Final

Focused Preliminary Assessment/Site Inspection Off-Base Surface Danger Zones

Marine Corps Base Camp Lejeune
Jacksonville, North Carolina

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Acronyms and Abbreviations

AGS	aerial geophysical survey
AP	armor piercing
ASR	Archives Search Report
ASTM	American Society of Testing and Materials
Battelle	Battelle Memorial Institute
BDU	bomb dummy unit
bgs	below ground surface
Bristol	Bristol Construction Services, LLC
BT	bomb target
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-term Environmental Action—Navy
cm	centimeter
COPC	constituent of potential concern
CSM	conceptual site model
DAS	Data Acquisition System
DGM	digital geophysical mapping
DO	dissolved oxygen
DOT	Department of Transportation
DQO	data quality objective
EcoSSL	Ecological Soil Screening Level
ERS	Ecological Risk Screening
ESV	ecological screening value
GP	general purpose
GPS	global positioning system
GSV	Geophysical System Verification
HE	high explosive
HEAT	high explosive anti-tank
HeliMag	helicopter magnetics
HEP	high explosive—plastic
HHRS	human health risk screening
HI	hazards index
HQ	hazard quotient
ICW	Intracoastal Waterway
ID	inner diameter
IDW	investigation-derived waste

IRIS	Integrated Risk Information System
ISO	Industry Standard Objects
JATO	jet assisted take off
lb	pound, pounds
LVT	landing vehicles tracked
µm	micron
µg/L	micrograms per liter
m	meter
MC	munitions constituents
MCAS	Marine Corps Air Station
MCB CamLej	Marine Corps Base Camp Lejeune
MCL	maximum contaminant level
MEC	munitions and explosives of concern
MG	machine gun
mg/kg	milligrams per kilogram
mm	millimeter
MMRP	Military Munitions Response Program
MPP	Master Project Plan
MPPEH	material potentially presenting an explosive hazard
MRA	Munitions Response Area
NAVFAC	Naval Facilities Engineering Command
NCDENR	North Carolina Department of Environment and Natural Resources
NCGWQS	North Carolina Groundwater Quality Standards
NC SSL	North Carolina Soil Screening Limit
NRWQC	National Recommended Water Quality Criteria
ORP	oxidation-reduction potential
PA	Preliminary Assessment
PETN	pentaerythritol tetranitrate
PPE	personal protective equipment
PRA	Preliminary Range Assessment
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RSL	regional screening level
RTK	real-time kinematic
SDZ	surface danger zone
SI	Site Inspection
SOP	standard operating procedure
ST	strafing target
TOC	total organic carbon
TOW	tube-launched optically-tracked wire-guided

TP	target practice
TP-T	target practice—tracer
UCL	upper confidence limit
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USMC	United States Marine Corps
UXO	unexploded ordnance
VOC	volatile organic compound
WAA	Wide Area Assessment
WP	white phosphorus
WQP	water quality parameter
WQS	water quality standards

SECTION 1

Introduction

This document presents the findings and conclusions for the Preliminary Assessment (PA)/ Site Inspection (SI) conducted within the Off-Base Surface Danger Zones (SDZs) located just north and east of the southeastern corner of 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**.

This PA/SI was conducted under the Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic, Comprehensive Long-term Environmental Action—Navy (CLEAN) Contract N62470-08-D-1000, Contract Task Order 080 in accordance with the *Site Specific Work Plan Addendum for Preliminary Assessment/Site Inspection Off-Base Surface Danger Zones* (CH2M HILL, 2009) (herein referred to as Work Plan), the *MCB Camp Lejeune Munitions Response Program Master Project Plans, Marine Corps Base Camp Lejeune, North Carolina* (herein referred to as the Military Munitions Response Program [MMRP] Master Project Plan [MPP]) (CH2M HILL, 2008a), and the *Master Project Plans, Marine Corps Base Camp Lejeune, Jacksonville, North Carolina* (herein referred to as the MPP) (CH2M HILL, 2008b). This report is intended for submittal to NAVFAC Mid-Atlantic, MCB CamLej, the United States Environmental Protection Agency (USEPA), and the North Carolina Department of Environment and Natural Resources (NCDENR).

1.1 Objectives and Approach

MCB CamLej conducted an investigation of its closed ranges that have encroached upon off-base property. Due to potential hazards associated with historical range activities within the Off-Base SDZs, an MMRP PA/SI was conducted at the Off-Base SDZs Munitions Response Area (MRA). The work was conducted following the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. The objective of the PA/SI is to evaluate potential presence or suggested absence of munitions and explosives of concern (MEC) and potential environmental impacts to environmental media that may have resulted from the former range activities. The specific tasks completed to meet the stated objective included:

- Identifying historical activities conducted within the MRA that may have impacted environmental media from MEC and/or munitions constituents (MC)
- Performing a Wide Area Assessment (WAA) using an aerial geophysical survey (AGS) to identify potential areas of concentrated munitions use
- Performing digital geophysical mapping (DGM) on the upland areas of the MRA to assess the number and density of geophysical anomalies that may indicate the potential presence of subsurface MEC
- Collecting groundwater, surface soil, and subsurface soil samples from the upland areas to evaluate potential impacts to the environment
- Collecting sediment, pore water, and surface water samples from the coastal wetlands area of the Off-Base SDZs MRA to evaluate potential impacts to the environment

- Assessing the ecological and human health risks posed by potential contaminants in environmental media within the MRA

1.2 Report Organization

The Focused PA/SI report includes the following sections:

- Section 1—Introduction
- Section 2—Site Background
- Section 3—Field Investigation Activities
- Section 4—Field Investigation Results
- Section 5— Human Health Risk Screening
- Section 6— Ecological Risk Screening
- Section 7— Conclusions and Recommendations
- Section 8— References

Figures and tables are provided at the end of each respective section and appendices are included after Section 8.

1.3 Stakeholder Involvement

Stakeholders for the investigation include affected property owners, regulators, local government, watermen (boaters, guides, recreational and professional fishermen), other local businesses, interested non-governmental organizations, and the general public. The primary objectives of stakeholder involvement included:

- Obtaining access agreements and/or right-of-entry permits from affected property owners, allowing United States Marine Corps (USMC)/Navy to conduct field surveys and investigative work on their properties
- Ensuring that appropriate information reached the correct audiences and was presented in a way that was concise, consistent, accessible, accurate, and easy to understand
- Providing for a two-way exchange of information with stakeholders during the investigation.

Outreach activities complied with the requirements of CERCLA and the Munitions Response Site Prioritization Protocol (32 Code of Federal Regulations [CFR] 179). Primary activities included:

- Conducting individual meetings with affected property owners, regulators, and local elected officials
- Developing fact sheets, press releases, and public notices
- Making information available in local libraries
- Developing a mailing list of interested persons
- Conducting a public information meeting on July 21, 2009

The public notice and fact sheet are provided in **Appendix A**.

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Legend

- Highways
- Off-Base SDZs MRA
- Installation Boundary

N

0 7,500 15,000 30,000 Feet

1 inch = 15,000 feet

Figure 1-1
Site Location Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

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SECTION 2

Site Background

2.1 MCB CamLej Location and Description

MCB CamLej encompasses approximately 236 square miles of land in Onslow County, North Carolina, adjacent to the southern boundary of the city of Jacksonville. MCB CamLej is bordered by the Atlantic Ocean to the east, U.S. Route 17 to the west and State Route 24 to the north. It is bisected by the New River, which flows into the Atlantic Ocean in a southeasterly direction (**Figure 1-1**).

2.2 Site Setting

The Off-Base SDZs MRA 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 Off-Base SDZs MRA is located between the Atlantic Ocean at Bear Inlet and the Intracoastal Waterway, and encompasses tidal channels, coastal wetlands, and uplands located just north and east of the southeastern corner of MCB CamLej (**Figure 2-1**).

The Off-Base SDZs MRA encompasses an area of approximately 1,632 acres comprised of roughly 173 acres of upland terrain (above mean high tide), and 1,459 acres of surface water and salt marsh. The majority of the upland area, approximately 127 acres, is located on the southern portion of Bear Island, which is part of Hammocks Beach State Park. The remainder of the upland area occurs as seven small hammocks (islands) along the Atlantic Intracoastal Waterway (ICW) (referred to in this Report as ICW Islands 1 through 7) and as small upland areas on Sanders Island. The ICW Islands receive dredge spoils from the maintenance of the Intracoastal Waterway. There are no residences or commercial buildings within the Off-Base SDZs MRA.

An engineered dredge management area is located on the western-most ICW Island (ICW-7). The center of ICW-7 contains a depression surrounded by sand berms that contain the dredged material. Following deposition of dredge spoils within this basin, water can drain into a dewatering pond with a corrugated metal pipe riser and outlet system. The outer slopes of the berms are reinforced with erosion control netting secured into the sand with metal staples approximately 6 inches in length.

Sanders Island consists of small uplands areas (less than 1 acre aggregate) surrounded by coastal wetlands and intertidal creeks located between Bear Island and the ICW Islands. Additionally, there are 59 acres of intertidal zone in the Bear Inlet vicinity between Bear Island and Sanders Island. The remainder of the Off-Base SDZs MRA is composed of estuarine salt marsh, tidal channels, and creeks.

The dominant land cover in the Off-Base SDZs MRA is extensive coastal salt marsh that has developed on intertidal sands situated inland of a system of barrier islands and at the

confluence with coastal rivers and higher-salinity waters from Onslow Bay and the Atlantic Ocean.

The topography of the Off-Base SDZs MRA generally consists of low-lying hammocks, with higher elevations occurring on Bear Island, which contains shifting sand dunes and sand ridges ranging up to 75 feet above sea level. **Figure 2-2** presents a three-dimensional depiction of the site.

Mild winters and hot humid summers generally characterize climatic conditions within southeastern North Carolina and at the Off-Base SDZs MRA. Winters are usually short and mild with occasional short, cold periods. Summers are long, hot and humid. Average annual precipitation in the area is approximately 50 inches. The average ambient air temperature is 62 degrees Fahrenheit (Weather Reports, 2010).

2.3 Site History

2.3.1 Overview

In July 2009, CH2M HILL completed a detailed historical review of information relating to past uses of the Off-Base SDZs MRA. The information obtained from this review is presented in **Appendix B**.

The Off-Base SDZs MRA shown on **Figure 2-3** consists of the following former ranges described in the *Range Identification and Preliminary Range Assessment* (PRA) (USACE, 2001a) and the Archive Search Report (ASR) (USACE, 2001b):

- Rocket Range Number 1 (ASR #2.33)
- Direct Fire Artillery Range (G-7) (ASR #2.61)
- G-6 Artillery Range (ASR #2.62), and
- Impact Area N-1 (ASR 2.207), which includes Bomb Target (BT)-3

The Off-Base SDZs MRA was used jointly by MCB CamLej for artillery and airborne strafing, and by Marine Corps Air Station (MCAS) Cherry Point for rocket firing and bombing.

The following sections present a summary of the available information pertaining to the four former ranges.

2.3.2 Rocket Range Number 1

Rocket Range Number 1 affected approximately 1,564 acres, the most acreage of any historic SDZ. This aviation range was used for rocket firing during the period 1945-1947 (USACE, 2001a).

According to the PRA, the following munitions may have been used at Rocket Range Number 1 (USACE, 2001a):

- 2.25-inch Aircraft Rocket, Sub-caliber
- 5-inch Aircraft Rocket, armor piercing (AP)
- 5-inch Aircraft Rocket, high explosive (HE)
- 5-inch Aircraft Rocket, high explosive anti-tank (HEAT)
- 5-inch Aircraft Rocket, white phosphorus (WP)
- 11.75-inch Aircraft Rocket, general purpose (GP)

2.3.3 G-7 Direct Fire Artillery Range

The Direct Fire Artillery Range was used from approximately 1945 to 2001 (USACE, 2001a). While an active firing range is still used at this firing location, the SDZs have been configured so as to remain within the bounds of MCB CamLej (Malcolm Pirnie, 2008). Camp Training Orders and Base Orders from 1946 to 1994 identified this area for various direct fire activities including, but not limited to, tanks, landing vehicles tracked (LVTs), field artillery, recoilless rifles, and machine guns. The following munitions may have been used at the G-7 range (USACE, 2001a):

- Small Arms (.50 Caliber, 5.56mm, 7.62mm)
- 25mm, Target Practice-Tracer (TP-T)
- 37mm: HE; and Shot
- 40mm: HE, Gun; and Grenade, Practice
- 57mm Recoilless Rifle: Target Practice (TP); HE; WP; and HEAT
- 75mm Howitzer: HE; and WP
- 75mm Gun: HE; AP; and WP
- 75mm Recoilless Rifle: HEAT; WP; HE; and high explosive-plastic (HEP)
- 76mm Gun: HE; HEAT; WP; and AP
- 90mm Recoilless Rifle: HE; and HEAT
- 90mm Gun: HE; AP; WP; and HEAT
- 105mm Howitzer: HE; Smoke; WP; Illumination; and HEAT
- 105mm Gun: HEAT; HE; WP; and TP
- 106mm Recoilless Rifle: HEAT
- 120mm Gun: HEAT; and TP
- 155mm Howitzer and Gun: HE; WP; and Illumination

2.3.4 G-6 Artillery Range

The PRA states that the G-6 Artillery Range was used from 1950 to 1960, and that various types of artillery were assumed to have been fired on this range (USACE, 2001a). According to the PRA, the following items may have been used at this range:

- 75mm Howitzer: HE, and WP
- 105mm Howitzer: HE, WP, and illumination
- 155mm Howitzer: HE, WP, and illumination

2.3.5 Impact Area N-1

Impact Area N-1 represents the main beach impact area from Brown's Inlet to Bear Inlet that has been utilized from World War II to the present day. Impact Area N-1 coincides with several historical ranges and danger zones including: Rocket Range Number 1, Strafing Target (ST)-2, BT-3/BT-5, G-6 Artillery Range, and G-7 Direct Fire Artillery Range.

Impact Area N-1 was used as an impact area for various artillery firing points and anti-tank activities. The ASR states that the impact area included historic bombing, strafing, and rocket targets that received various aerial rockets and bombs.

Aerial Machine Gun (MG) Ranges, (MG-1 to MG-3), were established in September 1945 over an area encompassing BT-5 and the whole of the Off-Base SDZs MRA (USACE, 2001c).

Training in the 1960s included the use of mortars, tank and anti-tank guns, rockets, and 106mm recoilless rifles.

According to the PRA, the following items may have been used at this range (USACE, 2001a):

- Rockets: 2.75-inch, 3.5-inch, 5-inch, and 11.75-inch
- Artillery: rockets, 37mm, 57mm, 90mm, 105mm
- Mortars: 60mm, 81mm, 4.2mm (all types)
- 75mm Cannon
- Recoilless Rifle (all types unless specified): 57mm, 75mm, 90mm, 105mm (HEP-T), 106mm
- AA (all types): 37mm, 40mm, 90mm, 120mm
- Tank Gun (all types): 90mm, 105mm (all types except toxics), 120mm
- 40mm Grenades
- Howitzer (all types except toxics): 75mm, 105mm, 8-inch, 155mm (Howitzer/Gun)
- Tube-launched optically-tracked wire-guided (TOW) Missile
- HE Bombs (old style): 100 pound (lb), 250 lb, 500 lb
- HE Bombs (low drag): 250 lb, 500 lb
- Practice Bombs

2.4 Previous Investigations

As part of the initial investigation to identify the extent of the Off-Base SDZs MRA, the potentially affected property owners were presented a 2008 report entitled *Verification of Property Affected by Off-Base SDZs* (Malcolm Pirnie, 2008).

2.5 Regional Geology and Hydrogeology

The MCB CamLej area 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 towards 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 was deposited over pre-Cretaceous crystalline basement rock. Within the MCB CamLej area, approximately 1,500 feet of a sedimentary sequence overlies the crystalline basement rock.

The sedimentary sequence of southeastern North Carolina 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. Inter-stream areas generally provide the recharge for aquifers within the Coastal Plain region, and have been estimated to have a yearly range of 5 to 21 inches of rainfall (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, 1989).

2.6 Site Geology and Hydrogeology

This section presents the geological and hydrogeological characteristics of the Off-Base SDZs MRA.

2.6.1 Site Geology

Sand dunes formed by aeolian and fluvial processes dominate the surficial geological setting. Large sand ridges are located on Bear Island, running generally parallel to the coastline and increasing in elevation away from the shoreline. The estuarine marsh areas are dynamic depositional environments. Tidal and wave action continually change the channels and inlet areas resulting in constantly changing sand bars and mud banks.

The shallow soils (0 to 15 feet below ground surface [bgs]) within upland areas generally consist of fine to medium grained sand. On Bear Island, the surface soils generally consisted of clean sands with little to no fines. On the ICW Islands/Sanders Island, surface soils were similar to the Bear Island samples, except with more fines. Most of the sediment consisted of fine sands with little to no fines. However, the sediment located in marsh areas and areas in Bear Creek north of the Intracoastal Waterway (as opposed to the areas around Bear Inlet) were composed of silts and clays.

2.6.2 Site Hydrogeology

The larger islands within the study area were found to contain lenses of fresh to brackish groundwater occurring under unconfined conditions, at depths ranging from 1 to 15 feet bgs. It is anticipated that the shallow groundwater would flow in a somewhat radial pattern from the upland areas and discharge to the surface water bodies that surround the islands.

2.6.3 Hydrology

Surface water was observed in ponds and swamps within the interior of Bear Island during the January 2010 sampling event. However, these areas were dry during the May 2010 sampling event, indicating these ephemeral surface water features are supplied and recharged by precipitation.

2.7 Regional Water Supply Usage

Regionally in southeastern North Carolina, the Castle Hayne aquifer may be utilized as a potable source of domestic water supply, for watering lawns, or for filling swimming pools. Potable water supplies for MCB CamLej and the surrounding residential areas are provided by water supply wells that pump groundwater from the Castle Hayne aquifer. Freshwater is present within the surficial, Castle Hayne, Beaufort, and Peedee aquifers, all of which are located below the Off-Base SDZs MRA (Cardinell, Berg, and Lloyd, 1993). According to the NCDENR Public Water Supply Well Section's Wellhead Protection Program Source Water Assessment Program website, no water supply wells are located within the MRA (NCDENR, 2007).

\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_2_1_OFF_BASE_SDZ_MRA.MXD



Legend

- Upland Area
- Camp Lejeune Installation Boundary
- Jurisdictional Wetlands
- Coastal Wetlands
- Off-Base SDZs

N

0 1,500 3,000 6,000 Feet

1 inch = 3,000 feet

Figure 2-1
Off-Base SDZs MRA
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

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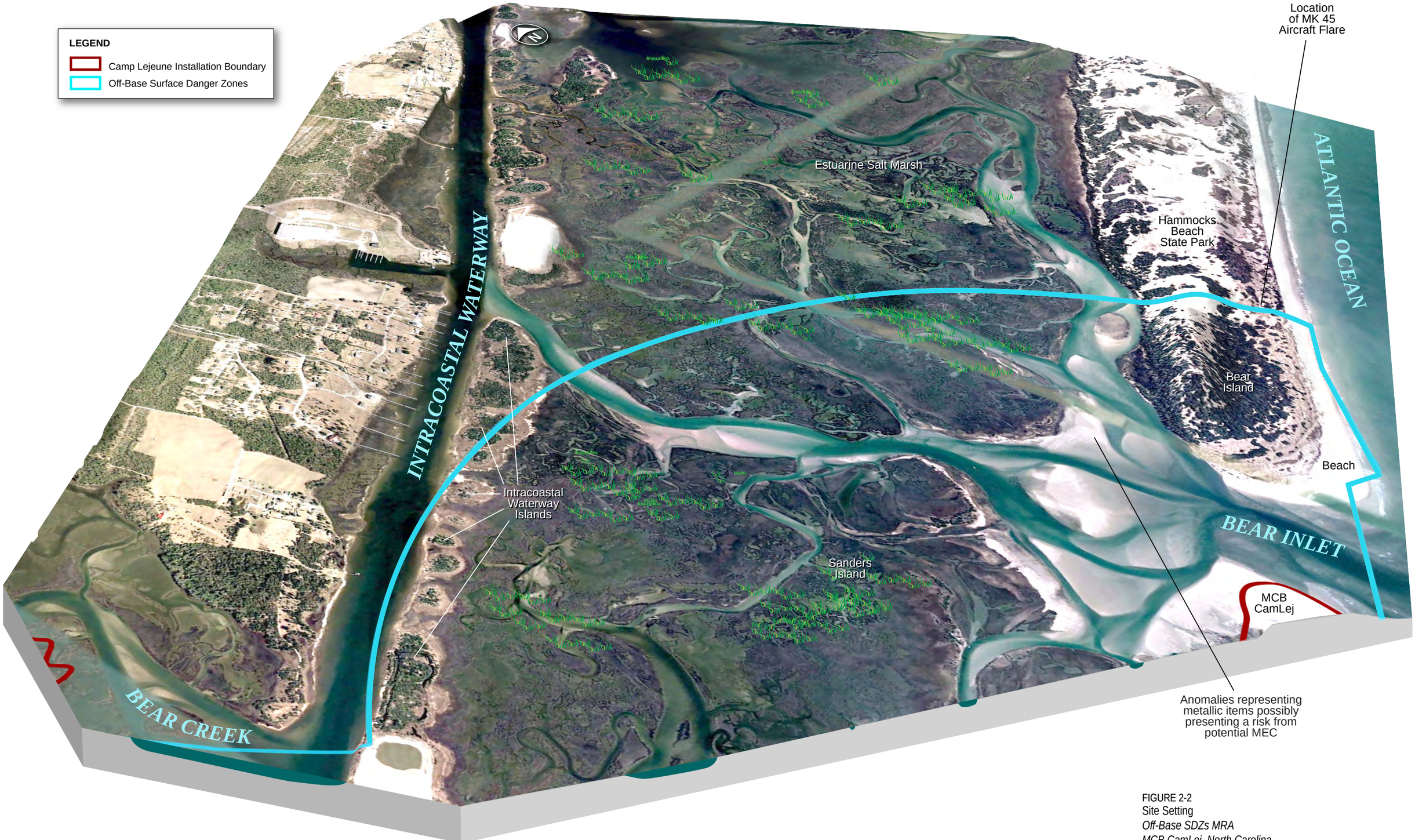


FIGURE 2-2
Site Setting
Off-Base SDZs MRA
MCB CamLej, North Carolina

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_2_3_HISTORIC_SDZ_RANGES.MXD



Legend

- Jurisdictional Wetlands
- Coastal Wetlands
- Installation Boundary
- Off-Base SDZs

N

0 1,500 3,000 6,000 Feet

1 inch = 3,000 feet

Figure 2-3
Historic SDZs
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

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SECTION 3

Field Investigation Activities

Field activities were conducted from January through May 2010 in accordance with standard operating procedures (SOPs) outlined in the Work Plan (CH2M HILL, 2009) and detailed in both the MMRP MPP (CH2M HILL, 2008a), and the MPP (CH2M HILL, 2008b). MEC avoidance was practiced during all sampling activities as described in the Work Plan (CH2M HILL, 2009).

Field investigation activities included:

- A WAA using an AGS over the entire MRA
- Terrestrial DGM in accessible areas
- MEC avoidance
- Collection of 86 surface soil samples and 73 subsurface soil samples
- Collection of 83 groundwater samples
- Collection of 30 sediment, 6 surface water, and 25 pore water samples

The field investigation activities are detailed below and reference the MMRP MPP throughout.

3.1 Site Preparation and Support

The following subsections describe the procedures associated with mobilization of personnel and equipment and preparation for AGS, DGM and environmental sampling activities.

3.1.1 MEC Avoidance

MEC avoidance was performed during all ground-based phases of the investigation. An Unexploded Ordnance (UXO) technician escorted field personnel while onsite, and cleared all locations where intrusive activities occurred (such as soil borings, surface soil sampling, and insertion of survey stakes). During the field work at the Off-Base SDZs MRA, one munitions related item was found. Management and disposition of this item is described in Section 3.1.2.

3.1.2 Controlled Detonations

On January 21, 2010 during UXO-technician escorted environmental sampling activities, a MK 45 Mod 0 Aircraft Flare was discovered on Bear Island, and its positive identification was subsequently verified by a second UXO technician the next day. The candle portion of the flare was still intact and unexpended, but the parachute had been deployed and was not present. Since the flare was discovered in a heavily vegetated area unsuitable for controlled, intentional demolition operations (**Figure 3-1**) and was deemed safe to move, the item was transferred approximately 75 yards east to a pre-constructed disposal pit for intentional detonation. The flare was guarded from time of discovery on January 21 until January 27, 2010 when the item was destroyed by controlled, intentional detonation. Additional detail

concerning the MEC item found and the intentional detonation operation is presented in **Appendix C**.

Pre- and post-detonation soil samples were collected from within and around the disposal pit. Explosives residues and perchlorate were not detected in either the pre- or post-detonation soil samples. Several metals were detected; however, the metal concentrations did not exceed both adjusted residential regional screening levels (RSLs) and site-specific background levels. The post-detonation sample contained increased levels of magnesium compared to the pre-detonation soil sample; the pyrotechnic filler in the flare was composed of magnesium (**Table 3-1**).

3.1.3 Vegetation Clearance

Due to the sensitive nature of the coastal environment, minimal vegetation clearance was conducted to allow access for DGM and environmental sampling. Vegetation clearance included cutting transects through dense vegetation on the ICW islands to allow for sampling and DGM activities. The vegetation clearance team cut approximately 4- to 5-foot wide transects through the islands. Vegetation was cut to within approximately 6 inches above the ground surface. Root systems were not disturbed. During the vegetation removal process, a UXO technician conducted MEC avoidance activities and scanned areas prior to vegetation removal.

3.1.4 Site Survey

Land surveying activities included placing survey stakes for fiducial positioning for the transect-based DGM investigation in transects through dense vegetation on the ICW islands. This involved placing survey stakes with accurately recorded positions at regular intervals along the transects. Marking the location of each stake in the DGM data stream allows the position of data points along the transect to be calculated during data processing.

3.2 Wide Area Assessment – Aerial Digital Geophysical Survey

The initial geophysical investigation involved WAA consisting of two AGS efforts which covered the entire Off-Base SDZs MRA. This phase of the investigation was used to identify potential areas of concentrated munitions use through the detection of large ferrous metallic items or clusters of ferrous metallic items. Aerial geophysical survey data quality is highly dependent on the vertical separation between the survey instruments and the land surface since the amplitude of the anomaly associated with an item falls off rapidly with the distance of the sensor from that item (the third power of the distance for magnetometer based systems and the sixth power for electromagnetic systems). This is mitigated somewhat by the fact that the noise on the helicopter-based sensors is often lower than vehicular sensors; however, detection probabilities fall off dramatically for items more than 2 to 3 meters (m) away from the sensors. Magnetometer surveys detect ferrous metallic items and do not differentiate metallic items associated with munitions related material from other manmade ferrous metallic objects such as boat anchors and crab pots.

Sky Research, Inc., under subcontract to CH2M HILL, conducted an AGS over 1,593 acres of the Off-Base SDZs MRA. Battelle Memorial Institute (Battelle), under subcontract to Bristol

Construction Services, LLC (Bristol), conducted an AGS over approximately 200 acres of Bear Island (**Figure 3-2**). Under direction of MCB CamLej, the Bear Island portion of the geophysical investigation was removed from the CH2M HILL scope of work of the investigation and contracted to Bristol. This change was made in an effort to accelerate the combined geophysical survey and intrusive investigation of the Bear Island portion of the MRA, and in an attempt to minimize disturbance of the users of Hammocks Beach State Park by combining the geophysical investigation and intrusive investigation of geophysical anomalies under a single contractor.

CH2M HILL was not involved in the AGS completed by Battelle and did not inspect the data to insure compliance with data quality objectives (DQO) established by either Battelle or CH2M HILL. Approximately 32 acres of the Off-Base SDZs could not be surveyed by CH2M HILL/Sky Research with the aerial method because vegetation and steep sand ridges prevented the helicopters from flying low enough to obtain data that would meet the CH2M HILL DQOs. Portions of the Battelle AGS were flown at elevations that would not satisfy the CH2M HILL DQOs, but it is unknown whether the DQOs established for Bear Island AGS were met.

3.2.1 Aerial Geophysical Mapping

The first AGS was conducted by Battelle from October 23, 2009 to November 1, 2009, and covered 200 acres of the western portion of Bear Island. The Battelle AGS involved the application of both an airborne vertical magnetic gradient system and a time-domain electromagnetic system, flown in separate surveys.

The VG-22 airborne magnetic data acquisition system consisted of 11 vertical gradiometers, each consisting of a pair of cesium magnetometers vertically offset 50 centimeters (cm) from one another. Seven gradient pods with 1 m horizontal separation were mounted in a forward boom and constituted the primary sensor array, providing high sensitivity and positional accuracy for detection of small targets or weak signals. Additionally, lateral booms with 1.7 m gradient pod spacing were used to supplement small gaps in the data coverage. Flight lines were spaced 6m apart and flown, where possible, 1 to 2 m above ground level at a speed of approximately 45 miles per hour. As noted above and described in Section 4, approximately two-thirds of the area surveyed by Battelle was flown at elevations above 3 m.

The TEM-8 airborne time-domain electromagnetic system was contained within a 3 m by 12 m rectangular boom structure with a two-lobed transmitter loop composed of two 3-m by 4-m rectangles. The system included four receivers on each side of the aircraft. The system functioned by establishing a current in the transmitter loop, then rapidly switching it off to induce a secondary magnetic field in the earth, the decay of which can be measured in the receiver coils. The central third of the boom structure directly under the helicopter remained inactive, making it necessary to interleave flight lines in order to achieve full coverage.

The data positioning and system orientation were based on a pair of real-time kinematic (RTK) global positioning (GPS) antennae mounted on the rear booms of the array. A laser altimeter mounted beneath the helicopter monitored sensor height above the ground or water surface. Details of the system are described in the Bear Island Aerial Survey Report (Battelle, 2010) found in **Appendix D**.

Battelle performed 100 percent coverage surveys over accessible areas over the western portion of Bear Island. Trees and vegetation as well as steep sand dune slopes prohibited the helicopter from collecting useful data in some areas. A total of 200 acres of survey data were collected (**Figure 3-2**). Approximately two-thirds of this data, however was surveyed at helicopter elevations above that which is commonly considered useful (3 m). The technology, data collection, processing, analysis, and quality control (QC) activities associated with the survey are described in detail in the Bear Island Aerial Survey Report (Battelle, 2010) found in **Appendix D**.

Sky Research conducted the second AGS from November 29, 2009 to December 8, 2009, using helicopter magnetics (HeliMag). The HeliMag platform was equipped with seven Geometrics G-822 cesium vapor magnetometers spaced 1.5 m apart, two Trimble MS750 RTK GPS receivers to provide positions and platform attitude, four altimeters for recording the altitude of the platform, and a Data Acquisition System (DAS) with integrated pilot guidance software displaying the platform position and altitude information relative to the pre-determined flight lines. Details of the system employed during this phase of the investigation are described in the Aerial Magnetometer Survey Work Plan (Sky Research, 2009).

Sky Research performed 100% coverage surveys over accessible areas. Trees and vegetation as well as steep sand dune slopes prohibited the helicopter from collecting useful data in some areas, and data from elevations greater than 3 m was discarded. Survey data were collected over a total of 1,593 acres at an average of 400 acres per survey day (**Figure 3-2**). Following completion of the AGS activities, the resultant data was processed and analyzed and potential targets identified, as described in **Appendix D**, the HeliMag Survey Report (Sky Research, 2009).

3.2.2 Geophysical System Validation and Quality Control

Sky Research established an Instrument Validation Survey test lane at Robert J Ellis Airport in Jacksonville, North Carolina to evaluate the system response prior to the commencement of data acquisition. The test lane was comprised of inert ordnance items and items that simulated ordnance. Precise ground truth location measurements, made with RTK GPS, were used to assess the performance of the system with respect to accuracy of detected target positions. The test lane was also flown at the beginning and end of each survey day (and after any sensor changes that were required during a day's survey activities) as a means of continually monitoring system performance. A stringent QC process (summarized in **Figure 3-3**), composed of daily tests summarized in **Table 3-2** and described in detail in **Appendix E**, was followed to document geophysical system performance throughout the survey. Additionally, blind QC seed items were placed throughout the survey area to demonstrate that project data quality objectives were being met throughout the survey.

A similar Geophysical Prove-Out test strip, composed of ten items, was utilized by Battelle for system verification during their AGS. Details of the QC process for these surveys can be found in the Bear Island Aerial Survey Report (Battelle, 2010).

3.3 Terrestrial Digital Geophysical Mapping

Following completion of the AGS, terrestrial DGM was conducted in portions of the 231 acres of upland areas and intertidal zones within the Off-Base SDZs. Terrestrial surveys were performed in representative areas of the dredge spoil islands and in areas throughout the site where land was exposed above water. This phase of investigation provided higher resolution data than the AGS to search for geophysical anomalies that represented potential subsurface MEC.

3.3.1 Digital Geophysical Mapping

The terrestrial DGM survey was conducted by NAEVA Geophysics, Inc. from April 6, 2010 through April 27, 2010, and encompassed a total of 27 acres. The areas covered by this phase of investigation included (**Figure 3-2**):

- Seven dredge spoil islands located on the southern bank of the ICW
- Several marshy areas on and adjacent to Sanders Island
- The western tip of Bear Island
- Sandbars within Bear Inlet

Although initially planned, DGM surveys on Bear Island were not conducted due to the decision of MCB CamLej to conduct analog "mag and dig" surveys without the additional steps of digital data mapping, processing, and anomaly identification in an attempt to minimize disturbance to the users of Hammocks Beach State Park on the island. The analog survey was conducted by Bristol and will be included as **Appendix F**. At the time of this report, Bristol's survey data and results were not available for discussion in this report.

Both comprehensive grid-based and transect-based DGM surveys were conducted over a total of 27 acres. Grid-based DGM provides comprehensive geophysical investigation of the area, whereas transect-based DGM surveys provide a sampling of geophysical data along transects spaced across the area. To maximize the collection of useful data in areas where vegetation cover and above-water time windows did not allow practical comprehensive DGM surveys, transect surveys were used to gather representative data. A comprehensive grid-based DGM survey was conducted over 10.5 acres and an additional 16.5 acres of transects were surveyed.

A full coverage grid survey was performed in the open sandy area on the western-most dredge spoil island (ICW-7 on **Figure 3-2**). Transect surveys were conducted on the ICW Islands since dense vegetation precluded using the comprehensive grid method. Additionally, accessible intertidal areas and sandbars in Bear Inlet were surveyed using the transect method.

DGM surveys were conducted using a Geonics EM61-MK2 time domain electromagnetic metal detector designed to detect, with high spatial resolution, shallow ferrous and non-ferrous metallic objects. A Trimble R8 Global Navigation Satellite System RTK GPS base station and rover were used for the real-time acquisition of positional data during geophysical data collection in the areas with no overhead canopy. Transects through the wooded areas of the ICW islands were cleared of ground cover vegetation and, because the tree canopy precluded the use of global positioning system (GPS), fiducial positioning methods were used to position the DGM data.

The terrestrial DGM activities are documented in the *Geophysical Investigation Report, Preliminary Assessment/Site Inspection, Marine Corps Base (MCB) Camp Lejeune, North Carolina* (NAEVA, 2010), provided in **Appendix E**.

3.3.2 Geophysical System Verification and Quality Control

The functionality of the geophysical system was evaluated through the Geophysical System Verification (GSV) process. The GSV evaluates sensor performance through comparison of system response to Industry Standard Objects (ISOs) to established response curves for those items. The GSV process is designed to perform initial verification of the DGM system using an Instrument Verification Strip followed by a blind-seeding program for continued verification throughout the field operations.

Additional QC tests were conducted throughout the project. The QC process is illustrated in **Figure 3-3**, and QC tests and acceptance criteria are summarized in **Table 3-2**. QC details and records are included in **Appendix E**, the Geophysical Investigation Report (NAEVA, 2010). Tests were conducted prior to and after all data collection sessions.

3.4 Bear Island Intrusive Investigation

Following the AGS conducted by Battelle in November 2010, Bristol conducted an intrusive investigation of approximately 200 acres of Bear Island as an immediate action to minimize any potential for the public to come into contact with MEC/material potentially presenting an explosive hazard (MPPEH). Bristol investigated each terrestrial AGS anomaly and a portion of the shallow underwater/intertidal zone anomalies by hand-digging. In addition, Bristol utilized an analog magnetometer to identify additional items that were not detectable by the AGS.

The report from this investigation is included in **Appendix F**.

3.5 Environmental Investigation Activities

Environmental investigation activities were conducted in three phases, beginning in January 2010 and ending in May 2010, as summarized below:

- January 25 through February 1, 2010 – surface and subsurface soil and groundwater samples collected on Bear Island
- March 22 through March 26, 2010 - surface and subsurface soil and groundwater samples collected on the ICW islands and Sanders Island
- May 3 through May 10, 2010 - sediment, surface water, and pore water samples collected

The field sampling activities were performed in accordance with the SOPs outlined in the Work Plan (CH2M HILL, 2009) and detailed in both the MMRP MPP (CH2M HILL, 2008a), and the MPP (CH2M HILL, 2008b). MEC avoidance was practiced during all intrusive sampling activities as described in the Work Plan (CH2M HILL, 2009).

Surface soil, subsurface soil, surface water, and groundwater sampling locations were proportionally distributed throughout the upland areas and intertidal zones. Sediment and

pore water sample locations were biased toward areas reported to contain high densities of geophysical anomalies.

A summary of the environmental samples collected and analytical methods used is provided in **Table 3-3**. Detailed investigation activities are summarized below.

3.5.1 Surface Soil Sampling

Surface soil samples were collected using the TR-02-1 sampling method as summarized below and described in the United States Army Corps of Engineers (USACE) Technical Report ERDC/CRREL TR-02-1, *Guide for Characterization of Sites Contaminated with Energetic Materials* (Thiboutot, Ampleman, and Hewitt, 2002).

Each surface soil sample consisted of a composite of at least 30 aliquots of soil collected from 0 to 0.5 feet bgs from random locations within an area of 1 m × 1 m. The soil aliquots were collected using a decontaminated trowel. Sample aliquots were homogenized in a decontaminated stainless steel bowl following the *Homogenization of Soil and Sediment Samples* SOP in Appendix C of the MMRP MPP (CH2M HILL, 2008a). Following homogenization, the soil was transferred to the appropriate sample containers, placed on ice, and shipped under chain of custody via courier to CompuChem of Cary, North Carolina, for analysis.

A total of 86 surface soil samples were collected (75 from inside the Off-Base SDZs MRA and 11 from background locations outside the MRA) as shown on **Figure 3-4**. Surface soil samples were analyzed for the following parameters:

- Total metals (SW846 USEPA Methods 6010B and 7471A)
- Explosives residues (nitroaromatics and nitramines), including pentaerythritol tetranitrate (PETN) and nitroglycerin, (SW846/8330 and SW846/8332)
- Perchlorate (SW846 USEPA Method 6850)

To provide supplemental information for Ecological Risk Screening (ERS) purposes, surface soil samples from ten locations evenly distributed across the study area were also analyzed for the following parameters:

- Grain-size analysis (American Society of Testing and Materials [ASTM] Method D-422)
- Total organic carbon (TOC) by Lloyd Kahn method
- Soil pH (using a direct-read field pH meter)

3.5.2 Subsurface Soil Sampling

Each subsurface sample location was co-located with a surface soil sample location. All subsurface soil samples were collected above the water table. Therefore, at surface soil sample locations where groundwater was present at less than 1 foot bgs, a corresponding subsurface soil sample was not collected.

A decontaminated stainless steel hand auger was used to collect subsurface soil samples in accordance with the MPP (CH2M HILL, 2008b). The samples were transferred to the appropriate sample containers, placed on ice, and shipped under chain of custody via courier to CompuChem of Cary, North Carolina for analysis.

A total of 73 subsurface soil samples were collected (65 from inside the MRA and eight from background locations) as shown on **Figure 3-5**. Subsurface samples were analyzed for the following parameters:

- Total metals (SW846 USEPA Methods 6010B and 7471A)
- Explosives residues (nitroaromatics and nitramines), including PETN and nitroglycerin, (SW846/8330 and SW846/8332)
- Perchlorate (SW846 USEPA Method 6850)

3.5.3 Groundwater Sampling

Each groundwater sampling location was co-located with a surface and subsurface soil sample location (if collected). Groundwater samples were not collected at BI-GW18, BI-GW19, or BI-GW37 because water could not be reached by hand auger due to collapse of the borings above the water table.

A decontaminated stainless steel hand auger was used to advance the borehole to a depth 3 to 4 feet below the water table. Once the borehole reached the required depth, a length of 2-inch inner diameter (ID) polyvinyl chloride (PVC) casing and 5 feet of 0.010-inch machine slotted PVC well screen was placed into the borehole.

Prior to sample collection, at least one casing volume of water was evacuated to remove suspended solids that had entered the screen. Groundwater samples were collected from each sampling location using low-flow purge techniques in general accordance with the *Low-Flow Groundwater Sampling from Monitoring Wells* SOP in Appendix C of the MMRP MPP (CH2M HILL, 2008a). Water quality parameters (WQPs), including pH, specific conductance, temperature, dissolved oxygen (DO), oxidation-reduction potential (ORP), salinity, and turbidity were measured frequently using a water quality meter and recorded in the field logbook.

The final groundwater quality readings for pH, specific conductance, temperature, DO, ORP, salinity and turbidity are shown in **Table 3-4.**

Parameters were considered stabilized when three successive readings were as follows:

- pH within 0.1 pH unit
- Temperature within 10 percent
- Conductivity within 3 percent
- Turbidity varied by no more than 10 percent or had stabilized as low as practicable

Samples were collected once the WQPs stabilized. If the WQPs did not stabilize, at least three volumes were purged prior to sampling. If purging resulted in the sample location going dry, the sampling point was allowed to recharge and then the sample was collected. After placing the groundwater samples into the appropriate containers, the samples were placed on ice, and shipped under chain of custody via courier to CompuChem of Cary, North Carolina, for analysis.

A total of 83 groundwater samples were collected (72 from inside the MRA and 11 from background locations) as shown on **Figure 3-6**. Groundwater samples were analyzed for the following parameters:

- Total metals (SW846 USEPA Methods 6010B and 7470A)
- Explosives residues (nitroaromatics and nitramines), including PETN and nitroglycerin, (SW846/8330 and SW846/8332)
- Perchlorate (SW846 USEPA Method 6850)

At ten locations, the groundwater samples were field filtered with a 0.45 micron (μm) membrane filter and analyzed for dissolved metals by SW846/6010B and SW846/7470A) in order to provide supplemental information for the ERS.

3.5.4 Sediment Sampling

A decontaminated stainless steel hand auger was used to collect sediment samples from a depth of 0 to 0.5 feet below the surface water/sediment interface, in accordance with the *Sediment Sampling* SOP in Appendix C of the MMRP MPP (CH2M HILL, 2008a. The sediment samples were placed in the appropriate sample containers, placed on ice, and shipped under chain-of-custody via courier to CompuChem of Cary, North Carolina, for analysis.

A total of 30 sediment samples were collected (27 from inside the MRA and three from background locations) as shown on **Figure 3-7**. Sediment samples were analyzed for the following parameters:

- Total metals (SW846 USEPA methods 6010B/ 7471A)
- Explosives residues (nitroaromatics and nitramines), including PETN and nitroglycerin, (SW846/8330 and SW846/8332)
- Perchlorate (SW846 USEPA method 6850)

At nine locations, the samples were also analyzed for the following parameters in order to provide supplemental information for the ERS:

- Grain-size analysis (ASTM Method D-422)
- TOC (Lloyd Kahn)

3.5.5 Pore Water Sampling

Pore water sampling locations were co-located with the sediment sampling locations. Each sample was collected using the well point method. Well points were constructed using 2-inch diameter PVC piping with a 1-foot length of 0.010-inch machine slotted screen. A pointed well cap was attached to the bottom of the screen. The screen was then driven into the sediment such that the top of screen was several inches below the surface water/ sediment interface. In order to reduce turbidity, a one foot long, pre-packed 1-inch ID PVC screen attached to 1-inch riser was then inserted inside the 2-inch ID PVC well point. New, clean, disposable tubing was then inserted inside the 1-inch ID PVC pipe and connected to a peristaltic pump. The well point was then purged and sampled using the low-flow purging/sampling methods described in **Section 3.4.3**. Pore water samples could not be

collected from five proposed sampling locations, (SDZ-SD01, SDZ-SD04, SDZ-SD05, SDZ-SD08, and SDZ-SD09) due to the presence of very fine grained soils and limited recharge.

After transferring the pore water samples to the appropriate containers, the containers were placed on ice, and shipped under chain-of-custody via courier to CompuChem of Cary, North Carolina, for analysis.

A total of 25 pore water samples were collected (22 from inside the MRA and three from background locations) as shown on **Figure 3-8**. Pore water samples were analyzed for the following parameters:

- Total metals (SW846 USEPA Methods 6010B 7470A)
- Dissolved metals (field filtered with a 0.45 µm membrane filter ; SW846 USEPA Methods 6010B and 6020)
- Explosives residues (nitroaromatics and nitramines), including PETN and nitroglycerin, (SW846/8330 and SW846/8332)
- Perchlorate (SW846 USEPA Method 6850)

3.5.6 Surface Water Sampling

Surface water samples were collected from six locations (five within Off-Base SDZs MRA and one background location) as shown in F**igure 3-8.** The samples were collected in accordance with the *Surface Water Sampling* SOP in Appendix C of the MMRP MPP (CH2M HILL, 2008a).

The sample intended for the analysis of dissolved metals was collected using a peristaltic pump with new disposable tubing and an in-line 0.45 µm membrane filter. The samples were then placed on ice, and shipped under chain of custody via courier to CompuChem of Cary, North Carolina for analysis. Surface water samples were analyzed for the following parameters:

- Total metals (SW846 USEPA Methods 6010B /7470A)
- Dissolved metals (field filtered with a 0.45 µm membrane filter; SW846 USEPA Methods 6010B and 7470A)
- Explosives residues (nitroaromatics and nitramines), including PETN and nitroglycerin, (SW846/8330 and SW846/8332)
- Perchlorate (SW846 USEPA Method 6850)

3.5.7 Background Samples

Background samples were collected for every media from areas outside the Off-Base SDZs MRA boundary (**Figures 3-4 through 3-8**). Background samples were collected from nearby areas located outside the boundary of the Off-Base SDZs. The background sample locations were selected from similar geomorphological areas as the field characterization samples (such as on Bear Island outside the SDZ or on an un-owned island along the Intracoastal Waterway outside the SDZ). These background sample locations represent areas unaffected by potential munitions activity inside the SDZs.

3.5.8 Quality Assurance/Quality Control Sampling

Quality assurance (QA)/QC samples were collected during the investigation and submitted for laboratory analysis. Field QA/QC samples included field blanks, equipment blanks, duplicate samples, matrix spike and matrix spike duplicate samples. QA/QC requirements for environmental sampling, handling, and management are detailed in Section 3.18 of the MPP (CH2M HILL, 2008b). QA/QC samples were collected in the same type of bottleware used for all aqueous samples during this investigation. QC samples were collected at the following rates.

- One matrix spike/matrix spike duplicate per 20 samples collected
- One duplicate per 10 samples collected
- One equipment blank per day for soil sampling equipment
- One equipment blank per roll of tubing using to collect pore water and groundwater samples
- One field blank per week

3.6 Data Tracking and Validation

Field samples and their corresponding analytical tests were recorded on chain-of-custody forms, which were submitted with the samples to the laboratory. Chain-of-custody entries were checked against the Work Plan (CH2M HILL, 2009) to verify all designated samples were collected and submitted for the appropriate analyses. Upon receipt of the samples by the laboratories, a comparison to the field information was made to verify that each sample was analyzed for the correct parameters. In addition, a check was made to ensure that the proper number and types of QA/QC samples were collected. Analytical data reports, in hard copy and electronic format, were submitted for third-party validation using the *National Functional Guidelines for Superfund for Organic Methods Data Review* (USEPA, 2008), and *National Functional Guidelines for Inorganic Data Review* (USEPA, 2004). The electronic data was uploaded into a CH2M HILL database. These steps (third-party validation and electronic data handling) serve to reduce inherent uncertainties associated with data authenticity and usability.

3.7 Investigation-derived Waste Management

Investigation-derived waste (IDW) generated during the field sampling activities was managed in accordance with Section 3.17 of the MPP (CH2M HILL, 2008b). IDW included decontamination fluids and was placed in a Department of Transportation (DOT)-approved 55-gallon drum, labeled, and staged for disposal. Samples were collected from the drummed IDW for characterization purposes. Used personal protective equipment (PPE) and trash were placed into opaque garbage bags and placed in an MCB CamLej dumpster.

The IDW drum was removed and transported offsite for disposal on July 26, 2010. The waste manifest is included in **Appendix H**.

TABLE 3-1

Pre- and Post-Detonation Soil Analytical Results

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Station ID	Site Specific Background SS 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May, 2010)	Adjusted Residential Soil RSLs (May, 2010)	BI-SO58	BI-SO60
Sample ID					BI-SS58-10A	BI-SS60-10A
Sample Date					01/26/10	01/27/10
Chemical Name						
Explosives (µg/kg)						
No Detections					NA	NA
Total Metals (mg/kg)						
Aluminum	2,040	--	99,000	7,700	322	358
Antimony	1.31	--	41	3.1	1 U	0.46 J
Arsenic	1.432	5.8	1.6	0.39	1 U	0.41 J
Barium	16.7	580	19,000	1,500	1.7 J	1.9 J
Beryllium	--	--	200	16	0.51 U	0.51 U
Cadmium	0.53	3	80	7	0.51 U	0.51 U
Calcium	9,580	--	--	--	739	1,580
Chromium	12.22	3.8	5.6	0.29	3.7	4.4
Cobalt	0.606	--	30	2.3	0.51 U	0.13 J
Copper	1.594	700	4,100	310	0.23 J	0.86
Iron	3,120	150	72,000	5,500	713	693
Lead	6.1	270	800	400	2.6 J	1.7 J
Magnesium	1,412	--	--	--	512 U	4,500 J
Manganese	27.6	65	2,300	180	5.6	5.8
Mercury	0.0764	1	31	2.3	0.034 U	0.034 U
Nickel	1.77	130	2,000	150	4.1 U	0.36 J
Potassium	592	--	--	--	512 U	511 U
Vanadium	6.38	--	520	39	2 U	2 U
Zinc	11.7	1,200	31,000	2,300	4.2 J	24.6

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Notes:

Shading indicates exceedance of two times the site specific base background concentration for surface 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

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

TABLE 3-2
Geophysical Instrument Standardization Tests and Acceptance Criteria

Test	Test Description	Acceptance Criteria	Power On	Beginning of Day	Beginning and End of Day	1st Time Instr. Used	2% of Total Area Surveyed
1	Equipment Warm-up	Equipment specific (typically 5 min)	X				
2	Record Sensor Positions	10 cm		X			
3	Personnel Test	Based on instrument used. Personnel, clothing, etc. should have <2mv (EM61-MK2 channel 3) or 2nT on instrument response.		X			
4	Vibration Test (Cable Shake)	Data profile does not exhibit data spikes (<2mv [EM61-MK2 channel 3] or 2nT)		X			
5	Static Background & Static Spike	+/- 20% of standard item response, after background correction			X		
6	Repeat Data	Qualitative repeatability of response amplitude					X
7	Azimuthal Test *	Sensor orientation that minimizes drop-outs				X	
8	Height Optimization *	Maximum S/N ratio that reliably detects smallest target objective				X	
9	Octant Test (Heading Error Test) *	Document heading error for post-processing correction				X	

Magnetometer Only
S/N = Signal to Noise

TABLE 3-3

Summary of Samples and Analyses

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Station ID	Sample ID	Total Metals 6010B	Total Dissolved Metals 6010B	Explosives 8330	PETN and Nitroglycern 8332	Perchlorate 6850	Grainsize D422	TOC Lloyd Kahn	Sample Date	Sample Type
Bear Island Inside SDZ Surface Soil										
BI-GW01/SO01	BI-SS01-10A	X		X	X	X			1/28/2010	N
	BI-SS01D-10A	X		X	X	X			1/28/2010	FD
BI-GW02/SO02	BI-SS02-10A	X		X	X	X			1/26/2010	N
BI-GW03/SO03	BI-SS03-10A	X		X	X	X	X		1/28/2010	N
BI-GW04/SO04	BI-SS04-10A	X		X	X	X			1/28/2010	N
BI-GW05/SO05	BI-SS05-10A	X		X	X	X			1/29/2010	N
BI-GW06/SO06	BI-SS06-10A	X		X	X	X			1/29/2010	N
BI-GW07/SO07	BI-SS07-10A	X		X	X	X			1/29/2010	N
BI-GW08/SO08	BI-SS08-10A	X		X	X	X			1/29/2010	N
BI-GW09/SO09	BI-SS09-10A	X		X	X	X			1/31/2010	N
BI-GW10/SO10	BI-SS10-10A	X		X	X	X			1/31/2010	N
BI-GW11/SO11	BI-SS11-10A	X		X	X	X	X		1/31/2010	N
BI-GW12/SO12	BI-SS12-10A	X		X	X	X			1/31/2010	N
BI-GW13/SO13	BI-SS13-10A	X		X	X	X			1/31/2010	N
BI-GW14/SO14	BI-SS14-10A	X		X	X	X			1/27/2010	N
BI-GW15/SO15	BI-SS15-10A	X		X	X	X			1/31/2010	N
	BI-SS15-10A-MS	X		X	X	X			1/31/2010	MS
	BI-SS15-10A-SD	X		X	X	X			1/31/2010	SD
BI-GW16/SO16	BI-SS16-10A	X		X	X	X			1/31/2010	N
	BI-SS16-10A-MS	X		X	X	X			1/31/2010	MS
	BI-SS16-10A-SD	X		X	X	X			1/31/2010	SD
BI-GW17/SO17	BI-SS17-10A	X		X	X	X			1/26/2010	N
BI-SO18	BI-SS18-10A	X		X	X	X			1/26/2010	N
BI-GW19/SO19	BI-SS19-10A	X		X	X	X			1/26/2010	N
	BI-SS19D-10A	X		X	X	X			1/26/2010	FD
BI-GW20/SO20	BI-SS20-10A	X		X	X	X	X		2/1/2010	N
BI-GW21/SO21	BI-SS21-10A	X		X	X	X			2/1/2010	N
BI-GW22/SO22	BI-SS22-10A	X		X	X	X			1/26/2010	N
BI-GW23/SO23	BI-SS23-10A	X		X	X	X			1/28/2010	N
BI-GW24/SO24	BI-SS24-10A	X		X	X	X			1/28/2010	N
BI-GW25/SO25	BI-SS25-10A	X		X	X	X			1/28/2010	N
BI-GW26/SO26	BI-SS26-10A	X		X	X	X			1/28/2010	N
	BI-SS26D-10A	X		X	X	X			1/28/2010	FD
BI-GW27/SO27	BI-SS27-10A	X		X	X	X			1/28/2010	N
BI-GW28/SO28	BI-SS28-10A	X		X	X	X			1/29/2010	N
BI-GW29/SO29	BI-SS29-10A	X		X	X	X			1/29/2010	N
BI-GW30/SO30	BI-SS30-10A	X		X	X	X	X		1/29/2010	N
BI-GW31/SO31	BI-SS31-10A	X		X	X	X			1/31/2019	N
BI-GW32/SO32	BI-SS32-10A	X		X	X	X			1/31/2019	N

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MCB CamLej, North Carolina

Station ID	Sample ID	Total Metals 6010B	Total Dissolved Metals 6010B	Explosives 8330	PETN and Nitroglycern 8332	Perchlorate 6850	Grainsize D422	TOC Lloyd Kahn	Sample Date	Sample Type
BI-GW33/SO33	BI-SS33-10A	X		X	X	X			1/31/2019	N
BI-GW34/SO34	BI-SS34-10A	X		X	X	X			1/27/2010	N
BI-GW35/SO35	BI-SS35-10A	X		X	X	X			1/26/2010	N
	BI-SS35D-10A	X		X	X	X			1/26/2010	FD
BI-GW36/SO36	BI-SS36-10A	X		X	X	X			1/26/2010	N
BI-GW37/SO37	BI-SS37-10A	X		X	X	X			1/26/2010	N
BI-GW38/SO38	BI-SS38-10A	X		X	X	X			1/26/2010	N
BI-GW39/SO39	BI-SS39-10A	X		X	X	X			1/26/2010	N
BI-GW40/SO40	BI-SS40-10A	X		X	X	X			2/1/2010	N
BI-GW41/SO41	BI-SS41-10A	X		X	X	X	X		2/1/2010	N
BI-GW42/SO42	BI-SS42-10A	X		X	X	X			1/28/2010	N
BI-GW43/SO43	BI-SS43-10A	X		X	X	X			1/28/2010	N
BI-GW44/SO44	BI-SS44-10A	X		X	X	X			1/29/2010	N
BI-GW45/SO45	BI-SS45-10A	X		X	X	X	X		1/27/2010	N
BI-GW46/SO46	BI-SS46-10A	X		X	X	X			1/27/2010	N
BI-GW47/SO47	BI-SS47-10A	X		X	X	X			2/1/2010	N
	BI-SS47D-10A	X		X	X	X			2/1/2010	FD
BI-GW48/SO48	BI-SS48-10A	X		X	X	X			2/1/2010	N
BI-GW49/SO49	BI-SS49-10A	X		X	X	X			1/28/2010	N
BI-GW59/SO59	BI-SS59-10A	X		X	X	X			2/1/2010	N
Bear Island Outside SDZ Surface Soil (Background)										
BIBG-GW50/SO50	BI-SS50-10A	X		X	X	X			1/27/2010	N
BIBG-GW51/SO51	BI-SS51-10A	X		X	X	X			1/27/2010	N
BIBG-GW52/SO52	BI-SS52-10A	X		X	X	X			1/27/2010	N
BIBG-GW53/SO53	BI-SS53-10A	X		X	X	X			1/27/2010	N
BIBG-GW54/SO54	BI-SS54-10A	X		X	X	X			1/27/2010	N
	BI-SS54D-10A	X		X	X	X			1/27/2010	FD
BIBG-GW55/SO55	BI-SS55-10A	X		X	X	X			1/27/2010	N
BIBG-GW56/SO56	BI-SS56-10A	X		X	X	X	X		1/25/2010	N
	BI-SS56-10A-MS	X		X	X	X			1/25/2010	MS
	BI-SS56-10A-SD	X		X	X	X			1/25/2010	SD
BIBG-GW57/SO57	BI-SS57-10A	X		X	X	X			1/31/2010	N
Bear Island Pre- and Post-Detonation Soil										
BI-SO58	BI-SS58-10A	X		X	X	X			1/26/2010	N
BI-SO60	BI-SS60-10A	X		X	X	X			1/27/2010	N
Bear Island Inside SDZ Subsurface Soil										
BI-GW01/SO01	BI-IS01-4-5-10A	X		X	X	X			1/28/2010	N
BI-GW02/SO02	BI-IS02-8-9-10A	X		X	X	X			1/26/2010	N
	BI-IS02D-8-9-10A	X		X	X	X			1/26/2010	FD

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MCB CamLej, North Carolina

Station ID	Sample ID	Total Metals 6010B	Total Dissolved Metals 6010B	Explosives 8330	PETN and Nitroglycern 8332	Perchlorate 6850	Grainsize D422	TOC Lloyd Kahn	Sample Date	Sample Type
BI-GW03/SO03	BI-IS03-6-7-10A	X		X	X	X			1/28/2010	N
BI-GW04/SO04	BI-IS04-3-4-10A	X		X	X	X			1/28/2010	N
BI-GW05/SO05	BI-IS05-5-6-10A	X		X	X	X			1/29/2010	N
BI-GW06/SO06	BI-IS06-2-3-10A	X		X	X	X			1/29/2010	N
BI-GW07/SO07	BI-IS07-4-5-10A	X		X	X	X			1/29/2010	N
BI-GW08/SO08	BI-IS08-3-4-10A	X		X	X	X			1/29/2010	N
BI-GW09/SO09	BI-IS09-1-2-10A	X		X	X	X			1/31/2010	N
BI-GW10/SO10	BI-IS10-1-2-10A	X		X	X	X			1/31/2010	N
BI-GW11/SO11	BI-IS11-3-4-10A	X		X	X	X			1/31/2010	N
BI-GW12/SO12	BI-IS12-1-2-10A	X		X	X	X			1/31/2010	N
BI-GW13/SO13	BI-IS13-0-1-10A	X		X	X	X			1/31/2010	N
BI-GW14/SO14	BI-IS14-4-5-10A	X		X	X	X			1/27/2010	N
BI-GW15/SO15	BI-IS15-6-7-10A	X		X	X	X			1/31/2010	N
	BI-IS15-6-7-10A-MS	X		X	X	X			1/31/2010	MS
	BI-IS15-6-7-10A-SD	X		X	X	X			1/31/2010	SD
BI-GW16/SO16	BI-IS16-3-4-10A	X		X	X	X			1/31/2010	N
	BI-IS16-3-4-10A-MS	X		X	X	X			1/31/2010	MS
	BI-IS16-3-4-10A-SD	X		X	X	X			1/31/2010	SD
BI-GW17/SO17	BI-IS17-6-7-10A	X		X	X	X			1/26/2010	N
BI-SO18	BI-IS18-16-17-10A	X		X	X	X			1/26/2010	N
BI-GW19/SO19	BI-IS19-14-15-10A	X		X	X	X			1/26/2010	N
BI-GW20/SO20	BI-IS20-8-9-10A	X		X	X	X			2/1/2010	N
BI-GW21/SO21	BI-IS21-17-18-10A	X		X	X	X			2/1/2010	N
	BI-IS21D-17-18-10A	X		X	X	X			2/1/2010	FD
BI-GW22/SO22	BI-IS22-12-13-10A	X		X	X	X			1/26/2010	N
BI-GW23/SO23	BI-IS23-10-11-10A	X		X	X	X			1/28/2010	N
BI-GW24/SO24	BI-IS24-3-4-10A	X		X	X	X			1/28/2010	N
BI-GW25/SO25	BI-IS25-2-3-10A	X		X	X	X			1/28/2010	N
BI-GW26/SO26	BI-IS26-0-0.5-10A	X		X	X	X			1/28/2010	N
BI-GW27/SO27	BI-IS27-1-2-10A	X		X	X	X			1/28/2010	N
	BI-IS27D-1-2-10A	X		X	X	X			1/28/2010	FD
BI-GW28/SO28	BI-IS28-1-2-10A	X		X	X	X			1/29/2010	N
BI-GW29/SO29	BI-IS29-1-2-10A	X		X	X	X			1/29/2010	N
BI-GW30/SO30	BI-IS30-2-3-10A	X		X	X	X			1/29/2010	N
BI-GW31/SO31	BI-IS31-1-2-10A	X		X	X	X			1/31/2019	N
BI-GW32/SO32	BI-IS32-0-1-10A	X		X	X	X			1/31/2019	N
BI-GW33/SO33	BI-IS33-5-6-10A	X		X	X	X			1/31/2019	N
BI-GW34/SO34	BI-IS34-2-3-10A	X		X	X	X			1/27/2010	N
BI-GW35/SO35	BI-IS35-1-2-10A	X		X	X	X			1/26/2010	N
BI-GW36/SO36	BI-IS36-2-3-10A	X		X	X	X			1/26/2010	N

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MCB CamLej, North Carolina

Station ID	Sample ID	Total Metals 6010B	Total Dissolved Metals 6010B	Explosives 8330	PETN and Nitroglycern 8332	Perchlorate 6850	Grainsize D422	TOC Lloyd Kahn	Sample Date	Sample Type
BI-GW36/SO36	BI-IS36D-2-3-10A	X		X	X	X			1/26/2010	FD
BI-GW37/SO37	BI-IS37-10-11-10A	X		X	X	X			1/26/2010	N
BI-GW38/SO38	BI-IS38-14-15-10A	X		X	X	X			1/26/2010	N
BI-GW39/SO39	BI-IS39-1-2-10A	X		X	X	X			1/26/2010	N
BI-GW40/SO40	BI-IS40-7-8-10A	X		X	X	X			2/1/2010	N
BI-GW41/SO41	BI-IS41-3-4-10A	X		X	X	X			2/1/2010	N
BI-GW42/SO42	BI-IS42-7-8-10A	X		X	X	X			1/28/2010	N
BI-GW43/SO43	BI-IS43-5-6-10A	X		X	X	X			1/28/2010	N
BI-GW44/SO44	BI-IS44-1-2-10A	X		X	X	X			1/29/2010	N
BI-GW45/SO45	BI-IS45-0-1-10A	X		X	X	X			1/27/2010	N
BI-GW46/SO46	BI-IS46-0-1-10A	X		X	X	X			1/27/2010	N
BI-GW47/SO47	BI-IS47-3-4-10A	X		X	X	X			2/1/2010	N
BI-GW48/SO48	BI-IS48-8-9-10A	X		X	X	X			2/1/2010	N
	BI-IS48D-8-9-10A	X		X	X	X			2/1/2010	FD
BI-GW49/SO49	BI-IS49-4-5-10A	X		X	X	X			1/28/2010	N
BI-GW59/SO59	BI-IS59-0-0.5-10A	X		X	X	X			2/1/2010	N
Bear Island Outside SDZ Subsurface Soil (Background)										
BIBG-GW50/SO50	BI-IS50-1-2-10A	X		X	X	X			1/27/2010	N
BIBG-GW51/SO51	BI-IS51-1-2-10A	X		X	X	X			1/27/2010	N
BIBG-GW52/SO52	BI-IS52-2-3-10A	X		X	X	X			1/27/2010	N
BIBG-GW53/SO53	BI-IS53-3-4-10A	X		X	X	X			1/27/2010	N
BIBG-GW54/SO54	BI-IS54-1-2-10A	X		X	X	X			1/27/2010	N
BIBG-GW55/SO55	BI-IS55-2-3-10A	X		X	X	X			1/27/2010	N
	BI-IS55D-2-3-10A	X		X	X	X			1/27/2010	FD
BIBG-GW56/SO56	BI-IS56-6-7-10A	X		X	X	X			1/25/2010	N
	BI-IS56-6-7-10A-MS	X		X	X	X			1/25/2010	MS
	BI-IS56-6-7-10A-SD	X		X	X	X			1/25/2010	SD
BIBG-GW57/SO57	BI-IS57-3-4-10A	X		X	X	X			1/31/2010	N
Bear Island Inside SDZ Groundwater										
BI-GW01/SO01	BI-GW01-10A	X		X	X	X			1/28/2010	N
BI-GW02/SO02	BI-GW02-10A	X		X	X	X			1/28/2010	N
BI-GW03/SO03	BI-GW03-10A	X	X	X	X	X			1/28/2010	N
	BI-GW03D-10A	X	X	X	X	X			1/28/2010	FD
BI-GW04/SO04	BI-GW04-10A	X		X	X	X			1/28/2010	N
BI-GW05/SO05	BI-GW05-10A	X		X	X	X			1/29/2010	N
BI-GW06/SO06	BI-GW06-10A	X		X	X	X			1/29/2010	N
BI-GW07/SO07	BI-GW07-10A	X		X	X	X			1/29/2010	N
BI-GW08/SO08	BI-GW08-10A	X		X	X	X			1/29/2010	N
BI-GW09/SO09	BI-GW09-10A	X		X	X	X			1/31/2010	N

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MCB CamLej, North Carolina

Station ID	Sample ID	Total Metals 6010B	Total Dissolved Metals 6010B	Explosives 8330	PETN and Nitroglycern 8332	Perchlorate 6850	Grainsize D422	TOC Lloyd Kahn	Sample Date	Sample Type
BI-GW10/SO10	BI-GW10-10A	X		X	X	X			1/31/2010	N
BI-GW11/SO11	BI-GW11-10A	X	X	X	X	X			1/31/2010	N
BI-GW12/SO12	BI-GW12-10A	X		X	X	X			1/31/2010	N
BI-GW13/SO13	BI-GW13-10A	X		X	X	X			1/31/2010	N
BI-GW14/SO14	BI-GW14-10A	X		X	X	X			1/27/2010	N
BI-GW15/SO15	BI-GW15-10A	X		X	X	X			1/31/2010	N
	BI-GW15-10A-MS	X		X	X	X			1/31/2010	MS
	BI-GW15-10A-SD	X		X	X	X			1/31/2010	SD
BI-GW16/SO16	BI-GW16-10A	X		X	X	X			1/31/2010	N
	BI-GW16-10A-MS	X		X	X	X			1/31/2010	MS
	BI-GW16-10A-SD	X		X	X	X			1/31/2010	SD
BI-GW17/SO17	BI-GW17-10A	X		X	X	X			1/26/2010	N
BI-GW20/SO20	BI-GW20-10A	X	X	X	X	X			2/1/2010	N
BI-GW21/SO21	BI-GW21-10A	X		X	X	X			2/1/2010	N
BI-GW22/SO22	BI-GW22-10A	X		X	X	X			1/26/2010	N
	BI-GW22D-10A	X		X	X	X			1/26/2010	FD
BI-GW23/SO23	BI-GW23-10A	X		X	X	X			1/28/2010	N
BI-GW24/SO24	BI-GW24-10A	X		X	X	X			1/28/2010	N
BI-GW25/SO25	BI-GW25-10A	X		X	X	X			1/28/2010	N
BI-GW26/SO26	BI-GW26-10A	X		X	X	X			1/28/2010	N
BI-GW27/SO27	BI-GW27-10A	X		X	X	X			1/28/2010	N
BI-GW28/SO28	BI-GW28-10A	X		X	X	X			1/29/2010	N
	BI-GW28D-10A	X		X	X	X			1/29/2010	FD
BI-GW29/SO29	BI-GW29-10A	X		X	X	X			1/29/2010	N
BI-GW30/SO30	BI-GW30-10A	X	X	X	X	X			1/29/2010	N
BI-GW31/SO31	BI-GW31-10A	X		X	X	X			1/31/2019	N
BI-GW32/SO32	BI-GW32-10A	X		X	X	X			1/31/2019	N
BI-GW33/SO33	BI-GW33-10A	X		X	X	X			1/31/2019	N
BI-GW34/SO34	BI-GW34-10A	X		X	X	X			1/27/2010	N
BI-GW35/SO35	BI-GW35-10A	X		X	X	X			1/26/2010	N
	BI-GW35D-10A	X		X	X	X			1/26/2010	FD
BI-GW36/SO36	BI-GW36-10A	X		X	X	X			1/26/2010	N
BI-GW38/SO38	BI-GW38-10A	X		X	X	X			1/26/2010	N
BI-GW39/SO39	BI-GW39-10A	X		X	X	X			1/26/2010	N
BI-GW40/SO40	BI-GW40-10A	X		X	X	X			2/1/2010	N
BI-GW41/SO41	BI-GW41-10A	X	X	X	X	X			2/1/2010	N
BI-GW42/SO42	BI-GW42-10A	X		X	X	X			1/28/2010	N
BI-GW43/SO43	BI-GW43-10A	X		X	X	X			1/28/2010	N
BI-GW44/SO44	BI-GW44-10A	X		X	X	X			1/29/2010	N
BI-GW45/SO45	BI-GW45-10A	X	X	X	X	X			1/27/2010	N

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MCB CamLej, North Carolina

Station ID	Sample ID	Total Metals 6010B	Total Dissolved Metals 6010B	Explosives 8330	PETN and Nitroglycern 8332	Perchlorate 6850	Grainsize D422	TOC Lloyd Kahn	Sample Date	Sample Type
BI-GW46/SO46	BI-GW46-10A	X		X	X	X			1/27/2010	N
BI-GW47/SO47	BI-GW47-10A	X		X	X	X			2/1/2010	N
BI-GW48/SO48	BI-GW48-10A	X		X	X	X			2/1/2010	N
BI-GW49/SO49	BI-GW49-10A	X		X	X	X			1/28/2010	N
	BI-GW49D-10A	X		X	X	X			1/28/2010	FD
BI-GW59/SO59	BI-GW59-10A	X		X	X	X			2/1/2010	N
Bear Island Outside SDZ Groundwater (Background)										
BIBG-GW50/SO50	BI-GW50-10A	X		X	X	X			1/27/2010	N
BIBG-GW51/SO51	BI-GW51-10A	X		X	X	X			1/27/2010	N
BIBG-GW52/SO52	BI-GW52-10A	X		X	X	X			1/27/2010	N
BIBG-GW53/SO53	BI-GW53-10A	X		X	X	X			1/27/2010	N
BIBG-GW54/SO54	BI-GW54-10A	X		X	X	X			1/27/2010	N
BIBG-GW55/SO55	BI-GW55-10A	X		X	X	X			2/1/2010	N
BIBG-GW56/SO56	BI-GW56-10A	X	X	X	X	X			1/25/2010	N
	BI-GW56-10A-MS	X	X	X	X	X			1/25/2010	MS
	BI-GW56-10A-SD	X	X	X	X	X			1/25/2010	SD
BIBG-GW57/SO57	BI-GW57-10A	X		X	X	X			2/1/2010	N
	BI-GW57D-10A	X		X	X	X			2/1/2010	FD
Bear Island Sample Quality Control Blanks										
BI-QC	BI-EB-012610-HA	X		X	X	X			1/26/2010	EB
BI-QC	BI-EB-012710-HA	X		X	X	X			1/27/2010	EB
BI-QC	BI-EB-012810-HA	X		X	X	X			1/28/2010	EB
BI-QC	BI-EB-012910-GW	X	X	X	X	X			1/29/2010	EB
BI-QC	BI-EB-012910-SS	X		X	X	X			1/29/2010	EB
BI-QC	BI-EB-012910-IS	X		X	X	X			1/29/2010	EB
BI-QC	BI-EB-013110-IS	X		X	X	X			1/31/2010	EB
BI-QC	BI-EB-013110-SS	X		X	X	X			1/31/2010	EB
BI-QC	BI-EB-020110-GW	X	X	X	X	X			2/1/2010	EB
BI-QC	BI-EB-020110-SS	X		X	X	X			2/1/2010	EB
BI-QC	BI-EB-020110-IS	X		X	X	X			2/1/2010	EB
BI-QC	BI-FB012910	X	X	X	X	X			1/29/2010	FB
BI-QC	BI-FB020110	X	X	X	X	X			2/1/2010	FB
Intercoastal Waterways Surface Soil										
ICW-GW01/SO01	ICW-SS01-10A	X		X	X	X			3/23/2010	N
ICW-GW02/SO02	ICW-SS02-10A	X		X	X	X			3/23/2010	N
ICW-GW03/SO03	ICW-SS03-10A	X		X	X	X	X	X	3/23/2010	N
	ICW-SS03D-10A	X		X	X	X			3/23/2010	FD
ICW-GW04/SO04	ICW-SS04-10A	X		X	X	X			3/22/2010	N

TABLE 3-3

Summary of Samples and Analyses

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Station ID	Sample ID	Total Metals 6010B	Total Dissolved Metals 6010B	Explosives 8330	PETN and Nitroglycern 8332	Perchlorate 6850	Grainsize D422	TOC Lloyd Kahn	Sample Date	Sample Type
ICW-GW05/SO05	ICW-SS05-10A	X		X	X	X			3/22/2010	N
	ICW-SS05-10A-MS	X		X	X	X			3/22/2010	MS
	ICW-SS05-10A-SD	X		X	X	X			3/22/2010	SD
ICW-GW06/SO06	ICW-SS06-10A	X		X	X	X			3/22/2010	N
ICW-GW07/SO07	ICW-SS07-10A	X		X	X	X			3/22/2010	N
ICW-GW08/SO08	ICW-SS08-10A	X		X	X	X			3/23/2010	N
ICW-GW09/SO09	ICW-SS09-10A	X		X	X	X			3/23/2010	N
ICW-GW10/SO10	ICW-SS10-10A	X		X	X	X			3/23/2010	N
ICW-GW11/SO11	ICW-SS11-10A	X		X	X	X			3/23/2010	N
ICW-GW12/SO12	ICW-SS12-10A	X		X	X	X			3/24/2010	N
ICW-GW13/SO13	ICW-SS13-10A	X		X	X	X			3/25/2010	N
ICW-GW14/SO14	ICW-SS14-10A	X		X	X	X			3/25/2010	N
ICW-GW15/SO15	ICW-SS15-10A	X		X	X	X			3/25/2010	N
	ICW-SS15-10A-MS	X		X	X	X			3/25/2010	MS
	ICW-SS15-10A-SD	X		X	X	X			3/25/2010	SD
ICW-GW16/SO16	ICW-SS16-10A	X		X	X	X			3/25/2010	N
ICW-GW17/SO17	ICW-SS17-10A	X		X	X	X			3/25/2010	N
ICW-GW18/SO18	ICW-SS18-10A	X		X	X	X			3/25/2010	N
ICW-GW19/SO19	ICW-SS19-10A	X		X	X	X			3/25/2010	N
Intercoastal Waterways Surface Soil Outside SDZ (Background)										
ICW-GW20/SO20	ICW-SS20-10A	X		X	X	X	X	X	3/26/2010	N
	ICW-SS20D-10A	X		X	X	X			3/26/2010	FD
ICW-GW21/SO21	ICW-SS21-10A	X		X	X	X			3/26/2010	N
ICW-GW22/SO22	ICW-SS22-10A	X		X	X	X			3/25/2010	N
Intercoastal Waterways Subsurface Soil										
ICW-GW01/SO01	ICW-IS01-6-7-10A	X		X	X	X			3/23/2010	N
ICW-GW02/SO02	ICW-IS02-1-2-10A	X		X	X	X			3/23/2010	N
ICW-GW05/SO05	ICW-IS05-1-1.5-10A	X		X	X	X			3/22/2010	N
	ICW-IS05-1-1.5-10A-MS	X		X	X	X			3/22/2010	MS
	ICW-IS05-1-1.5-10A-SD	X		X	X	X			3/22/2010	SD
ICW-GW07/SO07	ICW-IS07-1-2-10A	X		X	X	X			3/22/2010	N
ICW-GW08/SO08	ICW-IS08-1-2-10A	X		X	X	X			3/23/2010	N
ICW-GW10/SO10	ICW-IS10-1-2-10A	X		X	X	X			3/23/2010	N
ICW-GW11/SO11	ICW-IS11-1-2-10A	X		X	X	X			3/23/2010	N
ICW-GW13/SO13	ICW-IS13-1-1.5-10A	X		X	X	X			3/25/2010	N
ICW-GW15/SO15	ICW-IS15-1-2-10A	X		X	X	X			3/25/2010	N

TABLE 3-3

Summary of Samples and Analyses

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Station ID	Sample ID	Total Metals 6010B	Total Dissolved Metals 6010B	Explosives 8330	PETN and Nitroglycern 8332	Perchlorate 6850	Grainsize D422	TOC Lloyd Kahn	Sample Date	Sample Type
Intercoastal Waterways Groundwater										
ICW-GW01/SO01	ICW-GW01-10A	X		X	X	X			3/23/2010	N
ICW-GW02/SO02	ICW-GW02-10A	X		X	X	X			3/23/2010	N
ICW-GW03/SO03	ICW-GW03-10A	X	X	X	X	X			3/23/2010	N
	ICW-GW03D-10A	X	X	X	X	X			3/23/2010	FD
ICW-GW04/SO04	ICW-GW04-10A	X		X	X	X			3/22/2010	N
ICW-GW05/SO05	ICW-GW05-10A	X		X	X	X			3/22/2010	N
	ICW-GW05-10A-MS	X		X	X	X			3/22/2010	MS
	ICW-GW05-10A-SD	X		X	X	X			3/22/2010	SD
ICW-GW06/SO06	ICW-GW06-10A	X		X	X	X			3/22/2010	N
ICW-GW07/SO07	ICW-GW07-10A	X		X	X	X			3/22/2010	N
ICW-GW08/SO08	ICW-GW08-10A	X		X	X	X			3/23/2010	N
ICW-GW09/SO09	ICW-GW09-10A	X		X	X	X			3/23/2010	N
ICW-GW10/SO10	ICW-GW10-10A	X		X	X	X			3/23/2010	N
ICW-GW11/SO11	ICW-GW11-10A	X		X	X	X			3/23/2010	N
ICW-GW12/SO12	ICW-GW12-10A	X		X	X	X			3/24/2010	N
ICW-GW13/SO13	ICW-GW13-10A	X		X	X	X			3/25/2010	N
ICW-GW14/SO14	ICW-GW14-10A	X		X	X	X			3/25/2010	N
ICW-GW15/SO15	ICW-GW15-10A	X		X	X	X			3/25/2010	N
	ICW-GW15-10A-MS	X		X	X	X			3/25/2010	MS
	ICW-GW15-10A-SD	X		X	X	X			3/25/2010	SD
ICW-GW16/SO16	ICW-GW16-10A	X		X	X	X			3/26/2010	N
ICW-GW17/SO17	ICW-GW17-10A	X		X	X	X			3/25/2010	N
ICW-GW18/SO18	ICW-GW18-10A	X		X	X	X			3/25/2010	N
ICW-GW19/SO19	ICW-GW19-10A	X		X	X	X			3/26/2010	N
Intercoastal Waterways Groundwater Outside SDZ (Background)										
ICW-GW20/SO20	ICW-GW20-10A	X	X	X	X	X			3/26/2010	N
	ICW-GW20D-10A	X	X	X	X	X			3/26/2010	FD
ICW-GW21/SO21	ICW-GW21-10A	X		X	X	X			3/26/2010	N
ICW-GW22/SO22	ICW-GW22-10A	X		X	X	X			3/25/2010	N
Intercoastal Waterways Sample Quality Control Blanks										
ICW-QC	ICW-EB-032310-SS	X		X	X	X			3/23/2010	EB
ICW-QC	ICW-EB-032310-IS	X		X	X	X			3/23/2010	EB
ICW-QC	ICW-EB-032210-SS	X		X	X	X			3/22/2010	EB
ICW-QC	ICW-EB032210-IS	X		X	X	X			3/22/2010	EB
ICW-QC	ICW-EB-032510-SS	X		X	X	X			3/25/2010	EB
ICW-QC	ICW-EB-032510-IS	X		X	X	X			3/25/2010	EB
ICW-QC	ICW-EB-032410-SS	X		X	X	X			3/24/2010	EB
ICW-QC	ICW-EB-032410-IS	X		X	X	X			3/24/2010	EB

TABLE 3-3

Summary of Samples and Analyses

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MCB CamLej, North Carolina

Station ID	Sample ID	Total Metals 6010B	Total Dissolved Metals 6010B	Explosives 8330	PETN and Nitroglycern 8332	Perchlorate 6850	Grainsize D422	TOC Lloyd Kahn	Sample Date	Sample Type
ICW-QC	ICW-EB-032410-GW	X		X	X	X			3/24/2010	EB
ICW-QC	ICW-FB032510	X	X	X	X	X			3/25/2010	FB
ICW-QC	ICW-EB0-32610-SS	X		X	X	X			3/26/2010	EB
Sander's Island Surface Soil										
SI-GW01/SO01	SI-SS01-10A	X		X	X	X	X	X	3/24/2010	N
	SI-SS01D-10A	X		X	X	X			3/24/2010	FD
SI-GW01/SO02	SI-SS02-10A	X		X	X	X			3/24/2010	N
SI-GW01/SO03	SI-SS03-10A	X		X	X	X			3/24/2010	N
SI-GW01/SO04	SI-SS04-10A	X		X	X	X			3/24/2010	N
SI-GW01/SO05	SI-SS05-10A	X		X	X	X			3/24/2010	N
SI-GW01/SO06	SI-SS06-10A	X		X	X	X			3/24/2010	N
Sander's Island Subsurface Soil										
SI-GW01/SO01	SI-IS01-1-1.5-10A	X		X	X	X			3/24/2010	N
	SI-IS01D-1-1.5-10A	X		X	X	X			3/24/2010	FD
SI-GW01/SO02	SI-IS02-1-2-10A	X		X	X	X			3/24/2010	N
SI-GW01/SO03	SI-IS03-2-3-10A	X		X	X	X			3/24/2010	N
SI-GW01/SO04	SI-IS04-1-2-10A	X		X	X	X			3/24/2010	N
SI-GW01/SO05	SI-IS05-1-2-10A	X		X	X	X			3/24/2010	N
SI-GW01/SO06	SI-IS06-1-2-10A	X		X	X	X			3/24/2010	N
Sander's Island Groundwater										
SI-GW01/SO01	SI-GW01-10A	X	X	X	X	X			3/24/2010	N
	SI-GW01D-10A	X	X	X	X	X			3/24/2010	FD
SI-GW01/SO02	SI-GW02-10A	X		X	X	X			3/24/2010	N
SI-GW01/SO03	SI-GW03-10A	X		X	X	X			3/24/2010	N
SI-GW01/SO04	SI-GW04-10A	X		X	X	X			3/24/2010	N
SI-GW01/SO05	SI-GW05-10A	X		X	X	X			3/24/2010	N
SI-GW01/SO06	SI-GW06-10A	X		X	X	X			3/24/2010	N
Inside SDZ Sediment										
SDZ-WN01/SD01	SDZ-SD01-10B	X		X	X	X	X	X	5/7/2010	N
SDZ-WN02/SD02	SDZ-SD02-10B	X		X	X	X			5/7/2010	N
SDZ-WN03/SD03	SDZ-SD03-10B	X		X	X	X			5/6/2010	N
SDZ-WN04/SD04	SDZ-SD04-10B	X		X	X	X	X	X	5/6/2010	N
SDZ-WN05/SD05	SDZ-SD05-10B	X		X	X	X			5/5/2010	N
SDZ-WN06/SD06	SDZ-SD06-10B	X		X	X	X	X	X	5/3/2010	N
SDZ-WN07/SD07	SDZ-SD07-10B	X		X	X	X			5/3/2010	N
SDZ-WN08/SD08	SDZ-SD08-10B	X		X	X	X			5/3/2010	N
SDZ-WN09/SD09	SDZ-SD09-10B	X		X	X	X			5/3/2010	N
	SDZ-SD09D-10B	X		X	X	X			5/3/2010	FD
SDZ-WN10/SD10	SDZ-SD10-10B	X		X	X	X	X	X	5/6/2010	N

TABLE 3-3

Summary of Samples and Analyses

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Station ID	Sample ID	Total Metals 6010B	Total Dissolved Metals 6010B	Explosives 8330	PETN and Nitroglycern 8332	Perchlorate 6850	Grainsize D422	TOC Lloyd Kahn	Sample Date	Sample Type
SDZ-WN11/SD11	SDZ-SD11-10B	X		X	X	X			5/10/2010	N
SDZ-WN12/SD12	SDZ-SD12-10B	X		X	X	X			5/10/2010	N
SDZ-WN13/SD13	SDZ-SD13-10B	X		X	X	X	X	X	5/10/2010	N
SDZ-WN14/SD14	SDZ-SD14-10B	X		X	X	X			5/10/2010	N
SDZ-WN15/SD15	SDZ-SD15-10B	X		X	X	X			5/10/2010	N
	SDZ-SD15-10B-MS	X		X	X	X			5/10/2010	MS
	SDZ-SD15-10B-SD	X		X	X	X			5/10/2010	SD
SDZ-WN16/SD16	SDZ-SD16-10B	X		X	X	X			5/8/2010	N
SDZ-WN17/SD17	SDZ-SD17-10B	X		X	X	X			5/5/2010	N
SDZ-WN18/SD18	SDZ-SD18-10B	X		X	X	X	X	X	5/8/2010	N
SDZ-WN19/SD19	SDZ-SD19-10B	X		X	X	X			5/8/2010	N
SDZ-WN20/SD20	SDZ-SD20-10B	X		X	X	X	X	X	5/8/2010	N
SDZ-WN21/SD21	SDZ-SD21-10B	X		X	X	X			5/8/2010	N
SDZ-WN22/SD22	SDZ-SD22-10B	X		X	X	X	X	X	5/5/2010	N
SDZ-WN23/SD23	SDZ-SD23-10B	X		X	X	X			5/5/2010	N
	SDZ-SD23D-10B	X		X	X	X			5/5/2010	FD
SDZ-WN24/SD24	SDZ-SD24-10B	X		X	X	X			5/4/2010	N
SDZ-WN25/SD25	SDZ-SD25-10B	X		X	X	X			5/4/2010	N
SDZ-WN26/SD26	SDZ-SD26-10B	X		X	X	X			5/4/2010	N
SDZ-WN27/SD27	SDZ-SD27-10B	X		X	X	X	X	X	5/4/2010	N
Inside SDZ Pore Water										
SDZ-WN02/SD02	SDZ-WN02-10B	X	X	X	X	X			12:00	N
SDZ-WN03/SD03	SDZ-WN03-10B	X	X	X	X	X			11:45	N
SDZ-WN06/SD06	SDZ-WN06-10B	X	X	X	X	X			11:50	N
SDZ-WN07/SD07	SDZ-WN07-10B	X	X	X	X	X			15:15	N
SDZ-WN10/SD10	SDZ-WN10-10B	X	X	X	X	X			14:45	N
SDZ-WN11/SD11	SDZ-WN11-10B	X	X	X	X	X			9:00	N
SDZ-WN12/SD12	SDZ-WN12-10B	X	X	X	X	X			10:10	N
SDZ-WN13/SD13	SDZ-WN13-10B	X	X	X	X	X			11:40	N
SDZ-WN14/SD14	SDZ-WN14-10B	X	X	X	X	X			13:45	N
SDZ-WN15/SD15	SDZ-WN15-10B	X	X	X	X	X			14:30	N
SDZ-WN16/SD16	SDZ-WN16-10B	X	X	X	X	X			14:40	N
SDZ-WN17/SD17	SDZ-WN17-10B	X	X	X	X	X			15:15	N
SDZ-WN18/SD18	SDZ-WN18-10B	X	X	X	X	X			10:30	N
SDZ-WN19/SD19	SDZ-WN19-10B	X	X	X	X	X			9:30	N
	SDZ-WN19D-10B	X	X	X	X	X			9:35	FD
SDZ-WN20/SD20	SDZ-WN20-10B	X	X	X	X	X			12:15	N
	SDZ-WN20D-10B	X	X	X	X	X			12:20	N
SDZ-WN21/SD21	SDZ-WN21-10B	X	X	X	X	X			13:15	N

TABLE 3-3

Summary of Samples and Analyses

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Station ID	Sample ID	Total Metals 6010B	Total Dissolved Metals 6010B	Explosives 8330	PETN and Nitroglycern 8332	Perchlorate 6850	Grainsize D422	TOC Lloyd Kahn	Sample Date	Sample Type
SDZ-WN22/SD22	SDZ-WN22-10B	X	X	X	X	X			14:00	N
	SDZ-WN22-10B-MS	X	X	X	X	X			14:00	MS
	SDZ-WN22-10B-SD	X	X	X	X	X			14:00	SD
SDZ-WN23/SD23	SDZ-WN23-10B	X	X	X	X	X			12:35	N
	SDZ-WN23-10B-MS	X	X	X	X	X			12:35	MS
	SDZ-WN23-10B-SD	X	X	X	X	X			12:35	SD
SDZ-WN24/SD24	SDZ-WN24-10B	X	X	X	X	X			9:30	N
SDZ-WN25/SD25	SDZ-WN25-10B	X	X	X	X	X			8:45	N
SDZ-WN26/SD26	SDZ-WN26-10B	X	X	X	X	X			14:30	N
SDZ-WN27/SD27	SDZ-WN27-10B	X	X	X	X	X			10:30	N
Inside SDZ Surface Water										
SDZ-SW01	SDZ-SW01-10B	X	X	X	X	X			5/9/2010	N
	SDZ-SW01D-10B	X	X	X	X	X			5/9/2010	FD
SDZ-SW02	SDZ-SW02-10B	X	X	X	X	X			5/3/2010	N
SDZ-SW03	SDZ-SW03-10B	X	X	X	X	X			5/6/2010	N
	SDZ-SW03-10B-MS	X	X	X	X	X			5/6/2010	MS
	SDZ-SW03-10B-SD	X	X	X	X	X			5/6/2010	SD
SDZ-SW04	SDZ-SW04-10B	X	X	X	X	X			5/9/2010	N
SDZ-SW06	SDZ-SW06-10B	X	X	X	X	X			5/7/2010	N
Outside SDZ Sediment (Background)										
SDZ-WN28/SD28	SDZ-SD28-10B	X		X	X	X			5/5/2010	N
SDZ-WN29/SD29	SDZ-SD29-10B	X		X	X	X			5/4/2010	N
	SDZ-SD29D-10B	X		X	X	X			5/4/2010	FD
SDZ-WN30/SD30	SDZ-SD30-10B	X		X	X	X	X	X	5/5/2010	N
	SDZ-SD30-10B-MS	X		X	X	X	X	X	5/5/2010	MS
	SDZ-SD30-10B-SD	X		X	X	X	X	X	5/5/2010	SD
Outside SDZ Pore Water (Background)										
SDZ-WN28/SD28	SDZ-WN28-10B	X	X	X	X	X			5/5/2010	N
SDZ-WN29/SD29	SDZ-WN28D-10B	X	X	X	X	X			5/5/2010	FD
	SDZ-WN29-10B	X	X	X	X	X			5/4/2010	N
SDZ-WN30/SD30	SDZ-WN30-10B	X	X	X	X	X			5/6/2010	N
Outside SDZ Surface Water (Background)										
SDZ-SW05	SDZ-SW05-10B	X	X	X	X	X			5/9/2010	N
SDZ Sample Quality Control Blanks										
SDZ-QC	SDZ-EB-050610-SD	X		X	X	X			5/6/2010	EB
SDZ-QC	SDZ-EB-050710-SD	X		X	X	X			5/7/2010	EB
SDZ-QC	SDZ-FB050810	X	X	X	X	X			5/8/2010	FB
SDZ-QC	SDZ-EB-050810-SD	X		X	X	X			5/8/2010	EB

TABLE 3-3

Summary of Samples and Analyses

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Station ID	Sample ID	Total Metals 6010B	Total Dissolved Metals 6010B	Explosives 8330	PETN and Nitroglycern 8332	Perchlorate 6850	Grainsize D422	TOC Lloyd Kahn	Sample Date	Sample Type
SDZ-QC	SDZ-EB-050310-SD	X		X	X	X			5/3/2010	EB
SDZ-QC	SDZ-EB-050410-SD	X		X	X	X			5/4/2010	EB
SDZ-QC	SDZ-EB-050410-WN	X	X	X	X	X			5/4/2010	EB
SDZ-QC	SDZ-EB-050510-SD	X		X	X	X			5/5/2010	EB
SDZ-QC	SDZ-EB-051010-SD	X		X	X	X			5/10/2010	EB
SDZ-QC	SDZ-FB051010	X	X	X	X	X			5/10/2010	FB
SDZ IDW										
	Sample ID	**Full TCLP 1311/8260B/8270C/8081A/8151A/6010B**			**Ignitability Pensky Martens**	**Reactivity to Cyanide**	**Reactivity to Sulfide**	**pH 9045C**	**Sample Date**	**Sample Type**
	CTO080-SDZ-W01-01	X	X	X	X	X	X	X	5/11/2010	IDW

TABLE 3-4
Summary of Water Quality Parameters
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Sample ID	Sample Date	Media	Temperature (°C)	Conductivity (mS/cm)	DO (mg/L)	pH (SU)	ORP (mV)	Turbidity (NTU)	Salinity (ppt)	Comments
ICW-GW01	3/23/10	GW	13.70	0.210	1.62	8.24	-67.2	7.30	0.13	
ICW-GW02	3/23/10	GW	12.35	0.184	0.95	8.33	-118.9	3.93	0.11	
ICW-GW03	3/23/10	GW	12.51	0.350	1.04	8.21	-141.9	5.30	0.17	
ICW-GW04	3/22/10	GW	12.44	6.252	0.58	7.09	-41.9	24.2	3.42	
ICW-GW05	3/22/10	GW	12.97	0.700	3.21	7.17	-18.8	4.39	0.34	
ICW-GW06	3/22/10	GW	12.91	0.744	0.86	7.17	-11.3	19.8	0.37	
ICW-GW07	3/22/10	GW	12.56	0.390	0.68	7.16	-34.3	36.0	0.19	
ICW-GW08	3/23/10	GW	13.19	2.023	2.08	7.33	-136.7	16.8	1.36	
ICW-GW09	3/23/10	GW	13.01	14.510	0.30	7.10	-92.7	32.9	11.19	
ICW-GW10	3/23/10	GW	13.51	0.613	0.89	7.50	-113.5	9.0	0.39	
ICW-GW11	3/23/10	GW	12.76	0.616	0.73	7.11	66.5	9.8	0.30	
ICW-GW12	3/24/10	GW	12.92	7.527	0.66	7.34	28.5	194	4.17	
ICW-GW13	3/25/10	GW	13.20	26.66	0.84	7.22	-107.4	2.04	17.39	
ICW-GW14	3/25/10	GW	13.44	19.22	0.81	7.32	-74.0	4.90	11.47	
ICW-GW15	3/25/10	GW	13.03	5.023	0.63	7.29	-121.9	34.2	2.71	
ICW-GW16	3/26/10	GW	14.19	9.524	2.55	7.40	-216.4	21.9	5.63	
ICW-GW17	3/25/10	GW	13.53	10.46	0.81	7.40	-215.3	15.8	5.94	
ICW-GW18	3/25/10	GW	14.34	13.84	0.84	6.52	-85.2	3.87	8.05	
ICW-GW19	3/26/10	GW	12.70	5.155	0.48	7.58	-271.4	3.93	2.80	
ICW-GW20	3/26/10	GW	13.87	1.503	1.04	7.21	-214.4	7.66	0.76	Background Sample
ICW-GW21	3/26/10	GW	13.38	30.69	1.68	6.65	-334.0	4.02	19.09	Background Sample
ICW-GW22	3/25/10	GW	13.65	1.377	0.82	6.58	-142.6	8.03	0.69	Background Sample
SI-GW01	3/24/10	GW	13.97	8.210	1.07	6.00	78.4	15.2	4.56	
SI-GW02	3/24/10	GW	15.15	4.760	3.54	7.36	-240.4	18.4	0.28	
SI-GW03	3/24/10	GW	15.46	0.894	0.43	7.02	-265.8	16.2	0.55	
SI-GW04	3/24/10	GW	13.95	4.310	0.40	6.89	-350.1	6.43	2.97	
SI-GW05	3/24/10	GW	13.01	1.792	0.74	7.20	-276.1	2.43	1.21	
SI-GW06	3/24/10	GW	13.89	3.524	0.97	7.33	-41.9	5.69	1.87	
SDZ-WN02	5/7/10	WN	21.04	1.465	4.54	7.14	-131.6	240	0.73	
SDZ-WN03	5/6/10	WN	26.76	28.88	4.75	7.69	-44.0	150	17.78	
SDZ-WN06	5/3/10	WN	22.47	50.98	1.29	7.45	-112.7	24	33.53	
SDZ-WN07	5/3/10	WN	23.22	54.140	0.46	7.24	-232.8	19.0	35.84	
SDZ-WN10	5/6/10	WN	23.30	49.10	0.60	7.32	-162.3	28.0	31.94	

TABLE 3-4
Summary of Water Quality Parameters
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Sample ID	Sample Date	Media	Temperature (°C)	Conductivity (mS/cm)	DO (mg/L)	pH (SU)	ORP (mV)	Turbidity (NTU)	Salinity (ppt)	Comments
SDZ-WN11	5/10/10	WN	19.60	47.06	0.62	8.37	-176.7	1.50	30.65	
SDZ-WN12	5/10/10	WN	18.35	48.60	0.43	7.55	-105.8	9.70	31.79	
SDZ-WN13	5/10/10	WN	20.80	79.59	0.85	8.00	-115.3	1.70	32.50	
SDZ-WN14	5/10/10	WN	21.53	46.41	0.40	7.72	-179.9	22.8	30.20	
SDZ-WN15	5/10/10	WN	21.86	49.66	4.67	8.04	-13.2	14.0	32.53	
SDZ-WN16	5/8/10	WN	24.34	51.77	0.49	7.05	109.9	1.30	34.04	
SDZ-WN17	5/5/10	WN	20.29	53.09	0.23	7.84	-275.5	11.0	35.08	
SDZ-WN18	5/8/10	WN	20.88	48.48	0.29	6.88	-81.8	10.0	31.70	
SDZ-WN19	5/8/10	WN	22.25	53.85	0.26	6.85	-139.2	4.30	39.63	
SDZ-WN20	5/8/10	WN	23.39	51.76	2.27	7.25	-28.5	3.40	34.08	
SDZ-WN21	5/8/10	WN	22.73	51.72	2.01	7.29	-102.0	0.9	34.05	
SDZ-WN22	5/5/10	WN	20.11	52.67	0.87	7.88	-29.6	7.10	34.77	
SDZ-WN23	5/5/10	WN	20.30	52.08	0.26	7.80	-115.6	2.80	34.33	
SDZ-WN24	5/4/10	WN	19.90	51.12	0.31	7.42	-127.2	8.40	33.63	
SDZ-WN25	5/4/10	WN	20.46	50.80	0.42	7.22	-127.4	2.0	33.40	
SDZ-WN26	5/4/10	WN	20.98	51.69	1.71	7.64	-167.7	37.00	34.04	
SDZ-WN27	5/4/10	WN	21.16	53.04	0.5	7.83	-120.2	1.90	35.08	
SDZ-WN28	5/5/10	WN	20.20	52.12	0.51	7.76	-88.9	2.90	34.36	
SDZ-WN29	5/4/10	WN	20.64	43.65	0.27	6.99	-128.9	24.00	28.19	
SDZ-WN30	5/6/10	WN	19.99	49.62	1.25	6.43	39.2	NM	32.50	
SDZ-SW01	5/9/10	SW	20.24	49.35	8.35	8.36	-13.0	6.90	32.32	
SDZ-SW02	5/6/10	SW	24.38	36.75	6.55	7.70	-1.8	35.0	23.24	
SDZ-SW03	5/4/10	SW	21.56	52.30	5.60	7.98	25.8	12.0	34.49	
SDZ-SW04	5/9/10	SW	19.64	49.11	8.47	8.4	-9.2	2.6	32.16	
SDZ-SW05	5/9/10	SW	22.94	48.82	8.35	8.30	2.3	6.20	31.91	Background Sample
SDZ-SW06	5/7/10	SW	24.56	19.2	5.71	6.79	-23.7	29.0	11.04	
BI-GW01	1/28/10	GW	15.63	0.386	6.07	7.72	57.1	1.38	0.19	
BI-GW02	1/28/10	GW	15.84	0.326	7.44	7.90	113.9	2.73	0.16	
BI-GW03	1/28/10	GW	15.42	0.264	6.65	7.92	64.9	0.82	0.13	
BI-GW04	1/28/10	GW	13.35	0.141	8.03	8.39	36.8	3.80	0.07	
BI-GW05	1/29/10	GW	15.1	0.332	7.02	8.00	111.3	1.46	0.16	
BI-GW06	1/29/10	GW	14.5	0.553	7.21	8.19	98.3	4.47	0.27	
BI-GW07	1/29/10	GW	16.48	0.219	7.74	8.29	111.3	2.60	0.10	

TABLE 3-4
Summary of Water Quality Parameters
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Sample ID	Sample Date	Media	Temperature (°C)	Conductivity (mS/cm)	DO (mg/L)	pH (SU)	ORP (mV)	Turbidity (NTU)	Salinity (ppt)	Comments
BI-GW08	1/29/10	GW	17.92	0.299	7.34	7.94	-10.9	0.77	0.18	
BI-GW09	1/31/10	GW	12.91	0.193	8.19	6.57	103.6	1.40	0.09	
BI-GW10	1/31/10	GW	11.2	0.289	8.72	8.59	105.1	1.70	0.16	
BI-GW11	1/31/10	GW	13.7	0.290	8.50	8.19	131.3	2.90	0.14	
BI-GW12	1/31/10	GW	8.90	0.331	5.46	7.87	146.1	3.01	0.16	
BI-GW13	1/31/10	GW	10.75	0.146	10.95	8.30	71.8	13.0	0.07	
BI-GW14	1/27/10	GW	11.81	0.118	2.73	6.32	175.0	15.4	0.06	
BI-GW15	1/31/10	GW	13.84	0.050	12.57	10.07	53.5	26.9	0.02	
BI-GW16	1/31/10	GW	11.71	0.063	9.33	8.10	111.1	40	0.03	
BI-GW17	1/26/10	GW	13.8	0.183	6.10	6.59	167.3	28.0	0.09	
BI-GW20	2/1/10	GW	15.1	0.108	4.89	6.96	128.5	38.4	0.05	
BI-GW21	2/1/10	GW	16.52	0.322	6.68	7.18	125.2	1.38	0.19	
BI-GW22	1/28/10	GW	16.9	0.201	5.24	7.04	161.8	8.25	0.09	
BI-GW23	1/28/10	GW	16.1	0.125	3.16	7.41	133.1	14.7	0.07	
BI-GW24	1/28/10	GW	13.05	0.353	6.77	7.82	107.7	1.59	0.17	
BI-GW25	1/28/10	GW	13.71	0.188	8.48	8.14	75.4	3.77	0.09	
BI-GW26	1/28/10	GW	10.82	0.269	1.87	7.81	37.3	1.68	0.13	
BI-GW27	1/29/10	GW	13.50	0.206	8.87	8.01	63.6	2.75	0.10	
BI-GW28	1/29/10	GW	11.12	0.242	0.55	7.17	-162.0	3.54	0.16	
BI-GW29	1/29/10	GW	14.39	0.340	8.02	8.27	112.1	1.10	0.16	
BI-GW30	1/29/10	GW	7.67	0.402	1.10	8.02	127.2	20.0	0.19	
BI-GW31	1/31/10	GW	8.48	0.316	4.11	7.73	122.7	19.5	0.15	
BI-GW32	1/31/10	GW	9.21	0.347	5.63	7.49	108.0	12.6	0.17	
BI-GW33	1/31/10	GW	14.59	0.183	12.73	8.50	76.9	5.58	0.09	
BI-GW34	1/27/10	GW	11.71	0.073	4.61	6.26	131.2	32.3	0.03	
BI-GW35	1/26/10	GW	12.04	0.134	4.93	6.53	118.8	17.1	0.06	
BI-GW36	1/26/10	GW	12.15	0.053	NM*	7.42	116.5	23	0.02	*Probe fouled
BI-GW38	1/26/10	GW	17.66	0.440	6.50	7.17	107.9	17.4	0.21	
BI-GW39	1/26/10	GW	14.04	0.127	1.94	6.21	99.6	30	0.08	
BI-GW40	2/1/10	GW	14.8	0.225	7.09	7.23	8.3	7.3	0.13	
BI-GW41	2/1/10	GW	10.6	0.260	3.10	6.57	87.8	9.8	0.12	
BI-GW42	1/28/10	GW	10.1	0.231	8.58	7.86	85.7	9.8	0.11	
BI-GW43	1/28/10	GW	15.13	0.121	7.27	8.08	68.0	6.65	0.07	

TABLE 3-4
Summary of Water Quality Parameters
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Sample ID	Sample Date	Media	Temperature (°C)	Conductivity (mS/cm)	DO (mg/L)	pH (SU)	ORP (mV)	Turbidity (NTU)	Salinity (ppt)	Comments
BI-GW44	1/29/10	GW	11.53	0.144	8.47	8.50	107.7	13.0	0.07	
BI-GW45	1/27/10	GW	10.34	0.070	7.31	6.06	165.0	14.3	0.03	
BI-GW46	1/27/10	GW	9.24	0.186	8.43	8.14	129.3	8.5	0.09	
BI-GW47	2/1/10	GW	11.66	0.083	6.98	8.19	-103.7	21.6	0.04	
BI-GW48	2/1/10	GW	15.22	0.135	7.54	8.36	-55.4	43.9	0.06	
BI-GW49	1/28/10	GW	13.84	0.187	8.03	7.92	79.8	11.2	0.11	
BI-GW50	1/27/10	GW	11.48	0.154	8.70	6.81	105.5	3.6	0.07	Background Sample
BI-GW51	1/27/10	GW	9.63	0.104	9.68	6.79	190.8	14.9	0.05	Background Sample
BI-GW52	1/27/10	GW	13.87	0.252	8.11	7.75	70.8	5.8	0.12	Background Sample
BI-GW53	1/27/10	GW	14.5	0.280	8.30	7.96	133.8	9.44	0.13	Background Sample
BI-GW54	1/27/10	GW	12.36	0.077	8.54	8.71	40.6	23.1	0.04	Background Sample
BI-GW55	2/1/10	GW	11.28	0.112	8.84	7.26	26.7	5.02	0.05	Background Sample
BI-GW56	1/25/10	GW	7.54	0.208	3.07	6.97	-113	38.2	0.15	Background Sample
BI-GW57	2/1/10	GW	14.99	0.052	7.39	7.11	104.8	16.3	0.02	Background Sample
BI-GW59	2/1/10	GW	8.77	0.337	0.87	6.15	-47.4	7.85	0.16	

Created By:	*Jennifer Wheat*	7/29/2010
Checked By:	*Gordon Little*	10/11/2010

Notes:

mV - millivolts

SU - standard units

ms/cm - Milliseimens per centimeter

mg/L - milligram per liter

NTU - Nephelometric turbidity units

ppt - parts per thousand

NM - not measured

^{o}C - Degrees Celsius

GW - groundwater

WN - pore water

\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_3_1_LOCATION_OF_MEC_MK_45_MOD_0_AIRCRAFT_FLARE.MXD



Legend

- Intentional Detonation
- Location of MK 45 Mod 0 Aircraft Flare
- Off-Base SDZs

N

0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet

Figure 3-1
Location of MEC
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

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\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_3_2_GEOPHYSICAL_INVESTIGATION_AREAS.MXD



Legend

- Terrestrial DGM Coverage
- Upland Area
- Elevated Anomaly Density Area
- Installation Boundary
- Off-Base SDZs
- AGS Battelle
- AGS Sky Research

N

0 1,000 2,000 4,000 Feet

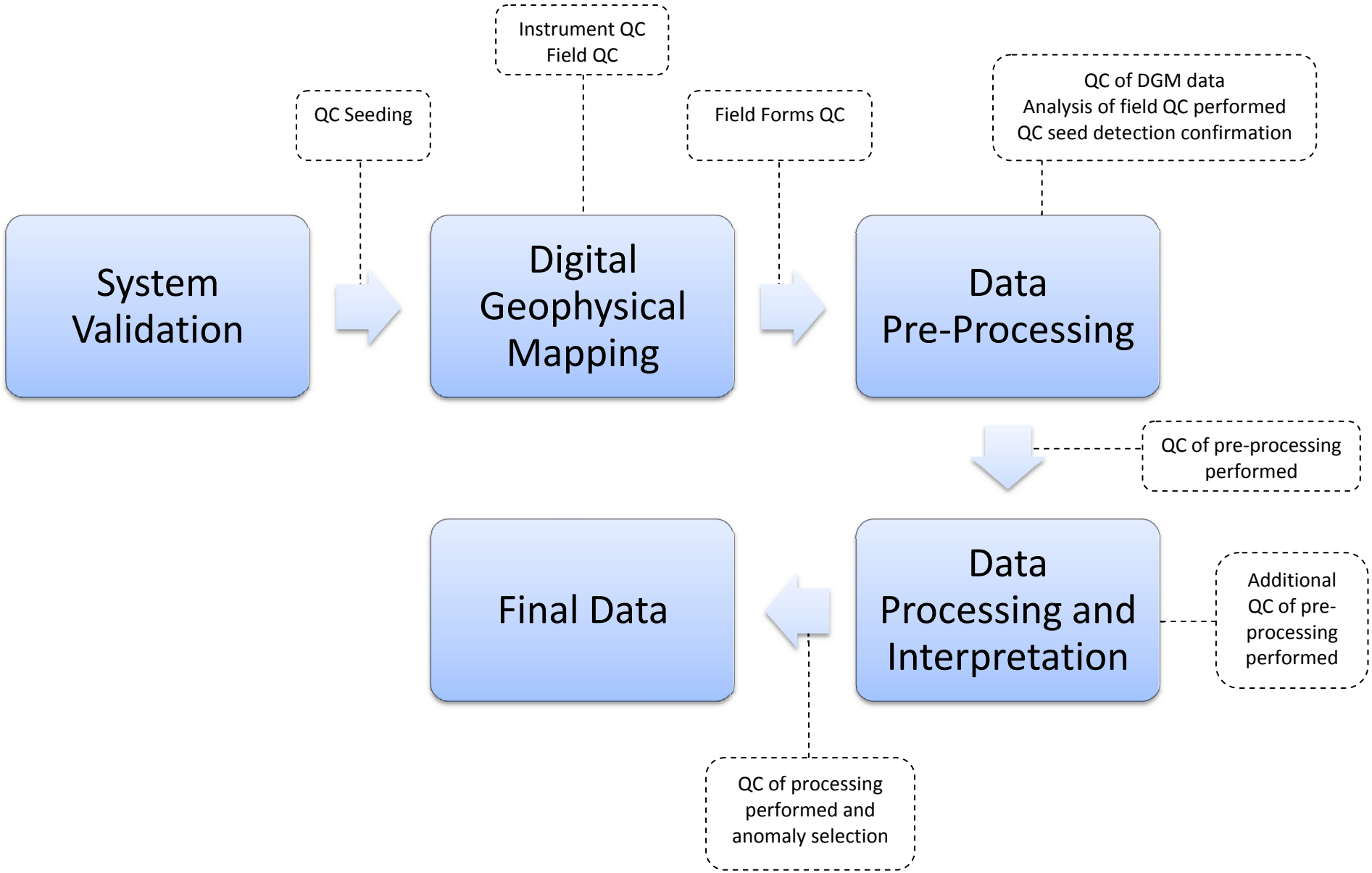
1 inch = 2,000 feet

Figure 3-2
Geophysical Investigation Areas
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

CH2MHILL

Generated By:*Dan Hockett/CLT* Checked by: *Keith LaTorre/KNV*

FIGURE 3-3
Overview of DGM Operations QC Process



\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_3_4_BEAR_ISLAND_SURFACE_SOIL_SAMPLE_LOC_MAP.MXD



Legend

- Surface Soil Sample Location
- Background Surface Soil Sample Location
- Upland Area
- Installation Boundary
- Off-Base SDZs

N

0 500 1,000 2,000 Feet

1 inch = 1,000 feet

Figure 3-4
Surface Soil Sample Location Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

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\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_3_5_SUBSURFACE_SOIL_SAMPLE_LOC_MAP.MXD MARTESE 11/30/2010 15:54:51



Legend

- Subsurface Soil Sample Location
- Background Subsurface Soil Sample Location
- Upland Area
- Installation Boundary
- Off-Base SDZs

N

0 500 1,000 2,000 Feet

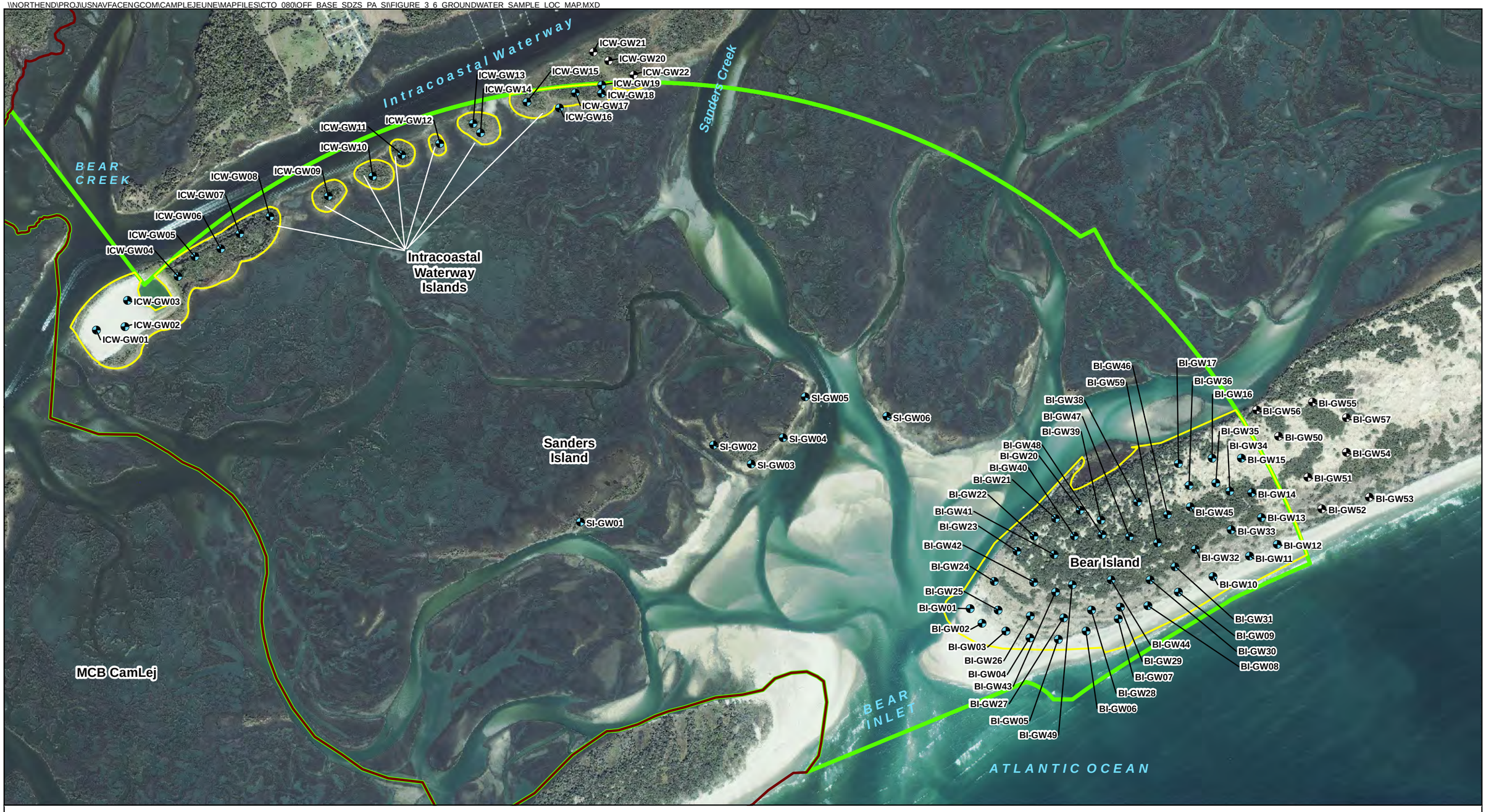
1 inch = 1,000 feet

Figure 3-5
Subsurface Soil Sample Location Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

CH2MHILL

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\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_3_6_GROUNDWATER_SAMPLE_LOC_MAP.MXD



Legend

- Groundwater Sample Location
- Background Groundwater Sample Location
- Upland Area
- Installation Boundary
- Off-Base SDZs

N

0 500 1,000 2,000 Feet

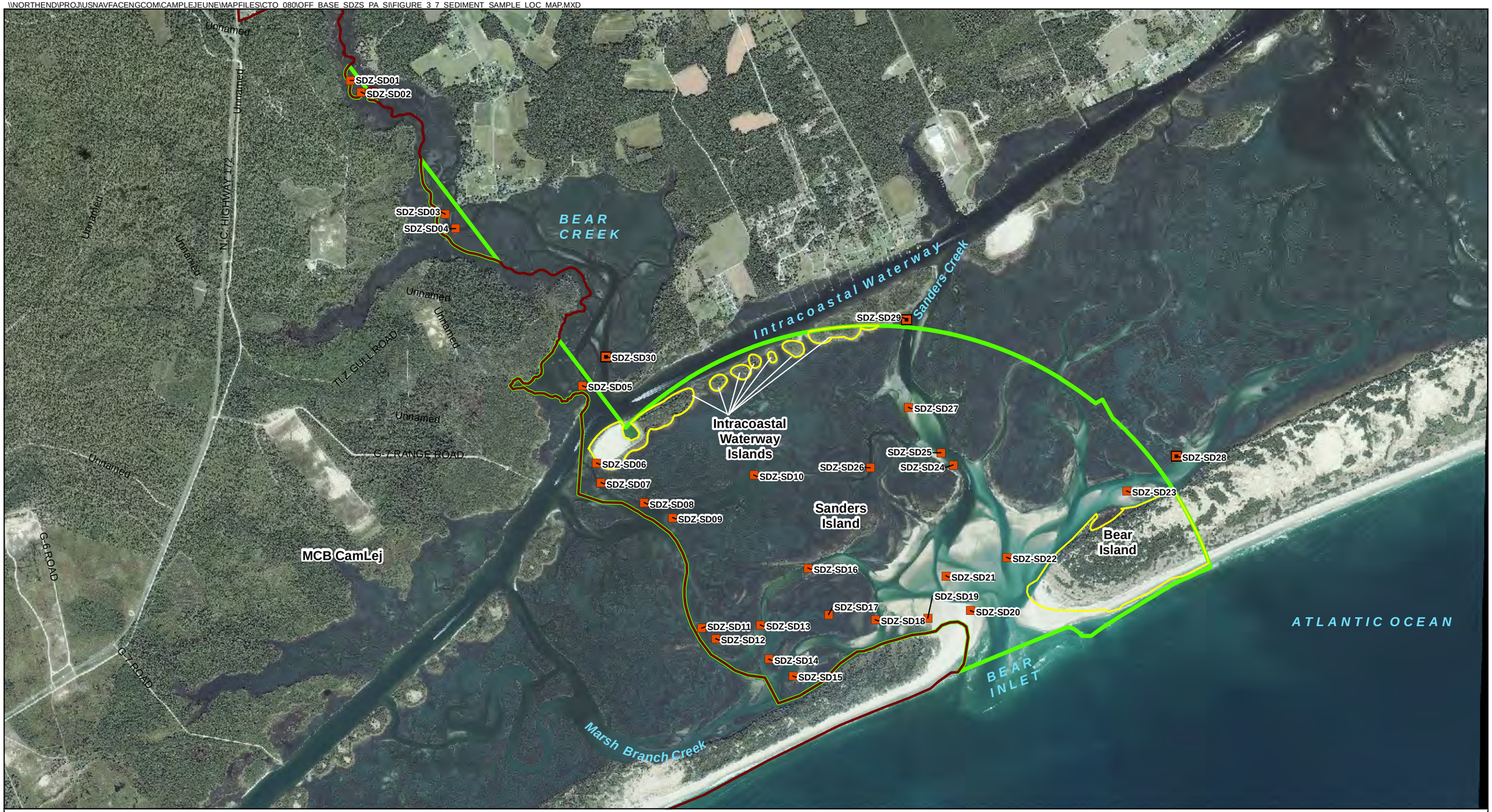
1 inch = 1,000 feet

Figure 3-6
Groundwater Sample Location Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

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\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_3_7_SEDIMENT_SAMPLE_LOC_MAP.MXD



Legend

- Sediment Sample Location
- Background Sediment Sample Location
- Upland Area
- Installation Boundary
- Off-Base SDZs

N

0 1,000 2,000 4,000 Feet

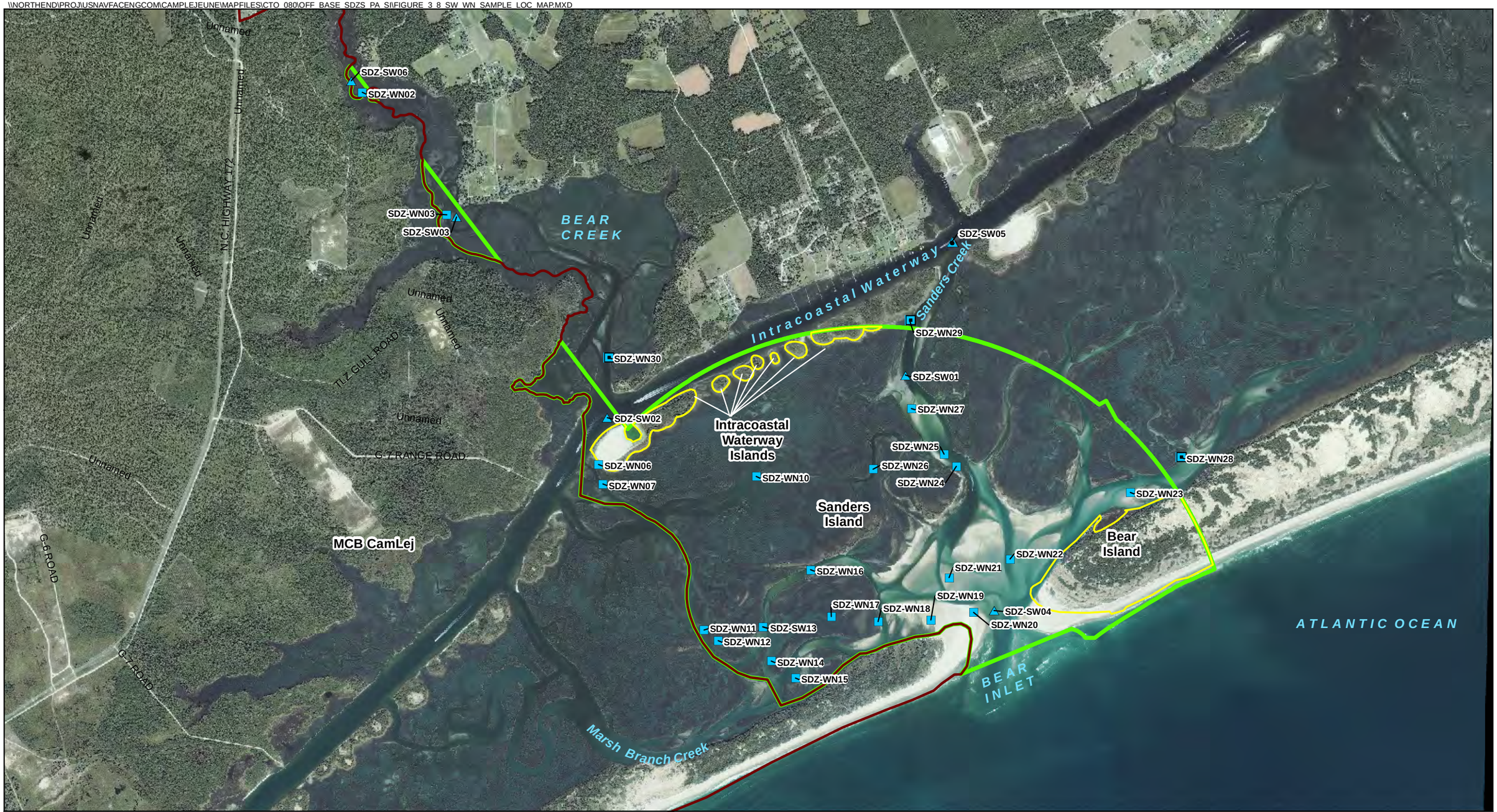
1 inch = 2,000 feet

Figure 3-7
Sediment Sample Location Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

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\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_3_8_SW_WN_SAMPLE_LOC_MAP.MXD



Legend

- Surface Water Sample Location
- Pore Water Sample Location
- Background Surface Water Sample Location
- Background Pore Water Sample Location
- Upland Area
- Installation Boundary
- Off-Base SDZs

N

0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet

Figure 3-8
Surface Water and Pore Water Sample Location Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

CH2MHILL

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SECTION 4

Field Investigation Results

This section summarizes the findings of the field investigation activities discussed in Section 3.

4.1 Geophysical Investigation Results

This section summarizes the results of the AGS and the terrestrial DGM.

4.1.1 Aerial Digital Geophysical Mapping

A total of 2,059 geophysical anomalies were identified from the AGS. Data processing and analysis of the Sky Research AGS data identified 1,720 geophysical anomalies. Analysis of the AGS data collected by Battelle yielded a total of 339 anomalies. Anomaly density maps were then produced to illustrate the spatial distribution of ferrous material (**Figure 4-1**). Analysis of the anomaly distribution identified the following three general areas as having the greatest anomaly densities:

- The mouth of Bear Inlet
- The confluence of Bear Creek and the ICW
- Along a main channel through the east-central portion of the MRA

The majority of the identified targets were located within or very close to water channels running through the site. Additional details and discussions are provided in **Appendix D-1**, the HeliMag Survey Report (Sky Research, 2009) including the magnetometer response signal. All Sky Research AGS data presented in this report met the data quality objectives outlined in the Geophysical Systems Verification Plan and the Geophysical Investigation Plan in the Work Plan (CH2M HILL, 2008a) and are suitable for evaluating the relationship between airborne detected anomalies and the presence of potential MEC at the site.

Analysis of the AGS data collected by Battelle yielded a total of 208 magnetic anomalies and 136 electromagnetic anomalies, located within the 200-acre portion of Bear Island. Only five of these anomalies were coincident in both magnetic and electromagnetic data sets, for a total of 339 anomalies (**Figure 4-1**). Relatively few anomalies were detected in the eastern half of the survey block. This may be the result of the vegetation and steeper sand dune topography on Bear Island which forced considerably higher altitudes than is practical for reliable munitions detection. Approximately two-thirds of the Battelle AGS data was surveyed at elevations greater than 10 feet above the ground surface (see Figures 11 and 12 in the Bear Island Aerial Survey Report [Battelle, 2010] found in **Appendix D-2**). Therefore, these data did not meet the Geophysical Systems Verification Plan DQOs (Appendix C, CH2M HILL, 2009) and are not reliable as an indication of the presence or lack of metallic items on the ground surface or in the subsurface.

4.1.2 Terrestrial Digital Geophysical Mapping

The terrestrial DGM activities conducted by NAEVA under subcontract to CH2M HILL identified a total of 3,165 geophysical anomalies. The vast majority of these anomalies were

detected along the periphery of the ICW Island ICW-7 (**Figure 4-2**). The margins of the upland portions of this island are lined with erosion control netting that is affixed by numerous metal staples and appear to manifest as geophysical anomalies. In contrast, the intertidal zones only contained 259 anomalies.

Of the 2,808 anomalies detected in the grids on ICW-7, approximately 2,500 were suspected to be cultural debris based on field observation of the numerous metal staples along the outer berms of ICW-7, leaving roughly 308anomalies that are not in the area of the erosion control netting. While these suspected cultural anomalies cannot be discounted without intrusive investigation, as it is possible for one source to mask the response of another, this number gives a more informative picture of the true background anomaly density.

Figure 4-2 illustrates that the distribution of anomalies other than those more evidently associated with cultural debris does not seem to indicate the presence of clustered metallic items, and suggests generally random occurrence. Additional details and discussions are provided in **Appendix E**, the *Geophysical Investigation Report, Preliminary Assessment/Site Inspection, Marine Corps Base (MCB) Camp Lejeune, North Carolina* (NAEVA, 2010).

4.1.3 Summary

A total of 2,059 anomalies were identified by the AGS. The areas of greatest anomaly densities were observed at the mouth of Bear Inlet, at the convergence of Bear Creek and the ICW, and along a main channel through the east-central portion of the site. The majority of the identified targets are located within or very close to water channels running through the site. In general, anomaly density across the 27 acres of land-based DGM area is quite low, with large areas in the intertidal zone having little to no response. The geophysical data alone are not suitable for determining the presence or absence of MEC.

Without intrusive investigation results, however, it is not possible to rule out the presence or absence of MEC in the Off-Base SDZs MRA. Section 4.2 presents the results of the intrusive investigation on Bear Island.

4.2 Intrusive Investigation Results

The certificate of clearance concerning the intrusive investigation of Bear Island conducted by Bristol is presented in **Appendix F**. A total of 183 anomalies were investigated and removed from Bear Island. Bristol found one expended jet-assisted take-off (JATO) bottle, three bomb dummy unit (BDU)-33s, and one 25mm cartridge case. No MEC or MPPEH were found, and all these items were found in the land portion of Bear Island (not in the water portion of the investigation).

4.3 Environmental Investigation Results

The laboratory analytical test results for surface soil, subsurface soil, sediment, groundwater, surface water and pore water for the Off-Base SDZ MRA are presented in this section. Laboratory analytical results are provided in **Appendix I**.

4.3.1 Background Evaluation

The laboratory analytical metal data for the samples of surface and subsurface soil and groundwater were evaluated statistically (using Gehan or Wilcoxon Ranks Sum) to assess

whether the concentrations of constituents detected in the Off-Base SDZs MRA samples were consistent with those detected in the samples collected from background locations. Overall, statistically significant differences between the background and site samples were not observed except for cadmium in surface soil samples; antimony, calcium, and copper for subsurface soil samples; and barium in groundwater samples. However, there were no exceedances of regulatory criteria in surface soil samples for cadmium, nor for antimony, calcium, and copper in subsurface soil samples. Of the 72 groundwater samples collected within the Off-Base SDZs MRA, barium was detected in every sample and exceeded regulatory criteria in only one sample.

Given the limited number of sediment and pore water samples collected from background locations outside the Off-Base SDZs MRA, statistical analysis was not possible. Consequently, analyte detections in samples collected from within the Off-Base SDZs MRA were compared to twice the mean background concentrations. If target analytes were not detected in background samples, the mean value was calculated using half the laboratory reporting limit.

Because only one background surface water sample was collected, a mean concentration could not be calculated and the detected background concentrations were directly compared to the maximum site concentrations.

4.3.2 Surface Soil

A total of 86 surface soil samples were collected, with 75 samples collected within the Off-Base SDZs MRA, and 11 samples collected from locations outside the MRA, representing background conditions. The analytical data are presented in **Table 4-1**.

Figures 4-3, 4-4 and 4-5 illustrate the distribution of target analytes that exceeded the North Carolina Soil Screening Limits (NC SSLs), USEPA Adjusted RSLs, and/or USEPA Adjusted Industrial RSLs on Bear Island, the ICW Islands, and Sanders Island, respectively.

Explosives residues and perchlorate were not detected above the method detection limits in the surface soil samples. However, the concentrations of aluminum, arsenic, chromium, and iron exceeded either the NC SSL or the Adjusted RSL. **Table 4-2** provides a summary of the metal concentrations that exceeded either the NC SSLs or the RSLs.

- Aluminum was detected in all 75 surface soil samples collected inside the Off-Base SDZs MRA at concentrations ranging from 159 milligrams per kilogram (mg/kg) to 7,800 mg/kg. Aluminum was also detected in all 11 background samples at concentrations ranging from 290 mg/kg to 4,790 mg/kg. Only one sample, collected inside the MRA, was reported to contain a concentration of aluminum that exceeded the USEPA Adjusted Residential RSL for aluminum.

- There was no statistically significant difference between the aluminum concentrations detected in the surface soil samples collected from within the Off-Base SDZs MRA and the background samples collected from outside the MRA.

- Arsenic was detected in 39 surface soil samples collected inside the Off-Base SDZs MRA at concentrations ranging from 0.33 J mg/kg to 9.2 mg/kg. Arsenic was also detected in eight of the background surface soil samples at concentrations ranging from 0.28 J mg/kg to 2.4 mg/kg. The detected concentrations of arsenic exceeded the NC SSL in

two surface soil samples and exceeded the USEPA Adjusted Residential RSL in 33 surface soil samples. There was no statistically significant difference between the arsenic concentrations in surface soil samples collected from within the Off-Base SDZs MRA compared to the background samples collected from outside the MRA.

- Chromium was detected in all 75 surface soil samples collected inside the Off-Base SDZs MRA at concentrations ranging from 2 mg/kg to 22.1 mg/kg, and was also detected in all 11 background samples at concentrations ranging from 3.7 mg/kg to 15.5 mg/kg. Chromium was detected at concentrations exceeding the NC SSL in 59 surface soil samples and the USEPA Adjusted Residential RSL in all 75 surface soil samples. There was no statistically significant difference between the chromium concentrations in surface soil samples collected from within the Off-Base SDZs MRA compared to the background samples collected from outside the MRA.
- Iron was detected in all 75 surface soil samples collected inside the Off-Base SDZs MRA at concentrations ranging from 291 mg/kg to 10,200 mg/kg, and was also detected in all 11 background samples at concentrations ranging from 635 mg/kg to 6,700 mg/kg. Iron was detected at concentrations exceeding the NC SSLs in 75 surface soil samples and the USEPA Adjusted Residential RSL in one surface soil sample. There was no statistically significant difference between the iron concentrations in surface soil samples collected from within the Off-Base SDZs MRA compared to the background samples collected from outside the MRA.
- One other metal (manganese) was detected in one surface soil sample at a concentration exceeding the regulatory screening criteria from sample location ICW-SS13 (**Figure 4-4**).

Supplemental data collected to support the ERS indicated that the surface soils across the uplands portions of the MRA were predominantly medium to fine sands with pH values ranging from 6.6 to 6.8. TOC concentrations in soil and sediment ranged from 1,050 mg/kg to 36,200 mg/kg (i.e., 0.1 to 3.6 percent)

4.3.3 Subsurface Soil

A total of 73 subsurface soil samples were collected during this phase of investigation, consisting of 65 samples from the Off-Base SDZs MRA, and 8 samples from locations outside the MRA, representing background conditions. The analytical data are presented in **Table 4-3**.

Figures 4-6, 4-7 and **4-8** illustrate the distribution of target analytes that exceeded the NC SSLs, USEPA Adjusted RSLs, and/or USEPA Adjusted Industrial RSLs on Bear Island, the ICW islands, and Sanders Island, respectively.

Explosives residues and perchlorate were not detected above the method detection limits in any of the subsurface soil samples. However, the concentrations of arsenic, chromium, and iron exceeded either the NC SSL or the Adjusted RSL, as summarized in **Table 4-4**.

- Arsenic was detected in 44 subsurface soil samples collected inside the MRA, at concentrations ranging from 0.32 J mg/kg to 2.1 mg/kg. The detected concentrations of arsenic exceeded the USEPA Adjusted Residential RSL in 39 subsurface soil samples, but did not exceed the NC SSL. There was no statistically significant difference between the

arsenic concentrations detected in subsurface soil samples collected from within the Off-Base SDZs MRA and the background samples collected from outside the MRA.

- Chromium was detected in all 73 subsurface soil samples at concentrations ranging from 1.8 mg/kg to 6.4 mg/kg, exceeded the NC SSL in 55 samples, and exceeded the USEPA Adjusted Residential RSL in all subsurface soil samples. There was no statistically significant difference between the chromium concentrations in subsurface soil samples collected from within the Off-Base SDZs MRA compared to the background samples collected from outside the MRA.
- Iron was detected in all subsurface soil samples at concentrations ranging from 198 mg/kg to 2,150 mg/kg. Iron was detected at concentrations exceeding the NC SSL in all subsurface soil samples and was not detected at concentrations exceeding the USEPA Adjusted Residential RSL in any subsurface soil samples. There was no statistically significant difference between the iron concentrations in subsurface soil samples collected from within the Off-Base SDZs MRA compared to the background samples collected from outside the MRA.
- No other metals were detected at concentrations exceeding the regulatory screening criteria in the subsurface soil samples.

4.3.4 Groundwater

A total of 83 groundwater samples were collected, with 72 samples collected within the Off-Base SDZs MRA, and 11 samples collected from locations outside the MRA, representing background conditions. The analytical data are presented in **Table 4-5**.

Figures 4-9, 4-10 and 4-11 illustrate the distribution of target analytes that exceeded the lower of the North Carolina Groundwater Quality Standards (NCGWQS) (NCDENR, 2010a) and maximum contaminant levels (MCLs) and/or the USEPA Adjusted Tap Water RSLs on Bear Island, the ICW islands, and Sanders Island, respectively.

Explosives residues were not detected above the method detection limits in any of the groundwater samples. Perchlorate was detected in 15 samples at estimated concentrations that were at least one order of magnitude below the Adjusted Tap Water RSL. Several metals were detected in groundwater samples. The concentrations of 16 metals exceeded either the NC SSL or the RSLs. The three metals (arsenic, chromium, and iron) that most frequently exceeded the NCGWQS and the Adjusted Tap Water RSL are discussed below. **Table 4-6** provides a summary of the metal concentrations that exceeded either the lower of the NCGWQS and MCLs and/or the USEPA Adjusted Tap Water RSL in groundwater samples.

- Arsenic was detected in 24 groundwater samples collected inside the Off-Base SDZs MRA at concentrations ranging from 3.0 J micrograms per liter (µg/L) to 43 µg/L. Arsenic was also detected in 7 of the 11 background groundwater samples at concentrations ranging from 3.0 µg/L to 16 µg/L. All detected concentrations were above the USEPA Adjusted Tap Water RSLs and nine of those sample concentrations exceeded the NCGWQS. There was no statistically significant difference between the arsenic concentrations in groundwater samples collected from within the Off-Base SDZs MRA compared to the background samples collected from outside the MRA.

- Chromium was detected in 67 groundwater samples collected inside the Off-Base SDZs MRA at concentrations ranging from 0.95 J µg/L to 197 µg/L. Chromium was also detected in all 11 of the background groundwater samples at concentrations ranging from 1.9 µg/L to 5.8 µg/L. All detected concentrations were above the USEPA Adjusted Tap Water RSL and 12 of those concentrations exceeded the NCGWQS. There was no statistically significant difference between the chromium concentrations in groundwater samples collected from within the Off-Base SDZs MRA compared to the background samples collected from outside the MRA.
- Iron was detected in 56 groundwater samples collected inside the MRA at concentrations ranging from 34.1 J µg/L to 60,300 µg/L. Iron was also detected in all 13 of the background groundwater samples at concentrations ranging from 191 µg/L to 8,940 µg/L. There was no statistically significant difference between the iron concentrations in groundwater samples collected from within the Off-Base SDZs MRA compared to the background samples collected from outside the MRA.

4.3.5 Surface Water

Surface water was collected at five locations in the Off-Base SDZs MRA and one background location outside the MRA. The analytical data for the six surface water samples are presented in **Table 4-7**.

None of the detected concentrations of target analytes were found to exceed the NCDENR Surface Water Human Health and Surface Water Supply criteria (NCDENR, 2010b).

4.3.6 Sediment

A total of 30 sediment samples were collected, with 27 samples collected within the Off-Base SDZs MRA, and 3 samples collected from locations outside the MRA, representing background conditions. The analytical data are presented in **Table 4-8**.

Figure 4-12 illustrates the distribution of target analytes that exceeded the SSLs), USEPA Adjusted RSLs, and/or USEPA Adjusted Industrial RSLs on Bear Island, the ICW Islands, and Sanders Island, respectively.

Explosives residues and perchlorate were not detected above the method detection limits in the sediment samples. However, the concentrations of aluminum, arsenic, chromium, iron, and vanadium exceeded either the NC SSL or the Adjusted RSL. **Table 4-9** provides a summary of the metal concentrations that exceeded either the NC SSLs or the RSLs.

- Aluminum was detected in all 30 sediment samples and was detected at concentrations that exceeded the USEPA Adjusted Residential RSLs in three samples.
- Arsenic was detected in all 30 sediment samples in the Off-Base SDZs MRA at concentrations that exceeded the USEPA Adjusted Residential RSLs. Arsenic was detected at concentrations exceeding the USEPA Adjusted Industrial RSL in 17 sediment samples.
- Chromium was detected in all 30 sediment samples in the Off-Base SDZs MRA at concentrations that exceeded the USEPA Adjusted Residential RSLs. Chromium was detected at concentrations exceeding the USEPA Adjusted Industrial RSL in 21 sediment samples.

- Iron was detected in all 30 sediment samples and exceeded the USEPA Adjusted Residential RSLs in 10 samples.
- Vanadium was detected in 1 sediment sample at a concentration that exceeded the USEPA Adjusted Residential RSLs.

4.3.7 Pore Water

A total of 25 pore water samples were collected, with 22 samples collected within the Off-Base SDZs MRA, and 3 samples collected from locations outside the MRA, representing background conditions. The analytical data are presented in **Table 4-10**.

Figure 4-13 illustrates the distribution of target analytes that exceeded the lower of the NCGWQS (NCDENR, 2010a) and MCLs and/or the USEPA Adjusted Tap Water RSLs on Bear Island, the ICW islands, and Sanders Island, respectively.

Table 4-11 provides a summary of the metal concentrations that exceeded either the lower of the NCGWQS and MCLs and/or the USEPA Adjusted Tap Water RSL in pore water samples.

- Aluminum was detected in 17 of 22 pore water samples collected inside the Off-Base SDZs MRA at concentrations ranging from 35.3 J µg/L to 8,630 J µg/L and was detected at concentrations that exceeded its respective USEPA Adjusted Tap Water RSL in two samples.
- Antimony was detected in 7 of 22 pore water samples collected inside the Off-Base SDZs MRA at concentrations ranging from 2.3 J µg/L to 4.4 J µg/L and was detected at concentrations that exceeded its respective USEPA Adjusted Tap Water RSL in all seven samples.
- Arsenic was detected in 13 of 22 pore water samples collected inside the Off-Base SDZs MRA at concentrations ranging from 2.7 J µg/L to 39.6 µg/L and was detected at concentrations that exceeded its respective USEPA Adjusted Tap Water RSL in all 13 samples and the NCGWQS in three samples.
- Cadmium was detected in 21 of 22 pore water samples collected inside the Off-Base SDZs MRA at concentrations ranging from 5.1 µg/L to 10.2 µg/L and was detected at concentrations that exceeded its respective USEPA Adjusted Tap Water RSL and NCGWQS in all 21 samples.
- Chromium was detected in 2 of 22 pore water samples collected inside the Off-Base SDZs MRA at concentrations ranging from 17.1 µg/L to 22.6 µg/L and was detected at concentrations that exceeded its respective USEPA Adjusted Tap Water RSL and the NCGWQS in both samples.
- Cobalt was detected in 21 of 22 pore water samples collected inside the Off-Base SDZs MRA at concentrations ranging from 19 µg/L to 37.1 µg/L and was detected at concentrations that exceeded its respective USEPA Adjusted Tap Water RSL in all twenty one samples.
- Iron was detected in all 22 pore water samples collected inside the Off-Base SDZs MRA at concentrations ranging from 14.1 J µg/L to 9,030 µg/L and was detected at

concentrations that exceeded its respective USEPA Adjusted Tap Water RSL in six samples and the NCGWQS in 21 samples.

- Manganese was detected in 12 of 22 pore water samples collected inside the Off-Base SDZs MRA at concentrations ranging from 16.2 µg/L to 175 µg/L and was detected at concentrations that exceeded its respective USEPA Adjusted Tap Water RSL in four samples and the NCGWQS in six samples.
- Thallium was detected in 1 of 22 pore water samples collected inside the Off-Base SDZs MRA at a concentration of 5 J µg/L, which exceeded its respective NCGWQS.
- Vanadium was detected in 16 of 22 pore water samples collected inside the Off-Base SDZs MRA at concentrations ranging from 1.5 J µg/L to 22 µg/L and was detected at concentrations that exceeded its respective USEPA Adjusted Tap Water RSL in one sample.

TABLE 4-1
Surface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SS 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54		BIBG-GW55/SO55	BIBG-GW56/SO56	BIBG-GW57/SO57
Sample ID					BI-SS50-10A	BI-SS51-10A	BI-SS52-10A	BI-SS53-10A	BI-SS54-10A	BI-SS54D-10A	BI-SS55-10A	BI-SS56-10A	BI-SS57-10A
Sample Date					01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/25/10	01/31/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	2,040	--	99,000	7,700	290	343	411	388	344	353	353	297	323
Antimony	1.31	--	41	3.1	0.97 U	0.98	0.29 J	1	0.98 U	1 U	0.95 U	1 U	0.96 U
Arsenic	1.432	5.8	1.6	0.39	0.28 J	0.96 U	0.53 J	0.91 J	0.44 J	0.44 J	0.95 U	0.33 J	0.96 U
Barium	16.68	580	19,000	1,500	1.7 J	19.2 UJ	2.7 J	19.6 UJ	2.6 J	2.3 J	2.3 J	2.3 J	19.2 UJ
Beryllium	--	--	200	16	0.49 U	0.48 U	0.5 U	0.49 U	0.49 U	0.5 U	0.48 U	0.52 U	0.48 U
Cadmium	0.53	3	80	7	0.49 U	0.48 U	0.5 U	0.49 U	0.49 U	0.5 U	0.48 U	0.52 U	0.48 U
Calcium	9,580	--	--	--	1,390	1,340	2,150	3,440	2,280	2,180	1,800	1,340	1,710
Chromium	12.22	3.8	5.6	0.29	4	4.4	5.4	**5.9**	4.8	4.9	4.7	3.8	4
Cobalt	0.606	--	30	2.3	0.1 J	0.48 U	0.18 J	0.49 U	0.14 J	0.13 J	0.14 J	0.52 U	0.48 U
Copper	1.594	700	4,100	310	0.19 J	0.48 U	0.26 J	0.49 U	0.21 J	0.22 J	0.17 J	0.52 U	0.22 J
Iron	3,120	150	72,000	5,500	635	725	894	859	735	780	733	642	661
Lead	6.14	270	800	400	1.1 J	1.5 J	2.8 J	1.8 J	1.6 J	1.5 J	1.5 J	1.4 J	1.1 J
Magnesium	1,412	--	--	--	486 UJ	479 U	502 UJ	489 U	489 UJ	503 UJ	477 UJ	524 U	118 J
Manganese	27.6	65	2,300	180	4.3	5.9	8.7	7.9	5.8	6	6.2	5.5	4.9
Mercury	0.0764	1	31	2.3	0.033 U	0.032 U	0.033 U	0.034 U	0.033 U	0.031 U	0.034 U	0.035 U	0.034 U
Nickel	1.77	130	2,000	150	0.18 J	0.27 J	0.34 J	0.41 J	0.26 J	0.32 J	0.26 J	4.2 U	0.29 J
Potassium	592	--	--	--	486 U	479 U	502 U	489 U	489 U	503 U	477 U	524 U	481 U
Selenium	--	2.1	510	39	0.49 U	0.48 UJ	0.5 U	0.49 UJ	0.49 U	0.5 U	0.48 U	0.52 UJ	0.48 UJ
Silver	--	3.4	510	39	0.49 U	0.48 U	0.5 U	0.49 U	0.49 U	0.5 U	0.48 U	0.52 U	0.48 U
Sodium	736	--	--	--	486 U	479 U	502 U	489 U	489 U	503 U	477 U	524 U	481 U
Vanadium	6.38	--	520	39	1.9 U	1.4 J	2 U	1.9 J	2 U	2 U	1.9 U	2.1 U	1.4 J
Zinc	11.7	1,200	31,000	2,300	2.6	2.7	4.8	3.4	2.4	2.5	2.6	2.8 J	2.4

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Underline indicates exceedance of Adjusted Residential Soil RSLs

Shading indicates exceedance of two times the mean site specific background concentration for surface soil

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

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

J- - Analyte present, value may be biased low, actual value may be higher

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 4-1
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Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SS 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW01/SO01		BI-GW02/SO02	BI-GW03/SO03	BI-GW04/GW04	BI-GW05/SO05	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08
Sample ID					BI-SS01-10A	BI-SS01D-10A	BI-SS02-10A	BI-SS03-10A	BI-SS04-10A	BI-SS05-10A	BI-SS06-10A	BI-SS07-10A	BI-SS08-10A
Sample Date					01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	2,040	--	99,000	7,700	319	326	350	338	325	326	330	377 J	465 J
Antimony	1.31	--	41	3.1	0.81 J	0.89 J	0.71 J	0.79 J	0.8 J	0.82 J	0.66 J	0.99 U	1 U
Arsenic	1.432	5.8	1.6	0.39	0.87 J	0.83 J	1.2	0.91 J	0.84 J	0.74 J	0.99	0.87 J	0.94 J
Barium	16.68	580	19,000	1,500	1.1 J	1.2 J	1.5 J	1.2 J	0.94 J	1.2 J	1.2 J	2.3 J	2.8 J
Beryllium	--	--	200	16	0.5 U	0.5 U	0.47 U	0.51 U	0.47 U	0.48 U	0.07 J	0.49 U	0.5 U
Cadmium	0.53	3	80	7	0.5 U	0.5 U	0.47 U	0.51 U	0.47 U	0.48 U	0.48 U	0.04 J	0.04 J
Calcium	9,580	--	--	--	6,240	6,400	7,200	4,990	3,590	4,620	6,570	4,420	3,380
Chromium	12.22	3.8	5.6	0.29	4.7	4.7	5.6	5.1	4.2	4.8	4.8	**5.9**	**6.3**
Cobalt	0.606	--	30	2.3	0.5 U	0.5 U	0.47 U	0.51 U	0.47 U	0.48 U	0.48 U	0.13 J	0.15 J
Copper	1.594	700	4,100	310	0.5 U	0.5 U	0.47 U	0.51 U	0.47 U	0.48 U	0.48 U	0.49 U	0.5 U
Iron	3,120	150	72,000	5,500	761	772	831	745	711	748	786	900	935
Lead	6.14	270	800	400	1.2 J	1.2 J	1.5 J	1.3 J	1.1 J	1.4 J	1.3 J	2 J	2.5 J
Magnesium	1,412	--	--	--	262 J	268 J	284 J	262 J	217 J	255 J	243 J	494 U	498 U
Manganese	27.6	65	2,300	180	6.2	6.5	7.1	6.1	5.4	6.7	6.1	7.5	10
Mercury	0.0764	1	31	2.3	0.034 U	0.032 U	0.033 U	0.033 U	0.034 U	0.034 U	0.033 U	0.033 U	0.033 U
Nickel	1.77	130	2,000	150	0.26 J	0.32 J	0.35 J	0.27 J	0.26 J	0.34 J	0.24 J	0.28 J	0.38 J
Potassium	592	--	--	--	49 J	51.3 J	56.8 J	50.3 J	48.8 J	49.8 J	50.5 J	40.6 J	55.5 J
Selenium	--	2.1	510	39	0.5 U	0.5 U	0.47 U	0.51 U	0.47 U	0.48 U	0.48 U	0.49 U	0.5 U
Silver	--	3.4	510	39	0.5 U	0.5 U	0.47 U	0.51 U	0.47 U	0.48 U	0.48 U	0.49 U	0.5 U
Sodium	736	--	--	--	503 U	498 U	466 U	506 U	474 U	477 U	478 U	494 U	498 U
Vanadium	6.38	--	520	39	1.8 J	1.8 J	2	1.8 J	1.5 J	1.7 J	1.8 J	2	2.2
Zinc	11.7	1,200	31,000	2,300	2.7	2.6	3.5	3	2.8	2.7	2.8	3.5	5.3

Notes:

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

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Sample ID					BI-SS09-10A	BI-SS10-10A	BI-SS11-10A	BI-SS12-10A	BI-SS13-10A	BI-SS14-10A	BI-SS15-10A	BI-SS16-10A	BI-SS17-10A
Sample Date					01/31/10	01/31/10	01/31/10	01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	2,040	--	99,000	7,700	404	363	421	366	438	245	286	302 J	356
Antimony	1.31	--	41	3.1	1 U	1 U	1 U	0.99 U	1.1	1 U	1.1	1 U	0.96 U
Arsenic	1.432	5.8	1.6	0.39	1	1.2	1	0.92 J	1 U	1 U	0.66 J	1 U	0.38 J
Barium	16.68	580	19,000	1,500	20 UJ	20.3 UJ	20.6 UJ	19.9 UJ	20.4 UJ	1.6 J	20.8 UJ	1.8 J	2.5 J
Beryllium	--	--	200	16	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U	0.52 U	0.52 U	0.52 U	0.48 U
Cadmium	0.53	3	80	7	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U	0.52 U	0.52 U	0.52 U	0.48 U
Calcium	9,580	--	--	--	6,240	6,780	4,960	5,680	1,640	594	1,620	1,910	1,340
Chromium	12.22	3.8	5.6	0.29	**5.8**	**6.5**	**6.6**	5.4	5.4	3.6	4.1	4.3	4.6
Cobalt	0.606	--	30	2.3	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U	0.52 U	0.52 U	0.52 U	0.48 U
Copper	1.594	700	4,100	310	0.5 U	0.37 J	0.24 J	0.5 U	0.28 J	0.41 J	0.52 U	0.52 U	0.48 U
Iron	3,120	150	72,000	5,500	899	853	897	847	889	602	627	679	746
Lead	6.14	270	800	400	1.7 J	2 J	2 J	1.5 J	2.2 J	2.2 J	1.1 J	1.3 J	1.5 J
Magnesium	1,412	--	--	--	279 J	286 J	296 J	266 J	170 J	516 UJ	519 U	517 U	481 U
Manganese	27.6	65	2,300	180	7.8	8.1	9.5	7.4	8.8	3.6	4.5	4.8	6.6
Mercury	0.0764	1	31	2.3	0.03 U	0.034 U	0.035 U	0.032 U	0.035 U	0.036 U	0.035 U	0.034 U	0.033 U
Nickel	1.77	130	2,000	150	0.42 J	0.44 J	0.41 J	0.47 J	0.4 J	0.28 J	0.24 J	0.13 J	3.9 U
Potassium	592	--	--	--	500 U	508 U	516 U	496 U	510 U	516 U	519 U	31 J	481 U
Selenium	--	2.1	510	39	0.5 UJ	0.51 UJ	0.52 UJ	0.5 UJ	0.51 UJ	0.52 U	0.52 UJ	0.52 U	0.48 UJ
Silver	--	3.4	510	39	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U	0.52 U	0.52 U	0.52 U	0.48 U
Sodium	736	--	--	--	500 U	508 U	516 U	496 U	510 U	516 U	519 U	517 U	481 U
Vanadium	6.38	--	520	39	2.1	2.2	2.3	1.9 J	1.9 J	2.1 U	1.3 J	1.4 J	1.9 U
Zinc	11.7	1,200	31,000	2,300	3	3.3	3.4	3.4	4.5	2.3	2.7	2.5	2.5 J

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Underline indicates exceedance of Adjusted Residential Soil RSLs

Shading indicates exceedance of two times the mean site specific background concentration for surface soil

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TABLE 4-1
Surface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SS 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-SO18	BI-GW19/SO19		BI-GW20/SO20	BI-GW21/SO21	BI-GW22/SO22	BI-GW23/SO23	BI-GW24/SO24	BI-GW25/SO25
Sample ID					BI-SS18-10A	BI-SS19-10A	BI-SS19D-10A	BI-SS20-10A	BI-SS21-10A	BI-SS22-10A	BI-SS23-10A	BI-SS24-10A	BI-SS25-10A
Sample Date					01/26/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/28/10	01/28/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	2,040	--	99,000	7,700	440	297	289	297	372	320	159	349	393
Antimony	1.31	--	41	3.1	1.3 U	1.1 U	1 U	1.1	1 U	1 U	1.1	1	0.64 J
Arsenic	1.432	5.8	1.6	0.39	1.3 U	1.1 U	1 U	1 U	1 U	1 U	1.1 U	0.7 J	0.67 J
Barium	16.68	580	19,000	1,500	2.8 J	2 J	2.1 J	20.7 UJ	20.4 UJ	20.9 UJ	21.6 UJ	19 UJ	1.3 J
Beryllium	--	--	200	16	0.64 U	0.53 U	0.5 U	0.52 U	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U
Cadmium	0.53	3	80	7	0.64 U	0.53 U	0.5 U	0.52 U	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U
Calcium	9,580	--	--	--	1,190	1,070	1,010	1,200	989	732	541 U	3,010	2,880
Chromium	12.22	3.8	5.6	0.29	5.3	3.4	3.3	4.3	5	3.9	2.4	4.5	5.1
Cobalt	0.606	--	30	2.3	0.64 U	0.53 U	0.5 U	0.52 U	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U
Copper	1.594	700	4,100	310	0.64 U	0.32 J	0.22 J	0.36 J	0.51 U	0.26 J	0.54 U	0.47 U	0.22 J
Iron	3,120	150	72,000	5,500	947	645	614	633	772	686	354	788	817
Lead	6.14	270	800	400	2.6 J	2.1 J	2.1 J	2.2	3.4	3.7	2.8 J	1.9 J	1.5 J
Magnesium	1,412	--	--	--	641 U	528 U	502 U	93.4 J	108 J	522 U	541 U	474 U	248 J
Manganese	27.6	65	2,300	180	9.3	6.5	5.6	7.7	11.7	6.4	2.9	6.8	7.6
Mercury	0.0764	1	31	2.3	0.042 U	0.034 U	0.033 U	0.032 U	0.034 U	0.035 U	0.033 U	0.031 U	0.034 U
Nickel	1.77	130	2,000	150	5.1 U	4.2 U	4 U	0.29 J	0.29 J	0.27 J	4.3 U	0.32 J	0.31 J
Potassium	592	--	--	--	641 U	528 U	502 U	45.6 J	60 J	522 U	541 U	474 U	61.1 J
Selenium	--	2.1	510	39	0.64 UJ	0.53 UJ	0.5 UJ	0.52 U	0.51 U	0.52 UJ	0.54 UJ	0.47 UJ	0.49 U
Silver	--	3.4	510	39	0.64 U	0.53 U	0.5 U	0.52 U	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U
Sodium	736	--	--	--	641 U	528 U	502 U	518 U	511 U	522 U	541 U	474 U	489 U
Vanadium	6.38	--	520	39	2.6 U	2.1 U	2 U	2.1 U	2 U	1.3 J	0.92 J	1.5 J	1.7 J
Zinc	11.7	1,200	31,000	2,300	4.5 J	5 J	4.4 J	3.9	5.5	5.4	8	3.6	3.2

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Surface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SS 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW26/SO26		BI-GW27/SO27	BI-GW28/SO28	BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31	BI-GW32/SO32	BI-GW33/SO33
Sample ID					BI-SS26-10A	BI-SS26D-10A	BI-SS27-10A	BI-SS28-10A	BI-SS29-10A	BI-SS30-10A	BI-SS31-10A	BI-SS32-10A	BI-SS33-10A
Sample Date					01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	2,040	--	99,000	7,700	315	308	256	321 J	340 J	306 J	344 J	369 J	344 J
Antimony	1.31	--	41	3.1	0.89 J	0.84 J	0.87 J	0.33 J	1 U	1 U	1 U	1.1 U	0.3 J
Arsenic	1.432	5.8	1.6	0.39	0.7 J	0.7 J	0.71 J	0.34 J	0.44 J	1 U	0.65 J	1.1 J	0.67 J
Barium	16.68	580	19,000	1,500	1.3 J	1.1 J	1 J	1.9 J	2.3 J	1.8 J	1.5 J	2.1 J	1.9 J
Beryllium	--	--	200	16	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U
Cadmium	0.53	3	80	7	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U
Calcium	9,580	--	--	--	2,300	2,160	4,330	1,690	2,200	1,470	3,710	7,180	4,710
Chromium	12.22	3.8	5.6	0.29	4.1	4	3.5	4.4	5.2	4	4.6	5.6	5.1
Cobalt	0.606	--	30	2.3	0.51 U	0.52 U	0.48 U	0.52 U	0.08 J	0.5 U	0.12 J	0.15 J	0.11 J
Copper	1.594	700	4,100	310	0.21 J	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U
Iron	3,120	150	72,000	5,500	713	723	644	664	729	653	757	888	786
Lead	6.14	270	800	400	1.6 J	1.4 J	1.2 J	2.7 J	2.4 J	2.5 J	1.3 J	1.9 J	1.6 J
Magnesium	1,412	--	--	--	176 J	175 J	177 J	524 U	505 U	505 U	503 U	541 U	503 U
Manganese	27.6	65	2,300	180	5.8	5.6	5.7	5.1	7.1	6.2	5.6	6.6	6.8
Mercury	0.0764	1	31	2.3	0.033 U	0.035 U	0.034 U	0.035 U	0.032 U	0.035 U	0.02 J	0.035 U	0.033 U
Nickel	1.77	130	2,000	150	4.1 U	4.2 U	3.9 U	0.18 J	0.23 J	0.19 J	0.28 J	0.32 J	0.33 J
Potassium	592	--	--	--	56.7 J	56.5 J	41.9 J	39.5 J	39 J	37.4 J	37.6 J	40.2 J	37.6 J
Selenium	--	2.1	510	39	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U
Silver	--	3.4	510	39	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U
Sodium	736	--	--	--	507 U	522 U	484 U	524 U	505 U	505 U	503 U	541 U	503 U
Vanadium	6.38	--	520	39	1.5 J	1.5 J	1.4 J	2.1 U	2 U	2 U	2 U	2.2 U	2 U
Zinc	11.7	1,200	31,000	2,300	4.5	3.6	2.3	4.9	4	5.5	2.8	2.9	2.7

Notes:

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TABLE 4-1
Surface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	**Site Specific Background SS 2X Mean**	**NC SSLs (January, 2010)**	**Adjusted Industrial Soil RSLs (May 2010)**	**Adjusted Residential Soil RSLs (May 2010)**	BI-GW34/SO34	BI-GW35/SO35		BI-GW36/SO36	BI-SO37	BI-GW38/SO38	BI-GW39/SO39	BI-GW40/SO40	BI-GW41/SO41
Sample ID					BI-SS34-10A	BI-SS35-10A	BI-SS35D-10A	BI-SS36-10A	BI-SS37-10A	BI-SS38-10A	BI-SS39-10A	BI-SS40-10A	BI-SS41-10A
Sample Date					01/27/10	01/26/10	01/26/10	01/26/10	01/26/10	01/26/10	01/26/10	02/01/10	02/01/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	2,040	--	99,000	7,700	339	330	423	338	302	286	171	295	218
Antimony	1.31	--	41	3.1	1 U	1 U	1.2 U	1 U	1 U	1 U	1.4 U	1.1 U	1 U
Arsenic	1.432	5.8	1.6	0.39	0.36 J	1 U	0.43 J	0.38 J	1 U	1 U	1.4 U	1.1 U	1 U
Barium	16.68	580	19,000	1,500	2.4 J	2.8 J	3.2 J	2.3 J	1.9 J	2 J	1.6 J	21.1 UJ	20.8 UJ
Beryllium	--	--	200	16	0.51 U	0.51 U	0.62 U	0.5 U	0.51 U	0.5 U	0.7 U	0.53 U	0.52 U
Cadmium	0.53	3	80	7	0.51 U	0.51 U	0.62 U	0.5 U	0.51 U	0.5 U	0.7 U	0.53 U	0.52 U
Calcium	9,580	--	--	--	1,600	1,380	1,710	2,020	945	571	700 U	660	520 U
Chromium	12.22	3.8	5.6	0.29	4.4	4.1	5.1	4.7	3.8	3.6	2	3.7	2.8
Cobalt	0.606	--	30	2.3	0.13 J	0.51 U	0.62 U	0.5 U	0.51 U	0.5 U	0.7 U	0.53 U	0.52 U
Copper	1.594	700	4,100	310	0.39 J	0.21 J	0.22 J	0.15 J	0.51 U	0.16 J	0.7 U	0.26 J	0.52 U
Iron	3,120	150	72,000	5,500	740	707	903	745	657	649	291	677	526
Lead	6.14	270	800	400	1.6 J	1.6 J	2 J	1.6 J	1.5 J	2.4 J	2 J	2.4	2.7
Magnesium	1,412	--	--	--	507 UJ	505 U	623 U	504 U	514 U	499 U	700 U	91.7 J	51.6 J
Manganese	27.6	65	2,300	180	8.6	6.3	8.1	6.1	4.5	7.8	2	5.9	3.6
Mercury	0.0764	1	31	2.3	0.033 U	0.033 U	0.042 U	0.032 U	0.034 U	0.034 U	0.048 U	0.033 U	0.032 U
Nickel	1.77	130	2,000	150	0.24 J	4 U	5 U	4 U	4.1 U	4 U	5.6 U	4.2 U	4.2 U
Potassium	592	--	--	--	507 U	505 U	623 U	504 U	514 U	499 U	700 U	528 U	520 U
Selenium	--	2.1	510	39	0.51 U	0.51 UJ	0.62 UJ	0.5 UJ	0.51 UJ	0.5 UJ	0.7 UJ	0.53 UJ	0.52 UJ
Silver	--	3.4	510	39	0.51 U	0.51 U	0.62 U	0.5 U	0.51 U	0.5 U	0.7 U	0.53 U	0.52 U
Sodium	736	--	--	--	507 U	505 U	623 U	504 U	514 U	499 U	700 U	528 U	520 U
Vanadium	6.38	--	520	39	2 U	2 U	2.5 U	2 U	2.1 U	2 U	2.8 U	1.3 J	1.2 J
Zinc	11.7	1,200	31,000	2,300	3.4	4.3 J	5.4 J	2.3 J	3.5 J	3 J	2.8 UJ	2.8	2.1 U

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Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SS 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW42/SO42	BI-GW43/SO43	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46	BI-GW47/SO47		BI-GW48/SO48	BI-GW49/SO49
Sample ID					BI-SS42-10A	BI-SS43-10A	BI-SS44-10A	BI-SS45-10A	BI-SS46-10A	BI-SS47-10A	BI-SS47D-10A	BI-SS48-10A	BI-SS49-10A
Sample Date					01/28/10	01/28/10	01/29/10	01/27/10	01/27/10	02/01/10	02/01/10	02/01/10	01/28/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	2,040	--	99,000	7,700	349	356	406 J	332	345	351	322	352	322
Antimony	1.31	--	41	3.1	0.97 U	0.87 J	0.97 U	1 U	1 U	1.1	1	1 U	0.98 U
Arsenic	1.432	5.8	1.6	0.39	0.62 J	0.59 J	0.97 U	1 U	0.56 J	0.97 U	1 U	1 U	0.61 J
Barium	16.68	580	19,000	1,500	19.5 UJ	1.6 J	2.5 J	20.6 UJ	2.3 J	19.3 UJ	20 UJ	20.5 UJ	19.7 UJ
Beryllium	--	--	200	16	0.49 U	0.48 U	0.49 U	0.52 U	0.51 U	0.48 U	0.5 U	0.51 U	0.49 U
Cadmium	0.53	3	80	7	0.49 U	0.48 U	0.49 U	0.52 U	0.51 U	0.48 U	0.5 U	0.51 U	0.49 U
Calcium	9,580	--	--	--	2,030	1,880	836	975	2,240	597	643	791	1,820
Chromium	12.22	3.8	5.6	0.29	4.6	4.4	5	4.4	5.1	4	3.8	4.6	4.5
Cobalt	0.606	--	30	2.3	0.49 U	0.48 U	0.14 J	0.52 U	0.11 J	0.48 U	0.5 U	0.51 U	0.49 U
Copper	1.594	700	4,100	310	0.49 U	0.48 U	0.49 U	0.52 U	0.21 J	0.26 J	0.32 J	0.35 J	0.21 J
Iron	3,120	150	72,000	5,500	751	771	916	726	777	735	652	738	710
Lead	6.14	270	800	400	1.6 J	2.3 J	3.2 J	2.4 J	1.8 J	1.8	1.5	2.3	1.8 J
Magnesium	1,412	--	--	--	486 U	154 J	487 U	516 U	511 UJ	107 J	104 J	102 J	492 U
Manganese	27.6	65	2,300	180	6.6	7.4	10.2	6.8	7	7.6	6.5	6.2	7
Mercury	0.0764	1	31	2.3	0.033 U	0.033 U	0.03 U	0.034 U	0.035 U	0.034 U	0.033 U	0.033 U	0.032 U
Nickel	1.77	130	2,000	150	0.28 J	0.24 J	0.2 J	4.1 U	0.27 J	0.28 J	0.26 J	0.32 J	0.24 J
Potassium	592	--	--	--	486 U	65.8 J	45.6 J	516 U	511 U	41.5 J	42.4 J	46.3 J	492 U
Selenium	--	2.1	510	39	0.49 UJ	0.48 U	0.49 U	0.52 UJ	0.51 U	0.48 U	0.5 U	0.51 U	0.49 UJ
Silver	--	3.4	510	39	0.49 U	0.48 U	0.49 U	0.52 U	0.51 U	0.48 U	0.5 U	0.51 U	0.49 U
Sodium	736	--	--	--	486 U	478 U	487 U	516 U	511 U	483 U	500 U	512 U	492 U
Vanadium	6.38	--	520	39	1.4 J	1.6 J	1.9 U	1.4 J	2 U	1.9 U	2 U	2 U	1.4 J
Zinc	11.7	1,200	31,000	2,300	3.2	4.8	5.2	4.1	3	3.3	2.6	3.9	4

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

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J- - Analyte present, value may be biased low, actual value may be higher

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U - The material was analyzed for, but not detected

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mg/kg - Milligrams per kilogram

µg/kg - Micrograms per kilogram

TABLE 4-1
Surface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SS 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW59/SO59	BI-SO18	BI-SO37	BI-SO58	BI-SO60	ICWBG-GW20/SO20		ICWBG-GW21/SO21	ICWBG-GW22/SO22
Sample ID					BI-SS59-10A	BI-SS18-10A	BI-SS37-10A	BI-SS58-10A	BI-SS60-10A	ICW-SS20-10A	ICW-SS20D-10A	ICW-SS21-10A	ICW-SS22-10A
Sample Date					02/01/10	01/26/10	01/26/10	01/26/10	01/27/10	03/26/10	03/26/10	03/26/10	03/25/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	2,040	--	99,000	7,700	481	440	302	322	358	2,080	1,810	1,560	4,790
Antimony	1.31	--	41	3.1	1.6 U	1.3 U	1 U	1 U	0.46 J	1.7 U	1.7 U	1.3 U	2 U
Arsenic	1.432	5.8	1.6	0.39	1.6 U	1.3 U	1 U	1 U	0.41 J	0.9 J	0.53 J	1.3 U	**2.4**
Barium	16.68	580	19,000	1,500	32.8 UJ	2.8 J	1.9 J	1.7 J	1.9 J	34.9 U	34.6 U	26.9 U	40.4 U
Beryllium	--	--	200	16	0.82 U	0.64 U	0.51 U	0.51 U	0.51 U	0.87 U	0.87 U	0.67 U	1 U
Cadmium	0.53	3	80	7	0.82 U	0.64 U	0.51 U	0.51 U	0.51 U	0.87 U	0.87 U	0.67 U	0.18 J
Calcium	9,580	--	--	--	1,030	1,190	945	739	1,580	9,530	11,100	2,070	25,600
Chromium	12.22	3.8	5.6	0.29	4.6	5.3	3.8	3.7	4.4	**8.6**	**8**	**6.1**	**15.5**
Cobalt	0.606	--	30	2.3	0.82 U	0.64 U	0.51 U	0.51 U	0.13 J	0.49 J	0.37 J	0.2 J	1.1
Copper	1.594	700	4,100	310	0.57 J	0.64 U	0.51 U	0.23 J	0.86	1.7	1.4	0.77	4.5
Iron	3,120	150	72,000	5,500	966	947	657	713	693	3,020	2,650	1,610	6,700
Lead	6.14	270	800	400	3.8	2.6 J	1.5 J	2.6 J	1.7 J	5.2	4.9	4.2	11.6
Magnesium	1,412	--	--	--	236 J	641 U	514 U	512 U	4,500 J	1,760	1,510	799	3,370
Manganese	27.6	65	2,300	180	5.9	9.3	4.5	5.6	5.8	31.6	26	9.1	61.7
Mercury	0.0764	1	31	2.3	0.056 U	0.042 U	0.034 U	0.034 U	0.034 U	0.068	0.12	0.048	0.17
Nickel	1.77	130	2,000	150	0.48 J	5.1 U	4.1 U	4.1 U	0.36 J	1.4	1.1	0.73	3.5
Potassium	592	--	--	--	820 U	641 U	514 U	512 U	511 U	307 J	278 J	318 J	672 J
Selenium	--	2.1	510	39	0.82 UJ	0.64 UJ	0.51 UJ	0.51 UJ	0.51 U	0.87 UJ	0.87 UJ	0.67 UJ	1 UJ
Silver	--	3.4	510	39	0.82 U	0.64 U	0.51 U	0.51 U	0.51 U	0.87 U	0.87 U	0.67 U	1 U
Sodium	736	--	--	--	820 U	641 U	514 U	512 U	511 U	266 J	287 J	1,390	428 J
Vanadium	6.38	--	520	39	1.5 J	2.6 U	2.1 U	2 U	2 U	6.5	5.7	5.1	13.8
Zinc	11.7	1,200	31,000	2,300	5.3	4.5 J	3.5 J	4.2 J	24.6	8.8	7.8	5.2	26.7

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Underline indicates exceedance of Adjusted Residential Soil RSLs

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TABLE 4-1
Surface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SS 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	ICW-GW01/SO01	ICW-GW02/SO02	ICW-GW03/SO03		ICW-GW04/SO04	ICW-GW05/SO05	ICW-GW06/SO06	ICW-GW07/SO07	ICW-GW08/SO08
Sample ID					ICW-SS01-10A	ICW-SS02-10A	ICW-SS03-10A	ICW-SS03D-10A	ICW-SS04-10A	ICW-SS05-10A	ICW-SS06-10A	ICW-SS07-10A	ICW-SS08-10A
Sample Date					03/23/10	03/23/10	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10	03/22/10	03/23/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	2,040	--	99,000	7,700	337	381	510	487	2,140	855	1,370	639	1,040
Antimony	1.31	--	41	3.1	1 U	1 U	1.3 U	1.2 U	2.7 U	1.2 U	1.6 U	1.3 U	1.4 U
Arsenic	1.432	5.8	1.6	0.39	1 U	0.33 J	1.3 U	1.2 U	2.7 U	1.2 U	1.6 U	1.3 U	1.4 U
Barium	16.68	580	19,000	1,500	1.4 J	1.7 J	2.5 J	1.9 J	7.8 J	24.6 U	4.2 J	3.2 J	3.4 J
Beryllium	--	--	200	16	0.05 J	0.02 J	0.05 J	0.07 J	0.09 J	0.71	0.04 J	0.67 U	0.72 U
Cadmium	0.53	3	80	7	0.51 UJ	0.51 UJ	0.63 UJ	0.62 UJ	1.4 UJ	1.1 J-	0.81 UJ	0.67 UJ	0.72 UJ
Calcium	9,580	--	--	--	9,880	15,500	19,100	16,400	5,080	1,770	1,500	983	1,580
Chromium	12.22	3.8	5.6	0.29	3.6	4.5	**6.1**	**5.7**	**7.3**	4.2	**5.7**	2.6	4.6
Cobalt	0.606	--	30	2.3	0.51 U	0.51 U	0.16 J	0.62 U	0.48 J	0.44 J	0.15 J	0.67 U	0.72 U
Copper	1.594	700	4,100	310	0.19 J	0.22 J	0.27 J	0.22 J	1.7	1.2	0.74 J	0.77	0.92
Iron	3,120	150	72,000	5,500	893	1,010	1,290	1,220	2,820	1,220	1,960	898	1,460
Lead	6.14	270	800	400	1.2	1.2	1.8	1.8	11.7	4.3	6.5	5.1	4.4
Magnesium	1,412	--	--	--	510 U	508 U	634 U	621 U	2,750	591 J	977	674 U	1,080
Manganese	27.6	65	2,300	180	6.5 J	7.4 J	10.6 J	9.9 J	19 J	9.1 J	8.5 J	3.8 J	11.8 J
Mercury	0.0764	1	31	2.3	0.032 U	0.034 U	0.042 U	0.04 U	0.074 J	0.041 U	0.054 J	0.027 J	0.028 J
Nickel	1.77	130	2,000	150	0.51 U	0.51 U	0.18 J	0.16 J	1 J	0.49 J	0.55 J	0.15 J	0.72 U
Potassium	592	--	--	--	40.8 J	42.3 J	70.3 J	63.8 J	453 J	111 J	247 J	286 J	266 J
Selenium	--	2.1	510	39	0.51 R	0.51 R	0.63 R	0.62 R	1.4 R	0.58 J-	0.81 R	0.67 R	0.72 R
Silver	--	3.4	510	39	0.51 U	0.51 U	0.63 U	0.62 U	1.4 U	0.35 J	0.81 U	0.67 U	0.72 U
Sodium	736	--	--	--	195 J	250 J	292 J	260 J	1,560	164 J	914	237 J	611 J
Vanadium	6.38	--	520	39	1.7 J	1.8 J	2.6	2.3 J	6.4	2.7	4.8	2.4 J	3.4
Zinc	11.7	1,200	31,000	2,300	2.7 J	4.8 J	3.5 J	3.4 J	11.8 J	3.4 J	3.6 J	3.9 J	4 J

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

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TABLE 4-1
Surface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SS 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	ICW-GW09/SO09	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW12/SO12	ICW-GW13/SO13	ICW-GW14/SO14	ICW-GW15/SO15	ICW-GW16/SO16	ICW-GW17/SO17
Sample ID					ICW-SS09-10A	ICW-SS10-10A	ICW-SS11-10A	ICW-SS12-10A	ICW-SS13-10A	ICW-SS14-10A	ICW-SS15-10A	ICW-SS16-10A	ICW-SS17-10A
Sample Date					03/23/10	03/23/10	03/23/10	03/24/10	03/25/10	03/25/10	03/25/10	03/25/10	03/25/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	2,040	--	99,000	7,700	3,090	825	3,970	602	7,800	2,790	2,820	1,220	1,660
Antimony	1.31	--	41	3.1	1.6 U	1.3 U	2.5 U	1.8 U	2.4 U	1.4 U	2.3 U	1.3 U	1.5 U
Arsenic	1.432	5.8	1.6	0.39	1.6 U	1.3 U	1.1 J	1.8 U	**3.1**	0.75 J	2.3 U	1.3 U	1.5 U
Barium	16.68	580	19,000	1,500	9.3 J	3.5 J	8 J	2.6 J	47.1 U	27.1 U	46.5 U	26.1 U	29.8 U
Beryllium	--	--	200	16	0.08 J	0.04 J	0.13 J	0.06 J	1.2 U	0.68 U	1.2 U	0.65 U	0.74 U
Cadmium	0.53	3	80	7	0.82 UJ	0.66 UJ	1.3 UJ	0.88 UJ	0.23 J	0.05 J	1.2 U	0.65 U	0.74 U
Calcium	9,580	--	--	--	861	1,680	11,800	21,700	8,930	3,300	7,040	3,610	2,110
Chromium	12.22	3.8	5.6	0.29	**9.8**	3	**11.1**	**7.6**	**22.1**	**10**	**8.3**	**5.7**	**6.2**
Cobalt	0.606	--	30	2.3	0.54 J	0.66 U	1 J	0.88 U	1.8	0.57 J	0.62 J	0.19 J	0.3 J
Copper	1.594	700	4,100	310	1.2	0.85	3.4	0.36 J	7	1.3	3.4	0.63 J	1.3
Iron	3,120	150	72,000	5,500	3,660	1,220	5,230	1,480	10,200	3,630	3,790	1,670	2,170
Lead	6.14	270	800	400	8	4.9	13.1	2.1	20.2	5	20.9	2.5	7.7
Magnesium	1,412	--	--	--	1,260	1,180	5,470	882 U	5,230	1,280	3,760	701	1,320
Manganese	27.6	65	2,300	180	17.3 J	7.4 J	35.2 J	11.1 J	91.8	16.7	50.8	10.1	21.9
Mercury	0.0764	1	31	2.3	0.05 U	0.034 J	0.17	0.052 J	0.17	0.046 U	0.14	0.043 U	0.051 U
Nickel	1.77	130	2,000	150	1.7	0.31 J	2.7	0.88 U	5.6	1.5	2.1	0.65 U	0.86
Potassium	592	--	--	--	588 J	236 J	627 J	72 J	1,760 J	526 J	774 J	240 J	292 J
Selenium	--	2.1	510	39	0.82 R	0.49 J-	0.97 J-	0.88 R	1.1 J-	0.68 UJ	0.9 J-	0.65 UJ	0.74 UJ
Silver	--	3.4	510	39	0.82 U	0.66 U	1.3 U	0.88 U	1.2 U	0.68 U	1.2 U	0.65 U	0.74 U
Sodium	736	--	--	--	732 J	333 J	417 J	380 J	3,110	934	1,410	808	459 J
Vanadium	6.38	--	520	39	8	3.4	13.7	2.8 J	21.2	8.4	8.5	4.5	4.7
Zinc	11.7	1,200	31,000	2,300	8.3 J	3.3 J	21.8 J	4.6 J	52.7	8.7	15	4.2	7.6

Notes:

Bold box indicates exceedance of NC SSL

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µg/kg - Micrograms per kilogram

TABLE 4-1
Surface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SS 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	ICW-GW18/SO18	ICW-GW19/SO19	SI-GW01/SO01		SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID					ICW-SS18-10A	ICW-SS19-10A	SI-SS01-10A	SI-SS01D-10A	SI-SS02-10A	SI-SS03-10A	SI-SS04-10A	SI-SS05-10A	SI-SS06-10A
Sample Date					03/25/10	03/25/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	2,040	--	99,000	7,700	898	1,100	817	274	310	389	242	261	282
Antimony	1.31	--	41	3.1	1.4 U	1.4 U	1.1 U	1.1 U	1 U	0.99 U	0.95 U	1 U	1.1 U
Arsenic	1.432	5.8	1.6	0.39	1.4 U	0.51 J	1.1 U	**9.2**	0.38 J	0.99 U	0.95 U	**8.1**	0.73 J
Barium	16.68	580	19,000	1,500	27.8 U	28.1 U	1.7 J	2.3 J	1.7 J	1.3 J	1.5 J	2.2 J	1.8 J
Beryllium	--	--	200	16	0.7 U	0.7 U	0.05 J	0.54 U	0.04 J	0.49 U	0.03 J	0.51 U	0.05 J
Cadmium	0.53	3	80	7	0.7 U	0.7 U	0.53 UJ	0.54 UJ	0.5 UJ	0.49 UJ	0.48 UJ	0.51 UJ	0.53 UJ
Calcium	9,580	--	--	--	5,290	8,660	1,540	535 U	17,300	1,330	6,100	509 U	15,100
Chromium	12.22	3.8	5.6	0.29	5.5	**6.5**	2.7	**12.7**	3.8	3.8	3.6	**11.7**	3.7
Cobalt	0.606	--	30	2.3	0.15 J	0.25 J	0.12 J	0.54 U	0.5 U	0.49 U	0.48 U	0.51 U	0.53 U
Copper	1.594	700	4,100	310	0.56 J	0.62 J	0.93	17.6	0.21 J	0.25 J	0.15 J	16.3	0.2 J
Iron	3,120	150	72,000	5,500	1,460	1,740	1,100	485	970	697	622	435	1,040
Lead	6.14	270	800	400	2.4	2.9	5.5	4.7	1.2	1.9	1.4	4.4	1.3
Magnesium	1,412	--	--	--	614 J	815	1,230	125 J	500 U	495 U	476 U	509 U	526 U
Manganese	27.6	65	2,300	180	9.7	13	27.3 J	4.4 J	7.5 J	5.4 J	4.5 J	4.3 J	7.4 J
Mercury	0.0764	1	31	2.3	0.047 U	0.047	0.036 U	0.052	0.034 U	0.019 J	0.098	0.081	0.032 U
Nickel	1.77	130	2,000	150	0.7 U	0.58 J	0.46 J	0.54 U	0.5 U	0.49 U	0.48 U	0.51 U	0.53 U
Potassium	592	--	--	--	155 J	147 J	286 J	101 J	37.1 J	48.2 J	35.1 J	50.9 J	37.8 J
Selenium	--	2.1	510	39	0.7 UJ	0.7 UJ	0.53 R	0.54 R	0.5 R	0.49 R	0.48 R	0.51 R	0.53 R
Silver	--	3.4	510	39	0.7 U	0.7 U	0.53 U	0.54 U	0.5 U	0.49 U	0.48 U	0.51 U	0.53 U
Sodium	736	--	--	--	379 J	267 J	934	158 J	265 J	119 J	170 J	111 J	245 J
Vanadium	6.38	--	520	39	3.4	4.4	2.7	1.2 J	2.1	1.4 J	1.5 J	0.92 J	2.1 J
Zinc	11.7	1,200	31,000	2,300	4	4.5	4.2 J	8 J	2.5 J	3.1 J	2 J	6.9 J	2.6 J

Notes:

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J- - Analyte present, value may be biased low, actual value may be higher

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UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

µg/kg - Micrograms per kilogram

TABLE 4-2
Surface Soil Analytical Data Summary
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Analyte Name	NC SSLs (January, 2010)	Number Exceeding NC SSLs	Adjusted Residential Soil RSLs (May, 2010)	Number Exceeding Residential Soil RSL	2X Site Background	Number Exceeding both 2x Site Background and one other Screening Limit	Detection Frequency			Minimum Detected Concentration (mg/kg)	Maximum Detected Concentration (mg/kg)	Location of Maximum Detected Value
Total Metals (mg/kg)												
Aluminum	--	--	7,700	1	2,040	1	75	-	75	159	7,800	ICW-SS13-10A
Arsenic	5.8	2	0.39	33	1.4	3	39	-	75	0.33 J	9.2	SI-SS01D-10A
Chromium	3.8	59	0.29	75	12.2	2	75	-	75	2	22.1	ICW-SS13-10A
Iron	150	75	5,500	1	3,120	5	75	-	75	291	10,200	ICW-SS13-10A

Notes:
RSL - Regional Screening Level
NC SSL - North Carolina Soil Screening Level
J - Analyte present. Value may or may not be accurate or precise
mg/kg - milligrams per kilogram

Created by: J. Wheat 8/02/2010
Updated by: R. Shaw 8/04/2010
Updated by: R. Shaw10/21/2010

TABLE 4-3
Subsurface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SB 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54	BIBG-GW55/SO55		BIBG-GW56/SO56	BIBG-GW57/SO57	BI-GW01/SO01
Sample ID					BI-IS50-1-2-10A	BI-IS51-1-2-10A	BI-IS52-2-3-10A	BI-IS53-3-4-10A	BI-IS54-1-2-10A	BI-IS55-2-3-10A	BI-IS55D-2-3-10A	BI-IS56-6-7-10A	BI-IS57-3-4-10A	BI-IS01-4-5-10A
Sample Date					01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/25/10	01/31/10	01/28/10
Chemical Name														
Semivolatile Organic Compounds (µg/kg)														
No Detections														
Explosives (µg/kg)														
No Detections														
Total Metals (mg/kg)														
Aluminum	682	--	99,000	7,700	358	336	341	384	328	325	351	302	355	278
Antimony	1.218	--	41	3.1	1 U	1 U	1 U	1.1	0.32 J	0.96 U	0.37 J	0.37 J	1.1	0.82 J
Arsenic	1.13	5.8	1.6	0.39	1 U	1 U	0.64 J	1 J	0.46 J	0.44 J	0.5 J	0.48 J	1 U	0.79 J
Barium	10.32	580	19,000	1,500	2.4 J	20.5 UJ	2.4 J	20.8 UJ	2.3 J	1.7 J	2.1 J	1.5 J	20.6 UJ	1 J
Beryllium	--	--	200	16	0.51 U	0.51 U	0.5 U	0.52 U	0.54 U	0.48 U	0.5 U	0.53 U	0.52 U	0.5 U
Calcium	5,500	--	--	--	2,300	1,620	3,810	6,580	2,270	1,890	2,120	1,720	1,770	10,200
Chromium	9.28	3.8	5.6	0.29	4.9	4.3	5.1	**5.8**	4.6	4.1	4.7	4	4.3	3.6
Cobalt	0.366	--	30	2.3	0.14 J	0.51 U	0.14 J	0.52 U	0.14 J	0.13 J	0.14 J	0.14 J	0.52 U	0.5 U
Copper	0.444	700	4,100	310	0.16 J	0.51 U	0.16 J	0.52 U	0.54 U	0.48 U	0.15 J	0.17 J	0.52 U	0.5 U
Iron	1,454	150	72,000	5,500	709	701	744	903	713	665	755	660	717	791
Lead	2.6	270	800	400	1.4 J	1.1 J	1.6 J	1.6 J	1.4 J	1.2 J	1.3 J	1.1 J	1 J	0.88 J
Magnesium	484	--	--	--	513 UJ	512 U	500 UJ	520 U	537 UJ	481 UJ	495 UJ	527 UJ	142 J	280 J
Manganese	11.06	65	2,300	180	4.8	5.2	6.1	7.7	5.5	4.9	5.8	4.7	5.3	5.3
Mercury	--	1	31	2.3	0.036 U	0.037 U	0.035 U	0.033 U	0.037 U	0.031 U	0.034 U	0.035 U	0.036 U	0.033 U
Nickel	0.592	130	2,000	150	0.21 J	0.33 J	0.3 J	0.49 J	0.24 J	0.21 J	0.24 J	0.27 J	0.32 J	0.29 J
Potassium	--	--	--	--	513 U	512 U	500 U	520 U	537 U	481 U	495 U	527 U	515 U	44.8 J
Sodium	--	--	--	--	513 U	512 U	500 U	520 U	537 U	481 U	495 U	527 U	515 U	496 U
Vanadium	2.48	--	520	39	2.1 U	1.3 J	2 U	2 J	2.1 U	1.9 U	2 U	2.1 U	1.5 J	1.5 J
Zinc	4.86	1,200	31,000	2,300	2.1	2.4	2.6	3.1	2.4	2.1	2.5	2.2	2.5	2.1

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Shading indicates exceedance of two times the mean site specific background concentration for subsurface

Underline indicates exceedance of Adjusted Residential Soil RSLs

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

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

µg/kg - Micrograms per kilogram

TABLE 4-3
Subsurface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SB 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW02/SO02		BI-GW03/SO03	BI-GW04/GW04	BI-GW05/SO05	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08
Sample ID					BI-IS02-8-9-10A	BI-IS02D-8-9-10A	BI-IS03-6-7-10A	BI-IS04-3-4-10A	BI-IS05-5-6-10A	BI-IS06-2-3-10A	BI-IS07-4-5-10A	BI-IS08-3-4-10A
Sample Date					01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10
Chemical Name												
Semivolatile Organic Compounds (µg/kg)												
No Detections												
Explosives (µg/kg)												
No Detections												
Total Metals (mg/kg)												
Aluminum	682	--	99,000	7,700	331	343	337	327	339 J	302	298 J	347 J
Antimony	1.218	--	41	3.1	1	1 U	0.83 J	0.92 J	1 U	0.8 J	1 U	0.99 U
Arsenic	1.13	5.8	1.6	0.39	1	0.77 J	0.93 J	0.82 J	0.89 J	0.86 J	0.6 J	0.71 J
Barium	10.32	580	19,000	1,500	19.8 UJ	20.4 UJ	1.1 J	1.1 J	1.8 J	0.9 J	1.7 J	1.9 J
Beryllium	--	--	200	16	0.5 U	0.51 U	0.5 U	0.52 U	0.51 U	0.5 U	0.51 U	0.5 U
Calcium	5,500	--	--	--	8,060	7,110	6,430	4,640	7,310	5,940	9,750	5,050
Chromium	9.28	3.8	5.6	0.29	4.4	4.6	4.8	4.4	5.3	4	3.7	5.3
Cobalt	0.366	--	30	2.3	0.5 U	0.51 U	0.5 U	0.52 U	0.09 J	0.5 U	0.51 U	0.09 J
Copper	0.444	700	4,100	310	0.5 U	0.51 U	0.5 U	0.52 U	0.51 U	0.5 U	0.51 U	0.5 U
Iron	1,454	150	72,000	5,500	883	878	811	685	855	731	802	847
Lead	2.6	270	800	400	0.95 J	0.92 J	1.1 J	1 J	1.7 J	0.97 J	1.1 J	1.7 J
Magnesium	484	--	--	--	495 U	511 U	263 J	218 J	512 U	225 J	511 U	497 U
Manganese	11.06	65	2,300	180	6.4	6	6.4	5.2	6.7	5.1	5.2	6.6
Mercury	--	1	31	2.3	0.035 U	0.035 U	0.031 U	0.033 U	0.035 U	0.033 U	0.035 U	0.034 U
Nickel	0.592	130	2,000	150	0.32 J	0.42 J	0.33 J	0.3 J	0.36 J	0.23 J	0.25 J	0.33 J
Potassium	--	--	--	--	495 U	511 U	52.3 J	51.2 J	37.2 J	46 J	35.5 J	34.7 J
Sodium	--	--	--	--	495 U	511 U	504 U	520 U	512 U	500 U	511 U	497 U
Vanadium	2.48	--	520	39	1.6 J	1.5 J	1.7 J	1.6 J	1.8 J	1.5 J	2 U	2 U
Zinc	4.86	1,200	31,000	2,300	2.7	3.3	2.9	2.8	4.3	2.3	2	2.9

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Shading indicates exceedance of two times the mean site specific background concentration for subsurface

Underline indicates exceedance of Adjusted Residential Soil RSLs

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

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

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mg/kg - Milligrams per kilogram

µg/kg - Micrograms per kilogram

TABLE 4-3
Subsurface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SB 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW09/SO09	BI-GW10/SO10	BI-GW11/SO11	BI-GW12/SO12	BI-GW13/SO13	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17
Sample ID					BI-IS09-1-2-10A	BI-IS10-1-2-10A	BI-IS11-3-4-10A	BI-IS12-1-2-10A	BI-IS13-0-1-10A	BI-IS14-4-5-10A	BI-IS15-6-7-10A	BI-IS16-3-4-10A	BI-IS17-6-7-10A
Sample Date					01/31/10	01/31/10	01/31/10	01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	682	--	99,000	7,700	271	355	353	373	379	333	300	268	330
Antimony	1.218	--	41	3.1	1 U	1.1	1.1 U	1.1 U	1	1.1 U	0.93 J	1.1 U	1 U
Arsenic	1.13	5.8	1.6	0.39	**2.1**	1.3	0.93 J	0.87 J	0.99 U	0.39 J	1.1 U	1.1 U	0.67 J
Barium	10.32	580	19,000	1,500	20 UJ	21.2 UJ	21.3 UJ	22.6 UJ	19.7 UJ	2.3 J	0.76 J	22.7 UJ	5.7 J
Beryllium	--	--	200	16	0.5 U	0.53 U	0.53 U	0.57 U	0.49 U	0.53 U	0.54 U	0.57 U	0.52 U
Calcium	5,500	--	--	--	30,500	6,990	7,010	4,780	1,710	1,940	3,060	2,040	2,950
Chromium	9.28	3.8	5.6	0.29	3.5	**5.9**	5	5.6	4.7	4.8	3.8	3.9	5.1
Cobalt	0.366	--	30	2.3	0.5 U	0.53 U	0.53 U	0.57 U	0.49 U	0.16 J	0.54 U	0.57 U	0.52 U
Copper	0.444	700	4,100	310	0.5 U	0.53 U	0.53 U	0.57 U	0.49 U	0.18 J	0.54 U	0.57 U	0.52 U
Iron	1,454	150	72,000	5,500	1,190	843	834	816	787	726	633	591	738
Lead	2.6	270	800	400	0.96 J	1.7 J	1.2 J	1.6 J	1.3 J	1.5 J	0.87 J	0.72 J	1.4 J
Magnesium	484	--	--	--	362 J	284 J	261 J	244 J	170 J	529 UJ	177 J	119 J	516 U
Manganese	11.06	65	2,300	180	8.8	7.4	7	6.6	5.7	5.5	3.9	3.7	6
Mercury	--	1	31	2.3	0.035 U	0.036 U	0.034 U	0.039 U	0.034 U	0.032 U	0.036 U	0.038 U	0.034 U
Nickel	0.592	130	2,000	150	0.3 J	0.4 J	0.38 J	0.44 J	0.36 J	0.26 J	0.26 J	0.38 J	4.1 U
Potassium	--	--	--	--	501 U	530 U	531 U	566 U	493 U	529 U	47.4 J	568 U	516 U
Sodium	--	--	--	--	501 U	530 U	531 U	566 U	493 U	529 U	541 U	568 U	516 U
Vanadium	2.48	--	520	39	2.4	2.1	1.8 J	2 J	1.6 J	2.1 U	1.3 J	1.3 J	2.1 U
Zinc	4.86	1,200	31,000	2,300	2	2.9	2.7	2.9	3.2	2.3	2.2 U	2.3 U	2.2 J

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Shading indicates exceedance of two times the mean site specific background concentration for subsurface

Underline indicates exceedance of Adjusted Residential Soil RSLs

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TABLE 4-3
Subsurface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SB 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW19/SO19	BI-GW20/SO20	BI-GW21/SO21		BI-GW22/SO22	BI-GW23/SO23	BI-GW24/SO24	BI-GW25/SO25	BI-GW26/SO26
Sample ID					BI-IS19-14-15-10A	BI-IS20-8-9-10A	BI-IS21-17-18-10A	BI-IS21D-17-18-10A	BI-IS22-12-13-10A	BI-IS23-10-11-10A	BI-IS24-3-4-10A	BI-IS25-2-3-10A	BI-IS26-0-0.5-10A
Sample Date					01/26/10	02/01/10	02/01/10	02/01/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	682	--	99,000	7,700	250	138	384	373	297	322	271	348	286
Antimony	1.218	--	41	3.1	1 U	1.2	1 U	1.2	1	1.1 U	1 U	1 J	0.81 J
Arsenic	1.13	5.8	1.6	0.39	1 U	1 U	0.81 J	0.72 J	0.64 J	1.1 U	0.86 J	0.84 J	0.77 J
Barium	10.32	580	19,000	1,500	1.7 J	20.6 UJ	20.2 UJ	19.7 UJ	20.4 UJ	21.3 UJ	20 UJ	0.98 J	1.4 J
Beryllium	--	--	200	16	0.5 U	0.52 U	0.51 U	0.49 U	0.51 U	0.53 U	0.5 U	0.57 U	0.51 U
Calcium	5,500	--	--	--	1,350	515 U	2,500	2,270	2,550	2,520	6,920	5,680	3,690
Chromium	9.28	3.8	5.6	0.29	3.2	1.9	5.1	4.9	4.6	4.8	3.7	4.5	4
Cobalt	0.366	--	30	2.3	0.5 U	0.52 U	0.51 U	0.49 U	0.51 U	0.53 U	0.5 U	0.57 U	0.51 U
Copper	0.444	700	4,100	310	0.5 U	0.52 U	0.51 U	0.49 U	0.51 U	0.53 U	0.5 U	0.37 J	0.51 U
Iron	1,454	150	72,000	5,500	501	198	785	767	633	757	710	777	703
Lead	2.6	270	800	400	1.2 J	1.4	1.1	1.1	1.1 J	1.1 J	0.81 J	1.1 J	1.3 J
Magnesium	484	--	--	--	503 U	25.8 J	142 J	139 J	509 U	533 U	500 U	252 J	179 J
Manganese	11.06	65	2,300	180	4.2	2.4	5.6	5.3	5.2	4.6	4.9	5.3	5.1
Mercury	--	1	31	2.3	0.034 U	0.034 U	0.034 U	0.031 U	0.031 U	0.035 U	0.035 U	0.039 U	0.033 U
Nickel	0.592	130	2,000	150	4 U	4.1 U	0.36 J	0.4 J	0.3 J	4.3 U	0.23 J	0.36 J	0.27 J
Potassium	--	--	--	--	503 U	13.6 J	47.9 J	45.8 J	509 U	533 U	500 U	53.4 J	45.1 J
Sodium	--	--	--	--	503 U	515 U	506 U	494 U	509 U	533 U	500 U	573 U	509 U
Vanadium	2.48	--	520	39	2 U	2.1 U	2 U	2 U	1.4 J	1.6 J	1.3 J	1.6 J	1.4 J
Zinc	4.86	1,200	31,000	2,300	2 UJ	0.97 J	4.2 J	2.7 J	2.5	2.2	2.2	2.9	2.9

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

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TABLE 4-3
Subsurface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SB 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW27/SO27		BI-GW28/SO28	BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31	BI-GW32/SO32	BI-GW33/SO33	BI-GW34/SO34
Sample ID					BI-IS27-1-2-10A	BI-IS27D-1-2-10A	BI-IS28-1-2-10A	BI-IS29-1-2-10A	BI-IS30-2-3-10A	BI-IS31-1-2-10A	BI-IS32-0-1-10A	BI-IS33-5-6-10A	BI-IS34-2-3-10A
Sample Date					01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/27/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	682	--	99,000	7,700	226	223	339 J	257 J	285 J	320 J	303 J	358 J	340
Antimony	1.218	--	41	3.1	1 U	1.1	1.1 U	1 U	1 U	1 U	1 U	1 U	1.1 U
Arsenic	1.13	5.8	1.6	0.39	0.99 J	0.71 J	1.1 U	0.43 J	0.42 J	0.72 J	0.63 J	0.6 J	0.37 J
Barium	10.32	580	19,000	1,500	20.4 UJ	19.8 UJ	2 J	1.3 J	1.2 J	1.6 J	1.4 J	1.8 J	1.7 J
Beryllium	--	--	200	16	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.52 U	0.5 U	0.5 U	0.53 U
Calcium	5,500	--	--	--	6,810	5,920	1,980	4,010	4,980	4,500	5,670	3,440	1,480
Chromium	9.28	3.8	5.6	0.29	3.4	3.2	4.8	3.5	3.8	4.5	4.1	4.7	4.3
Cobalt	0.366	--	30	2.3	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.11 J	0.11 J	0.09 J	0.17 J
Copper	0.444	700	4,100	310	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.52 U	0.5 U	0.5 U	0.21 J
Iron	1,454	150	72,000	5,500	621	577	701	582	678	682	735	807	716
Lead	2.6	270	800	400	0.84 J	0.82 J	2.1 J	1.3 J	1.1 J	1.3 J	1.3 J	1.3 J	1.2 J
Magnesium	484	--	--	--	511 U	496 U	558 U	517 U	516 U	517 U	502 U	502 U	535 UJ
Manganese	11.06	65	2,300	180	4.4	4.1	3.9	3.7	4.7	5.1	4.9	6.1	5.2
Mercury	--	1	31	2.3	0.031 U	0.032 U	0.035 U	0.033 U	0.034 U	0.034 U	0.035 U	0.032 U	0.036 U
Nickel	0.592	130	2,000	150	0.32 J	0.22 J	0.16 J	0.2 J	0.19 J	0.27 J	0.26 J	0.3 J	0.27 J
Potassium	--	--	--	--	511 U	496 U	30.5 J	26.7 J	29.2 J	35.2 J	32.8 J	34.4 J	535 U
Sodium	--	--	--	--	511 U	496 U	558 U	517 U	516 U	517 U	502 U	502 U	535 U
Vanadium	2.48	--	520	39	1.2 J	1.2 J	2.2 U	2.1 U	2.1 U	2.1 U	2 U	2 U	2.1 U
Zinc	4.86	1,200	31,000	2,300	2 U	2 U	2.5	2.1	2.2	2.8	2.2	2.7	2.1

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Shading indicates exceedance of two times the mean site specific background concentration for subsurface

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µg/kg - Micrograms per kilogram

TABLE 4-3
Subsurface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SB 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW35/SO35	BI-GW36/SO36		BI-GW38/SO38	BI-GW39/SO39	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42	BI-GW43/SO43
Sample ID					BI-IS35-1-2-10A	BI-IS36-2-3-10A	BI-IS36D-2-3-10A	BI-IS38-14-15-10A	BI-IS39-1-2-10A	BI-IS40-7-8-10A	BI-IS41-3-4-10A	BI-IS42-7-8-10A	BI-IS43-5-6-10A
Sample Date					01/26/10	01/25/10	01/25/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	682	--	99,000	7,700	325	353	357	309	266	222	140	300	275
Antimony	1.218	--	41	3.1	0.52 J	1 U	1.1 U	1.1 U	1 U	1 U	1.1 U	1.1	0.84 J
Arsenic	1.13	5.8	1.6	0.39	1.3 U	0.75 J	0.76 J	0.54 J	0.48 J	1 U	1.1 U	1.2	1.4
Barium	10.32	580	19,000	1,500	2.1 J	2.5 J	2.7 J	2.2 J	2.6 J	20.3 UJ	21.2 UJ	19.5 UJ	1 J
Beryllium	--	--	200	16	0.66 U	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U
Calcium	5,500	--	--	--	1,680	2,850	3,040	2,080	2,420	601	530 U	13,400	14,400
Chromium	9.28	3.8	5.6	0.29	4.7	5	5.2	4.5	4	3.4	2.4	4.2	3.9
Cobalt	0.366	--	30	2.3	0.14 J	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U
Copper	0.444	700	4,100	310	0.23 J	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U
Iron	1,454	150	72,000	5,500	727	793	807	660	615	504	252	904	916
Lead	2.6	270	800	400	1.6 J	1.4 J	1.6 J	1.1 J	0.92 J	1.2	1.4	0.82 J	1.1 J
Magnesium	484	--	--	--	657 UJ	523 U	532 U	532 U	520 U	66.1 J	27.4 J	487 U	276 J
Manganese	11.06	65	2,300	180	5.1	6	6.4	5.6	8.6	3.2	10.1	7	6.7
Mercury	--	1	31	2.3	0.044 U	0.034 U	0.036 U	0.035 U	0.035 U	0.035 U	0.034 U	0.031 U	0.035 U
Nickel	0.592	130	2,000	150	0.3 J	4.2 U	0.12 J	0.17 J	4.2 U	0.35 J	4.2 U	0.48 J	0.34 J
Potassium	--	--	--	--	657 U	523 U	532 U	532 U	520 U	508 U	530 U	487 U	41.6 J
Sodium	--	--	--	--	657 U	523 U	532 U	532 U	520 U	508 U	530 U	487 U	487 U
Vanadium	2.48	--	520	39	2.6 U	2.1 U	2.1 U	2.1 U	2.1 U	1.2 J	1 J	1.7 J	1.9 J
Zinc	4.86	1,200	31,000	2,300	2.6 U	2.6 J	2.5 J	2.1 UJ	2.1 UJ	1.5 J	0.77 J	2.4	2.3

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Shading indicates exceedance of two times the mean site specific background concentration for subsurface

Underline indicates exceedance of Adjusted Residential Soil RSLs

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

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

µg/kg - Micrograms per kilogram

TABLE 4-3
Subsurface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SB 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46	BI-GW47/SO47	BI-GW48/SO48		BI-GW49/SO49	BI-GW59/SO59	BI-SO18
Sample ID					BI-IS44-1-2-10A	BI-IS45-0-1-10A	BI-IS46-0-1-10A	BI-IS47-3-4-10A	BI-IS48-8-9-10A	BI-IS48D-8-9-10A	BI-IS49-4-5-10A	BI-IS59-0-0.5-10A	BI-IS18-16-17-10A
Sample Date					01/29/10	01/27/10	01/27/10	02/01/10	02/01/10	02/01/10	01/28/10	02/01/10	01/26/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	682	--	99,000	7,700	331 J	325	338	321	342	356	327	364	371
Antimony	1.218	--	41	3.1	1 U	1 U	1.2 U	1 U	1	1 U	1.2	1.2 U	0.99 U
Arsenic	1.13	5.8	1.6	0.39	0.38 J	0.32 J	1.2 U	1 U	0.7 J	0.9 J	0.91 J	1.2 U	0.53 J
Barium	10.32	580	19,000	1,500	1.5 J	1.5 J	2.2 J	20.3 UJ	20 UJ	20.8 UJ	21.3 UJ	23.8 UJ	2.9 J
Beryllium	--	--	200	16	0.5 U	0.52 U	0.6 U	0.51 U	0.5 U	0.52 U	0.53 U	0.6 U	0.5 U
Calcium	5,500	--	--	--	2,480	1,560	2,480	1,820	2,170	2,750	4,700	697	1,780
Chromium	9.28	3.8	5.6	0.29	4.4	4.3	5	4	5.2	5.6	4.7	3.9	4.6
Cobalt	0.366	--	30	2.3	0.5 U	0.12 J	0.13 J	0.51 U	0.5 U	0.52 U	0.53 U	0.6 U	0.5 U
Copper	0.444	700	4,100	310	0.5 U	0.19 J	0.18 J	0.28 J	0.27 J	0.28 J	0.53 U	0.6 U	0.5 U
Iron	1,454	150	72,000	5,500	765	706	785	673	693	746	792	604	791
Lead	2.6	270	800	400	1.3 J	1.2 J	1.6 J	0.92	1.5	1.6	1.2 J	2.6	1.1 J
Magnesium	484	--	--	--	501 U	515 UJ	602 UJ	150 J	152 J	159 J	534 U	96 J	497 U
Manganese	11.06	65	2,300	180	5.5	4.9	5.7	4.7	6.3	6.8	6	4.1	6.4
Mercury	--	1	31	2.3	0.031 U	0.035 U	0.038 U	0.036 U	0.034 U	0.035 U	0.036 U	0.042 U	0.033 U
Nickel	0.592	130	2,000	150	0.22 J	0.23 J	0.26 J	0.31 J	0.36 J	0.45 J	0.37 J	4.8 U	4 U
Potassium	--	--	--	--	32 J	515 U	602 U	506 U	47.1 J	50 J	534 U	596 U	497 U
Sodium	--	--	--	--	501 U	515 U	602 U	506 U	501 U	519 U	534 U	596 U	497 U
Vanadium	2.48	--	520	39	2 U	2.1 U	2.4 U	1.4 J	2 U	2.1 U	1.6 J	1.4 J	2 U
Zinc	4.86	1,200	31,000	2,300	2.4	2.1 U	2.5	2.4	2.5	2.7	2.7	3.6	2.2 J

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Shading indicates exceedance of two times the mean site specific background concentration for subsurface

Underline indicates exceedance of Adjusted Residential Soil RSLs

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TABLE 4-3
Subsurface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SB 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-SO37	ICW-GW01/SO01	ICW-GW02/SO02	ICW-GW05/SO05	ICW-GW07/SO07	ICW-GW08/SO08	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW13/SO13
Sample ID					BI-IS37-10-11-10A	ICW-IS01-6-7-10A	ICW-IS02-1-2-10A	ICW-IS05-1-1.5-10A	ICW-IS07-1-2-10A	ICW-IS08-1-2-10A	ICW-IS10-1-2-10A	ICW-IS11-1-2-10A	ICW-IS13-1-1.5-10A
Sample Date					01/26/10	03/23/10	03/23/10	03/22/10	03/22/10	03/23/10	03/23/10	03/23/10	03/25/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	682	--	99,000	7,700	293	676	376	577	618	652	652	395	1,680
Antimony	1.218	--	41	3.1	0.97 U	1.1 U	1.1 U	1.2 U	1.1 U	1.2 U	1.1 U	1.1 U	1.2 U
Arsenic	1.13	5.8	1.6	0.39	0.41 J	1.1 U	0.37 J	1.2 U	1.1 U	1.2 U	0.49 J	1.1 U	0.55 J
Barium	10.32	580	19,000	1,500	1.7 J	3 J	1.5 J	3.5 J	4.6 J	3.2 J	4.3 J	8.5 J	24.1 U
Beryllium	--	--	200	16	0.49 U	0.57 U	0.55 U	0.58 U	0.55 U	0.06 J	0.56 U	0.07 J	0.6 U
Calcium	5,500	--	--	--	3,180	13,000	17,800	3,970	1,690	20,800	3,370	3,660	35,300
Chromium	9.28	3.8	5.6	0.29	4.2	4.7	4.4	2.9	2.2	3.9	3.3	1.8	**6.2**
Cobalt	0.366	--	30	2.3	0.49 U	0.11 J	0.55 U	0.58 U	0.15 J	0.1 J	0.12 J	0.1 J	0.22 J
Copper	0.444	700	4,100	310	0.49 U	0.57 U	0.55 U	0.58 U	0.55 U	0.58 U	0.56 U	0.56 U	0.55 J
Iron	1,454	150	72,000	5,500	640	1,030 J	964 J	687 J	780 J	991 J	1,210 J	642 J	1,980
Lead	2.6	270	800	400	1.1 J	1.5	1.1	1.5	1.5	2.9	2	2.5	2
Magnesium	484	--	--	--	485 U	568 U	548 U	584 U	547 U	311 J	560 U	558 U	787
Manganese	11.06	65	2,300	180	4.8	8.4	7.4	5.5	3.5	7.4	7	4.9	13.5
Mercury	--	1	31	2.3	0.035 U	0.021 J	0.034 U	0.14	0.031 J	0.022 J	0.042	0.036 U	0.039 U
Nickel	0.592	130	2,000	150	0.14 J	4.5 U	4.4 U	0.32 J	4.4 U	4.6 U	4.5 U	4.5 U	0.76
Potassium	--	--	--	--	485 U	64.9 J	38.9 J	38.7 J	38.7 J	61.1 J	56 J	23.1 J	258 J
Sodium	--	--	--	--	485 U	568 U	548 U	584 U	547 U	577 U	560 U	558 U	813
Vanadium	2.48	--	520	39	1.9 U	2.4	1.7 J	1.8 J	1.7 J	2.2 J	2.3	1.5 J	5.4
Zinc	4.86	1,200	31,000	2,300	2.2 J	3	3	2.3 U	2.2 U	2.8	2.2 U	2.2 U	3.9

Notes:

Bold box indicates exceedance of NC SSL

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TABLE 4-3
Subsurface Soil Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SB 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	ICW-GW15/SO15	SI-GW01/SO01		SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID					ICW-IS15-1-2-10A	SI-IS01-1-1.5-10A	SI-IS01D-1-1.5-10A	SI-IS02-1-2-10A	SI-IS03-2-3-10A	SI-IS04-1-2-10A	SI-IS05-1-2-10A	SI-IS06-1-2-10A
Sample Date					03/25/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name												
Semivolatile Organic Compounds (µg/kg)												
No Detections												
Explosives (µg/kg)												
No Detections												
Total Metals (mg/kg)												
Aluminum	682	--	99,000	7,700	1,740	327	336	322	261	271	304	496
Antimony	1.218	--	41	3.1	1.1 U	1 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U
Arsenic	1.13	5.8	1.6	0.39	1.2	0.9 J	0.78 J	1.3 U	1.1	0.65 J	1.1 U	1.2 U
Barium	10.32	580	19,000	1,500	22.6 U	1.5 J	1.4 J	1.4 J	1.4 J	1.5 J	1.9 J	1.8 J
Beryllium	--	--	200	16	0.51 U	0.51 U	0.52 U	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Calcium	5,500	--	--	--	8,740	690	804	3,520	16,500	17,500	5,420	14,900
Chromium	9.28	3.8	5.6	0.29	**6.4**	3.5	3.7	4.1	3.5	3.9	3.9	4.6
Cobalt	0.366	--	30	2.3	0.27 J	0.51 U	0.52 U	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Copper	0.444	700	4,100	310	0.44 J	0.58	0.96	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Iron	1,454	150	72,000	5,500	2,150	626 J	616 J	630 J	995 J	998 J	716 J	996 J
Lead	2.6	270	800	400	2	1.1	1.2	1.1	0.93	1.1	1.3	1.4
Magnesium	484	--	--	--	629	506 U	515 U	635 U	500 U	592 U	552 U	601 U
Manganese	11.06	65	2,300	180	12.5	2.3	2.4	3.8	6	6.5	4.9	5.1
Mercury	--	1	31	2.3	0.037 U	0.031 U	0.033 U	0.041 U	0.034 U	0.038 U	0.035 U	0.042 U
Nickel	0.592	130	2,000	150	0.77	4 U	4.1 U	5.1 U	4 U	4.7 U	4.4 U	4.8 U
Potassium	--	--	--	--	223 J	37.6 J	41.4 J	36.7 J	27.9 J	30.4 J	35.7 J	60 J
Sodium	--	--	--	--	239 J	506 U	515 U	171 J	500 U	592 U	165 J	601 U
Vanadium	2.48	--	520	39	6.5	1.1 J	1.1 J	1.3 J	2 J	2 J	1.5 J	2.3 J
Zinc	4.86	1,200	31,000	2,300	3.8	2.3	2.4	2.5 U	2 U	2.4 U	3	2.8

Notes:

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TABLE 4-4
Subsurface Soil Analytical Data Summary
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Analyte Name	Adjusted Residential Soil RSLs (May, 2010)	Number Exceeding Residential Soil RSL	NC SSL (January, 2010)	Number Exceeding NC SSL	2X Site Background	Number Exceeding both 2x Site Background and one other Screening Limit	Detection Frequency			Minimum Detected Concentration (mg/kg)	Maximum Detected Concentration (mg/kg)	Location of Maximum Detected Value
Total Metals (mg/kg)												
Arsenic	0.39	39	5.8	0	1.24	3	44	-	65	0.32 J	2.1	BI-IS09-1-2-10A
Chromium	0.29	65	3.8	55	9.4	0	65	-	65	1.8	6.4	ICW-IS15-1-2-10A
Iron	5,500	0	150	65	1,476	2	65	-	65	198	2,150	ICW-IS15-1-2-10A

Notes:
RSL - Regional Screening Level
NC SSL - North Carolina Soil Screening Level
J - Analyte present. Value may or may not be accurate or precise
mg/kg - milligrams per kilogram

Created by: J. Wheat 7/30/2010
Updated by: R. Shaw 8/04/2010
Updated by: R. Shaw 10/21/2010

TABLE 4-5
Groundwater Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background GW 2X Mean	NCGWQS (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54	BIBG-GW55/SO55	BIBG-GW56/SO56	BIBG-GW57/SO57		BI-GW01/SO01	BI-GW02/SO02	BI-GW03/SO03		BI-GW04/GW04	BI-GW05/SO05	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08
Sample ID				BI-GW50-10A	BI-GW51-10A	BI-GW52-10A	BI-GW53-10A	BI-GW54-10A	BI-GW55-10A	BI-GW56-10A	BI-GW57-10A	BI-GW57D-10A	BI-GW01-10A	BI-GW02-10A	BI-GW03-10A	BI-GW03D-10A	BI-GW04-10A	BI-GW05-10A	BI-GW06-10A	BI-GW07-10A	BI-GW08-10A
Sample Date				01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	02/01/10	01/25/10	02/01/10	02/01/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10
Chemical Name																					
Semivolatile Organic Compounds (µg/L)																					
No Detections																					
Explosives (µg/L)																					
Perchlorate	--	--	2.6	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.08 J	0.2 U	0.2 U	0.03 J	0.2 U	0.17 J	0.07 J	0.2 U	0.2 U
Total Metals (µg/L)																					
Aluminum	360	--	3,700	545	200 U	196 J	200 U	346	200 U	200 U	206	239	200 UJ	320 J	200 UJ	200 UJ	200 U	200 UJ	200 UJ	53.1 J	200 UJ
Antimony	--	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.06	10	0.045	**3 J**	10 U	10 U	10 U	10 U	10 U	**14**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**3 J**	10 U	10 U	10 U
Barium	58.4	700	730	1.8 J	0.53 J	200 U	0.78 J	0.72 J	200 U	1.2 J	200 U	200 U	0.37 J	1.9 J	200 U	200 U	200 U	200 U	200 U	200 U	0.7 J
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	154,400	--	--	18,400	9,900	45,700	46,700	11,100	13,200	39,100	6,100	6,200	58,100	53,400	48,600	48,600	25,700	43,400	42,400	33,700	55,800
Chromium	6.7	10	0.043	**5.6 J**	**2.5 J**	**1.9 J**	**5.8 J**	**2.9 J**	**2.3 J**	**1.9 J**	**2.7 J**	**3 J**	**2.3 J**	**10.1**	**2 J**	**1.6 J**	**1.4 J**	**3 J**	**2 J**	**2.9 J**	**4.4 J**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	5 U	5 U	5 U	**1.9 J**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Copper	4.88	1,000	150	5 U	5 U	5 U	5 U	1.8 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	3,220	300	2,600	1,450	283	204	191	697	353	**8,940**	492	502	100 UJ	609 J	100 UJ	100 UJ	107 J	100 UJ	100 UJ	100 U	582 J
Lead	3.44	15	15	3 U	3 U	3.9 J	3 U	3 U	3 U	3 U	3 U	3 U	3.1 J	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	75,800	--	--	5,000 U	5,000 U	5,110	5,910	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	16,800	9,740	6,790	6,770	5,000 U	11,300	14,500	5,500 J	7,800
Manganese	116	50	88	10.5	3.2 J	2.7 J	8.9 J	7.8 J	5.3 J	**466**	6.1 J	6 J	0.68 J	7.2 J	10 U	10 U	1.3 J	0.44 J	10 U	0.62 J	3.8 J
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.22	0.2 U	0.17 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	107.4	100	73	40 U	40 U	40 U	**426**	40 U	40 U	40 U	40 U	40 U	40 U	1.7 J	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Potassium	61,000	--	--	362 J	512 J	518 J	645 J	226 J	219 J	700 J	282 J	289 J	1,620 J	1,220 J	757 J	756 J	366 J	1,430 J	1,920 J	624 J	1,040 J
Selenium	6.12	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	3.9 J	5 U	5 UJ	5 U
Silver	--	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	1,078,000	--	--	9,640	10,500	9,020	11,900	5,000 U	6,270	13,000	5,000 U	5,000 U	17,300	12,600	5,000 U	5,000 U	5,000 U	18,400	63,000	13,500	26,900
Thallium	13.34	2	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	6.06	--	18	2.9 J	0.88 J	1.5 J	1 J	2.8 J	1.5 J	1.4 J	1.9 J	2 J	1.8 J	2.4 J	1.3 J	1.2 J	1.4 J	2.2 J	1.7 J	1.7 J	2.2 J
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/L)																					
Aluminum, Dissolved	360	--	3,700	NA	NA	NA	NA	NA	NA	200 U	NA	NA	NA	NA	200 U	200 U	NA	NA	NA	NA	NA
Arsenic, Dissolved	13.06	10	0.045	NA	NA	NA	NA	NA	NA	**10.9**	NA	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA
Barium, Dissolved	58.4	700	730	NA	NA	NA	NA	NA	NA	200 U	NA	NA	NA	NA	200 U	200 U	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	7.3	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Calcium, Dissolved	154,400	--	--	NA	NA	NA	NA	NA	NA	39,300	NA	NA	NA	NA	50,600	49,800	NA	NA	NA	NA	NA
Chromium, Dissolved	6.7	10	0.043	NA	NA	NA	NA	NA	NA	**2.2 J**	NA	NA	NA	NA	**2.7 J**	10 U	NA	NA	NA	NA	NA
Cobalt, Dissolved	4.9	--	1.1	NA	NA	NA	NA	NA	NA	**1.6 J**	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Copper, Dissolved	4.88	1,000	150	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Iron, Dissolved	3,220	300	2,600	NA	NA	NA	NA	NA	NA	**8,930**	NA	NA	NA	NA	100 U	100 U	NA	NA	NA	NA	NA
Lead, Dissolved	3.44	15	15	NA	NA	NA	NA	NA	NA	3.5	NA	NA	NA	NA	3.3 J	3.3 J	NA	NA	NA	NA	NA
Magnesium, Dissolved	75,800	--	--	NA	NA	NA	NA	NA	NA	5,000 U	NA	NA	NA	NA	6,990	6,840	NA	NA	NA	NA	NA
Manganese, Dissolved	116	50	88	NA	NA	NA	NA	NA	NA	**475**	NA	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA
Mercury, Dissolved	0.234	1	1.1	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	0.2 U	0.2 U	NA	NA	NA	NA	NA
Nickel, Dissolved	107.4	100	73	NA	NA	NA	NA	NA	NA	40 U	NA	NA	NA	NA	40 U	40 U	NA	NA	NA	NA	NA
Potassium, Dissolved	61,000	--	--	NA	NA	NA	NA	NA	NA	584 J	NA	NA	NA	NA	773 J	752 J	NA	NA	NA	NA	NA
Sodium, Dissolved	1,078,000	--	--	NA	NA	NA	NA	NA	NA	12,600	NA	NA	NA	NA	5,000 U	5,000 U	NA	NA	NA	NA	NA
Vanadium, Dissolved	6.06	--	18	NA	NA	NA	NA	NA	NA	1.5 J	NA	NA	NA	NA	1.5 J	20 U	NA	NA	NA	NA	NA
Zinc, Dissolved	--	1,000	1,100	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA	20 U	20 U	NA	NA	NA	NA	NA

Notes:

Bold box indicates exceedance of NCGWQS or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

Shading indicates exceedance of two times the mean site specific background concentration for Groundwater

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

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

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/L - Micrograms per liter

TABLE 4-5
Groundwater Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background GW 2X Mean	NCGWQS (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BI-GW09/SO09	BI-GW10/SO10	BI-GW11/SO11	BI-GW12/SO12	BI-GW13/SO13	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17	BI-GW20/SO20	BI-GW21/SO21	BI-GW22/SO22		BI-GW23/SO23	BI-GW24/SO24	BI-GW25/SO25	BI-GW26/SO26	BI-GW27/SO27	BI-GW28/SO28	
Sample ID				BI-GW09-10A	BI-GW10-10A	BI-GW11-10A	BI-GW12-10A	BI-GW13-10A	BI-GW14-10A	BI-GW15-10A	BI-GW16-10A	BI-GW17-10A	BI-GW20-10A	BI-GW21-10A	BI-GW22-10A	BI-GW22D-10A	BI-GW23-10A	BI-GW24-10A	BI-GW25-10A	BI-GW26-10A	BI-GW27-10A	BI-GW28-10A	BI-GW28D-10A
Sample Date				01/31/10	01/31/10	01/31/10	01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10
Chemical Name																							
Semivolatile Organic Compounds (µg/L)																							
No Detections																							
Explosives (µg/L)																							
Perchlorate	--	--	2.6	0.2 U	0.2 U	0.2 U	0.2 U	0.05 J	0.2 U	0.2 U	0.08 J	0.13 J	0.2 U	0.21	0.2 U	0.04 J	0.04 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/L)																							
Aluminum	360	--	3,700	712	36.4 J	200 U	200 U	250	602	933 J	901	482	1,060	200 U	200 UJ	200 U	623 J	200 UJ	200 UJ	200 UJ	200 UJ	119 J	130 J
Antimony	--	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.06	10	0.045	10 U	10 U	10 U	10 U	**6.2 J**	**3.7 J**	10 U	**8.6 J**	**4.4 J**	**12**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**19.4**	**18.7**
Barium	58.4	700	730	200 U	200 U	200 U	200 U	200 U	1.2 J	200 U	200 U	1.5 J	200 U	200 U	0.54 J	0.89 J	3.1 J	200 U	200 U	200 U	200 U	0.62 J	0.34 J
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	154,400	--	--	60,100	45,800	52,500	55,200	38,000	10,600	10,200	10,700	13,000	14,600	70,900	42,100	43,300	26,300	58,300	38,200	54,400	42,700	64,000	67,200
Chromium	6.7	10	0.043	**14**	**1.7 J**	**0.99 J**	10 U	**2.2 J**	**9.6 J**	**5.5 J**	**6.5 J**	**10.3**	**13.1**	10 U	**1.8 J**	**2.7 J**	**8.8 J**	**1.4 J**	**1.9 J**	**1.6 J**	**1.4 J**	**6 J**	**7.6 J**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.9 J	5 U
Copper	4.88	1,000	150	5 U	5 U	1.6 J	5 U	5 U	5 U	5 U	5 U	2.2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	3,220	300	2,600	1,880	100 U	100 U	100 U	364	770	1,060 J	1,480	1,250	**3,140**	47.6 J	196 J	422 J	1,550 J	100 UJ	100 UJ	100 UJ	100 UJ	**8,180**	**8,490**
Lead	3.44	15	15	3.7	3 U	3 U	3 U	4.6	5.1 J	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4.2
Magnesium	75,800	--	--	5,600 J	8,870 J	5,670 J	8,800 J	5,000 UJ	6,200	5,000 U	5,000 UJ	5,000 U	5,000 U	5,500	5,000 U	5,000 U	5,000 U	5,160	5,000 U	5,770	5,000 U	5,000 UJ	5,000 UJ
Manganese	116	50	88	20	0.44 J	0.69 J	0.61 J	9.2 J	9 J	6.8 J	9.4 J	12.5	8.7 J	0.69 J	1.2 J	3 J	8.9 J	0.46 J	1.2 J	16.8	0.74 J	**416**	**427**
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	107.4	100	73	40 U	40 U	40 U	40 U	40 U	3.9 J	40 U	40 U	2.4 J	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	2.3 J	1.7 J
Potassium	61,000	--	--	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	104 J	244 J	265 J	378 J	101 J	274 J	127 J	141 J	130 J	438 J	311 J	832 J	255 J	1,610 J	1,570 J
Selenium	6.12	20	18	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	4.4 J	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 UJ
Silver	--	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	1,078,000	--	--	9,640	14,800	19,500	18,800	5,000 U	12,000	5,000 U	5,000 U	29,900	11,700	10,500	5,000 U	5,000 U	6,130	18,400	5,000 U	7,230	5,000 U	19,200	18,300
Thallium	13.34	2	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	6.06	--	18	4.6 J	0.98 J	0.89 J	0.72 J	3 J	2.7 J	4.4 J	4.5 J	3.5 J	5.1 J	2 J	2.2 J	2.4 J	3.9 J	1.1 J	1.3 J	1.2 J	1 J	10.4 J	10.3 J
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/L)																							
Aluminum, Dissolved	360	--	3,700	NA	NA	200 U	NA	NA	NA	NA	NA	NA	292	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	13.06	10	0.045	NA	NA	10 U	NA	NA	NA	NA	NA	NA	**7.9 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	58.4	700	730	NA	NA	200 U	NA	NA	NA	NA	NA	NA	2.8 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	7.3	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	154,400	--	--	NA	NA	47,700	NA	NA	NA	NA	NA	NA	12,800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	6.7	10	0.043	NA	NA	10 U	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	4.9	--	1.1	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	4.88	1,000	150	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	3,220	300	2,600	NA	NA	100 U	NA	NA	NA	NA	NA	NA	573	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	3.44	15	15	NA	NA	3 U	NA	NA	NA	NA	NA	NA	3.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	75,800	--	--	NA	NA	5,360	NA	NA	NA	NA	NA	NA	5,000 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	116	50	88	NA	NA	10 U	NA	NA	NA	NA	NA	NA	3.3 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury, Dissolved	0.234	1	1.1	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	107.4	100	73	NA	NA	40 U	NA	NA	NA	NA	NA	NA	40 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	61,000	--	--	NA	NA	581 J	NA	NA	NA	NA	NA	NA	77.5 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	1,078,000	--	--	NA	NA	17,300	NA	NA	NA	NA	NA	NA	11,800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	6.06	--	18	NA	NA	20 U	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	1,000	1,100	NA	NA	20 U	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Bold box indicates exceedance of NCGWQS or the more conservative MCL.

Bold text indicates exceedance of Adjusted Tap Water RSLs

Shading indicates exceedance of two times the mean site specific background concentration for Groundwater

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

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NA - Not analyzed

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

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R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/L - Micrograms per liter

TABLE 4-5
Groundwater Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background GW 2X Mean	NCGWQS (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31	BI-GW32/SO32	BI-GW33/SO33	BI-GW34/SO34	BI-GW35/SO35		BI-GW36/SO36	BI-GW38/SO38	BI-GW39/SO39	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42	BI-GW43/SO43	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46	BI-GW47/SO47
Sample ID				BI-GW29-10A	BI-GW30-10A	BI-GW31-10A	BI-GW32-10A	BI-GW33-10A	BI-GW34-10A	BI-GW35-10A	BI-GW35D-10A	BI-GW36-10A	BI-GW38-10A	BI-GW39-10A	BI-GW40-10A	BI-GW41-10A	BI-GW42-10A	BI-GW43-10A	BI-GW44-10A	BI-GW45-10A	BI-GW46-10A	BI-GW47-10A
Sample Date				01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/27/10	01/26/10	01/26/10	01/26/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/29/10	01/27/10	01/27/10	02/01/10
Chemical Name																						
Semivolatile Organic Compounds (µg/L)																						
No Detections																						
Explosives (µg/L)																						
Perchlorate	--	--	2.6	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.04 J	0.2 U	0.2 U	0.03 J	0.19 J	0.07 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/L)																						
Aluminum	360	--	3,700	200 UJ	580	422	363	41.4 J	746	286	204	485	259	657	452	200 U	226 J	200 UJ	186 J	168 J	200 U	291
Antimony	--	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.06	10	0.045	10 U	**9 J**	**13.8**	**13.8**	10 U	**3.3 J**	10 U	10 U	10 U	**4 J**	**5.9 J**	**7.9 J**	10 U	**8.4 J**	10 U	10 U	10 U	10 U	10 U
Barium	58.4	700	730	200 U	1 J	200 U	200 U	200 U	2.5 J	1.3 J	1.2 J	1.2 J	1.3 J	2.3 J	200 U	200 U	0.74 J	200 U	200 U	0.39 J	200 U	200 U
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	154,400	--	--	57,000	55,600	54,000	63,900	36,200	8,810	18,800	18,600	9,140	52,800	17,400	46,900	6,030	42,100	31,100	31,600	9,980	42,500	16,700
Chromium	6.7	10	0.043	10 U	**9 J**	**7.5 J**	**12.1**	**2.2 J**	**8.4 J**	**5.2 J**	**4.9 J**	**4.5 J**	**3.3 J**	**9.3 J**	**4.2 J**	**2.6 J**	**4.5 J**	**1.4 J**	**1.8 J**	**2.1 J**	**1.3 J**	**2.7 J**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Copper	4.88	1,000	150	5 U	5 U	5.9	1.6 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	3,220	300	2,600	100 UJ	627	742	480	100 U	2,100	806	537	1,080	590	1,300	850	481	431 J	100 UJ	250	471	71.3 J	851
Lead	3.44	15	15	3 U	4.2	3 U	3 U	3 U	3.3 J	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3.5 J	3 U
Magnesium	75,800	--	--	6,530	9,290 J	7,710 J	9,220 J	5,000 UJ	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	7,380	5,000 U	5,000 U	5,000 U	5,000 UJ	5,000 U	5,000 U	5,000 U
Manganese	116	50	88	0.56 J	57.4	12.5	19.3	1.2 J	11	13.6	9.8 J	9.7 J	3.2 J	20.3	2.9 J	5.9 J	24.9	1.4 J	4.5 J	6.9 J	1.4 J	9.4 J
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.1 J	0.1 J	0.2 U	0.2 U	0.2 U	0.38	0.23	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	107.4	100	73	40 U	3 J	2.1 J	5.9 J	40 U	40 U	2.3 J	2.2 J	40 U	40 U	2.2 J	40 U	40 U	1 J	40 U	40 U	40 U	40 U	40 U
Potassium	61,000	--	--	651 J	1,900 J	1,300 J	541 J	345 J	139 J	396 J	392 J	167 J	197 J	248 J	794 J	279 J	406 J	127 J	55.1 J	40.7 J	184 J	120 J
Selenium	6.12	20	18	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 U	5.2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U
Silver	--	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	1,078,000	--	--	9,070	33,600	32,300	32,700	12,400	5,000 U	5,090	5,210	5,000 U	43,300	21,600	6,420	5,000 U	11,800	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U
Thallium	13.34	2	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	6.06	--	18	0.97 J	12.5 J	6.9 J	7.6 J	1.3 J	4.7 J	3.7 J	3.4 J	2.6 J	2.4 J	4.8 J	3.2 J	1.8 J	4.7 J	0.95 J	2.4 J	0.97 J	0.92 J	3.4 J
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/L)																						
Aluminum, Dissolved	360	--	3,700	NA	224	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	388	NA	NA	NA	200 U	NA	NA
Arsenic, Dissolved	13.06	10	0.045	NA	**7.7 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**38**	NA	NA	NA	10 U	NA	NA
Barium, Dissolved	58.4	700	730	NA	200 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.7 J	NA	NA	NA	200 U	NA	NA
Beryllium, Dissolved	--	4	7.3	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	5 U	NA	NA
Calcium, Dissolved	154,400	--	--	NA	51,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	40,000	NA	NA	NA	10,000	NA	NA
Chromium, Dissolved	6.7	10	0.043	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**11.3**	NA	NA	NA	**1.1 J**	NA	NA
Cobalt, Dissolved	4.9	--	1.1	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.9 J**	NA	NA	NA	5 U	NA	NA
Copper, Dissolved	4.88	1,000	150	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	5 U	NA	NA
Iron, Dissolved	3,220	300	2,600	NA	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**9,640**	NA	NA	NA	100 U	NA	NA
Lead, Dissolved	3.44	15	15	NA	3.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.4	NA	NA	NA	3 U	NA	NA
Magnesium, Dissolved	75,800	--	--	NA	8,700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,000 U	NA	NA	NA	5,000 U	NA	NA
Manganese, Dissolved	116	50	88	NA	47.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**715**	NA	NA	NA	2 J	NA	NA
Mercury, Dissolved	0.234	1	1.1	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	0.2 U	NA	NA
Nickel, Dissolved	107.4	100	73	NA	3 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.2 J	NA	NA	NA	40 U	NA	NA
Potassium, Dissolved	61,000	--	--	NA	1,750 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,730 J	NA	NA	NA	28 J	NA	NA
Sodium, Dissolved	1,078,000	--	--	NA	30,100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	14,700	NA	NA	NA	5,000 U	NA	NA
Vanadium, Dissolved	6.06	--	18	NA	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA	1 J	NA	NA
Zinc, Dissolved	--	1,000	1,100	NA	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA	20 U	NA	NA

Notes:

Bold box indicates exceedance of NCGWQS or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

Shading indicates exceedance of two times the mean site specific background concentration for Groundwater

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

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

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/L - Micrograms per liter

TABLE 4-5
Groundwater Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background GW 2X Mean	NCGWQS (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BI-GW48/SO48	BI-GW49/SO49		BI-GW59/SO59	ICWBG-GW20/SO20		ICWBG-GW21/SO21	ICWBG-GW22/SO22	ICW-GW01/SO01	ICW-GW02/SO02	ICW-GW03/SO03		ICW-GW04/SO04	ICW-GW05/SO05	ICW-GW06/SO06	ICW-GW07/SO07	ICW-GW08/SO08
Sample ID				BI-GW48-10A	BI-GW49-10A	BI-GW49D-10A	BI-GW59-10A	ICW-GW20-10A	ICW-GW20D-10A	ICW-GW21-10A	ICW-GW22-10A	ICW-GW01-10A	ICW-GW02-10A	ICW-GW03-10A	ICW-GW03D-10A	ICW-GW04-10A	ICW-GW05-10A	ICW-GW06-10A	ICW-GW07-10A	ICW-GW08-10A
Sample Date				02/01/10	01/28/10	01/28/10	02/01/10	03/26/10	03/26/10	03/26/10	03/25/10	03/23/10	03/23/10	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10	03/22/10	03/23/10
Chemical Name																				
Semivolatile Organic Compounds (µg/L)																				
No Detections																				
Explosives (µg/L)																				
Perchlorate	--	--	2.6	0.03 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/L)																				
Aluminum	360	--	3,700	1,180	54.9 J	56.7 J	1,570	129 J+	116 J+	63.2 J	200 U	200 U	200 U	2,120	200 U	1,320	200 U	604	1,570	200 U
Antimony	--	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**19,800**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.06	10	0.045	**5.8 J**	10 U	10 U	**28.1**	**16**	**13.9**	**5.8 J**	**3 J**	10 U	10 U	10 U	10 U	**12.7**	10 U	10 U	10 U	10 U
Barium	58.4	700	730	200 U	200 U	200 U	200 U	1.5 J	1.4 J	13.1 J	1.2 J	200 U	200 U	200 U	12.1 J	8.7 J	1.1 J	3.9 J	12.8 J	2.1 J
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**985**	**214**	5 U	5 U	5 U	5 U	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**27**	**5 J**	5 U	5 U	5 U	5 U	5 U
Calcium	154,400	--	--	21,700	41,500	41,800	31,700	89,700	87,000	453,000	116,000	5,000 U	37,200	30,800	169,000	86,700	79,200	69,800	52,800	83,400
Chromium	6.7	10	0.043	**9.9 J**	10 U	**0.95 J**	**41**	**4.8 J**	**4.9 J**	**4.2 J**	**2.3 J**	10 U	**2.1 J**	**68.5**	**15.2**	**18.8**	**1 J**	**2.4 J**	**5.7 J**	**3.8 J**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	**13.4**	5 U	5 U	5 U	5 U	5 U	5 U	**39.8**	**23**	**2.8 J**	5 U	5 U	5 U	5 U
Copper	4.88	1,000	150	5 U	5 U	5 U	2.2 J	5 U	1.9 J	5 U	5 U	5 U	6.6	5 U	27.2	6.9	5 U	5 U	6.7	5.7
Iron	3,220	300	2,600	2,350	29.7 J	34.1 J	**60,300**	**3,730**	**3,600**	488	874	100 U	71.2 J	**5,780**	542	**8,920**	1,000	649	**3,850**	256
Lead	3.44	15	15	3 U	3 U	3 U	5.2	3 U	3 U	3 U	3 U	**11,800**	2.5 J	3 U	3 U	2.3 J	3 U	3 U	3.2	3 U
Magnesium	75,800	--	--	5,000 U	5,000 U	5,000 U	7,900	30,000	29,100	326,000	35,400	5,000 U	7,040	5,000 U	25,100	102,000	28,400	29,000	10,900	41,300
Manganese	116	50	88	14	0.69 J	0.84 J	**292**	55	53.4	41.6	31.4	10 U	1.4 J	33.9	8.9 J	26.5	33	16.7	19.2	16.7
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.13 J	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	107.4	100	73	40 U	40 U	40 U	40 U	2.2 J	2.5 J	40 U	5 U	5 U	1.3 J	**453**	45.1	7.2	5 U	5 U	5 U	5 U
Potassium	61,000	--	--	292 J	179 J	184 J	1,040 J	7,690 J	7,530 J	316,000 J	8,560 J	5,000 U	1,180 J	310,000 J	40,000 J	58,300 J	8,820 J	6,990 J	2,150 J	14,800 J
Selenium	6.12	20	18	5 U	5 U	5 U	5 U	4.2 J-	5 R	5 U	7 J-	5 U	5 U	5 U	5 U	5.8	5 U	4.6 J	5 U	3.8 J
Silver	--	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.5 J	13.7	1 J	5 U	5 U	5 U	5 U	5 U
Sodium	1,078,000	--	--	11,500	11,900	12,500	12,300	199,000 J	197,000 J	5,540,000 J	130,000 J	240,000	5,000 U	5,000 U	68,900	979,000	25,900	46,600	26,400	427,000
Thallium	13.34	2	--	10 U	10 U	10 U	10 U	10 U	10 U	23.4	10 U	5,440	10 U	345	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	6.06	--	18	7.2 J	1.6 J	1.7 J	17.4 J	11.9 J	11.6 J	2.7 J	4.8 J	20 U	3.7 J	20 U	20 U	**64.5**	1.5 J	6.1 J	11.2 J	9.9 J
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	441	20.9	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/L)																				
Aluminum, Dissolved	360	--	3,700	NA	NA	NA	NA	200 U	200 U	NA	NA	NA	NA	200 U	200 U	NA	NA	NA	NA	NA
Arsenic, Dissolved	13.06	10	0.045	NA	NA	NA	NA	**14.3**	**13.9**	NA	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA
Barium, Dissolved	58.4	700	730	NA	NA	NA	NA	1.1 J	1.2 J	NA	NA	NA	NA	200 U	200 U	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	7.3	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Calcium, Dissolved	154,400	--	--	NA	NA	NA	NA	82,900	82,600	NA	NA	NA	NA	40,200	41,500	NA	NA	NA	NA	NA
Chromium, Dissolved	6.7	10	0.043	NA	NA	NA	NA	**3.8 J**	**4.4 J**	NA	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA
Cobalt, Dissolved	4.9	--	1.1	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Copper, Dissolved	4.88	1,000	150	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Iron, Dissolved	3,220	300	2,600	NA	NA	NA	NA	**3,320**	**3,310**	NA	NA	NA	NA	100 U	100 U	NA	NA	NA	NA	NA
Lead, Dissolved	3.44	15	15	NA	NA	NA	NA	3 U	2.1 J	NA	NA	NA	NA	3 U	2.7 J	NA	NA	NA	NA	NA
Magnesium, Dissolved	75,800	--	--	NA	NA	NA	NA	28,200	28,100	NA	NA	NA	NA	10,600	10,600	NA	NA	NA	NA	NA
Manganese, Dissolved	116	50	88	NA	NA	NA	NA	49.3	49.1	NA	NA	NA	NA	1.1 J	1.4 J	NA	NA	NA	NA	NA
Mercury, Dissolved	0.234	1	1.1	NA	NA	NA	NA	0.2 U	0.2 U	NA	NA	NA	NA	0.44	0.39	NA	NA	NA	NA	NA
Nickel, Dissolved	107.4	100	73	NA	NA	NA	NA	2 J	2 J	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Potassium, Dissolved	61,000	--	--	NA	NA	NA	NA	7,310 J	7,210 J	NA	NA	NA	NA	2,150 J	2,040 J	NA	NA	NA	NA	NA
Sodium, Dissolved	1,078,000	--	--	NA	NA	NA	NA	191,000	191,000	NA	NA	NA	NA	9,210	9,310	NA	NA	NA	NA	NA
Vanadium, Dissolved	6.06	--	18	NA	NA	NA	NA	10.2 J	10.1 J	NA	NA	NA	NA	20 U	0.85 J	NA	NA	NA	NA	NA
Zinc, Dissolved	--	1,000	1,100	NA	NA	NA	NA	2.3 J	2.4 J	NA	NA	NA	NA	1.5 J	1.4 J	NA	NA	NA	NA	NA

Notes:

Bold box indicates exceedance of NCGWQS or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

Shading indicates exceedance of two times the mean site specific background concentration for Groundwater

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

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

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

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µg/L - Micrograms per liter

TABLE 4-5
Groundwater Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background GW 2X Mean	NCGWQS (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	ICW-GW09/SO09	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW12/SO12	ICW-GW13/SO13	ICW-GW14/SO14	ICW-GW15/SO15	ICW-GW16/SO16	ICW-GW17/SO17	ICW-GW18/SO18	ICW-GW19/SO19	SI-GW01/SO01		SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID				ICW-GW09-10A	ICW-GW10-10A	ICW-GW11-10A	ICW-GW12-10A	ICW-GW13-10A	ICW-GW14-10A	ICW-GW15-10A	ICW-GW16-10A	ICW-GW17-10A	ICW-GW18-10A	ICW-GW19-10A	SI-GW01-10A	SI-GW01D-10A	SI-GW02-10A	SI-GW03-10A	SI-GW04-10A	SI-GW05-10A	SI-GW06-10A
Sample Date				03/23/10	03/23/10	03/23/10	03/24/10	03/25/10	03/25/10	03/25/10	03/26/10	03/25/10	03/25/10	03/26/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name																					
Semivolatile Organic Compounds (µg/L)																					
No Detections																					
Explosives (µg/L)																					
Perchlorate	--	--	2.6	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/L)																					
Aluminum	360	--	3,700	2,050	253	200 U	**7,040**	200 U	648 J+	1,780 J+	476 J+	237 J+	617 J+	204 J+	3,370 J+	**3,880 J+**	200 U	200 U	43.7 J+	**4,090 J+**	200 U
Antimony	--	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**510**	10 U
Arsenic	13.06	10	0.045	10 U	10 U	10 U	10 U	10 U	**3.2 J**	10 U	**17.2**	**4.6 J**	**5 J**	10 U	**20.5**	**21.9**	10 U	10 U	10 U	**43**	10 U
Barium	58.4	700	730	15.2 J	6 J	1 J	12.9 J	7.7 J	5.3 J	5.4 J	4.7 J	5.9 J	6.3 J	3.6 J	200 U	18.6 J	3.8 J	1.7 J	2.2 J	**1,970**	2.5 J
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**8.4**	5 U	5 U	**48.8**	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	0.41 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.46 J	5 U	5 U	**46**	5 U
Calcium	154,400	--	--	212,000	61,000	74,600	151,000	334,000	184,000	188,000	255,000	280,000	333,000	175,000	54,600	53,600	76,400	49,500	95,800	186,000	129,000
Chromium	6.7	10	0.043	**11.2**	**2.5 J**	**2.2 J**	**27.2**	10 U	**2.2 J**	**7.9 J**	**8.3 J**	**2.6 J**	**5.4 J**	**5.7 J**	**25.5**	**30.9**	**5.2 J**	**4.7 J**	**1.2 J**	**197**	**2 J**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	**1.5 J**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.83 J	5 U	5 U	**487**	5 U
Copper	4.88	1,000	150	5 U	5.5	5 U	18.1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5.5	29.2	11.6	5 U	**246**	19.5
Iron	3,220	300	2,600	**4,320**	573	1,260	**7,390**	135	1,010	1,400	**4,970**	374	**3,060**	776	1,910	2,300	841	546	121	2,390	85 J
Lead	3.44	15	15	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3.3	4.2	3 U	3 U	3 U	**19.8**	3 U
Magnesium	75,800	--	--	362,000	21,800	22,500	150,000	594,000	420,000	86,900	216,000	216,000	265,000	95,400	139,000	137,000	18,100	31,300	89,900	87,000	74,900
Manganese	116	50	88	40.1	23.6	18.7	39.7	3.5 J	24.9	31.4	48.1	49.1	**103**	26.3	33.4	32.9	25.1	32.2	9.5 J	**518**	24.5
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	107.4	100	73	1.1 J	5 U	5 U	6	5 U	1.4 J	3 J	2.7 J	2.2 J	1.1 J	2.2 J	1.6 J	1.6 J	5 U	5 U	5 U	**471**	5 U
Potassium	61,000	--	--	170,000 J	11,200 J	3,090 J	88,400 J	235,000 J	231,000 J	28,400 J	93,300 J	72,400 J	98,100 J	34,600 J	63,600 J	63,000 J	14,200 J	23,700 J	41,000 J	28,600 J	33,900 J
Selenium	6.12	20	18	5 U	5	5 U	5 J	5 R	5 R	5 R	5 R	5 R	5 R	3.8 J-	5 R	5 R	5 U	5.5	5 R	5 R	5 U
Silver	--	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.2 J	5 U	5 U	**46.2**	5 U
Sodium	1,078,000	--	--	2,910,000	91,500	40,600	1,400,000	3,900,000 J	3,490,000 J	749,000 J	1,770,000 J	1,630,000 J	2,130,000 J	746,000 J	1,240,000 J	1,220,000 J	122,000	178,000	716,000 J	365,000 J	592,000
Thallium	13.34	2	--	10.8	10 U	10 U	10 U	13.2	9.5 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	57.1	10 U
Vanadium	6.06	--	18	**18.2 J**	3.4 J	5.7 J	**27.7**	1.1 J	5.3 J	16 J	15.2 J	4.3 J	6.6 J	12.7 J	20 U	16.2 J	20 U	13.8 J	20 U	**521**	20 U
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	476	20 U
Dissolved Metals (µg/L)																					
Aluminum, Dissolved	360	--	3,700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,640	2,690	NA	NA	NA	NA	NA
Arsenic, Dissolved	13.06	10	0.045	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**19.3**	**21.9**	NA	NA	NA	NA	NA
Barium, Dissolved	58.4	700	730	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	16.6 J	16.5 J	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	7.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 U	0.45 J	NA	NA	NA	NA	NA
Calcium, Dissolved	154,400	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	53,300	52,800	NA	NA	NA	NA	NA
Chromium, Dissolved	6.7	10	0.043	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**28.5**	**27.4**	NA	NA	NA	NA	NA
Cobalt, Dissolved	4.9	--	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Copper, Dissolved	4.88	1,000	150	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.1 J	5 U	NA	NA	NA	NA	NA
Iron, Dissolved	3,220	300	2,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,400	1,350	NA	NA	NA	NA	NA
Lead, Dissolved	3.44	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.1	2 J	NA	NA	NA	NA	NA
Magnesium, Dissolved	75,800	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	139,000	140,000	NA	NA	NA	NA	NA
Manganese, Dissolved	116	50	88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30.8	30.7	NA	NA	NA	NA	NA
Mercury, Dissolved	0.234	1	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.6	0.2 U	NA	NA	NA	NA	NA
Nickel, Dissolved	107.4	100	73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9 J	1 J	NA	NA	NA	NA	NA
Potassium, Dissolved	61,000	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	57,200 J	58,300 J	NA	NA	NA	NA	NA
Sodium, Dissolved	1,078,000	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,100,000	1,140,000	NA	NA	NA	NA	NA
Vanadium, Dissolved	6.06	--	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13.9 J	14.1 J	NA	NA	NA	NA	NA
Zinc, Dissolved	--	1,000	1,100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.3 J	5.4 J	NA	NA	NA	NA	NA

Notes:

Bold box indicates exceedance of NCGWQS or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

Shading indicates exceedance of two times the mean site specific background concentration for Groundwater

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

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

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/L - Micrograms per liter

TABLE 4-6
Groundwater Analytical Data Summary
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Analyte Name	NCGWQS[1] (January 2010)	Number Exceeding NCGWQS	Adjusted Tap Water RSLs	Number Exceeding Adjusted Tap Water RSLs	2X Site Background	Number Exceeding both 2x Site Background and one other Screening Limit	Detection Frequency			Minimum Detected Concentration (µg/L)	Maximum Detected Concentration (µg/L)	Location of Maximum Detected Value
Total Metals (µg/L)												
Aluminum	--	--	3,700	3	360.0	3	45	-	72	36.4 J	7,040	ICW-GW12-10A
Antimony	6	2	1.5	2	--	--	2	-	72	510	19,800	ICW-GW01-10A
Arsenic	10	9	0.045	24	13.1	7	24	-	72	3.0 J	43	BI-GW15-10A
Barium	700	1	730	1	58.40	1	39	-	72	0.37 J	1,970	SI-GW05-10A
Beryllium	4	3	7.3	3	--	--	3	-	72	48.8	985	ICW-GW03-10A
Cadmium	2	2	1.8	2	--	--	4	-	72	0.41 J	46	SI-GW05-10A
Chromium	10	12	0.043	67	6.7	22	67	-	72	0.95 J	197	SI-GW05-10A
Cobalt	--	--	1.1	5	4.9	3	7	-	72	0.83 J	487	SI-GW05-10A
Copper	1,000	0	150	1	4.9	1	17	-	72	1.6 J	246	SI-GW05-10A
Iron	300	46	2,600	10	3,220	8	56	-	72	34.1 J	60,300	BI-GW59-10A
Lead	15	2	15	2	3.4	2	15	-	72	2.3 J	11,800	ICW-GW01-10A
Manganese	50	5	88	4	116	3	69	-	72	0.44 J	518	SI-GW05-10A
Nickel	100	2	73	2	107.4	2	23	-	72	1.0 J	471	SI-GW05-10A
Silver	20	1	18	1	--	--	4	-	72	1.2 J	46.2	SI-GW05-10A
Thallium	2	6	--	--	13.3	3	6	-	72	9.5 J	5,440	ICW-GW01-10A
Vanadium	--	--	18	4	6.1	4	67	-	72	0.72 J	521	SI-GW05-10A

Notes:
[1]The MCL-Groundwater value is reported in place of the NCGWQS where the MCL value is more conservative.
RSL - Regional Screening Level
NCGWQS - North Carolina Groundwater Quality Standards
J - Analyte present. Value may or may not be accurate or precise
µg/L- micrograms per Liter

Created by: J. Wheat 7/30/2010
Updated by: R. Shaw 8/04/2010
Updated by: R. Shaw 8/21/2010

TABLE 4-7
Surface Water Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	**NC2B-SW-Human Health & Water Supply[1]**	**Adjusted Tapwater RSLs (May, 2010)**	SDZ-SW01		SDZ-SW02	SDZ-SW03	SDZ-SW04	SDZ-SW05	SDZ-SW06
Sample ID			SDZ-SW01-10B	SDZ-SW01D-10B	SDZ-SW02-10B	SDZ-SW03-10B	SDZ-SW04-10B	SDZ-SW05-10B	SDZ-SW06-10B
Sample Date			05/09/10	05/09/10	05/03/10	05/06/10	05/09/10	05/09/10	05/07/10
Chemical Name									
Explosives (µg/L)									
Perchlorate	--	2.6	0.2 U	0.2 U	0.2 U	0.08 J	0.2 U	0.2 U	0.08 J
Total Metals (µg/L)									
Aluminum	--	3,700	356 J	310 J	517 J	565 J	69.5 J	290 J	628 J
Antimony	--	1.5	10 U	10 U	**5.2 J**	10 U	10 U	10 U	10 U
Arsenic	10	0.045	**3.7 J**	**2.8 J**	10 U	10 U	10 U	10 U	10 U
Barium	1,000	730	200 U	200 U	200 U	200 U	200 U	200 U	19.2 J
Beryllium	--	7.3	5 U	5 U	5 U	5 U	5 U	0.73 J	5 U
Cadmium	--	1.8	**8.9**	**9**	**6.6**	**6.5**	**8.6**	**8.5**	0.65 J
Calcium	--	--	413,000	435,000	388,000	315,000	422,000	407,000	43,200
Cobalt	--	1.1	**32.4**	**32.8**	**25.8**	**24.5**	**31.6**	**31.2**	**2.2 J**
Copper	--	150	5 U	5 U	5 U	5 U	5 U	5 U	5 J+
Iron	--	2,600	716	744	942 J	662	507	612	1,020
Lead	--	15	3 U	3 U	3 U	3 U	3 U	3 U	2.1 J
Magnesium	--	--	1,380,000	1,350,000	1,320,000	937,000	1,330,000	1,340,000	72,100
Manganese	200	88	10 U	10 U	10 U	10 U	10 U	10 U	10.8
Potassium	--	--	589,000 J	542,000 J	574,000 J	369,000 J	535,000 J	574,000 J	31,900 J
Selenium	--	18	5 U	5 U	3.3 J	5 U	5 U	5 U	5 U
Sodium	--	--	10,800,000 J	10,200,000 J	10,400,000	7,470,000	10,100,000 J	10,500,000 J	584,000 J
Vanadium	--	18	2.9 J	3.5 J	3.4 J	3.5 J	2.1 J	3.8 J	2.2 J
Zinc	--	1,100	4.2 J	7.1 J	20 U	20 U	20 U	20 U	5.9 J
Dissolved Metals (µg/L)									
Antimony, Dissolved	--	1.5	**3.5 J**	**6.6 J**	**2.2 J**	10 U	**4.8 J**	**6.7 J**	**6.3 J**
Barium, Dissolved	1,000	730	200 U	200 U	200 U	200 U	200 U	200 U	17.9 J
Cadmium, Dissolved	--	1.8	**8.2**	**9.1**	**8.2**	**6.1**	**9.4**	**9.3**	5 U
Calcium, Dissolved	--	--	347,000	359,000	411,000	288,000	368,000	368,000	44,100
Cobalt, Dissolved	--	1.1	**30.2**	**34.4**	**29.5**	**21.6**	**33.1**	**34.2**	**1.6 J**
Copper, Dissolved	--	150	5 U	5 U	5 U	5 U	5 U	5 U	6.4
Iron, Dissolved	--	2,600	348	369	449 J	205	398	423	100 U
Magnesium, Dissolved	--	--	1,180,000	1,240,000	1,340,000 J	839,000	1,260,000	1,270,000	76,200 J
Manganese, Dissolved	200	88	10 U	10 U	10 U	10 U	10 U	10 U	7.1 J
Nickel, Dissolved	25	73	5 U	5 U	5 U	5 U	5 U	1.2 J	5 U
Potassium, Dissolved	--	--	509,000 J	554,000 J	560,000	321,000 J	526,000 J	553,000 J	36,300
Selenium, Dissolved	--	18	5 U	5 U	5 U	5 U	5 U	5 U	2.3 J
Sodium, Dissolved	--	--	9,460,000	9,940,000	10,200,000 J	6,660,000	9,720,000	9,980,000	629,000 J
Vanadium, Dissolved	--	18	1.9 J	20 U	2.1 J	2.7 J	20 U	1.7 J	1.7 J
Zinc, Dissolved	--	1,100	5.3 J	4.8 J	20 U	20 U	20 U	20 U	20 U

Notes:

Bold box indicates exceedance of NC2B-SW-Human Health + Water Supply

Bold text indicates exceedance of Adjusted Tap Water RSLs

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

[1] - NC2B-SW-Human Health and NC2B-SW-Water Supply were combined to show the most conservative criteria

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

U - The material was analyzed for, but not detected

µg/l - Micrograms per liter

TABLE 4-8
Sediment Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SD 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	SDZ-WN01/SD01	SDZ-WN02/SD02	SDZ-WN03/SD03	SDZ-WN04/SD04	SDZ-WN05/SD05	SDZ-WN06/SD06	SDZ-WN07/SD07	SDZ-WN08/SD08	SDZ-WN09/SD09		SDZ-WN10/SD10
Sample ID					SDZ-SD01-10B	SDZ-SD02-10B	SDZ-SD03-10B	SDZ-SD04-10B	SDZ-SD05-10B	SDZ-SD06-10B	SDZ-SD07-10B	SDZ-SD08-10B	SDZ-SD09-10B	SDZ-SD09D-10B	SDZ-SD10-10B
Sample Date					05/07/10	05/07/10	05/06/10	05/06/10	05/05/10	05/03/10	05/03/10	05/03/10	05/03/10	05/03/10	05/06/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	5,471	--	99,000	7,700	16,700	7,910	4,860	5,350	6,810	2,430	3,130	8,530	5,790	7,160	4,800
Antimony	2.8	--	41	3.1	1.6 J	2.2 J	1.9 J	0.9 J	1.6 U	1.4 U	1.4 U	1.2 U	1.7 U	1.8 U	1.3 J
Arsenic	5.3	5.8	1.6	0.39	**9.2**	**4.4**	**3.5**	**5.2**	**7.8**	1.4	**2.3**	**6.2**	**4.6**	**5.1**	**4.2**
Barium	10	580	19,000	1,500	19.4 J	9.9 J	7.2 J	8 J	10.3 J	4.9 J	5.6 J	12.2 J	9 J	10.1 J	7.7 J
Cadmium	0.68	3	80	7	1.3 U	1 U	0.16 J	0.76 U	0.8 U	0.68 U	0.68 U	0.74 U	0.84 U	0.89 U	0.89 U
Calcium	39,200	--	--	--	2,490	1,180	111,000	37,500	21,200	20,100	22,100	41,200	14,100	16,800	4,950
Chromium	21.2	3.8	5.6	0.29	**42.3**	**19.2**	**13.4**	**18.2**	**23.3**	**9.8**	**10.7**	**24**	**18.8**	**22**	**20.8**
Cobalt	1.04	--	30	2.3	1.3 U	1 UJ	0.71 J-	0.76 U	0.6 J-	0.68 UJ	0.68 UJ	0.68 J-	0.84 UJ	0.89 UJ	0.89 U
Copper	2.5	700	4,100	310	9.7	4.5	2.4	2.4	2.5	1	3	5.1	3	3.4	1.8
Iron	7,663	150	72,000	5,500	24,300	9,510	6,190	7,960	10,600	3,390	3,820	10,200	7,530	8,990	8,410
Lead	5.5	270	800	400	22.9	11 J	5 J	4.6	4.9 J	2.9 J	3.8 J	9.2 J	6 J	6.7 J	4.3
Magnesium	3,371	--	--	--	4,950	2,380	2,830	3,170	3,780	1,460	1,870	4,130	3,100	3,630	2,750
Manganese	51.7	65	2,300	180	96	45.6	43.9	49.7	58.9	23.7	25.6	74.3	46.9	56	57.3
Mercury	0.04	1	31	2.3	0.072 J	0.072	0.016 J	0.052 U	0.054 U	0.015 J	0.012 J	0.028 J	0.043 J	0.027 J	0.063 U
Nickel	4.5	130	2,000	150	11.1	4.8	3.3	4.5	6.1	1.9	2.1	5.8	4.4	5.2	5.1
Potassium	1,364	--	--	--	2,830 J	1,410 J	1,120 J	1,330 J	1,920 J	468 J	732 J	1,920 J	1,430 J	1,790 J	1,200 J
Selenium	0.68	2.1	510	39	0.96 J-	1 U	0.79 UJ	0.6 J-	0.7 J-	0.68 UJ	0.68 UJ	0.74 UJ	0.84 U	0.89 U	0.73 J-
Sodium	7,207	--	--	--	6,300	4,360	6,180	5,170	7,200	2,750	4,540	6,370	8,550	9,290	7,420
Vanadium	18.1	--	520	39	40.1	17.4	13.8	18.2	24.3	8.5	9.5	25.5	20.1	23	20.7
Zinc	17.3	1,200	31,000	2,300	55.6	26.3	19.7	16.2	18.9	8.4	10.5	24.5	19.8	20.5	17.2

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Underline indicates exceedance of Adjusted Residential Soil RSLs

Shading indicates exceedance of two times the mean site specific background concentration for sediment.

RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents
J - Analyte present, value may or may not be accurate or precise
J- - Analyte present, value may be biased low, actual value may be higher
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 4-8
Sediment Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SD 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	SDZ-WN11/SD11	SDZ-WN12/SD12	SDZ-WN13/SD13	SDZ-WN14/SD14	SDZ-WN15/SD15	SDZ-WN16/SD16	SDZ-WN17/SD17	SDZ-WN18/SD18	SDZ-WN19/SD19	SDZ-WN20/SD20	SDZ-WN21/SD21
Sample ID					SDZ-SD11-10B	SDZ-SD12-10B	SDZ-SD13-10B	SDZ-SD14-10B	SDZ-SD15-10B	SDZ-SD16-10B	SDZ-SD17-10B	SDZ-SD18-10B	SDZ-SD19-10B	SDZ-SD20-10B	SDZ-SD21-10B
Sample Date					05/10/10	05/10/10	05/10/10	05/10/10	05/10/10	05/08/10	05/05/10	05/08/10	05/08/10	05/08/10	05/08/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	5,471	--	99,000	7,700	2,630	1,390	299	2,480	2,030	323	6,030	467	990	313	363
Antimony	2.8	--	41	3.1	1.4 J	0.79 J	1.3 J	1.1 J	1.1 J	0.98 J	1.7 U	1 J	1.1 J	1.4 J	1.2 J
Arsenic	5.3	5.8	1.6	0.39	**2.7**	1.2 J	0.94 J	**2.3**	**2.1**	0.58 J	**4.8**	1.1 J	1.3	1.5	1.2
Barium	10	580	19,000	1,500	4.5 J	2.6 J	1.3 J	4.2 J	4 J	1.1 J	8.6 J	1.7 J	2.2 J	1.7 J	1.6 J
Cadmium	0.68	3	80	7	0.69 U	0.63 U	0.6 U	0.67 U	0.72 U	0.61 U	0.83 U	0.58 U	0.6 U	0.6 U	0.6 U
Calcium	39,200	--	--	--	22,900	14,300	9,300	24,500	30,900	9,190	9,590	25,000	16,300	16,800	26,500
Chromium	21.2	3.8	5.6	0.29	**11.2**	**7.5**	4	**10.9**	**10.1**	4	**19.6**	4.9	**6.3**	5	4.8
Cobalt	1.04	--	30	2.3	0.69 U	0.63 U	0.6 U	0.67 U	0.72 U	0.61 U	0.83 UJ	0.58 U	0.6 U	0.6 U	0.6 U
Copper	2.5	700	4,100	310	2.8	0.63 U	0.6 U	2.6	0.87	0.61 U	3.3	0.58 U	0.85	0.6 U	0.6 U
Iron	7,663	150	72,000	5,500	4,000	2,190	796	3,800	3,220	804	7,920	1,230	1,900	1,030	1,270
Lead	5.5	270	800	400	3.4	2.2	0.99	3.4	2.7	1.1	6.3 J	1.1	1.7	1.3	1.1
Magnesium	3,371	--	--	--	2,020	1,210	591 J	1,890	1,980	716	3,170	1,020	1,160	715	1,210
Manganese	51.7	65	2,300	180	27.3	15	5.1	25.1	23.7	5.3	41.2	10.4	11.5	8.9	10.5
Mercury	0.04	1	31	2.3	0.048 U	0.043 U	0.041 U	0.044 U	0.048 U	0.042 U	0.028 J	0.041 U	0.043 U	0.041 U	0.042 U
Nickel	4.5	130	2,000	150	2.3	1.2	0.37 J	2.1	1.8	0.37 J	4.6	0.53 J	1	0.5 J	0.45 J
Potassium	1,364	--	--	--	690 U	635 U	598 U	669 U	720 U	612 U	1,540 J	583 U	603 U	604 U	601 U
Selenium	0.68	2.1	510	39	0.69 UJ	0.63 UJ	0.6 UJ	0.67 U	0.72 U	0.61 UJ	0.53 J	0.58 UJ	0.6 UJ	0.6 UJ	0.6 UJ
Sodium	7,207	--	--	--	4,740	3,180	2,150	4,200	4,920	3,100	8,440	2,720	3,560	2,430	3,350
Vanadium	18.1	--	520	39	9.5	5.4	1.6 J	9.1	7.8	1.5 J	18.9	2.5	4	2 J	2.3 J
Zinc	17.3	1,200	31,000	2,300	11.5	6.6	2.6	10.4	9.4	2.6	19.1	3.3	5.3	3	3.1

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Underline indicates exceedance of Adjusted Residential Soil RSLs

Shading indicates exceedance of two times the mean site specific background concentration for sediment.

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

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

J- - Analyte present, value may be biased low, actual value may be higher

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 4-8
Sediment Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background SD 2X Mean	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	SDZ-WN22/SD22	SDZ-WN23/SD23		SDZ-WN24/SD24	SDZ-WN25/SD25	SDZ-WN26/SD26	SDZ-WN27/SD27	SDZ-WN28/SD28	SDZ-WN29/SD29		SDZ-WN30/SD30
Sample ID					SDZ-SD22-10B	SDZ-SD23-10B	SDZ-SD23D-10B	SDZ-SD24-10B	SDZ-SD25-10B	SDZ-SD26-10B	SDZ-SD27-10B	SDZ-SD28-10B	SDZ-SD29-10B	SDZ-SD29D-10B	SDZ-SD30-10B
Sample Date					05/05/10	05/05/10	05/05/10	05/04/10	05/04/10	05/04/10	05/04/10	05/05/10	05/04/10	05/04/10	05/05/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	5,471	--	99,000	7,700	306	315	327	515	428	2,490	324	317	2,050	2,120	5,770
Antimony	2.8	--	41	3.1	1.2 J	1.7 J	1.4 J	1.7 J	1.7 J	1.5 U	1.3 J	1.3 J	1.3 J	1.3 U	1.6 J
Arsenic	5.3	5.8	1.6	0.39	**2.4**	1.1 J	0.86 J	0.89 J	0.76 J	**2**	0.94 J	0.99 J	**2**	**1.9**	**4.9**
Barium	10	580	19,000	1,500	1.8 J	1.4 J	2.1 J	1.8 J	1.4 J	4.6 J	1.7 J	1.7 J	3.7 J	4.2 J	9.1 J
Cadmium	0.68	3	80	7	0.62 U	0.65 U	0.61 U	0.6 U	0.64 U	0.75 U	0.6 U	0.62 U	0.63 U	0.64 U	0.77 U
Calcium	39,200	--	--	--	30,200	13,100	12,300	18,000	13,600	26,500	15,400	13,600	14,800	15,000	30,200
Chromium	21.2	3.8	5.6	0.29	4	4.6	4.4	5.3	5	**10.2**	3.9	4	**9**	**8.9**	**18.8**
Cobalt	1.04	--	30	2.3	0.62 UJ	0.65 UJ	0.61 UJ	0.6 U	0.64 U	0.75 UJ	0.6 UJ	0.62 UJ	0.63 UJ	0.64 UJ	0.93
Copper	2.5	700	4,100	310	0.13 J	0.11 J	0.21 J	0.11 J	0.12 J	1.1	0.6 U	0.62 U	0.74	1	2.4
Iron	7,663	150	72,000	5,500	1,470	991	985	1,210 J	1,020 J	3,420	900	895	3,100	3,110	7,490 J
Lead	5.5	270	800	400	1.1 J	1.1 J	1.2 J	1.2 J	1.1 J	3.2 J	0.96 J	1 J	2.2 J	2.3 J	4.9 J
Magnesium	3,371	--	--	--	911	803	673	929	868	2,130	710	687	1,290	1,300	3,070
Manganese	51.7	65	2,300	180	11	7.6	7.7	10	7.6	25.4	7.2	6.9	20	20.1	50.6
Mercury	0.04	1	31	2.3	0.041 U	0.043 U	0.041 U	0.013 J	0.01 J	0.022 J	0.042 U	0.011 J	0.043 U	0.044 U	0.051 U
Nickel	4.5	130	2,000	150	0.31 J	0.52 J	0.37 J	0.6 U	0.64 U	1.8	0.4 J	0.42 J	1.7	1.7	4.6
Potassium	1,364	--	--	--	17.3 J	47.1 J	17.9 J	90 J	86.7 J	675 J	28.3 J	26.6 J	466 J	489 J	1,530 J
Selenium	0.68	2.1	510	39	0.62 UJ	0.65 UJ	0.61 UJ	0.6 UJ	0.64 UJ	0.75 UJ	0.6 UJ	0.62 UJ	0.63 UJ	0.64 UJ	0.77 UJ
Sodium	7,207	--	--	--	2,760	3,330	2,380	2,750	3,180	6,320	2,450	2,520	2,710	2,730	5,560
Vanadium	18.1	--	520	39	2.7	1.7 J	1.9 J	2.4 J	2 J	8.7	1.8 J	1.8 J	7.1	7	18.2
Zinc	17.3	1,200	31,000	2,300	2.6	2.8	2.6	3.8	3.4	9.3	2.5	2.5	6.6	6.6	16.8

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Underline indicates exceedance of Adjusted Residential Soil RSLs

Shading indicates exceedance of two times the mean site specific background concentration for sediment.

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

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

J- - Analyte present, value may be biased low, actual value may be higher

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 4-9
Sediment Analytical Data Summary
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Analyte Name	Adjusted Residential Soil RSLs (May, 2010)	Number Exceeding Residential Soil RSL	2X Site Background	Number Exceeding both 2x Site Background and one other Screening Limit	Detection Frequency			Minimum Detected Concentration (mg/kg)	Maximum Detected Concentration (mg/kg)	Location of Maximum Detected Value
Total Metals (mg/kg)										
Aluminum	7,700	3	5,471	3	27	-	27	299	16,700	SDZ-SD01-10B
Arsenic	0.39	27	5.3	3	27	-	27	0.58 J	9.2	SDZ-SD01-10B
Chromium	0.29	27	21.2	4	27	-	27	3.9	42.3	SDZ-SD01-10B
Iron	5,500	10	7,663	8	27	-	27	796	24,300	SDZ-SD01-10B
Vanadium	39	1	18.1	1	27	-	27	1.5 J	40.1	SDZ-SD01-10B

Notes:
RSL - Regional Screening Level
J - Analyte present. Value may or may not be accurate or precise
mg/kg - milligrams per kilogram

Created by: J. Wheat 7/30/2010
Updated by: R. Shaw 8/04/2010
Updated by: R. Shaw 10/21/2010

TABLE 4-10
Pore Water Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background WN 2X Mean	NCGWQS (January, 2010) *	Adjusted Tap Water RSLs (May, 2010)	SDZ-WN02/SD02	SDZ-WN03/SD03	SDZ-WN06/SD06	SDZ-WN07/SD07	SDZ-WN10/SD10	SDZ-WN11/SD11	SDZ-WN12/SD12	SDZ-WN13/SD13	SDZ-WN14/SD14	SDZ-WN15/SD15	SDZ-WN16/SD16	SDZ-WN17/SD17	SDZ-WN18/SD18	SDZ-WN19/SD19	
Sample ID				SDZ-WN02-10B	SDZ-WN03-10B	SDZ-WN06-10B	SDZ-WN07-10B	SDZ-WN10-10B	SDZ-WN11-10B	SDZ-WN12-10B	SDZ-WN13-10B	SDZ-WN14-10B	SDZ-WN15-10B	SDZ-WN16-10B	SDZ-WN17-10B	SDZ-WN18-10B	SDZ-WN19-10B	SDZ-WN19D-10B
Sample Date				05/07/10	05/06/10	05/03/10	05/03/10	05/07/10	05/10/10	05/10/10	05/10/10	05/10/10	05/10/10	05/08/10	05/05/10	05/08/10	05/08/10	05/08/10
Chemical Name																		
Semivolatile Organic Compounds (µg/L)																		
No Detections																		
Explosives (µg/L)																		
No Detections																		
Total Metals (µg/L)																		
Aluminum	442	--	3,700	200 U	**3,790 J**	3,330 J	424 J	**8,630 J**	1,620 J	180 J	80.9 J	1,660 J	657 J	104 J	215 J	88.3 J	161 J	297 J
Antimony	7.1	6	1.5	**4.4 J**	**2.7 J**	**4.2 J**	**4.2 J**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.5	10	0.045	10 U	**2.9 J**	**5.5 J**	**7.5 J**	**9 J**	10 U	10 U	10 U	**4.1 J**	10 U	**8.4 J**	10 U	10 U	10 U	10 U
Barium	200	700	730	200 U	18.4 J	16 J	200 U	19.9 J	16.8 J	200 U	200 U	200 U	18.2 J	200 U	200 U	200 U	16.2 J	15.9 J
Beryllium	4.3	4	7.3	5 U	2.3 J	1.6 J	5 U	0.79 J	5 U	5 U	5 U	5 U	5 U	5 U	2 J	5 U	5 U	5 U
Cadmium	16	2	1.8	5 U	**5.1**	**7.7**	**7**	**9.3**	**9**	**8.9**	**8.9**	**9.4**	**10.2**	**8.8**	**8.3**	**8.8**	**9.6**	**9.5**
Calcium	832,667	--	--	5,000 U	258,000	388,000	414,000	401,000	506,000	478,000	395,000	488,000	556,000	425,000	426,000	449,000	494,000	508,000
Chromium	7.2	10	0.043	10 U	10 U	**17.1**	10 U	**22.6**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cobalt	58.4	--	1.1	5 U	**19**	**28.2**	**26.5**	**32.5**	**34**	**34**	**32**	**34.4**	**37.1**	**31.7**	**30.7**	**31.3**	**36.3**	**34.9**
Copper	5	1,000	150	5 U	1.3 J	5 U	5 U	1.7 J+	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	2,536	300	2,600	14.1 J	**3,310 J**	**3,310 J**	945 J	**7,540**	1,680	594	734	2,420	1,510	2,160	594 J	2,070	654	930
Lead	3	15	15	3 U	3.7	3 U	3 U	4.6	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	2,413,333	--	--	5,000 U	840,000	1,250,000	1,320,000	1,280,000	1,240,000	1,310,000	1,340,000	1,310,000	1,430,000	1,350,000	1,280,000	1,230,000	1,420,000	1,400,000
Manganese	66.9	50	88	10 U	23.3	10 U	10 U	44.2	**137**	83.6	10 U	34.4	**140**	10 U	10 U	31	10 U	10 U
Mercury	0.2	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.091 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	5	100	73	5 U	4 J	9.9	5 U	9.7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Potassium	1,058,667	--	--	5,000 U	347,000 J	554,000 J	557,000 J	508,000 J	501,000 J	537,000 J	552,000 J	506,000 J	656,000 J	521,000 J	565,000 J	505,000 J	565,000 J	550,000 J
Selenium	5	20	18	5 U	5 U	5 U	5 U	5 U	3.1 J+	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	5	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	19,580,000	--	--	5,000 U	6,990,000	9,990,000	10,300,000	9,730,000 J	9,510,000	9,990,000	10,300,000	9,940,000	11,400,000	10,100,000 J	10,300,000	9,700,000 J	11,400,000 J	10,400,000 J
Thallium	10	2	--	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 UJ	10 UJ
Vanadium	14.1	--	18	20 U	11.8 J	10.2 J	4.3 J	**22**	5.3 J	1.5 J	2.1 J	5.9 J	2.9 J	1.8 J	1.5 J	1.6 J	3.2 J	3.7 J
Zinc	18.7	1,000	1,100	22.9	13.3 J	11.1 J	9.3 J	20.9	8.7 J	20 U	20 U	10.6 J	5.7 J	4.5 J	20 U	10.9 J	20 U	20 U
Dissolved Metals (µg/L)																		
Antimony, Dissolved	10.5	6	1.5	**7.4 J**	**4.9 J**	10 U	10 U	**5.4 J**	10 U	10 U	10 U	10 U	10 U	**5.8 J**	**5.5 J**	**6.5 J**	**3.1 J**	**4.2 J**
Arsenic, Dissolved	14.7	10	0.045	10 U	**9.3 J**	**2.9 J**	**5.2 J**	**3.7 J**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Barium, Dissolved	200	700	730	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	15.3 J	200 U	200 U	200 U	200 U	200 U
Cadmium, Dissolved	15.9	2	1.8	5 U	**6**	**8.2**	**8.1**	**8.6**	**7.9**	**7.6**	**8.2**	**8.2**	**8.2**	**9.2**	**8.5**	**8.5**	**9.5**	**9.2**
Calcium, Dissolved	863,333	--	--	25,200	295,000	388,000	440,000	395,000	468,000	420,000	396,000	426,000	488,000	354,000	449,000	459,000	433,000	415,000
Chromium, Dissolved	8	10	0.043	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**0.81 J**	10 U	10 U	10 U	10 U	10 U
Cobalt, Dissolved	58.5	--	1.1	5 U	**21.5**	**30**	**29.6**	**31.6**	**29.3**	**28.2**	**30.1**	**29.4**	**30.3**	**31.1**	**32**	**31.7**	**35.1**	**33.5**
Iron, Dissolved	2,119	300	2,600	100 U	224 J	423 J	534 J	454 J	415	473	817	431	909	1,680	461 J	1,860 J	477	434
Magnesium, Dissolved	2,400,000	--	--	29,400 J	881,000 J	1,180,000 J	1,350,000 J	1,270,000 J	1,170,000	1,180,000	1,290,000	1,190,000	1,280,000	1,180,000	1,330,000 J	1,240,000 J	1,300,000	1,240,000
Manganese, Dissolved	64.9	50	88	10 U	32.2 J	10 U	10 U	10 U	**125**	78.7	10 U	18.2	**127**	10 U	10 U	27.1 J	10 U	10 U
Nickel, Dissolved	5	100	73	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.7 J	1.3 J	5 U	5 U	1.4 J	1.2 J
Potassium, Dissolved	980,000	--	--	22,100	345,000	499,000	561,000	557,000	472,000 J	481,000 J	537,000 J	469,000 J	521,000 J	523,000 J	564,000	497,000	602,000 J	550,000 J
Selenium, Dissolved	5	20	18	5 U	5 U	5 U	5 U	4.5 J	5 U	5 U	5 U	5 U	5 U	5 U	2.3 J	5 U	5 U	5 U
Sodium, Dissolved	18,580,000	--	--	219,000 J	7,040,000 J	9,170,000 J	10,200,000 J	10,100,000 J	9,040,000	9,130,000	9,960,000	9,260,000	9,700,000	9,600,000	10,300,000 J	9,680,000 J	10,500,000	9,940,000
Vanadium, Dissolved	13	--	18	20 U	7.9 J	2.1 J	3.1 J	3.4 J	2.5 J	1.9 J	1.8 J	1.7 J	1.9 J	20 U	20 U	1.6 J	1.9 J	2 J
Zinc, Dissolved	15.5	1,000	1,100	4.4 J	20 U	4.6 J	20 U	20 U	20 U	6.2 J	20 U	20 U	5.6 J	20 U	20 U	20 U	20 U	20 U

Notes:

Bold box indicates exceedance of NCGWQS or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs
RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents

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

Shading indicates exceedance of two times the mean site specific background concentration for pore water

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

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/L - Micrograms per liter

TABLE 4-10
Pore Water Analytical Results
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Station ID	Site Specific Background WN 2X Mean	NCGWQS (January, 2010) *	Adjusted Tap Water RSLs (May, 2010)	SDZ-WN20/SD20		SDZ-WN21/SD21	SDZ-WN22/SD22	SDZ-WN23/SD23	SDZ-WN24/SD24	SDZ-WN25/SD25	SDZ-WN26/SD26	SDZ-WN27/SD27	SDZ-WN28/SD28		SDZ-WN29/SD29	SDZ-WN30/SD30
Sample ID				SDZ-WN20-10B	SDZ-WN20D-10B	SDZ-WN21-10B	SDZ-WN22-10B	SDZ-WN23-10B	SDZ-WN24-10B	SDZ-WN25-10B	SDZ-WN26-10B	SDZ-WN27-10B	SDZ-WN28-10B	SDZ-WN28D-10B	SDZ-WN29-10B	SDZ-WN30-10B
Sample Date				05/08/10	05/08/10	05/08/10	05/05/10	05/05/10	05/04/10	05/04/10	05/04/10	05/04/10	05/05/10	05/05/10	05/04/10	05/06/10
Chemical Name																
Semivolatile Organic Compounds (µg/L)																
No Detections																
Explosives (µg/L)																
No Detections																
Total Metals (µg/L)																
Aluminum	442	--	3,700	200 U	200 U	35.3 J	52.1 J	57.1 J	295 J	200 U	200 U	200 U	200 U	200 U	463 J	200 U
Antimony	7.1	6	1.5	10 U	10 U	10 U	10 U	**4.2 J**	5 U	10 U	**4 J**	**2.3 J**	10 U	**2.1 J**	10 U	**3.6 J**
Arsenic	13.5	10	0.045	**3.1 J**	**2.7 J**	**6.8 J**	**7.1 J**	**27.2**	**39.6**	**31.9**	**5.7 J**	10 U	**10.3**	**10.9**	10 U	**4.4 J**
Barium	200	700	730	200 U	200 U	200 U	200 U	200 U	200 U	200 U	15.4 J	200 U	200 U	200 U	200 U	200 U
Beryllium	4.3	4	7.3	5 U	5 U	5 U	5 U	5 U	2.9 J	5 U	5 U	5 U	5 U	2.1 J	5 U	1.8 J
Cadmium	16	2	1.8	**8.7**	**8.3**	**8.4**	**9.3**	**7.5**	**8.1**	**8.1**	**8.2**	**8.3**	**8.4**	**7.8**	**7.6**	**8**
Calcium	832,667	--	--	421,000	424,000	389,000	418,000	400,000	364,000	366,000	394,000	392,000	380,000	383,000	479,000	387,000
Chromium	7.2	10	0.043	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**0.81 J**
Cobalt	58.4	--	1.1	**32.4**	**31.2**	**30.1**	**34.7**	**27.2**	**28.4**	**28.1**	**30.9**	**31.4**	**30.9**	**28.5**	**27.5**	**29.2**
Copper	5	1,000	150	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	2,536	300	2,600	518	524	1,050	526	**4,090 J**	**9,030 J**	**7,240 J**	504 J	1,330 J	2,100 J	2,120 J	783 J	901 J
Lead	3	15	15	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	2,413,333	--	--	1,340,000	1,390,000	1,330,000	1,320,000	1,310,000	1,260,000	1,240,000	1,260,000	1,280,000	1,280,000	1,320,000	1,020,000	1,280,000
Manganese	66.9	50	88	39.5	38.5	10 U	**175**	16.2	**171**	54.8	10 U	10 U	28	29.8	23.9	46.7
Mercury	0.2	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	5	100	73	5 U	5 U	5 U	5 U	1.3 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Potassium	1,058,667	--	--	544,000 J	572,000 J	514,000 J	511,000 J	599,000 J	562,000 J	530,000 J	579,000 J	548,000 J	549,000 J	575,000 J	428,000 J	585,000 J
Selenium	5	20	18	2.3 J	5 U	5 U	5 U	5 U	5 U	5 U	2.6 J	5 U	5 U	5 U	5 U	5 U
Silver	5	20	18	5 U	5 U	5 U	0.68 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	19,580,000	--	--	10,200,000 J	10,500,000 J	9,980,000 J	9,910,000 J	10,900,000	10,200,000	9,860,000	10,200,000	10,200,000	10,100,000	10,500,000	8,470,000	10,400,000
Thallium	10	2	--	10 UJ	10 UJ	10 UJ	10 UJ	10 U	5 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	14.1	--	18	20 U	20 U	20 U	3 J	20 U	20 U	20 U	2.2 J	1.6 J	20 U	20 U	8.7 J	2.5 J
Zinc	18.7	1,000	1,100	4.7 J	5.1 J	6.4 J	6.7 J	9.9 J	20 U	20 U	20 U	7.7 J	10.7 J	20 U	7.3 J	20 U
Dissolved Metals (µg/L)																
Antimony, Dissolved	10.5	6	1.5	**2.8 J**	**2.2 J**	**2.1 J**	**2.4 J**	**4.6 J**	**3.8 J**	**5.5 J**	10 U	**2.7 J**	**3.7 J**	**6.5 J**	10 U	**4.3 J**
Arsenic, Dissolved	14.7	10	0.045	10 U	10 U	10 U	10 U	**24.7**	**36.5**	**30.3**	**4.6 J**	**6.7 J**	**10.2**	**10.4**	10 U	**6.7 J**
Barium, Dissolved	200	700	730	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Cadmium, Dissolved	15.9	2	1.8	**8.9**	**8.3**	**8.9**	**9.4**	**8.8**	**8.4**	**8.3**	**8.2**	**9.1**	**8.4**	**8.7**	**7.1**	**8.1**
Calcium, Dissolved	863,333	--	--	358,000	352,000	341,000	364,000	403,000	378,000	391,000	391,000	408,000	396,000	417,000	484,000	394,000
Chromium, Dissolved	8	10	0.043	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**2 J**	10 U
Cobalt, Dissolved	58.5	--	1.1	**31.6**	**31**	**31.5**	**33.3**	**30.3**	**29.3**	**28.8**	**30.1**	**32.5**	**30.7**	**31.9**	**26.4**	**29.5**
Iron, Dissolved	2,119	300	2,600	345	322	852	383	**3,700 J**	**7,490 J**	**7,330 J**	384 J	1,140 J	2,010 J	2,100 J	358 J	721 J
Magnesium, Dissolved	2,400,000	--	--	1,210,000	1,200,000	1,210,000	1,250,000	1,320,000 J	1,270,000 J	1,280,000 J	1,260,000 J	1,360,000 J	1,310,000 J	1,340,000 J	1,020,000 J	1,240,000 J
Manganese, Dissolved	64.9	50	88	29.7	31.3	10 U	**149**	18.5 J	**149 J**	55.2 J	10 U	10 U	28.5 J	28.4 J	22.1 J	46.8 J
Nickel, Dissolved	5	100	73	1 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Potassium, Dissolved	980,000	--	--	520,000 J	527,000 J	561,000 J	537,000 J	547,000	523,000	555,000	535,000	568,000	546,000	551,000	417,000	502,000
Selenium, Dissolved	5	20	18	2.5 J	5 U	5 U	5 U	5 U	5 U	5 U	2.2 J	5 U	5 U	5 U	5 U	5 U
Sodium, Dissolved	18,580,000	--	--	9,560,000	9,630,000	9,900,000	9,900,000	10,100,000 J	9,690,000 J	9,910,000 J	9,720,000 J	10,400,000 J	10,000,000 J	10,100,000 J	8,190,000 J	9,580,000 J
Vanadium, Dissolved	13	--	18	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	7.6 J	1.9 J
Zinc, Dissolved	15.5	1,000	1,100	20 U	19.6 J	15.6 J	4.4 J	4.7 J	5.8 J	5.6 J	20 U	20 U	6.3 J	20 U	6.9 J	20 U

Notes:

Bold box indicates exceedance of NCGWQS or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

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

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

Shading indicates exceedance of two times the mean site specific background concentration for pore water

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

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/L - Micrograms per liter

TABLE 4-11
Pore Water Analytical Data Summary
Off-Base SDZs MRA
PA/SI Report
MCB CamLej, North Carolina

Analyte Name	NCGWQS[1] (January 2010)	Number Exceeding NCGWQS	Adjusted Tap Water RSLs	Number Exceeding Adjusted Tap Water RSLs	2X Site Background	Number Exceeding both 2x Site Background and one other Screening Limit	Detection Frequency			Minimum Detected Concentration (µg/L)	Maximum Detected Concentration (µg/L)	Location of Maximum Detected Value
Total Metals (µg/L)												
Aluminum	--	--	3,700	2	442	2	17	-	22	35.3 J	8,630 J	SDZ-WN10-10B
Antimony	6	0	1.5	2	7.1	0	7	-	22	2.3 J	4.4 J	SDZ-WN02-10B
Arsenic	10	3	0.045	13	13.5	3	13	-	22	2.9 J	39.6	SDZ-WN24-10B
Cadmium	2	21	1.8	21	16.0	0	21	-	22	5.1	10.2	SDZ-WN15-10B
Chromium	10	2	0.043	2	7.2	2	2	-	22	17.1	22.6	SDZ-WN10-10B
Cobalt	--	--	1.1	13	58.4	0	21	-	22	19	37.1	SDZ-WN15-10B
Iron	300	21	2,600	6	2,536	6	22	-	22	14.1 J	9,030 J	SDZ-WN24-10B
Manganese	50	6	88	4	66.9	5	12	-	22	16.2	175	SDZ-WN22-10B
Vanadium	--	--	18	1	14.1	1	16	-	22	1.5 J	22	SDZ-WN10-10B

Notes:

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

RSL - Regional Screening Level

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

µg/L- micrograms per Liter

Created by: J. Wheat 8/2/2010

Updated by: R. Shaw 8/04/2010

Updated by: R. Shaw 10/21/2010

\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_4_1_AERIAL_GEOPHYSICAL_ANOMALY_MAP_V2.MXD



Legend

- AGS Anomalies - Off-Base SDZs (Batelle)
- AGS Anomalies - Off-Base SDZs (Sky Research)
- Elevated Anomaly Density Area
- Upland Area
- Off-Base SDZs
- Installation Boundary

N

0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet

Figure 4-1
Aerial Geophysical Anomaly Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

CH2MHILL

Generated By: ***Dan Hockett/CLT*** Checked by: ***Keith LaTorre/KNV***

\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_4_2_TERRESTRIAL_DGM_ANOMALY_MAP.MXD



Legend

- DGM Anomaly
- Upland Area
- Installation Boundary
- Off-Base SDZs

N

0 500 1,000 2,000 Feet

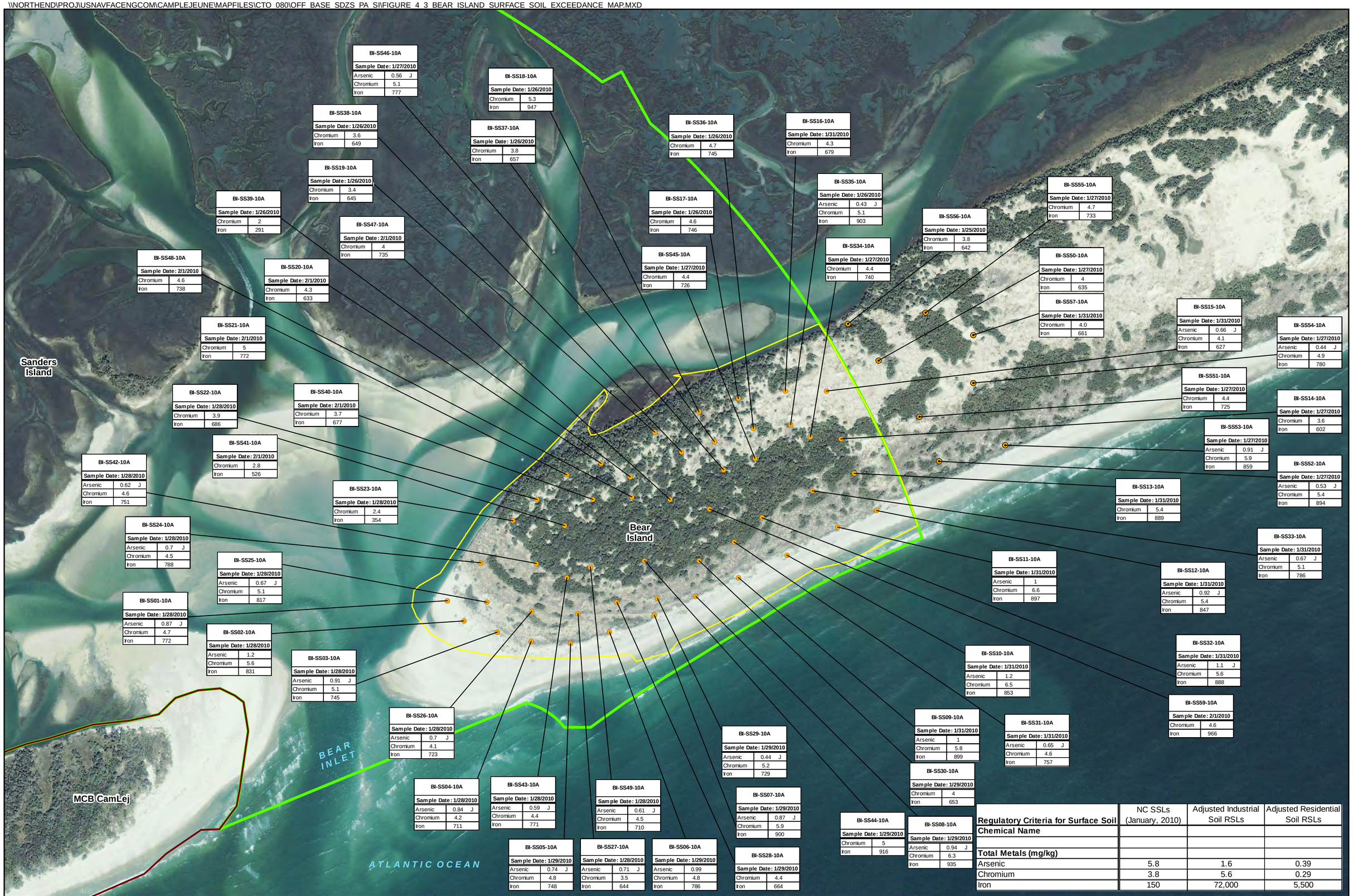
1 inch = 1,000 feet

Figure 4-2
Terrestrial DGM Anomaly Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

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\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_4_3_BEAR_ISLAND_SURFACE_SOIL_EXCEEDANCE_MAP.MXD



Regulatory Criteria for Surface Soil	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs	Adjusted Residential Soil RSLs
Chemical Name			
Total Metals (mg/kg)			
Arsenic	5.8	1.6	0.39
Chromium	3.8	5.6	0.29
Iron	150	72,000	5,500

Legend

- Bear Island Surface Soil Sample Location
- Background Bear Island Surface Soil Sample Location
- Upland Area
- Installation Boundary
- Off-Base SDZs

Notes:
J - Analyte present, value may or may not be accurate or precise
Sample results are in mg/kg - milligrams per kilogram

N

0 250 500 1,000 Feet

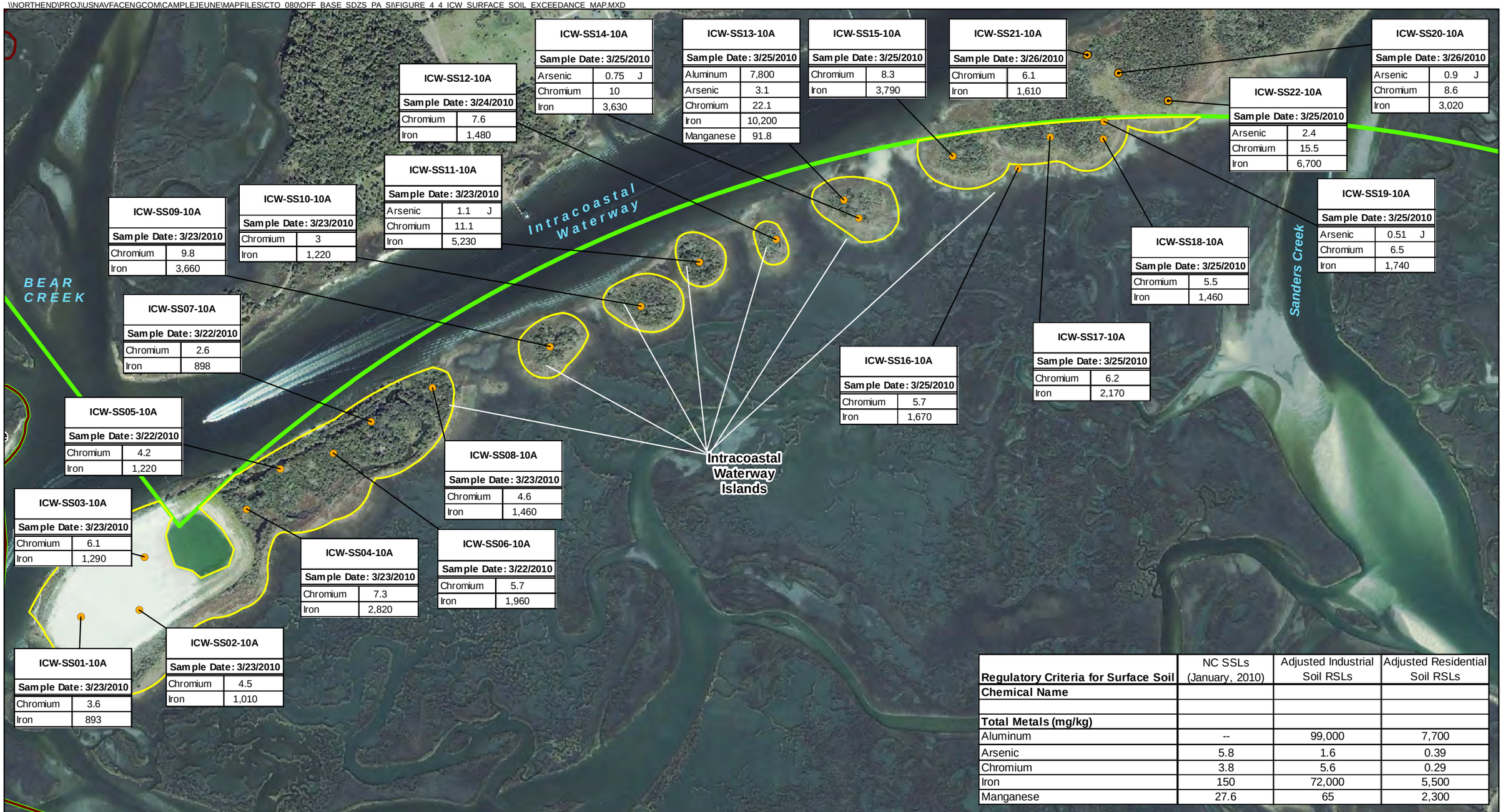
1 inch = 500 feet

Figure 4-3
Bear Island Surface Soil Exceedance Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

CH2MHILL

Generated By: *G. Little* Checked by: *D. Hockett*

\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_4_4_ICW_SURFACE_SOIL_EXCEEDANCE_MAP.MXD



Regulatory Criteria for Surface Soil	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs	Adjusted Residential Soil RSLs
Chemical Name			
Total Metals (mg/kg)			
Aluminum	--	99,000	7,700
Arsenic	5.8	1.6	0.39
Chromium	3.8	5.6	0.29
Iron	150	72,000	5,500
Manganese	27.6	65	2,300

Legend
- Surface Soil Sample Location
- Background Surface Soil Sample Location
- Upland Area
- Installation Boundary
- Off-Base SDZs

Notes:
J - Analyte present, value may or may not be accurate or precise
Sample results are in mg/kg - milligrams per kilogram

N

0 250 500 1,000 Feet

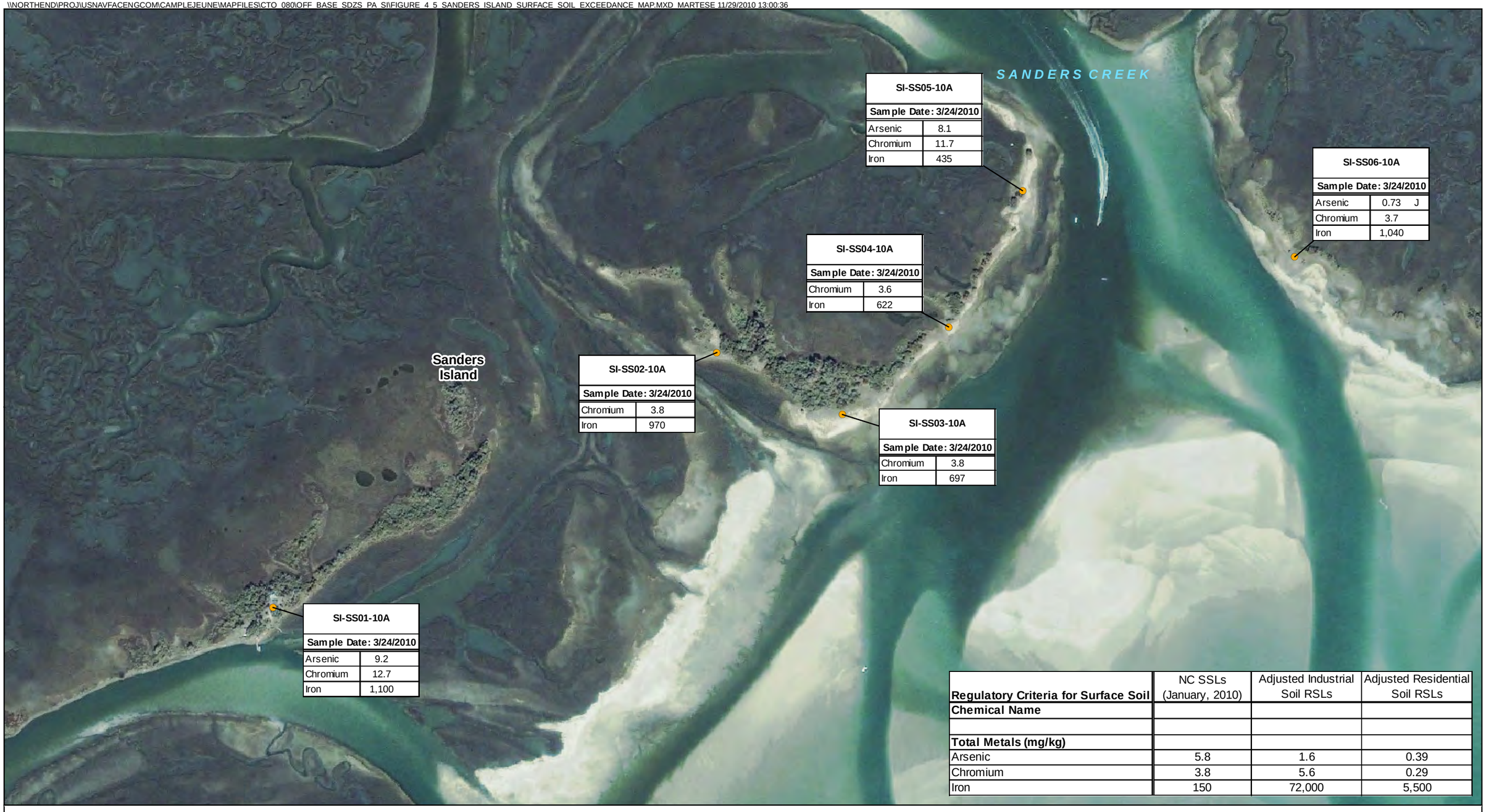
1 inch = 500 feet

Figure 4-4
Intracoastal Waterway Islands Surface Soil Exceedance Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

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\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_4_5_SANDERS_ISLAND_SURFACE_SOIL_EXCEEDANCE_MAP.MXD MARTESE 11/29/2010 13:00:36



SI-SS05-10A	
Sample Date: 3/24/2010	
Arsenic	8.1
Chromium	11.7
Iron	435

SI-SS06-10A	
Sample Date: 3/24/2010	
Arsenic	0.73 J
Chromium	3.7
Iron	1,040

SI-SS04-10A	
Sample Date: 3/24/2010	
Chromium	3.6
Iron	622

SI-SS02-10A	
Sample Date: 3/24/2010	
Chromium	3.8
Iron	970

SI-SS03-10A	
Sample Date: 3/24/2010	
Chromium	3.8
Iron	697

SI-SS01-10A	
Sample Date: 3/24/2010	
Arsenic	9.2
Chromium	12.7
Iron	1,100

Regulatory Criteria for Surface Soil	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs	Adjusted Residential Soil RSLs
Chemical Name			
Total Metals (mg/kg)			
Arsenic	5.8	1.6	0.39
Chromium	3.8	5.6	0.29
Iron	150	72,000	5,500

Legend

- Surface Soil Sample Location

Notes:
J - Analyte present, value may or may not be accurate or precise
Sample results are in mg/kg - milligrams per kilogram

N

0 150 300 600 Feet

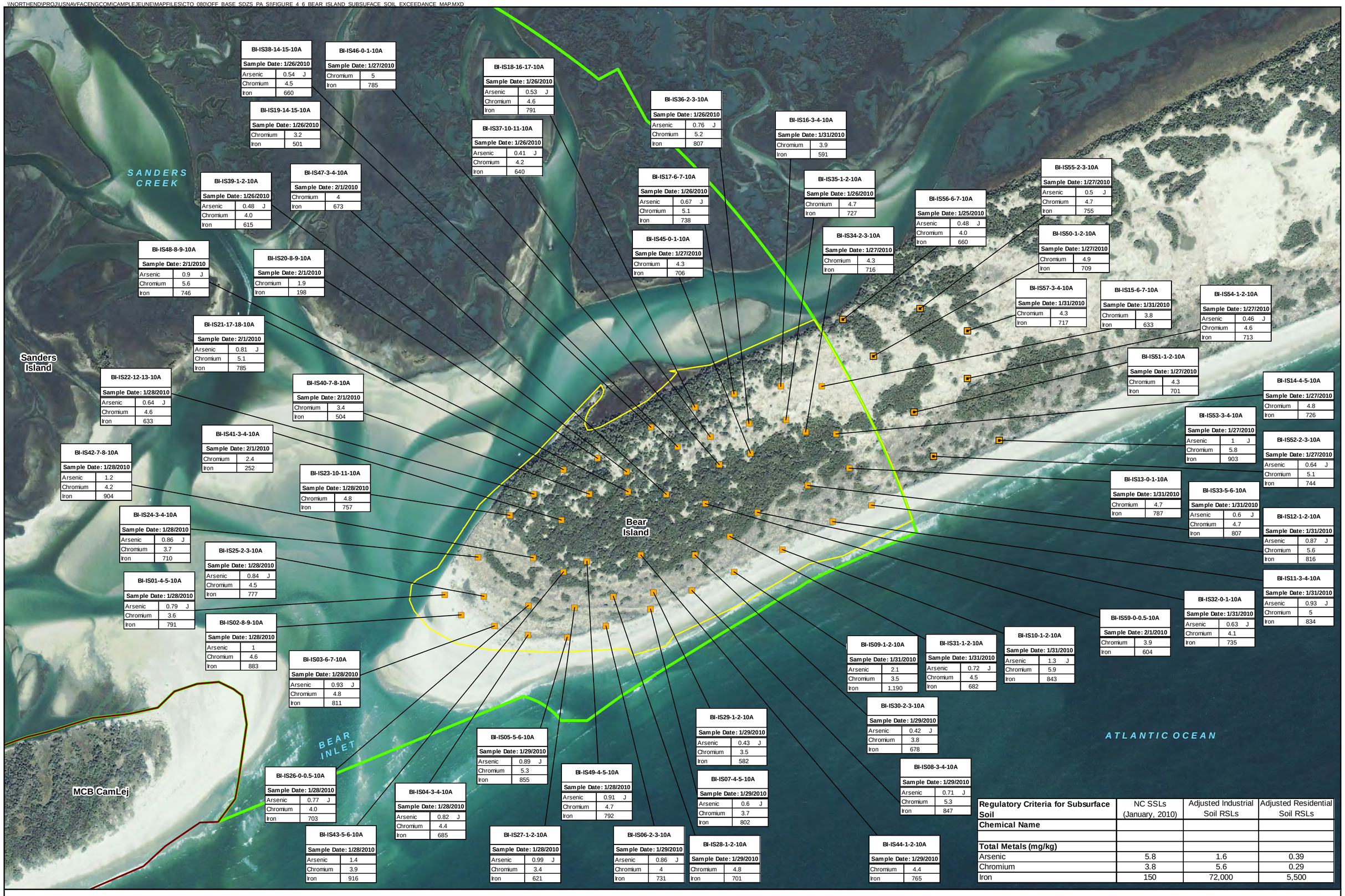
1 inch = 300 feet

Figure 4-5
Sanders Island Surface Soil Exceedance Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

CH2MHILL

Generated By: ***G. Little*** Checked by: ***D. Hockett***

\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_4_6_BEAR_ISLAND_SUBSUFACE_SOIL_EXCEEDANCE_MAP.MXD



Regulatory Criteria for Subsurface Soil	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs	Adjusted Residential Soil RSLs
Chemical Name			
Total Metals (mg/kg)			
Arsenic	5.8	1.6	0.39
Chromium	3.8	5.6	0.29
Iron	150	72,000	5,500

Legend

- Subsurface Soil Sample Location
- Background Subsurface Soil Sample Location
- Upland Area
- Installation Boundary
- Off-Base SDZs

Notes:
J - Analyte present, value may or may not be accurate or precise
Sample results are in mg/kg - milligrams per kilogram

N

0 250 500 1,000 Feet

1 inch = 500 feet

Figure 4-6
Bear Island Subsurface Soil Exceedance Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

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\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_4_7_ICW_SUBSURFACE_SOIL_EXCEEDANCE_MAP.MXD MARTESE

ICW-IS11-1-2-10A	
Sample Date: 3/23/2010	
Chromium	1.8
Iron	642 J

ICW-IS13-1-1.5-10A	
Sample Date: 3/25/2010	
Arsenic	0.55 J
Chromium	6.2
Iron	1,980

ICW-IS15-1-2-10A	
Sample Date: 3/25/2010	
Arsenic	1.2
Chromium	6.4
Iron	2,150

ICW-IS10-1-2-10A	
Sample Date: 3/23/2010	
Arsenic	0.49 J
Chromium	3.3
Iron	1,210 J

ICW-IS07-1-2-10A	
Sample Date: 3/22/2010	
Chromium	2.2
Iron	780 J

ICW-IS05-1-1.5-10A	
Sample Date: 3/22/2010	
Chromium	2.9
Iron	687 J

ICW-IS08-1-2-10A	
Sample Date: 3/23/2010	
Chromium	3.9
Iron	991 J

ICW-IS02-1-2-10A	
Sample Date: 3/23/2010	
Chromium	4.4
Iron	964 J

ICW-IS01-6-7-10A	
Sample Date: 3/23/2010	
Chromium	4.7
Iron	1,030 J

Intracoastal Waterway

BEAR CREEK

Sanders Creek

Intracoastal Waterway Islands

Regulatory Criteria for Subsurface Soil	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs	Adjusted Residential Soil RSLs
Chemical Name			
Total Metals (mg/kg)			
Arsenic	5.8	1.6	0.39
Chromium	3.8	5.6	0.29
Iron	150	72,000	5,500

Legend
- Subsurface Soil Sample Location
- Upland Area
- Installation Boundary
- Off-Base SDZs

Notes:
J - Analyte present, value may or may not be accurate or precise
Sample results are in mg/kg - milligrams per kilogram

N

0 250 500 1,000 Feet

1 inch = 500 feet

Figure 4-7
Intracoastal Waterway Islands Subsurface Soil Exceedance Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

CH2MHILL

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\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_4_8_SANDERS_ISLAND_SUBSURFACE_SOIL_EXCEEDANCE_MAP.MXD MARTESE 11/24/2010 12:46:30



Regulatory Criteria for Subsurface Soil	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs	Adjusted Residential Soil RSLs
Chemical Name			
Total Metals (mg/kg)			
Arsenic	5.8	1.6	0.39
Chromium	3.8	5.6	0.29
Iron	150	72,000	5,500

Legend
- Subsurface Soil Sample Location

Notes:
J - Analyte present, value may or may not be accurate or precise
Sample results are in mg/kg - milligrams per kilogram

N

0 150 300 600 Feet

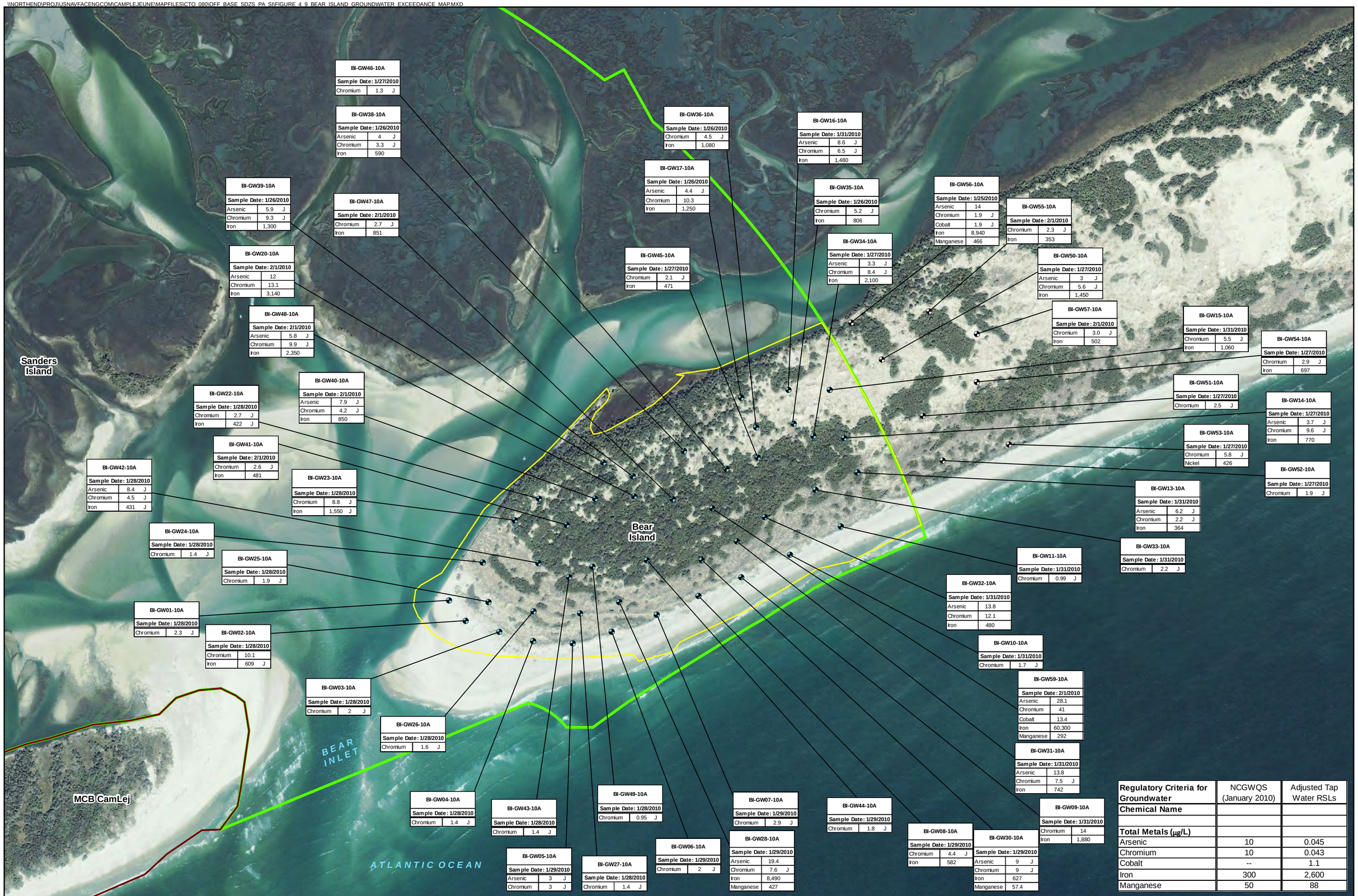
1 inch = 300 feet

Figure 4-8
Sanders Island Subsurface Soil Exceedance Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

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\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_4_9_BEAR_ISLAND_GROUNDWATER_EXCEEDANCE_MAP.MXD



Regulatory Criteria for Groundwater	NCGWQS (January 2010)	Adjusted Tap Water RSLs
Chemical Name		
Total Metals (µg/L)		
Arsenic	10	0.045
Chromium	10	0.043
Cobalt	--	1.1
Iron	300	2,600
Manganese	50	88

Legend

- Groundwater Sample Location
- Background Groundwater Sample Location
- Upland Area
- Installation Boundary
- Off-Base SDZs

Notes:
J - Analyte present, value may or may not be accurate or precise
µg/L - micrograms per liter

N

0 250 500 1,000 Feet

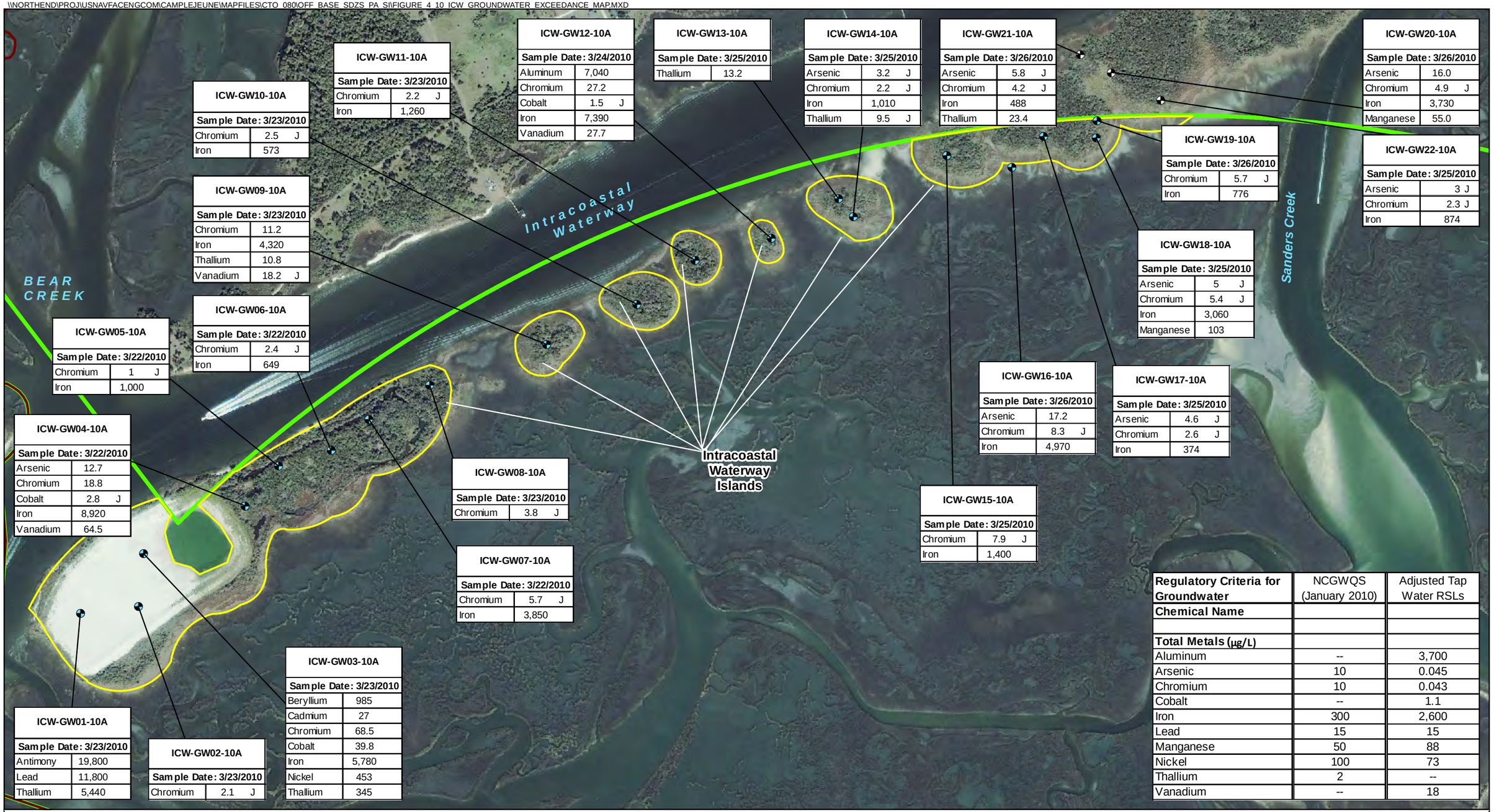
1 inch = 500 feet

Figure 4-9
Bear Island Groundwater Exceedance Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

CH2MHILL

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\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_4_10_ICW_GROUNDWATER_EXCEEDANCE_MAP.MXD



ICW-GW10-10A	
Sample Date: 3/23/2010	
Chromium	2.5 J
Iron	573

ICW-GW11-10A	
Sample Date: 3/23/2010	
Chromium	2.2 J
Iron	1,260

ICW-GW12-10A	
Sample Date: 3/24/2010	
Aluminum	7,040
Chromium	27.2
Cobalt	1.5 J
Iron	7,390
Vanadium	27.7

ICW-GW13-10A	
Sample Date: 3/25/2010	
Thallium	13.2

ICW-GW14-10A	
Sample Date: 3/25/2010	
Arsenic	3.2 J
Chromium	2.2 J
Iron	1,010
Thallium	9.5 J

ICW-GW21-10A	
Sample Date: 3/26/2010	
Arsenic	5.8 J
Chromium	4.2 J
Iron	488
Thallium	23.4

ICW-GW20-10A	
Sample Date: 3/26/2010	
Arsenic	16.0
Chromium	4.9 J
Iron	3,730
Manganese	55.0

ICW-GW19-10A	
Sample Date: 3/26/2010	
Chromium	5.7 J
Iron	776

ICW-GW22-10A	
Sample Date: 3/25/2010	
Arsenic	3 J
Chromium	2.3 J
Iron	874

ICW-GW09-10A	
Sample Date: 3/23/2010	
Chromium	11.2
Iron	4,320
Thallium	10.8
Vanadium	18.2 J

ICW-GW18-10A	
Sample Date: 3/25/2010	
Arsenic	5 J
Chromium	5.4 J
Iron	3,060
Manganese	103

ICW-GW06-10A	
Sample Date: 3/22/2010	
Chromium	2.4 J
Iron	649

ICW-GW05-10A	
Sample Date: 3/22/2010	
Chromium	1 J
Iron	1,000

ICW-GW16-10A	
Sample Date: 3/26/2010	
Arsenic	17.2
Chromium	8.3 J
Iron	4,970

ICW-GW17-10A	
Sample Date: 3/25/2010	
Arsenic	4.6 J
Chromium	2.6 J
Iron	374

ICW-GW04-10A	
Sample Date: 3/22/2010	
Arsenic	12.7
Chromium	18.8
Cobalt	2.8 J
Iron	8,920
Vanadium	64.5

ICW-GW08-10A	
Sample Date: 3/23/2010	
Chromium	3.8 J

ICW-GW15-10A	
Sample Date: 3/25/2010	
Chromium	7.9 J
Iron	1,400

ICW-GW07-10A	
Sample Date: 3/22/2010	
Chromium	5.7 J
Iron	3,850

ICW-GW03-10A	
Sample Date: 3/23/2010	
Beryllium	985
Cadmium	27
Chromium	68.5
Cobalt	39.8
Iron	5,780
Nickel	453
Thallium	345

ICW-GW01-10A	
Sample Date: 3/23/2010	
Antimony	19,800
Lead	11,800
Thallium	5,440

ICW-GW02-10A	
Sample Date: 3/23/2010	
Chromium	2.1 J

Regulatory Criteria for Groundwater	NCGWQS (January 2010)	Adjusted Tap Water RSLs
Chemical Name		
Total Metals (µg/L)		
Aluminum	--	3,700
Arsenic	10	0.045
Chromium	10	0.043
Cobalt	--	1.1
Iron	300	2,600
Lead	15	15
Manganese	50	88
Nickel	100	73
Thallium	2	--
Vanadium	--	18

Legend
- Groundwater Sample Location
- Background Groundwater Sample Location
- Upland Area
- Installation Boundary
- Off-Base SDZs

Notes:
µg/L - micrograms per liter
J - Analyte present, value may or may not be accurate or precise

N

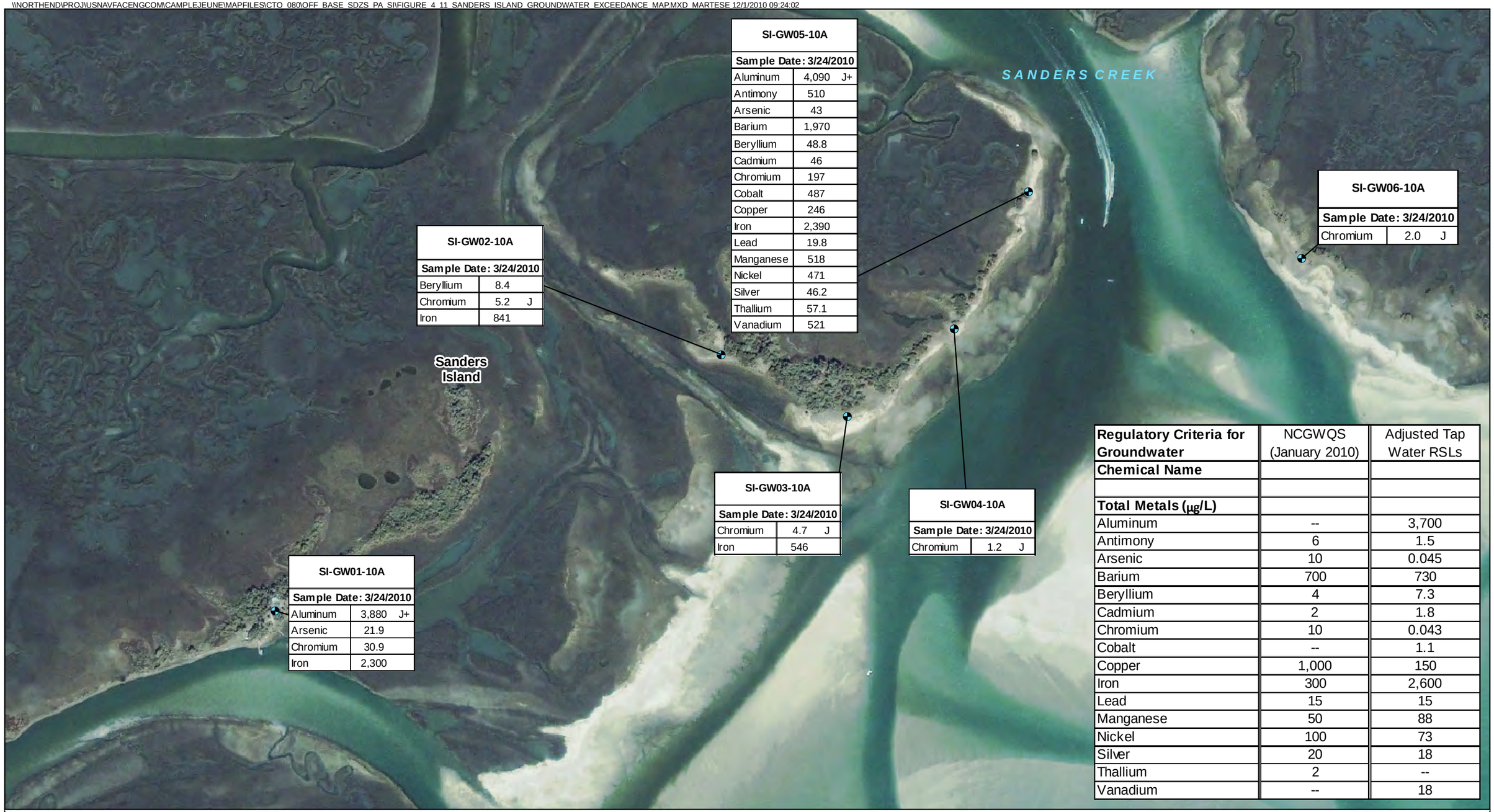
0 250 500 1,000 Feet

1 inch = 500 feet

Figure 4-10
Intracoastal Waterway Islands Groundwater Exceedance Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

CH2MHILL

Generated By: *G. Little* Checked by: *D. Hockett*



SI-GW05-10A	
Sample Date: 3/24/2010	
Aluminum	4,090 J+
Antimony	510
Arsenic	43
Barium	1,970
Beryllium	48.8
Cadmium	46
Chromium	197
Cobalt	487
Copper	246
Iron	2,390
Lead	19.8
Manganese	518
Nickel	471
Silver	46.2
Thallium	57.1
Vanadium	521

SI-GW06-10A	
Sample Date: 3/24/2010	
Chromium	2.0 J

SI-GW02-10A	
Sample Date: 3/24/2010	
Beryllium	8.4
Chromium	5.2 J
Iron	841

SI-GW03-10A	
Sample Date: 3/24/2010	
Chromium	4.7 J
Iron	546

SI-GW04-10A	
Sample Date: 3/24/2010	
Chromium	1.2 J

SI-GW01-10A	
Sample Date: 3/24/2010	
Aluminum	3,880 J+
Arsenic	21.9
Chromium	30.9
Iron	2,300

Regulatory Criteria for Groundwater	NCGWQS (January 2010)	Adjusted Tap Water RSLs
Chemical Name		
Total Metals (µg/L)		
Aluminum	--	3,700
Antimony	6	1.5
Arsenic	10	0.045
Barium	700	730
Beryllium	4	7.3
Cadmium	2	1.8
Chromium	10	0.043
Cobalt	--	1.1
Copper	1,000	150
Iron	300	2,600
Lead	15	15
Manganese	50	88
Nickel	100	73
Silver	20	18
Thallium	2	--
Vanadium	--	18

Legend
- Groundwater Sample Locations

Notes:
µg/L - micrograms per liter
J+ - Analyte present, value may be biased high, actual value may be lower

N

0 150 300 600 Feet

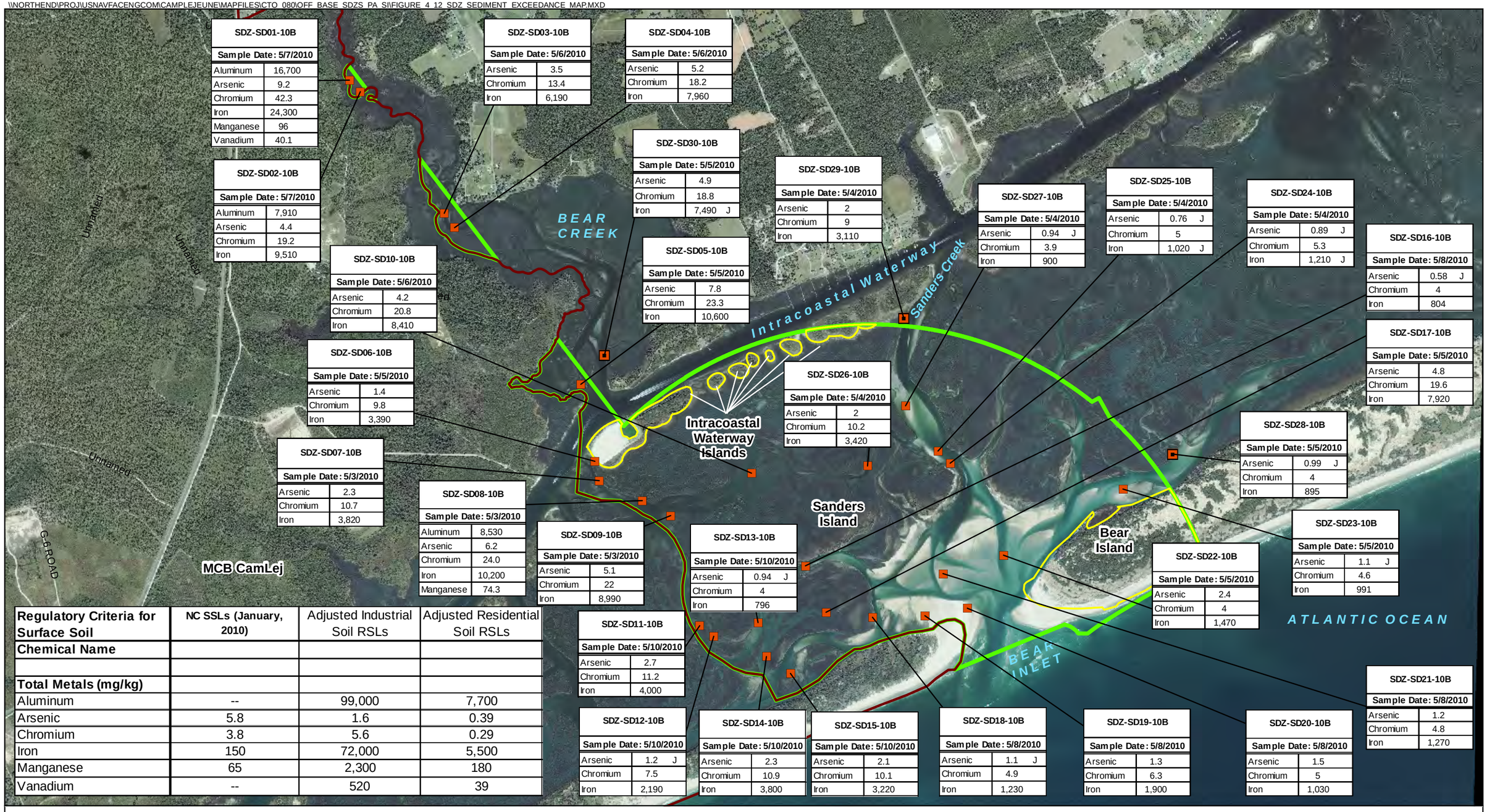
1 inch = 300 feet

Figure 4-11
Sanders Island Groundwater Exceedance Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

CH2MHILL

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\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\OFF_BASE_SDZS_PA_SI\FIGURE_4_12_SDZ_SEDIMENT_EXCEEDANCE_MAP.MXD



SDZ-SD01-10B	
Sample Date: 5/7/2010	
Aluminum	16,700
Arsenic	9.2
Chromium	42.3
Iron	24,300
Manganese	96
Vanadium	40.1

SDZ-SD02-10B	
Sample Date: 5/7/2010	
Aluminum	7,910
Arsenic	4.4
Chromium	19.2
Iron	9,510

SDZ-SD03-10B	
Sample Date: 5/6/2010	
Arsenic	3.5
Chromium	13.4
Iron	6,190

SDZ-SD04-10B	
Sample Date: 5/6/2010	
Arsenic	5.2
Chromium	18.2
Iron	7,960

SDZ-SD30-10B	
Sample Date: 5/5/2010	
Arsenic	4.9
Chromium	18.8
Iron	7,490 J

SDZ-SD29-10B	
Sample Date: 5/4/2010	
Arsenic	2
Chromium	9
Iron	3,110

SDZ-SD27-10B	
Sample Date: 5/4/2010	
Arsenic	0.94 J
Chromium	3.9
Iron	900

SDZ-SD25-10B	
Sample Date: 5/4/2010	
Arsenic	0.76 J
Chromium	5
Iron	1,020 J

SDZ-SD24-10B	
Sample Date: 5/4/2010	
Arsenic	0.89 J
Chromium	5.3
Iron	1,210 J

SDZ-SD16-10B	
Sample Date: 5/8/2010	
Arsenic	0.58 J
Chromium	4
Iron	804

SDZ-SD17-10B	
Sample Date: 5/5/2010	
Arsenic	4.8
Chromium	19.6
Iron	7,920

SDZ-SD10-10B	
Sample Date: 5/6/2010	
Arsenic	4.2
Chromium	20.8
Iron	8,410

SDZ-SD05-10B	
Sample Date: 5/5/2010	
Arsenic	7.8
Chromium	23.3
Iron	10,600

SDZ-SD06-10B	
Sample Date: 5/5/2010	
Arsenic	1.4
Chromium	9.8
Iron	3,390

SDZ-SD26-10B	
Sample Date: 5/4/2010	
Arsenic	2
Chromium	10.2
Iron	3,420

SDZ-SD28-10B	
Sample Date: 5/5/2010	
Arsenic	0.99 J
Chromium	4
Iron	895

SDZ-SD07-10B	
Sample Date: 5/3/2010	
Arsenic	2.3
Chromium	10.7
Iron	3,820

SDZ-SD08-10B	
Sample Date: 5/3/2010	
Aluminum	8,530
Arsenic	6.2
Chromium	24.0
Iron	10,200
Manganese	74.3

SDZ-SD09-10B	
Sample Date: 5/3/2010	
Arsenic	5.1
Chromium	22
Iron	8,990

SDZ-SD13-10B	
Sample Date: 5/10/2010	
Arsenic	0.94 J
Chromium	4
Iron	796

SDZ-SD23-10B	
Sample Date: 5/5/2010	
Arsenic	1.1 J
Chromium	4.6
Iron	991

SDZ-SD22-10B	
Sample Date: 5/5/2010	
Arsenic	2.4
Chromium	4
Iron	1,470

SDZ-SD11-10B	
Sample Date: 5/10/2010	
Arsenic	2.7
Chromium	11.2
Iron	4,000

SDZ-SD21-10B	
Sample Date: 5/8/2010	
Arsenic	1.2
Chromium	4.8
Iron	1,270

SDZ-SD12-10B	
Sample Date: 5/10/2010	
Arsenic	1.2 J
Chromium	7.5
Iron	2,190

SDZ-SD14-10B	
Sample Date: 5/10/2010	
Arsenic	2.3
Chromium	10.9
Iron	3,800

SDZ-SD15-10B	
Sample Date: 5/10/2010	
Arsenic	2.1
Chromium	10.1
Iron	3,220

SDZ-SD18-10B	
Sample Date: 5/8/2010	
Arsenic	1.1 J
Chromium	4.9
Iron	1,230

SDZ-SD19-10B	
Sample Date: 5/8/2010	
Arsenic	1.3
Chromium	6.3
Iron	1,900

SDZ-SD20-10B	
Sample Date: 5/8/2010	
Arsenic	1.5
Chromium	5
Iron	1,030

Regulatory Criteria for Surface Soil	NC SSLs (January, 2010)	Adjusted Industrial Soil RSLs	Adjusted Residential Soil RSLs
Chemical Name			
Total Metals (mg/kg)			
Aluminum	--	99,000	7,700
Arsenic	5.8	1.6	0.39
Chromium	3.8	5.6	0.29
Iron	150	72,000	5,500
Manganese	65	2,300	180
Vanadium	--	520	39

Legend
- Sediment Sample Location
- Background Sediment Sample Location
- Upland Area
- Installation Boundary
- Off-Base SDZs

Notes:
Sample results are in mg/kg - milligrams per kilogram
J - Analyte present, value may or may not be accurate or precise

N

0 1,000 2,000 4,000 Feet

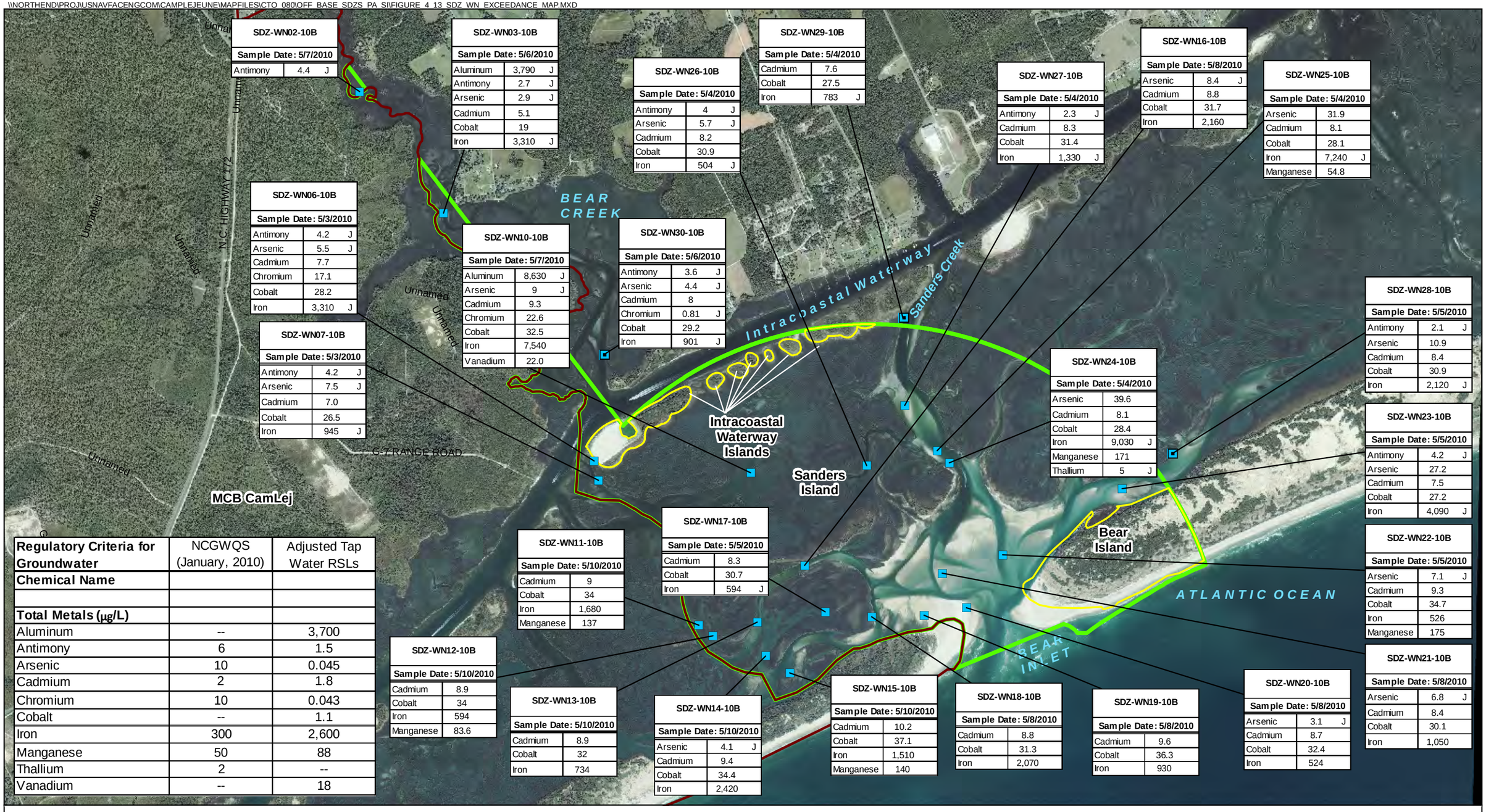
1 inch = 2,000 feet

Figure 4-12
SDZ Sediment Exceedance Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

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Regulatory Criteria for Groundwater	NCGWQS (January, 2010)	Adjusted Tap Water RSLs
Chemical Name		
Total Metals (µg/L)		
Aluminum	--	3,700
Antimony	6	1.5
Arsenic	10	0.045
Cadmium	2	1.8
Chromium	10	0.043
Cobalt	--	1.1
Iron	300	2,600
Manganese	50	88
Thallium	2	--
Vanadium	--	18

Legend
- Pore Water Sample Location
- Background Pore Water Sample Location
- Upland Area
- Installation Boundary
- Off-Base SDZs

Notes:
All samples are in µg/L - micrograms per liter
J - Analyte present, value may or may not be accurate or precise

N

0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet

Figure 4-13
SDZ Pore Water Exceedance Map
Preliminary Assessment - Site Inspection
Off-Base Surface Danger Zones
MCB CamLej
North Carolina

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SECTION 5

Human Health Risk Screening

A conservative preliminary human health risk screening (HHRS) was performed to assess the potential for human health risks associated with exposure to site media [surface soil, subsurface soil, groundwater, surface water, pore water (conservatively assumed to be representative of surface water, since only a limited number of surface water samples were collected), and sediment]. The results of the HHRS provide a preliminary indication of potential risks from constituents of potential concern (COPCs), and are used to help evaluate whether future unrestricted (residential) use of the site is acceptable based on human health risks or if the site requires further evaluation (e.g., a baseline risk assessment, additional data collection).

The data included in the risk screening were validated to assess the reliability of the data for use in the HHRS. A review of the data identified the following criteria for data usability:

- Estimated values flagged with a J qualifier were treated as detected concentrations.
- Data qualified with an R (rejected) were not used in the risk assessment.
- For duplicate samples, the maximum concentration between the two samples was used as the sample concentration.
- Unfiltered groundwater samples were analyzed in the risk evaluations following USEPA Region IV guidance (USEPA, 2000).

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 surface soil, subsurface soil, groundwater, surface water, pore water, and sediment is presented in **Figure 5-1**.

The potential current receptors for the Off-Base SDZs are recreational users that may come in contact with surface soil, surface water, pore water, and sediment. Ingestion of fish caught in the waters within the MRA was also considered. Exposure routes may include incidental ingestion of and dermal contact with the surface soil, surface water, pore water, and sediment. Inhalation of volatile emissions is not a significant pathway, since volatile organic compounds (VOCs) are not associated with the historic munitions use at the MRA.

Future site use is not expected to change significantly from current site use; therefore, potential future receptors include current receptors. Additionally, although unlikely potential future receptors may also include construction workers who perform any future construction projects at the site. Future residents are included as potential future receptors, as a worst-case scenario, to evaluate unrestricted future site use. Future receptors could be exposed to subsurface soil, in addition to the surface 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 subsurface soil are the same as those for the surface soil: incidental ingestion of and dermal contact with 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, and therefore, there is no current exposure to shallow groundwater at the site. The groundwater use patterns are already established for the Base and area around the site, thus, the future use of shallow groundwater from the site for industrial or residential purposes is unlikely. Additionally, as the groundwater beneath the site in some areas is brackish, it is not suitable for use as a potable or industrial water supply. However, it was conservatively assumed if future residential development of the site occurs; the residents could use the groundwater as a potable water supply, although this is extremely unlikely. The residents would be exposed through ingestion, and dermal contact. Additionally, due to the depth to groundwater at the Off-Base SDZs MRA (from 3 to 15 feet bgs at Bear Island and from 6 inches to 5 feet bgs at the ICW islands), construction workers could be exposed to the groundwater through dermal contact during construction activities.

5.2 Human Health Risk-Based Screening and Risk Ratio Evaluation

5.2.1 Methodology

The HHRS was conducted in three steps using a risk ratio technique (Navy, 2000). If COPCs were identified after Step 1, they were evaluated in Step 2. If COPCs were identified after Step 2, they were evaluated in Step 3. The three-step screening process is described below.

Step 1

The maximum detected analyte concentrations for each medium were compared to USEPA RSLs (USEPA, 2010a), other HHRS levels (if appropriate), and applicable site-specific background concentrations (for inorganic constituents in soil, surface water, pore water, and groundwater). RSLs based on noncarcinogenic effects were adjusted by dividing by 10 to account for exposure to multiple constituents (i.e., were adjusted to a hazard quotient [HQ] of 0.1, from the HQ of 1.0 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 and sediment data were compared to the USEPA Adjusted Residential Soil RSLs. Residential Soil RSLs are more conservative (i.e., lower) than Industrial Soil RSLs and are therefore protective of all potential receptors (e.g., residents, recreational users, and construction workers). NC SSLs are also shown on the Step 1 screening tables for comparison, but were not used to identify COPCs for further evaluation in the following steps. Soil data were compared to central tendency comparison background concentrations (Section 3.4.7), and sediment data were compared to two times the mean site-specific background concentration.

The groundwater data were compared to the USEPA Adjusted Tap Water RSLs. Groundwater data were also compared to MCLs and the NCGWQS (15A NCAC 2L); however, these comparisons were not used to identify the groundwater COPCs to carry

forward to Step 2. Groundwater data were compared to central tendency comparison background concentrations (see Section 3.4.7)

The surface water and pore water data were compared to the National Recommended Water Quality Criteria (NRWQC) (USEPA, 2009a) for human health (organisms criteria), North Carolina Water Quality Standards (WQS) for Human Health, and in some cases the Federal Safe Drinking Water Act MCL, when directed to use this value in the NRWQC. The criteria based on ingestion of organisms only (and not ingestion of organism and potable use of water) were used because the surface water is saline and would not be used as a potable water supply. If neither of these were available, the USEPA Adjusted Tap Water RSL was used for comparison and identification of COPCs. Surface water data were compared to background concentrations from sample location SDZ-SW05. Pore water data were compared to two times the mean site-specific background concentration.

If the maximum detected concentration in soil, groundwater, surface water, pore water, or sediment exceeded the appropriate screening value and background concentration, the screening level risk evaluation proceeded to Step 2.

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 are discussed below to evaluate the potential for underestimating the total risks.

Step 2

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

$$\textit{corresponding risk level} = \frac{\textit{concentration} \times \textit{acceptable risk level}}{\textit{RSL}}$$

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 for noncarcinogenic effects were not adjusted by 10 as was done in Step 1; they were used as presented in the RSL table.

All of the corresponding risk levels for each analyte within a medium 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 was greater than 0.5, or the cumulative corresponding carcinogenic risk was greater than 5×10^{-5}, the anayltes contributing to these values were retained as COPCs and carried forward to Step 3.

Step 3

A corresponding risk level was calculated as discussed above for Step 2; however, the 95 percent upper confidence limit (UCL) was used in place of the maximum detected concentration, if more than five samples were available for that medium, to obtain a more site-specific risk ratio. If the cumulative corresponding HI by target organ/effect was

greater than 0.5, or the cumulative corresponding carcinogenic risk was greater than 5×10^{-5}, then constituents contributing to these values were considered COPCs.

ProUCL Version 4.00.05 (USEPA, 2010b) was used to test the data distribution and calculate the 95 percent UCLs used for the Step 3 risk ratio calculations (**Appendix J**).

5.3 Human Health Risk Screening 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, if applicable) were performed for surface soil, subsurface soil, sediment, surface water, pore water, and groundwater.

Surface Soil

Table 2.1 in **Appendix J** presents the risk-based screening evaluation for surface soil. As shown in Table 2.1 in **Appendix J**, none of the detected chemicals exceeded the first step of the screening. Exposure to surface soil at the Off-Base SDZs MRA is not expected to result in any unacceptable human health risks.

Surface Water

Tables 2.2 and 2.2a**, Appendix J** present the risk-based screening for surface water. As shown in Table 2.2, **Appendix J**, three metals (arsenic, cadmium, and iron) exceeded the first step of the screening and were identified as COPCs for evaluation in Step 2. Step 2, Table 2.2a, **Appendix J**, used the RSLs (USEPA, 2010a) even if surface water screening values (NRQWC and North Carolina WQS) were available, as these surface water screening values are not necessarily risk-based. The RSLs use risk-based values with set risks for Step 2. Based on Step 2 (risk ratio using maximum detected concentration, Table 2.2a, **Appendix J** arsenic was retained as a COPC. Arsenic was detected in one of the five surface water samples. While the detected concentration (3.7 µg/L) exceeds the RSL and NRWQC, it is below the North Carolina WQS. Therefore, exposure to surface water at the Off-Base SDZs MRA is not expected to result in any unacceptable human health risks.

Pore Water

Although recreational receptors are not expected to directly contact pore water, due to the limited number of surface water samples, pore water was evaluated as representative of surface water. Tables 2.3 through 2.3b**, Appendix J**, present the risk-based screening and risk ratio evaluation for pore water. As shown in Table 2.3**, Appendix J**, five metals (aluminum, arsenic, iron, manganese, and vanadium) exceeded the first step of the screening and were identified as COPCs for evaluation in Step 2. As with surface water, Step 2, Table 2.3a, **Appendix J**, used the RSLs (USEPA, 2010a) even if surface water screening values (NRQWC and North Carolina WQS) were available, as these surface water screening values are not necessarily risk-based. The RSLs use risk-based values with set risks for Step 2. Based on Step 2 (Table 2.3a**, Appendix J**), arsenic was retained as a COPC and was carried forward to Step 3, where the 95 percent UCL concentration resulted in a cumulative carcinogenic risk below the screening criteria, Table 2.3b, **Appendix J.** Therefore, exposure to pore water would not result in any unacceptable human health risks.

Sediment

Tables 2.4 through 2.4b in **Appendix J** present the risk-based screening and risk ratio evaluation for sediment. As shown in Table 2.4 in **Appendix J**, five metals (aluminum, arsenic, chromium, iron, and vanadium) were identified as COPCs. Based on Step 2 (risk ratio using maximum detected concentrations, Table 2.4a**, Appendix J**), arsenic and chromium were retained as COPCs and carried forward to Step 3 (Table 2.4b, **Appendix J**), where the 95 percent UCL concentration resulted in a cumulative carcinogenic risk slightly above the screening criteria.

Chromium is the main contributor to the carcinogenic risk associated with the sediment. The analytical data for chromium is for total chromium; however, the RSL used for the screening is for hexavalent chromium, the more toxic (and carcinogenic) valence state of chromium. In the past, prior to including the New Jersey Environmental Protection Agency oral cancer slope factor for hexavalent chromium in the table, the USEPA's RSL table presented a residential soil RSL for total chromium assuming a 1:6 ratio of hexavalent chromium to trivalent chromium. Assuming this ratio applies for sediment at the Off-Base SDZs MRA, the maximum concentration of hexavalent chromium (the total measured chromium concentration multiplied by one-sixth) would not result in an unacceptable risk associated with exposure to the chromium. It also needs to be noted that there is some uncertainty associated with the hexavalent chromium oral cancer slope factor, and RSL, as the value is from New Jersey Environmental Protection Agency, and has not been included in the USEPA's Integrated Risk Information System (IRIS) database. Furthermore, based on the reducing geochemical environment in the sediments of the Off-Base SDZs MRA, hexavalent chromium would be reduced to the lower valence, less toxic trivalent form. Furthermore, there is not a known source of hexavalent chromium associated with historical munitions activities at the MRA. Elimination of chromium as a COPC in sediment would also result in elimination of arsenic as a COPC in Step 3 as it does not contribute significantly (above $5x10^{-5}$) to the cumulative calculated risk.

Therefore, exposure to sediment at the Off-Base SDZs MRA would not result in an unacceptable risk to human receptors and further evaluation of sediment based on human health is not necessary.

Subsurface Soil

Table 2.5 in **Appendix J** presents the risk-based screening evaluation for subsurface soil. As shown in Table 2.5 in **Appendix J**, none of the detected chemicals exceeded the first step of the screening. Exposure to subsurface soil at the Off-Base SDZs MRA is not expected to result in unacceptable human health risks.

Groundwater

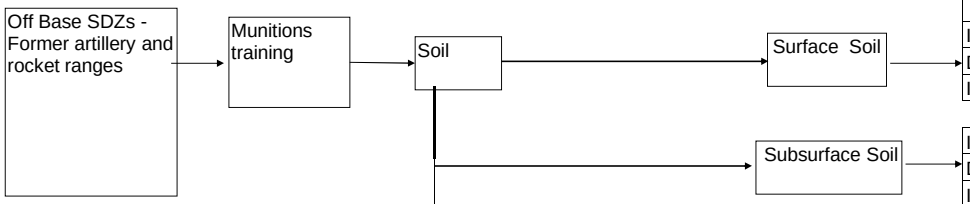
The risk-based screening and risk ratio evaluation for groundwater data are presented in Tables 2.6 and 2.6a of **Appendix J**. As shown in Table 2.6**, Appendix J**, one metal (barium) exceeded the first step of the screening and was identified as a COPC for evaluation in Step 2. Based on Step 2 (risk ratio using maximum detected concentration, Table 2.6a), barium was eliminated as a COPC. Exposure to groundwater at the Off-Base SDZs MRA is not expected to result in any unacceptable human health risks.

Non-Detected Analytes

For each media, there are several explosives with detection limits that are above the screening value; however, the detection limits were generally within an order of magnitude of the screening value. Therefore, there is some uncertainty associated with constituents that were not detected with detection limits above the screening levels, however based on past site use, and results of the constituents detected in the site media, this is not expected to effect the results of this risk evaluation.

5.4 Human Health Risk Screening Conclusion

This evaluation of the potential human health risks posed by the concentrations of target analytes detected within the environmental media collected during this investigation did not identify any potentially unacceptable risks to human health.



	Current/Future		Future		
Exposure Route	**Recreational Adult**	**Recreational Youth**	**Residential Adult**	**Residential Child**	**Construction Worker**
Ingestion	X	X	X	X	X
Dermal Contact	X	X	X	X	X
Inhalation	NA	NA	NA	NA	NA
Ingestion	X	X	X	X	X
Dermal Contact	X	X	X	X	X
Inhalation	NA	NA	NA	NA	NA
Ingestion	NA	NA	X	X	X
Dermal Contact	NA	NA	X	X	X
Inhalation	NA	NA	NA	NA	NA
Ingestion	X	X	NA	NA	X
Dermal Contact	X	X	NA	NA	X
Inhalation	NA	NA	NA	NA	NA
Ingestion	X	X	NA	NA	X
Dermal Contact	X	X	NA	NA	X
Inhalation	NA	NA	NA	NA	NA

FIGURE 5-1
Conceptual Site Model for HHRS
Off-Base SDZs
MCB CamLej, North Carolina

NA - Not Applicable or pathway is incomplete
X - Potentially complete exposure pathways

SECTION 6

Ecological Risk Screening

This section presents the ecological risk screen (ERS) conducted for the Off-Base SDZs MRA.

6.1 Site Ecological Setting and Available Data

The ecological checklist in **Appendix K** identifies the terrestrial and aquatic habitats on-site.

Approximately 173 acres of the 1,632 total site acres investigated are considered to be "upland areas" (i.e. above the mean high tide). Of the 173 acres of upland areas, approximately 127 acres are situated on the western portion of Bear Island and approximately 46 acres are comprised of small islands along the ICW.

6.2 Screening Methodology

For each medium (surface soil, subsurface soil, sediment, surface water, groundwater, and pore water), the maximum and arithmetic mean concentrations were calculated and Ecological Screening Values (ESVs) intended to be protective of ecological receptors were identified. HQs were calculated by dividing the exposure concentrations by the ESVs. It should be noted that ESVs for metals in water are generally based on dissolved concentrations and comparing them to total metals concentrations is conservative and may overestimate risk.

For soil, the USEPA Ecological Soil Screening Levels (EcoSSL) (USEPA, 2009b) were preferentially selected over Region 4 values (USEPA, 2001). When no EcoSSL was available for a constituent, the Region 4 value was selected.

A selection hierarchy was also applied to surface water, groundwater, and pore water. The NRWQC were preferentially selected over the Region 4 values (USEPA, 2001). However, when no NRWQC was available for a constituent, the Region 4 value was selected as the ESV for that constituent. Because groundwater, surface water, and pore water were collected within a salt marsh bordering the Atlantic Ocean, all water data were screened against marine ESVs.

For sediment, USEPA Region 4 values were used.

When an ESV value was not available for a detected analyte, a supplemental screening value from published literature was used, as available. Concentrations were also compared to background sample concentrations (Section 3.4.7).

Additional lines of evidence in the evaluation included the frequency of detection, frequency of exceedance, magnitude of exceedance, and identification of potential laboratory contaminants.

6.3 Screening Results

This section addresses constituents that were detected and had available ESVs based on the selection hierarchy discussed above. Non-detected constituents are not expected to pose a risk to ecological receptors. The ecological risk screening tables are located in **Appendix K**. Table K-1 presents the surface soil screen, Table K-2 presents the subsurface soil screen, Table K-3 presents the sediment screen, Table K-4 presents the surface water screen, Table K-5 presents the groundwater screen, and Table K-6 presents the pore water screen.

6.3.1 Surface Soil

Of the detected analytes in surface soil with available ESVs or supplemental screening values, nine metals had maximum-based HQs greater than one. Aluminum, antimony, iron, lead, mercury, selenium, vanadium, and zinc had HQs greater than one but were consistent with background levels. Cadmium had a low frequency (1 out of 74) and low magnitude (HQ = 3.03) of exceedance. Consequently, analytes in surface soils are not expected to pose significant risk to ecological receptors.

6.3.2 Subsurface Soil

Aluminum, antimony, iron, and mercury had maximum-based HQs greater than one. Antimony concentrations exceeded the ESV in 10 of 45 samples but with a low magnitude of exceedance (HQ less than 5). The concentrations of remaining constituents were consistent with background concentrations. As a result, analytes in subsurface soil are not expected to pose significant risk to ecological receptors.

6.3.3 Sediment

Of the detected analytes in sediment with available ESVs or supplemental screening values, three metals had maximum-based HQs greater than one. Antimony concentrations were consistent with background levels and had a low frequency (1 out of 27 samples) and low magnitude (HQ = 1.1) of exceedance. Arsenic had a maximum-based HQ greater than one (HQ = 1.27), but with a low magnitude of exceedance. Additionally, the mean-based HQ for arsenic was less than one. Iron had an HQ greater than one but with a low frequency (1 out of 27 samples) and magnitude (HQ = 1.22) of exceedance. Consequently, risk from these analytes in sediment is considered negligible.

6.3.4 Surface Water

Of the analytes with available ESVs or supplemental screening values, cadmium (total and dissolved), copper (total and dissolved), and iron (total) were the only analytes with a maximum-based HQ greater than one. The HQs for total copper and cadmium were less than 2, and the mean-based HQs were less than 1. Results for dissolved data were similar.

The maximum concentration of total iron only slightly exceeded the ESV (HQ=1.02), and the arithmetic mean concentration was less than 1. In addition, dissolved concentrations were equal to or less than those concentrations detected in the surface water background sample. Overall, risk from metals is considered negligible and analytes in surface water are not expected to pose significant risk to ecological receptors.

6.3.5 Groundwater

Arsenic (total and dissolved), cadmium (total), chromium (total), copper (total and dissolved), lead (total), nickel (total), silver (total), thallium (total), and zinc (total) had HQs greater than one. However, these constituents were either:

- Consistent with background
- Had low frequencies of detection (less than 5 percent)
- Had low frequencies of exceedance (i.e., total lead only exceeded the ESV in 2 of 71 samples)
- Had low magnitudes of exceedance
- Were not detected in the filtered samples.

As a result, none of the constituents in groundwater are likely to pose a significant risk to ecological receptors.

6.3.6 Pore Water

For pore water, arsenic (total and dissolved), cadmium (total and dissolved), iron (total and dissolved), manganese (total and dissolved), nickel (total), silver (total), and vanadium (total and dissolved) had maximum-based HQs greater than one. Arsenic had a low frequency (1 out of 22 samples) and low magnitude (HQs less than 2) of exceedance in both total and dissolved samples. Vanadium also had a low frequency (1 out of 22 samples) and low magnitude (HQ = 1.1) of exceedance in the total sample, and the dissolved vanadium concentrations were consistent with background. Manganese had a low magnitude of exceedance (HQs less than 2) in both total and dissolved samples. Cadmium (total and dissolved), nickel (total), and silver (total) had concentrations consistent with background. Cadmium HQs in both sample types also had low magnitudes of exceedance (HQs less than 2), and nickel and silver were not detected in the filtered samples.

Maximum iron concentrations were elevated in both total (HQ =9.03) and dissolved (HQ = 7.49) samples. Maximum dissolved concentrations were also greater than the supplemental screening value, although the degree of exceedance was lower. The screening value used is for freshwater and may not be applicable to marine waters. Supporting evidence is that the mean background level of iron in pore water also exceeded the screening value. Iron was consistent with background in surface water, groundwater, and soil. In sediment, there was only low frequency and magnitude of exceedance of the supplemental screening value. The weight of evidence suggests that iron is not a risk driver at the site.

In conclusion, none of the analytes in pore water are expected to pose significant risk to ecological receptors.

6.4 Summary

Based on the available data, no significant risks to populations of ecological receptors were identified within the Off-Base SDZs MRA.

SECTION 7

Conclusions and Recommendations

This section presents the conclusions and recommendations based on the results of the PA/SI.

7.1 Conclusions

7.1.1 Environmental Investigation

The environmental samples collected during this PA/SI were analyzed for metals, explosives residues including PETN and nitroglycerin, and perchlorate to assess the potential presence of contamination that may have resulted from the former range activities. Explosives residues were not detected. Perchlorate was detected in groundwater samples at concentrations at least one order of magnitude below RSLs. Metals were detected in all media at concentrations generally consistent with background levels. The results of the risk screenings indicate that there are no unacceptable risks to either human or ecological receptors due to exposure to soil, groundwater, pore water, sediment, and surface water, based on current and potential future use.

7.1.2 Aerial Digital Geophysical Mapping

A total of 2,059 anomalies were identified by the AGS. The areas of greatest anomaly densities were observed at the mouth of Bear Inlet, at the convergence of Bear Creek and the ICW, and along a main channel through the east-central portion of the site. The majority of the identified targets are located within or very close to water channels running through the site. The airborne data alone are not suitable for determining the presence or absence of MEC, as AGS is most suited to detecting large metallic items and clusters of items.

7.1.3 Terrestrial Digital Geophysical Mapping

In general, anomaly density across the 27 acres of terrestrial DGM area is quite low, with large areas in the intertidal zone having little to no response. Without intrusive investigation results, however, it is not possible to rule out the presence of MEC in the Off-Base SDZs MRA. The detected anomalies cannot be verified as MEC without an intrusive investigation.

7.1.4 Bear Island Intrusive Investigation

No MEC or MPPEH was found during the analog geophysical survey and intrusive investigation of 200 acres of Bear Island. Several munitions-related items were found, including one JATO bottle, three BDU-33s (expended), and one 25mm cartridge case.

7.2 Recommendations

Intrusive Investigation

Intrusive investigation of the geophysical anomalies identified in areas outside of Bear Island was not conducted during this PA/SI. Therefore, the nature of these anomalies could not be determined. Based on the discovery of MEC (aircraft flare) on Bear Island and some

munitions-related debris found during the intrusive investigation, an intrusive investigation of a representative portion of identified geophysical anomalies detected during the terrestrial-based geophysical investigation is recommended to further evaluate the presence or absence of MEC in terrestrial areas (**Figure 2-2**). Some MEC may fall below the detection thresholds of the AGS systems; therefore, additional higher-resolution marine geophysical surveys and intrusive investigation would be needed to determine the presence or absence of munitions in the WAA areas.

In the event that MEC is encountered during potential future intrusive investigations, it may be necessary to conduct controlled detonations. Since residual quantities of donor charge as well as explosive components of the MEC item may not be entirely destroyed during controlled detonations, it is recommended that post-detonation soil samples be collected to evaluate the presence of MC.

Environmental Investigation

Considering that no unacceptable risks were identified to human and ecological receptors from exposure to environmental media within the Off-Base SDZs MRA, no further environmental investigation is recommended. However, the need for additional sampling of MCs will be re-evaluated upon completion of the recommended intrusive investigation of geophysical anomalies.

SECTION 8

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Appendix A
Stakeholder Correspondence



Investigation of Former Off-Base Surface Danger Zones (SDZs)

Marine Corps Base Camp Lejeune

June 2009

During a recent review of operational range locations, Marine Corps Base (MCB) Camp Lejeune discovered that portions of the surface danger zones (SDZs) for one existing range (G-7) and several historical ranges were located outside the surveyed base boundary. *(See right for more information on SDZs.)*

The safety buffer (secondary danger area) for artillery range G-7 was adjusted, so that the entire SDZ now lies within the base boundary. Prompted by this discovery, historic range maps and documents were reviewed and it was determined that some other SDZs were also off the installation, during specific time frames dating back to the 1940s.

Figures 1 and 2 show the off-base areas that might have been affected. The greater part of this area consists of the SDZ for Rocket Range Number 1, which has not been used for over 50 years.

Investigation of Former Off-Base SDZs Begins

MCB Camp Lejeune is now investigating the off-base areas that might have been affected by munitions training in the past. This fact sheet describes what actions have already been taken and the goals of the proposed investigation.

This investigation is proactive and is not a result of any incident or discovery of munitions. Either it will confirm that there is no risk to human safety or the environment, or it will be followed by appropriate action if a risk is identified.

Training Ranges and SDZs

MCB Camp Lejeune is a military installation bordering the city of Jacksonville, in Onslow County, North Carolina. Camp Lejeune is the home of "Expeditionary Forces in Readiness." For more than 50 years, Camp Lejeune has been the home base for the II Marine Expeditionary Force, 2d Marine Division, 2d Marine Logistics Group, and other combat units and support commands.

A **Surface Danger Zone (SDZ)** *is an area associated with a training range that is designed to protect people during weapons training. It may include land, water, and airspace. An SDZ is an exclusion area that is strictly controlled and could contain projectiles, fragments, or components from firing, launching, or detonating weapons and explosives.*

An SDZ is comprised of three parts:

1. **Weapons Firing Position:** *Position from which the munitions are fired.*
2. **Impact Area:** *The target or intended area of munitions impact where munitions and munitions fragments are expected to land.*
3. **Secondary Danger Area:** *A safety buffer area where fragments from munitions may land.*

SDZs are established by MCB Camp Lejeune through Army guidelines and through regulations that are normally associated with public comment periods. The U.S. Army Corps of Engineers' regulations for public lands and waters are documented in the Code of Federal Regulations (Corps of Engineers, Department of the Army, Part 334 Danger Zones and Restricted Area Regulations, Section 440).

These regulations include safety procedures to ensure that the SDZs are clear of all personnel during training, and that the public is notified when training is conducted. The Department of Defense's current regulations require that SDZs be calculated so that there is only a one-in-one-million chance that munitions or munitions fragments would land outside the secondary danger area.

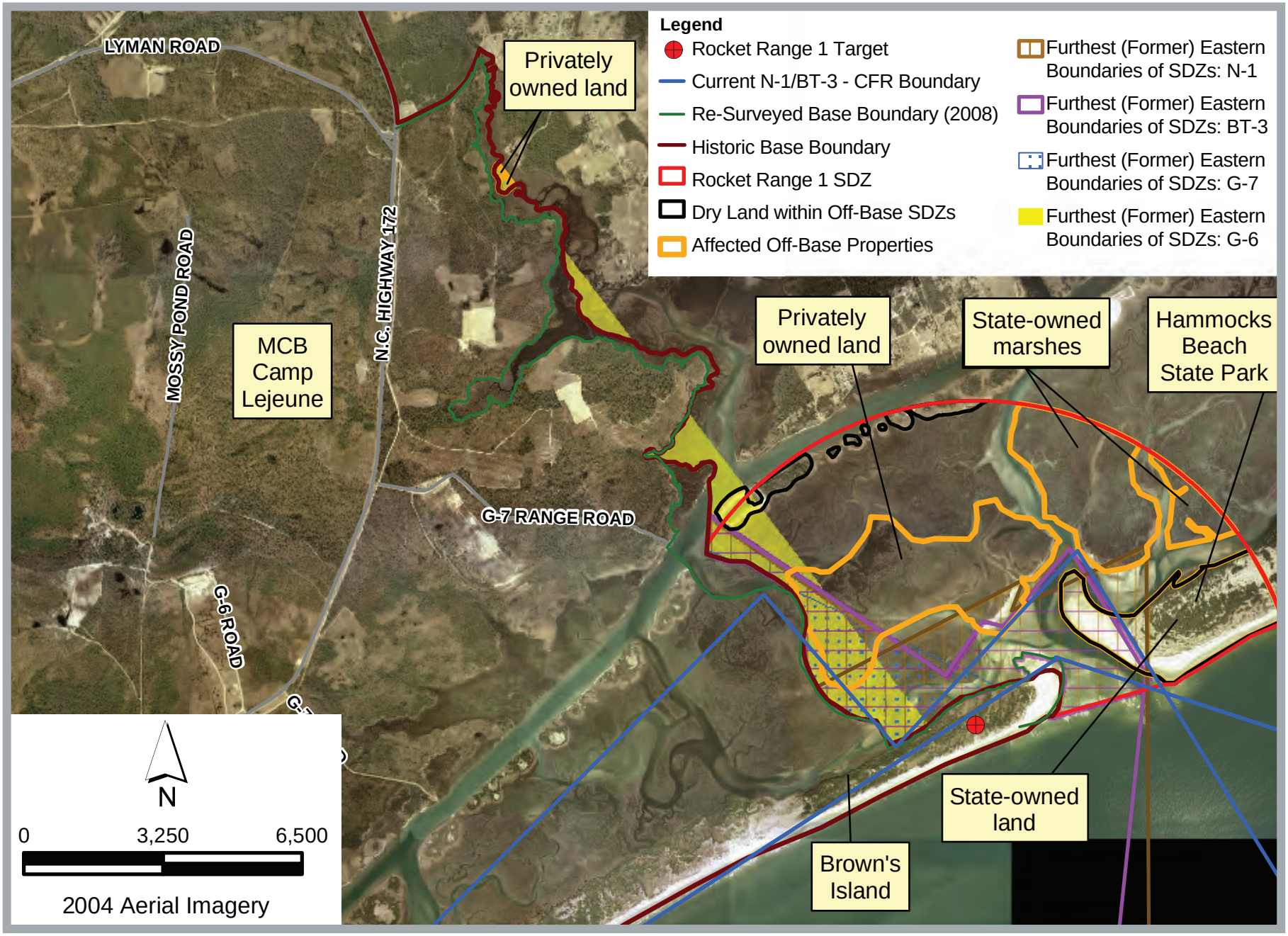


Figure 1 – Off-base SDZs aerial photograph

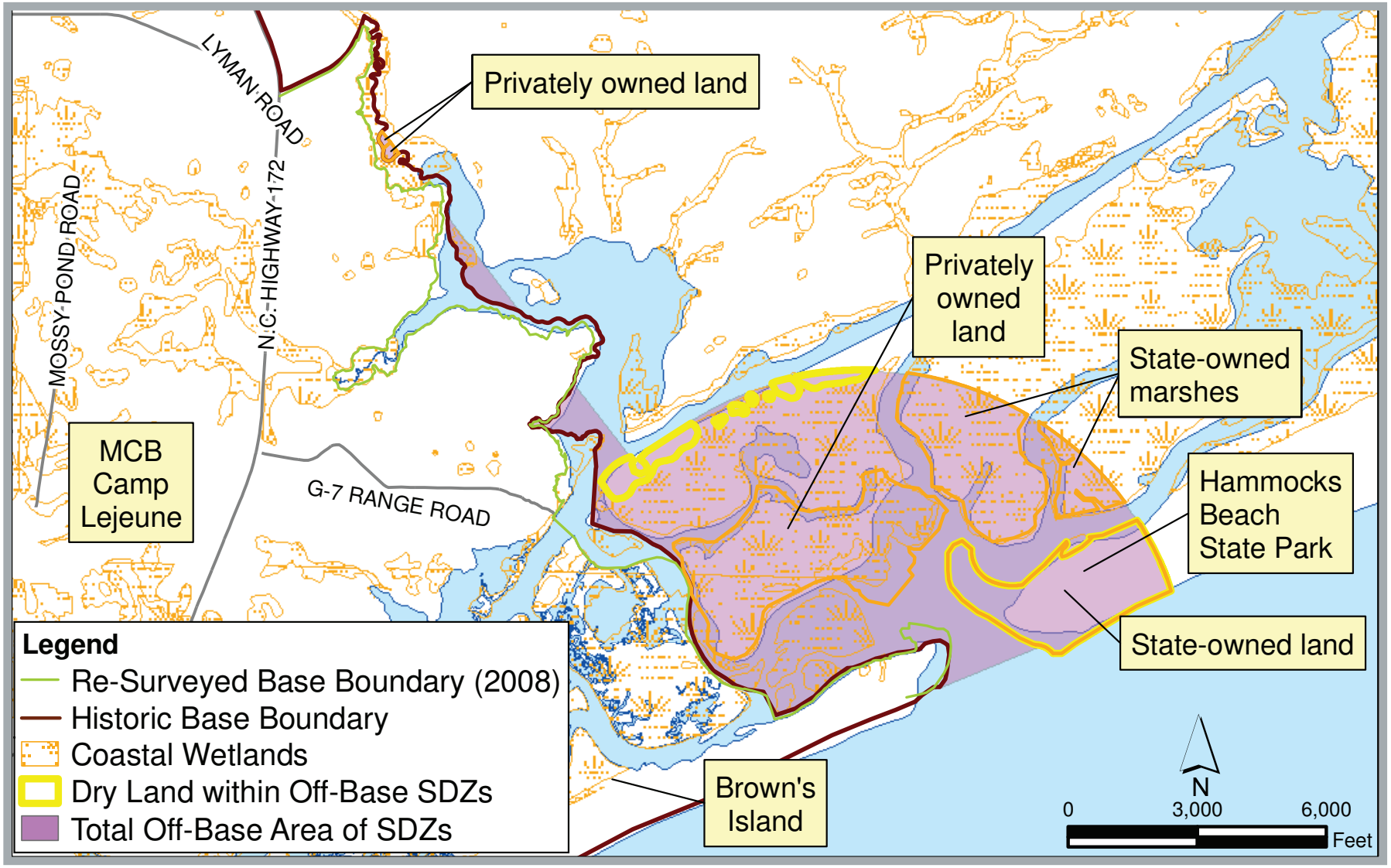
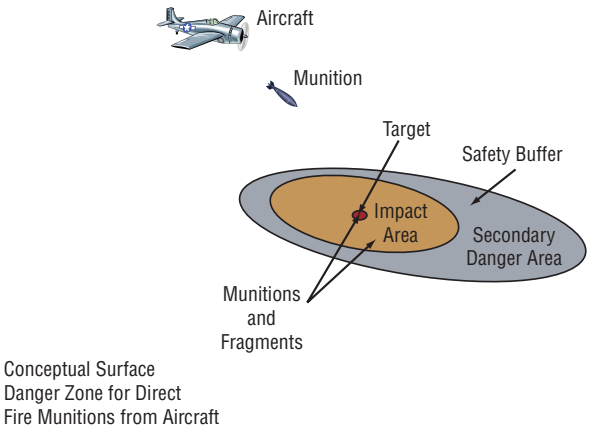
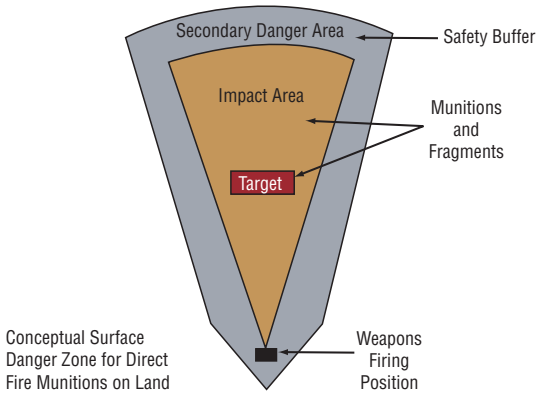


Figure 2 – Off-base SDZs map and wetlands





To ensure that MCB Camp Lejeune units are combat ready, certain areas on the base are used to train military personnel in the use of munitions. For safety purposes, each munitions training range is associated with a safety buffer area, called a surface danger zone.

The southeastern base boundary of MCB Camp Lejeune lies along a tidally-influenced area and is delineated by the high water mark. Due to the effects of nature, the surveyed boundary has changed over the years and will continue to change in the future.

Background on the Off-Base SDZs

Review and update of MCB Camp Lejeune's Military Installation Map (dated 1996) revealed that one current SDZ was depicted as being outside the installation boundary. Specifically, the eastern lateral limit of the SDZ for the G-7 direct fire artillery range (see Table 1) was depicted as being on private property near the southeast boundary of the base. As soon as the issue was identified, the G-7 safety buffer (secondary danger area) was adjusted, so that the entire SDZ now lies within the base boundary.

Historic range maps and documents were reviewed, and it was determined that some other SDZs were also off the installation. SDZs are continuously updated and examined to reflect changes in training requirements. The SDZs in question were off-base only during specific time-frames, dating back to the 1940s when the base was established.

After further review of the historic range delineations, it is believed that only portions of the safety buffer areas were located beyond the boundaries of the base. The boundaries of BT-3/N-1 (see Table 1) might have been simply an alignment or mapping error and would not reflect actual operations.

However, it is possible that munitions or munitions fragments might have inadvertently landed beyond the boundaries of

Table 1 – Ranges being Investigated

Range	Description	Years SDZ was Off Base
Rocket Range Number 1	Land target for rockets fired from aircraft. SDZ extended into off-shore waters, lands and wetlands.	1945 – 1947
G-6 Artillery Range	Land targets for artillery fired from land and from ships at sea. Small portion of SDZ extended into off-shore waters, lands and wetlands.	1945 – 1951
G-7 Artillery Range	Land targets for artillery fired from land. Small portion of SDZ extended into off-shore waters, lands and wetlands.	1945 – 1951 & 1987 – 2007
N-1 Surface Ship Maneuver Area	Land and off-shore waters for ships firing artillery into land ranges. SDZ extended into off-shore waters, lands and wetlands.	1945 – 1987
BT-3/N-1 Combined Impact Area	Land targets for various munitions from aircraft, ships and land-based equipment. SDZ extended into off-shore waters, lands and wetlands within the N-1 Surface Ship Maneuver Area.	1985 – 2007

the base. Although there has been no indication that a safety risk exists, MCB Camp Lejeune is conducting an investigation to ensure the protection of human safety and health and of the environment.

MCB Camp Lejeune personnel re-evaluated all ranges on the base for conflicts with private and State property and are confident that there are no other SDZ's which encroach onto off-base lands.

Off-Base Areas Possibly Affected

The off-base areas that might have been affected include three private properties totaling approximately 301 acres; the southwestern tip of Bear Island (182 acres of Hammocks Beach State Park); State-owned salt marshes that lie between Bear Island and the mainland; State waters used for fishing and recreation, including portions of Bear Creek; and shallow water areas of the Atlantic Intracoastal Waterway.

As Figure 2 shows, most of the affected acreage is marsh land.

The First Step is a Site Inspection

MCB Camp Lejeune is leading the investigation, working in partnership with the Naval Facilities Engineering Command Mid-Atlantic, the U.S. Environmental Protection Agency, and the North Carolina Department of Environment and Natural Resources, and in consultation with private property owners and all other interested parties.

A munitions site investigation follows the same basic steps as an investigation of environmental sites under the national "Superfund" program. It begins with a Preliminary Assessment and Site Inspection, which sets the stage for further action. Data is gathered and evaluated to determine if immediate action or more detailed investigation is needed, or if all or part of the site can be eliminated from further investigation.

The following activities are expected to begin in fall 2009. MCB Camp Lejeune is preparing a Work Plan describing these actions in more detail, which will be made available to the public in the Information Repositories (see back page).

- **Aerial Magnetometer Survey:** A helicopter will be flown over the entire affected area. The resulting data will identify areas and patterns of metallic debris, which could contain munitions-related material (or other unrelated metallic objects).
- **Focused Digital Geophysical Mapping (DGM):** Accessible areas of dry land will be investigated using magnetometers. The resulting data will identify specific locations, if any, that might contain buried munitions-related items.
- **Environmental Sampling:** Samples will be collected from:
  - –Soil (both on and below the surface) and groundwater, in dry land areas.
  - –Surface water and sediment in accessible portions of the creeks and salt marshes, in areas where the aerial survey reveals high densities of metallic objects.

  The resulting data will identify any areas of potential contamination from munitions-related chemicals

The information gathered by these investigations will be used to determine whether or not additional actions are necessary to ensure public safety and protection of the environment.

Digital geophysical mapping surveys use magnetometers (scientific instruments that measure the strength or direction of the earth's magnetic field) to locate and create a digital map of "magnetic anomalies"—metal objects submerged under water or buried under the ground—that might be munitions. The instruments can be hand-carried, towed behind a boat, or mounted onto aircraft. The resulting data is used to select areas for further evaluation.

Possible Future Steps

Depending on the results of the Site Inspection, future phases of the investigation could include:

- Taking actions to ensure public safety if any hazard is discovered, while the investigation continues; for example, posting warning signs and working with local officials
- Identifying and exploring "magnetic anomalies" that might be buried munitions and explosives of concern and might need to be removed to protect the public and the environment (an "intrusive investigation")
- An underwater investigation of the former surface danger zone in Bear Inlet

Public Involvement

In the U.S. Department of Defense's Munitions Response Program, military installations are encouraged to ask stakeholders for their input in developing relative priorities for investigating munitions sites. Stakeholders include federal agencies, state and local regulatory agencies, tribal governments, landowners directly affected by a site, and interested community members who live or work near the site.

MCB Camp Lejeune is committed to informing and involving community members. When the public is actively involved, the investigation/cleanup process is better understood and better cleanup decisions are made.

MCB Camp Lejeune compiles and makes available to the public a complete record of documents that were used to make investigation and cleanup decisions, called the Administrative Record File. Documents in the Administrative Record File include site work plans, investigation studies, risk assessments, sampling reports, and other materials related to the site. *How to find the Administrative Record File for MCB Camp Lejeune: see back page.*

MCB Camp Lejeune invites you to be a part of the decision-making process, as we develop a work plan for the initial investigation and use the results of that investigation in planning the next steps.

Restoration Advisory Board

You can learn more about MCB Camp Lejeune's environmental cleanup and munitions response by attending meetings of the Restoration Advisory Board (RAB). The best way to get involved in the process is to become an RAB member.

The RAB is made up of community members, along with representatives of federal and state regulatory agencies, MCB Camp Lejeune, and the Naval Facilities Command Mid-Atlantic. The RAB acts as a focal point for exchanging information between the base and the local community about environmental restoration and munitions response activities.

The RAB meets quarterly at the Coastal Community College, Jacksonville, NC. The date, time, and place of RAB meetings are advertised in the *Jacksonville Daily News* and the *Globe* newspapers. The public is always welcome to attend RAB meetings and membership is encouraged.

A Public Open House is Planned

MCB Camp Lejeune will present the Work Plan for the Off-Base SDZs Preliminary Assessment / Site Inspection and answer any questions you might have at a public open house meeting in summer 2009. The meeting will be advertised in the *Jacksonville Daily News*, the *Globe*, and the *Tideland News*.

If you are interested in this investigation, or if you have personal knowledge of the historical use of these ranges, please plan to attend the public meeting to share your views and discuss any concerns. Any relevant information that community members can provide will be included, as appropriate, in the investigation records.

If you would like to receive public meeting notices and future fact sheets by mail or e-mail, please sign up for the mailing list by returning the enclosed postage-paid form.
Or, if you prefer, just e-mail your address to: joe.m.ramirez@usmc.mil. Please put "SDZs Mailing List" in the subject line.







Aerial and ground magnetometry surveys

How to Find More Information

The complete Administrative Record for MCB Camp Lejeune's Environmental Restoration and Munitions Response Programs is available on CDs in the Reference Room at:

Onslow County Public Library
58 Doris Avenue East
Jacksonville, NC 28540
Phone: 910-455-7350

For your convenience, the Work Plan and related documents for the Off-Base SDZs investigation will be placed at:

Swansboro Branch Library
1460 West Corbett Avenue
Swansboro, NC 28584
Phone: 910-326-4888

For questions about MCB Camp Lejeune, please contact:

Mr. Joe Ramirez
910-451-7645
Joe.m.ramirez@usmc.mil
Community Liaison Officer

Marine Corps Base
PSC Box 20004
Camp Lejeune, NC 28542-0004

CH2M HILL, Inc.
(Attn: MCB Camp Lejeune Team)
5700 Cleveland Street, Suite 101
Virginia Beach, VA 23462

Place Stamp Here

ES042009027MKE

Public Meeting

Investigation of Off-Base Surface Danger Zones (SDZs)
Marine Corps Base Camp Lejeune

Why: Marine Corps Base (MCB) Camp Lejeune is investigating off-shore waters, land, and marshes adjacent to the base's southeast boundary that might have been affected by past munitions training. This area includes the western tip of Bear Island in Hammocks Beach State Park.

MCB Camp Lejeune is conducting the investigation as a necessary precaution, because training could have resulted in some munitions debris in these areas. There has been no indication of a safety risk to the surrounding community, nor have there been any reports of munitions found.

The investigation results will be used to determine whether or not any additional actions are needed to ensure safety and to protect human health and the environment.

The public is invited to come and learn more about the area being investigated, the investigation plans, and how the public can participate.

When: **July 21, 2009**
6:00 PM to 8:00 PM

Where: **Hammocks Beach State Park Visitor Center**
1572 Hammocks Beach Road
Swansboro, NC 28584

The meeting location is accessible to people with disabilities.

What: The meeting will be an **open house**, with posters describing the site and the planned investigation. You can drop in at your convenience, get the information that interests you, and stay only as long as you want to. Knowledgeable personnel will be available to provide information about the investigation, answer your questions, and listen to your views about the investigation of this site.

If you are interested in this investigation, or if you have personal knowledge of the historical use of these ranges, please plan to attend the public meeting to share your views.

Who: If you have questions about this investigation, or if you need special accommodations to attend the public meeting, please contact Joe Ramirez at 910-451-7645 or Joe.m.ramirez@usmc.mil.

Appendix B
Archival Records Search Report

Final

Archival Records Search Report for the Focused Preliminary Assessment/Site Inspection Off-Base Surface Danger Zones

Marine Corps Base Camp Lejeune
Jacksonville, North Carolina

Contract Task Order 080

October 2009

Prepared for

Department of the Navy
Naval Facilities Engineering Command
Mid-Atlantic

Under the

NAVFAC CLEAN 1000 Program
Contract N62470-08-D-1000

Prepared by



Raleigh, North Carolina

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A Resource Review Summary
B Copies of Historical Documents

Acronyms and Abbreviations

AA	Anti-aircraft
AP	Armor piercing
APDS-T	armor-piercing discarding sabot - tracer
ARSR	Archival Records Search Report
ASR	Archive Search Report
BATS	ballistic aerial target system
BT	bombing target
EOD	Explosive Ordnance Disposal
GP	general purpose
HE	high-explosive
HEAT	high-explosive anti-tank
HEP	high-explosive plastic
HEP-T	high-explosive plastic tracer
HVAP	high velocity armor piercing
HVTP	high velocity target practice
LCVP	landing craft, vehicle, personnel
LVT	landing vehicle, tracked
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MEC	munitions and explosives of concern
MG	machine gun
mm	millimeter
MR	munitions response
MRA	munitions response area
NCDENR	North Carolina Department of Environment and Natural Resources
NCDOA	North Carolina Department of Administration
PA/SI	Preliminary Assessment/Site Inspection
PAOC	potential area of concern
RR	rocket range
SDZ	surface danger zone
ST	strafing target
TNT	2,4,6-trinitrotoluene
TOW	tube-launched optically-tracked wire-guided
TP-T	target practice-tracer
UXO	unexploded ordnance
WP	white phosphorus
WWII	World War II

SECTION 1

Introduction

This archive records review is being conducted in support of a Munitions Response (MR) focused Preliminary Assessment/Site Inspection (PA/SI) at the Off-Base Surface Danger Zones (SDZs). The Off-Base SDZs Munitions Response Area (MRA) is located adjacent to the northeastern boundary of Marine Corps Base (MCB) Camp Lejeune (**Figure 1-1**). The Off-Base SDZs MRA encompasses approximately 1,632 acres of which an estimated 231 acres is part of the land-based investigation area. Details of the focused PA/SI activities can be found in the *Site Specific Work Plan Addendum for Preliminary Assessment/Site Inspection Off-Base Surface Danger Zones* (CH2M HILL, 2009).

1.1 Objective

This Archival Records Search Report (ARSR) is an investigative review of existing information about the site and its surrounding area, with an emphasis on obtaining information from personnel and historical resources that might indicate a potentially hazardous release to the environment, specifically with munitions and explosives of concern (MEC).

1.2 Scope

The ARSR includes a review of existing information relating to the site and the surrounding areas. The scope of the report includes:

- A review of existing historical information (including MCB Camp Lejeune maps, drawings, and reports, and interviews with Base personnel).
- Review of additional information based on the information gathered during the historical records review.

A summary of the resources identified and reviewed during the preparation of the ARSR is provided in **Attachment A,** and includes a detailed list of aerial and Base photographs, historical maps and records, and current Base records reviewed at Gray Research Center located on MCB Quantico, Virginia, the National Archives, located in College Park, Maryland, and at MCB Camp Lejeune. **Attachment B** contains chronological maps and aerial photographs obtained during the records review.

SECTION 2

Site Information

2.1 Facility Information

The Off-Base SDZs MRA was used jointly by MCB Camp Lejeune and Marine Corps Air Station (MCAS) Cherry Point. The danger zones related to MCB Camp Lejeune are primarily from land-based artillery ranges and the danger zones related to MCAS Cherry Point were used for aircraft strafing, rocket firing and bombing.

MCB Camp Lejeune is located on the Atlantic coast in Onslow County, North Carolina, **Figure 1-1**. The city of Jacksonville, North Carolina, is the principal support community for the Base. MCB Camp Lejeune occupies 153,000 acres including more than 450 miles of roads, approximately 6,800 buildings and facilities, and 14 miles of beach on the Atlantic Ocean. Approximately 14,000 acres of land have been developed for administrative, maintenance, logistics and personnel support facilities. Originally established in 1941, the Base is home to Marine Expeditionary Force units and includes six major Marine Corps commands, two Navy commands, one Coast Guard command, and is home to several Marine Corps Formal schools. MCB Camp Lejeune supports a total population of approximately 150,000 people, including active duty military and dependants, retirees and civilian employees (Global Security Website, 2008).

MCAS Cherry Point is a 13,164-acre military reservation north of the town of Havelock, in southeastern Craven County, North Carolina (**Figure 1-1**). The primary mission of MCAS Cherry Point is to support the Second Marine Aircraft Wing which consists of four aircraft groups, one aircraft control group, and one engineer group. MCAS Cherry Point also hosts Marine Air Group 14 and serves as the host installation for Commander Marine Corps Air Bases East. The boundaries of MCAS Cherry Point are the Neuse River to the north, Hancock Creek to the east, North Carolina Highway 101 to the south, and an irregular boundary approximately three-quarters of a mile west of Slocum Creek to the west (Global Security Website, 2009).

2.2 Current Site Information

The Off-Base SDZs MRA encompasses approximately 1,632 acres of waterway, coastal wetlands, and upland (above mean high tide) located just north and east of the northeastern corner of MCB Camp Lejeune, **Figure 1-1**. Of the 1,632 acres that comprise the Off-Base SDZs MRA, approximately 231 acres is part of the land-based investigation area. Of this area, approximately 172 acres are upland primarily comprised of the southwestern extent of Bear Island (part of Hammocks Beach State Park) and small hammocks (islands) along the Intracoastal Waterway, **Figure 2-1**. The rest of the land-based investigation area is comprised of the intertidal zone on Bear Island (59 acres), included due to its proximity to this public recreation area. Based on a review of publicly available aerial photographs and site reconnaissance, the investigation area is approximately 50 percent heavily vegetated

with some trees and moderate undergrowth. Additional areas may be added or subtracted from the land-based investigation area as more information is obtained.

Due to current operational activities occurring adjacent to the project site and within the Base boundary, such as direct firing artillery training, access to all areas of the Off-Base SDZs MRA may be restricted during exercises.

2.3 Ownership History

The current property owners for the Off-Base SDZs MRA include the following (Malcolm Pirnie, 2008):

- Gloria Sanders (Heir of D. J. Sanders): Approximately 300 acres of coastal wetlands/marshes, no designated upland areas. If during the course of the investigation, accessible areas of dry land are encountered, these areas may be included as part of the land-based investigation area.
- North Carolina Department of Administration (NCDOA): Approximately 225 acres of state owned coastal wetlands/marshes, no designated upland areas. If during the course of the investigation, accessible areas of dry land are encountered, these areas may be included as part of the land-based investigation area.
- Carrie E. Freshwater and Clifton T. and Dolores B. Humphrey: Adjacent approximately 1-acre coastal wetlands lots that are part of the northern extent of the Off-Base SDZs MRA. These are coastal wetlands, with no designated upland areas. If during the course of the investigation, accessible areas of dry land are encountered, these areas may be included as part of the land-based investigation area.
- North Carolina Department of Environment and Natural Resources (NCDENR): Approximately 190 acres of Hammocks Beach State Park, 127 acres are considered to be upland, 4 acres are considered to be coastal wetlands, and an additional 59 acres of intertidal zone. The upland and intertidal zone are considered to be part of the land-based investigation area. The intertidal zone of Hammocks Beach State Park is part of the land-based investigation area due to its proximity and accessibility by the public.
- Un-owned: The rest of the property is un-owned internal waters, land, or coastal wetlands. This includes up to about 45 acres of upland islands along the Atlantic Intracoastal Waterway. If during the course of the investigation, accessible areas of dry land are encountered, these areas may be included as part of the land-based investigation area.

The properties by owner are depicted on **Figure 2-2.**

What is now Hammocks Beach State Park history originally belonged to the North Carolina Teachers Association from 1950 to 1960. The approximately 190 acres that lie within the Off-Base SDZs MRA was managed as a private recreational resource, Bear Island Beach and "The Hammocks" on the mainland, for African American teachers. It became an African American-only state park from 1961 to 1964 (NCDPR, 2009).

According to a brief history of the beach from the nonprofit organization, Friends of The Hammocks and Bear Island, it was used during World War II (WWII) by the Marines to "practice amphibious landings with live ammunition" (NCDPR, 2009).

2.4 Operational History

Four historic ranges and impact areas comprise the Off-Base SDZs MRA: Rocket Range Number 1 (RR-1) (Archive Search Report [ASR] 2.33), G-7 Direct Fire Artillery Range (ASR #2.61), G-6 Artillery Range (ASR #2.62), and Impact Area N-1 (ASR #2.207). The operational history of each range will be presented below.

Figure 2-3 includes all the historical range fans that crossed the Base boundary. The largest impacted area is RR-1, the circular area covering Bear Inlet, portions of Bear Island, and part of Sanders Island. The G-6 range has encroached on private and/or public lands in the northern area of the site. The G-7 range fan crossed the base line in a similar pattern as the northern area of the N-1/Bombing Target 3 (BT-3) Impact areas. The N-1/BT-3 Impact Area and a historical bombing target Bombing Target 5 (BT-5) are shown to encroach onto Bear Island and the marsh lands to the north and east. The entirety of the N-1 Impact area, BT-3 and BT-5 are shown in **Figure 2-4.**

The MCAS Cherry Point ASR notes that range "locations given in collected historical documents may not exactly match from year to year. This fact maybe due to errors in mapping or in actual movement for the point being referenced" (USACE, 2001b).

Aerial photos from 1949 (**Attachment B**) show scarring in the area corresponding to the G-7 range. The land directly across Bear Creek appears to be a mix of forest and farmland. The main portion of the Off-Base SDZs MRA appears to be tidal marshland (ASCS, 1949).

Aerial imagery from 1962 includes only the most northern part of the Off-Base SDZs MRA. As shown in **Figure 2-5**, depicts roads and small cleared areas on the base. Residences and farmland can be seen in **Figure 2-5** directly across Bear Creek from the Base boundary.

Aerial imagery from 1989 shows additional cleared land in the eastern central portion of **Figure 2-6** corresponding with the G-7 Range fan, **Figure 2-3**. The main portion of the site appears to be tidal marshlands with no structures.

Rocket Range Number 1

RR-1 (ASR 2.33) reported operated between 1945 and 1947. RR-1 was identified as an aviation range for rocket firing in the Camp Training Order Number 5-1946, dated March 19 1946 (USACE, 2001a). MCAS Cherry Point controlled air operations which used RR-1 however the physical location of the range is located within MCB Camp Lejeune. RR-1 is located mainly within Bear/Browns Island Bomb Target/BT-5 which eventually became part of the current Impact Area N-1, **Figure 2-3** (USACE, 2001a).

A map enclosed in a letter to the Commandant, 5th Naval District, dated June 22, 1945 depicts the RR location completely within BT-5 (**Figure 2-7**). BT-5 is further discussed under Impact Area N-1.

In the 1946 Camp Training Order, RR-1 range is described as a circle with a 2,500-yard radius from Military Grid 9979 3279 as outlined in **Figure 2-3** (USACE, 2001a).

According to the *Final Range Identification and Preliminary Range Assessment*, the following munitions may have been used between 1945 and approximately 1947 (USACE, 2001a):

- 2.25" Aircraft Rocket, Sub-caliber
- 5" Aircraft Rocket, Armor-piercing (AP)
- 5" Aircraft Rocket, high explosive (HE)
- 5" Aircraft Rocket, high explosive anti-tank (HEAT)
- 5" Aircraft Rocket, white phosphorus (WP)
- 11.75" Aircraft Rocket, general purpose (GP)

The 1949 *Semi-Annual Supplement to the Original History of MCAS Cherry Point* states that the Aircraft Target Maintenance unit was frequently sent out to rebuild targets used for bombing and rocket firing including targets on Browns Island (MCAS Cherry Point, 1949).

A 1966 field training document describes the firing approach firing requirements at the "Bear Inlet Target and Bombing Area," including "display scarlet streamers/red lights on the Onslow Beach North Tower, Freeman's Creek Tower and the Bear Creek Tower. Red flashing lights will be displayed during the hours between sunset and sunrise" (MCB Camp Lejeune, 1966).

Direct Fire Artillery Range G-7

The Direct Fire Artillery Range (ASR #2.61), also known as G-7 Artillery Range and G-7 Field Firing Range, has been in operation since 1945 for all caliber artillery firing direct fire, including tanks and landing vehicles, tracked (LVTs).

The *Final Range Identification and Preliminary Range Assessment* states that this range was used from 1945 to "present" (2001). According to personal communication with Duane Richardson, there are currently no active ranges that encroach upon Off-Base areas (Richardson, 2009). However, the 2008 MCB Camp Lejeune Military Installations map indicates that a small portion of the G-7 Artillery Range does overlap an Off-Base area between the Intracoastal Waterway and Browns Island (MCB Camp Lejeune, 2008).

Camp Training Order 78-1946, with Mod 1 dated March 6, 1947, identified G-7 for use by all caliber artillery firing, and direct firing, including tanks and tracked land vehicles. The 1946 Range Overlay Map shows the "Direct Fire Artillery Range" (G-7) fan to cross the Base boundary, **Figure 2-8** (USACE, 2001a). In 1951 and 1953, the fans are shown to meet, but not cross, the Base boundary, **Figure 2-8**.

Base Order 11102.1G, dated February 6, 1970, identified the G-7 range for use by tank guns, field artillery, recoilless rifles, and machine guns (MGs) with only HVAP (high velocity armor piercing), HVAP-DS [high velocity armor piercing – discarding sabot) and HVTP (high velocity target practice) types of ammunition prohibited. In the 1976 Range Overlay Map, **Figure 2-9**, the G-7 range fan is shown to not exceed south past the Intracoastal Waterway to the south and stay well within the Base boundary to the east.

The 1979 existing conditions map **Figure 2-10** shows the roads, Bear Creek Tower, several small buildings near G-7 and the G-7 range fan (MCB Camp Lejeune, 1979).

Base Order P11102.1K, dated December 1, 1986, identified the G-7 range for use by 105 millimeter (mm) tank guns, field artillery (direct fire), MGs, and 25mm cannon using all types of ammunition except high velocity projectiles exceeding 25,000 yards seaward. In the 1987 Range Overlay Map, **Figure 2-9**, the G-7 has a much wider range fan than previous years extending past the Base boundary to the east and well into the Atlantic Ocean to the south.

The G-7 range fan in the 1993 Range Overlay Map, **Figure 2-9,** is similar to the 1987 range fan. The 1993 range fan extends to the east past the Base boundary and south into the Atlantic Ocean. Base Order P3570.1, dated June 2, 1994, identified the G-7 range for use with the following types of ammunition: .50 caliber, 5.56mm, 7.62mm, 25mm Target Practice-Tracer (TP-T), 105mm, 155mm, 120mm, and 40mm practice (MK 19 and M203).

According to the *Final Range Identification and Preliminary Range Assessment*, the following items may have been used at this range (USACE, 2001a):

- Small Arms (.50 Caliber, 5.56mm, 7.62mm)
- 25mm, TP-T
- 37mm: HE; and Shot
- 40mm: HE, Gun; and Grenade, Practice
- 57mm Recoilless Rifle: TP; HE; WP; and HEAT
- 75mm Howitzer, HE; and WP
- 75mm Gun, HE; AP; and WP
- 75mm Recoilless Rifle, HEAT; WP; HE; and high explosive-plastic (HEP)
- 76mm Gun, HE; HEAT; WP; and AP
- 90mm Recoilless Rifle, HE; and HEAT
- 90mm Gun, HE; AP; WP; and HEAT
- 105mm Howitzer, HE; Smoke; WP; Illumination; and HEAT
- 105mm Gun, HEAT; HE; WP; and TP
- 106mm Recoilless Rifle, HEAT
- 120mm Gun, HEAT; and TP
- 155mm Howitzer and Gun, HE; WP; and Illumination

According to the *Final Range Identification and Preliminary Range Assessment*, regular ordnance clearing and dredging activities are conducted by the Base Explosive Ordnance Disposal (EOD) Team for all ranges (USACE, 2001a).

Artillery Range G-6

G-6 Artillery Range (ASR#2.62) appears on range maps from 1951 to 1959. The *Final Range Identification and Preliminary Range Assessment* assumes all types of artillery were used at the G-6 Artillery Range (USACE, 2001a).

Although records do not indicate that G-6 was in operation before 1951, Camp General Order number 163, dated August 17, 1949, states that the "Artillery firing range G-1" includes "Browns Island extending 10,000 yards seaward" (MCB Camp Lejeune, 1949). Based on a comparison of a 1947 Camp Lejeune historical map, **Figure 2-11**, and the 1951 Range Overlay Map, **Figure 2-8**, G-1 is in the same location as G-6.

The 1951 Range Overlay Map shows the G-6 Artillery Range fan to cross the Base boundary to the east in several locations. The 1953 Range Overlay Map shows a much smaller range fan from the G-6 fan in 1951, **Figure 2-8**. The 1953 range fan has a firing position just above the creek and with a much narrower fan. The G-6 fan also appears in the 1993 Range Overlay Map; however, the position is well within the Base boundary, **Figure 2-9**.

According to the *Final Range Identification and Preliminary Range Assessment* the following items may have been used at this range (USACE, 2001a):

- 75mm Howitzer, HE; and WP
- 105mm Howitzer, HE; WP; and Illumination
- 155mm Howitzer, HE; WP; and Illumination

According to the *Final Range Identification and Preliminary Range Assessment*, regular clearing and dredging activities are conducted by the Base EOD Team for all ranges on the base (USACE, 2001a).

Impact Area N-1

The Impact Area N-1 (ASR#2.207) danger zone was established in 1945. The area has been used jointly by MCB Camp Lejeune (land-based munitions) and MCAS Cherry Point (aerial munitions). The area coincides with several historical ranges and danger zones including: RR-1, Strafing Target 2 (ST-2), BT-3, BT-5, G-6 Artillery Range, and G-7 Direct Fire Artillery Range.

In 1944, the pre-Bomb Disposal School conducted at MCB Camp Lejeune reportedly dropped seven 500 pound GP bombs in Browns Island as part of a training exercise where some of the bombs were rigged not to explode on impact (USACE, 2001a).

The MCAS Cherry Point ASR discusses five bombing targets proposed for acquisition then acquired by the Air Station in a 1944 document. By May 1945, the number of bomb targets increased to ten. BT-5 (encompassing both RR-1 and ST-2) is identified as one of the ten Air Station targets in Plate 24 of the *Range Identification Preliminary Range Assessment* for MCAS Cherry Point (USACE, 2001c) (**Figure 2-12**).

In a May 23, 1945 letter to the Commandant of the U.S. Coast Guard, the bombing target is described as a 3-mile by 6-mile "rectangle including all of the entrance to Bear Inlet, extending westward to a point approximately 1000 yards east of Browns Inlet, and extending seaward approximately 5½ miles from Bear Inlet." (USACE, 2001b, Appendix C-14). A map enclosed in the 1945 letter is provided in **Attachment B**.

Aerial MG Ranges (MG-1 to MG-3) were established in September 1945 over an area encompassing BT-5 and the whole of the Off-Base SDZs MRA, **Figure 2-12** (USACE, 2001c). Air Station Order 3570.2E, dated June 4, 1975, identified the W-122 area of approximately 200 to 100 miles located just off the coast of MCB Camp Lejeune and MCAS Cherry Point. This area includes the MG-1 to MG-3 areas, and is used for air-to-air gunnery, air-to-air missiles, air combat maneuvering, surface-to-air guns and missiles, and high Mach speed maneuvers (USACE, 2001b). It is assumed the MG-1 to MG-3 ranges were used for similar training operations from 1945 to 1975. The map attached to this Order is provided in **Attachment B**.

A map enclosed in a letter to the Commandant, 5th Naval District, dated June 21, 1945 depicts RR-1 and the ST-2 location within BT-5. **Figure 2-7** shows the BT-5 impact area extending off of the Base, including the southwestern portion of Bear Island (USACE, 2001b).

Camp Training Order Number 5-1946, dated March 19, 1946, lists the following weapons as authorized to fire into the "N" Impact Area: Artillery rockets, 37mm, 57mm, 75mm, 90mm, and 105mm artillery weapons. Training Order No. 78-1946 describes the "Area (N), Browns Island Impact Area. Browns Island bounded by the Intra-coastal Waterway Browns Inlet, the Atlantic Ocean and Bear Inlet" (MCB Camp Lejeune, 1946).

A letter to the Chief of Naval Operations from the Commanding General regarding Danger Zones in Navigable Waters, dated June 3, 1947, outlines danger zones from firing ranges, types of ranges, and regulations for operating the ranges. Impact Area "N" Sector is used jointly by the Fleet Marine Force Units stationed at MCB Camp Lejeune and Marine Aircraft units stationed at MCAS Cherry Point. The area was used for all types of land based artillery firing as well as aircraft strafing, rocket firing and bombing. According to the letter, the Impact Area "N" sector "will contain three adjacent artillery ranges as follows:

1. Artillery range (Utilizing Impact Area "N")
2. Direct Fire Range (Requires danger space to seaward due to ricochets from artillery, tanks and LVT's)
3. Anti-tank Range (Permanent mechanical installation)" (USMC, 1947b)

The accompanying map for this 1947 letter is provided in **Attachment B**.

Area "N" is depicted on the 1947 Camp Lejeune Historical Map (**Figure 2-11**). The impact area appears to be the composite of Artillery Firing Ranges G-1 and G-2 and Mechanized Anti-Tank Firing Range G-1 fans. It does not appear to encroach on off-Base property.

A 1949 document states that the Aircraft Target Maintenance unit was frequently sent out to rebuild targets used for bombing and rocket firing including targets on Browns Island (USACE, 2001b). A field training document describes the firing approach firing requirements at the "Bear Inlet Target and Bombing Area," include "display[ing] scarlet streamers/red lights on the Onslow Beach North Tower, Freeman's Creek Tower and the Bear Creek Tower. Red flashing lights will be displayed during the hours between sunset and sunrise" (MCB Camp Lejeune, 1966).

The 1953 Range Overlay map, **Figure 2-8**, depicts N-1 Impact area as including off Base property. It appears to include Bear Inlet and possibly extending into Bear Island, although the Range Overlay Map does not include the island or any other off-Base property.

Base Order 11102.1B, dated May 5, 1960, states that artillery, mortars, tank, and anti-tank guns may be fired to impact in the "N-1" Impact area. Artillery rockets and 106mm Recoilless Rifled will only impact in this area. The "N-1" Impact Area "extends east from the junction of NS line 500 yards north of the Intracoastal Waterway and thence on a line five hundred yards north of and paralleling the Intracoastal Waterway to NS grid line 94" (USACE, 2001a).

In 1960's the BT-5 coordinates were updated and included a separate restricted area including all navigable waters between Bear Creek and Onslow Beach Bridge (USACE, 2001b). Field training documents include discussions of "Bear Inlet Target and Bombing Area", "Browns Inlet Area between Bear Creek and Onslow Beach Bridge", and "N-1 Impact Area." The Browns Inlet Area includes navigable waters between "Bear Creek and Onslow Beach Bridge including all inlets, streams, bays, and Creek, on the east and south by the Atlantic Ocean:

> "The N-1 Impact area is designated as a high explosives impact area. N-1 extends east from the junction of NS Gridline 94 and Onslow Beach along the beach to Bear Creek Inlet; then along Bear Creek to a point 400 yards north of the Intracoastal Waterway; and then Aircraft Ordnance will be impacted on Browns Island only." (MCB Camp Lejeune, 1966).

Air Station Order 3570.2E dated, June 4, 1975 discusses BT-3, which lies in the same area as N-1, and provided additional coordinates for BT-3, **Figure 2-4**. The Air Station order describes the bomb target as follows:

> "BT-3 is on the eastern shore of the MCB Camp Lejeune Reservation and is used extensively by artillery and other ground-to-ground weapons. It is adjacent to the Intracoastal Waterway, and therefore, boat traffic may delay operations and impose limitation on impact areas. Targets include LCVP's [Landing Craft, Vehicle, Personnel], tanks, motor vehicles, and other improvised targets. Marking of targets may be by smoke (grenades/mortars)… This range is commonly referred to as N-1 Impact Area…
>
> Ordnance Authorized: All conventional inert weapons and explosive ordnance up to and including 250 lb TNT equivalent." (USACE, 2001b, Appendix C-30).

The 1976 Range Overlay Map, **Figure 2-9**, shows the N-1/BT-3 impact area fan extending east past the Base boundary into Bear Inlet.

Base Order P11102.1K, dated October 11, 1985 states that BT-3 and N-1 Impact Area are the same area. BT-3 is authorized for aircraft ordnance less than 250 pounds of 2,4,6-trinitrotoluene (TNT) equivalency, all types of artillery, all types of mortars, all ground weapons authorized for Ranges G-7/6/5 and tube-launched optically-tracked wire-guided (TOW) missiles fired from rotary-wing aircraft (USACE, 2001a).

The 1987 Range Overlay Map, **Figure 2-9**, shows the N-1/BT-3 impact area as similarly shaped to the G-7 range fan, however the N-1/BT-3 impact area extends further east in the Bear Inlet. The 1993 Range Overlay Map indicates a similar shape to G-7 with the range fans extending east past the base boundary.

Base Order P3750.1, dated June 2 1994, authorized the firing of the following ammunition into BT-3/N-1: .50 Caliber, 5.56mm, 7.62mm, 20mm TP-T, 25mm TP-T/Armor Piercing Discharging Sabot—Tracer (APDS-T), 30mm TP-T, 2.75-inch rockets, 105mm, 120mm, MK 76 practice bombs, MK 80 series inert filled bombs, 40mm practice grenades (USACE,

2001a). Also discussed in the base order is that the N-1/BT-3 impact area is authorized for artillery impact and dud ammunition disposal (USACE, 2001a).

To summarize, the following items may have been used at this range (USACE, 2001a):

- Rockets: 2.75-inch, 3.5-inch, 5-inch, and 11.75-inch
- Artillery: rockets, 37mm, 57mm, 90mm, 105mm
- Mortars: 60mm, 81mm, 4.2mm (all types)
- 75mm Cannon
- Recoilless Rifle (all types unless specified): 57mm, 75mm, 90mm, 105mm (high-explosive plastic tracer [HEP-T]), 106mm
- Anti-aircraft (AA) guns (all types): 37mm, 40mm, 90mm, 120mm
- Tank Gun (all types): 90mm, 105mm (all types except toxics), 120mm
- 40mm Grenades
- Howitzer (all types except toxics): 75mm, 105mm, 8-inch, 155mm (Howitzer/Gun)
- TOW Missile
- HE Bombs (old style): 100 lb, 250 lb, 500 lb
- HE Bombs (low drag): 250 lb, 500 lb
- Practice Bombs

2.5 Previous Site Investigations

There are two known environmental investigations performed in the vicinity of the Off-Base SDZs MRA. Additionally, Base EOD personnel have responded to requests for ordnance investigations and removal from the Hammocks Beach State Park staff. Brief descriptions of the investigations are provided below.

2.5.1 Verification of Property Affected by Off-Base Surface Danger Zones

A review of existing and historical locations of range SDZs determined that several range fans have encroached onto State or private property in the southeastern area of MCB Camp Lejeune. Malcolm Pirnie, Inc. identified potential areas of concern (PAOCs) that may have been encroached upon by existing and/or historic range SDZs. The report includes a data review of historical and current range locations, Base boundary survey, determination of PAOCs, and identification of land owners.

The areas of concern cover a total of 3,195.11 acres of which 826.23 acres are State or privately owned. The report determined that there are five private or state property owners of the areas of concern (Malcolm Pirnie, 2008).

2.5.2 Aerial Digital Geophysical Mapping

AMEC Earth and Environmental, Inc. preformed a geophysical investigation in the vicinity of Browns Island in November 2007. This work was conducted adjacent to the Off-Base SDZs MRA. The *Final Phase II Geophysical Anomaly Re-Acquisition Report for the Vicinity of Brown's Island, Camp Lejeune, North Carolina* was completed in June 2008. The research and development project objective was to "evaluate various aerial geophysical surveying methodologies with reguard to unexploded ordnance (UXO) and scrap (AMEC, 2008)." Statistical analysis was preformed on the Phase I aerial survey geophysical characteristics. Baseline values were established to discriminate UXO and scrap materials.

Phase I of the project included using three types of airborne geophysical survey systems, heliborne vertical magnetic gradient system, heliborne transient electromagnetic system and airborne mid-wave infrared imaging system. Geostatistical analysis was used to reduce the large number of anomalies identified to 423 in order to investigate, re-acquire and classify the anomalies. A total of 89 anomalies were investigated and data gathered to evaluate the various aerial geophysical methods employed.

2.5.3 Base EOD Responses to Off-Base Requests

A review of available MCB Camp Lejeune Command Chronologies from 1978 to 1986 indicated that base EOD personnel responded to requests from Hammocks Beach State Park to investigate and remove potential ordnance. Details on the location of the ordnance were not provided. The following is a summary of EOD responses to calls for assistance from Hammocks Beach State Park:

- On October 29, 1979, Base EOD recovered one expended MK-25 Naval Seamarker (USMC, 1979).
- On June 11, 1980, Base EOD investigated a possible bomb drop at Hammocks Beach State Park; a sweep of the island had negative results (USMC, 1980a).
- On December 15, 1980, Base EOD recovered one target drone, Ballistic Aerial Target System (BATS) (USMC, 1980b).

These reports indicate that military activities have impacted off-base areas.

SECTION 3

Findings

Based on the historical records review the G-6 Artillery Range, G-7 Direct Fire Artillery Range, Rocket Range 1, Bombing Target 3 and Bombing Target 5 ranges have encroached upon Off-Base land and navigable waters in the vicinity of Bear Inlet. Ongoing impacts from one or more of these ranges have been occurring from as early as the 1940's to the present. Based on the types of munitions used at these ranges, there is a possibility of unexploded ordnance as well as environmental impacts from munitions constituents within the Off-Base SDZs MRA. Although regular clearing activities are conducted for ranges on base, EOD responses at Hammocks Beach State Park indicate there is evidence that Military activities have impacted the Off-Base SDZs MRA.

SECTION 4

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Figures

\\aphrodite\proj\USNavFacEngCom\CampLejeune\MapFiles\CTO_080\ARSR\Figure 1-1 - Site Location Map.mxd



Legend
- Highways
- Off-Base SDZs MRA
- MCAS Cherry Point
- Camp Lejeune Installation Boundary

N

0 15,000 30,000 60,000 Feet

1 inch = 30,000 feet

Figure 1-1
Site Location Map
Off-Base SDZs MRA Archival Records Search Report
MCB Camp Lejeune
North Carolina

CH2MHILL

\\aphrodite\proj\USNavFacEngCom\CampLejeune\MapFiles\CTO_080\ARSR\Figure 2-1 - Site Map.mxd



Legend

- Land Based Investigation Area
- Buildings
- Hammocks Beach State Park
- Coastal Wetlands
- Camp Lejeune Installation Boundary
- Off-Base SDZs MRA

N

0 1,500 3,000 6,000 Feet

1 inch = 3,000 feet

Figure 2-1
Site Map
Off-Base SDZs MRA
Archival Records Search Report
MCB Camp Lejeune
North Carolina

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\\aphrodite\proj\USNavFaceNGCom\CampLejeune\MapFiles\CTO_080\ARSR\Figure 2-2 - Current Property Ownership Map.mxd



Legend

- Road
- Encroached Private Property
- Camp Lejeune Installation Boundary
- Off-Base SDZs MRA

Source: Malcom Pirnie, 2008

N

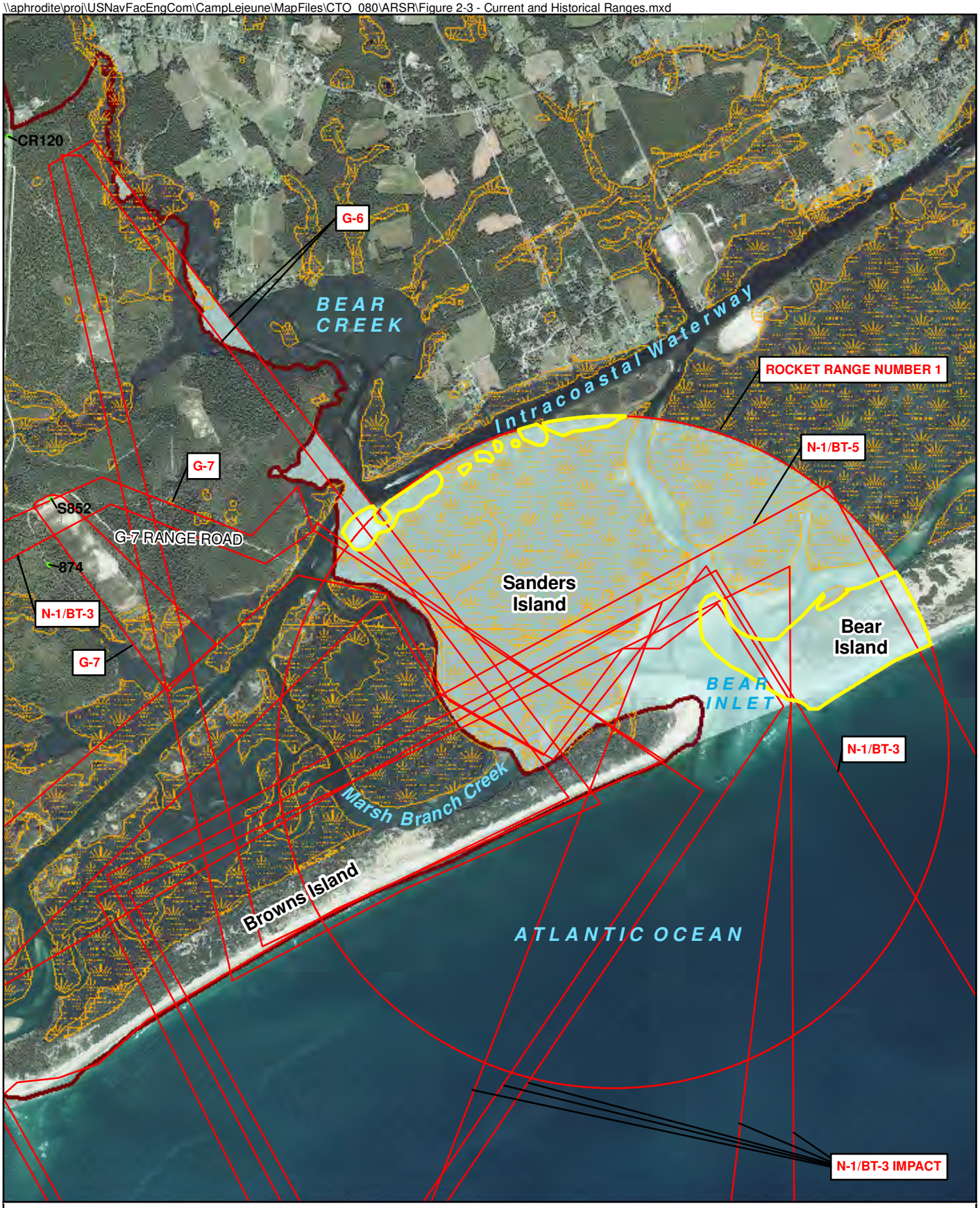
0 1,500 3,000 6,000 Feet

1 inch = 3,000 feet

Figure 2-2
Current Property Ownership Map
Off-Base SDZs MRA Archival Records Search Report
MCB Camp Lejeune
North Carolina

CH2MHILL

\\aphrodite\proj\USNavFacEngCom\CampLejeune\MapFiles\CTO_080\ARSR\Figure 2-3 - Current and Historical Ranges.mxd



Legend
- Buildings
- Coastal Wetlands
- Camp Lejeune Installation Boundary
- Off-Base SDZs MRA
- Range Boundary
- Land Based Investigation Area

N

0 1,500 3,000 6,000 Feet

1 inch = 3,000 feet

Figure 2-3
Current and Historical Ranges
Off-Base SDZs MRA
Archival Records Search Report
MCB Camp Lejeune
North Carolina

CH2MHILL

\\aphrodite\proj\USNavFacEngCom\CampLejeune\MapFiles\CTO_080\ARSR\Figure 2-4 - Entirety of Current and Historical Ranges.mxd



Legend
- Buildings
- Coastal Wetlands
- Camp Lejeune Installation Boundary
- Off-Base SDZs MRA
- Range Boundary
- Land Based Investigation Area

N

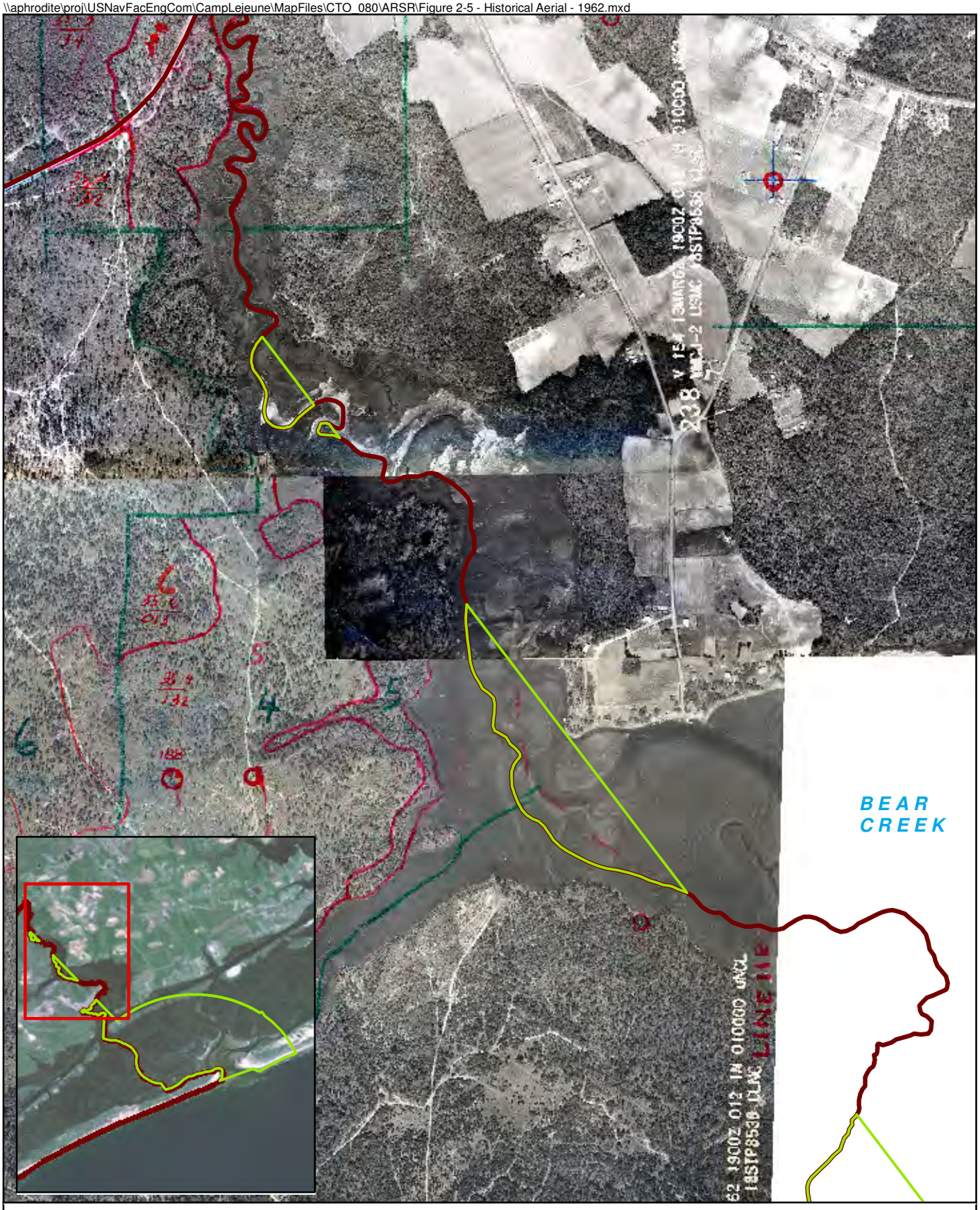
0 3,000 6,000 12,000 Feet

1 inch = 6,000 feet

Figure 2-4
Entirety of Current and Historical Ranges
Off-Base SDZs MRA
Archival Records Search Report
MCB Camp Lejeune
North Carolina

CH2MHILL

\\aphrodite\proj\USNavFacEngCom\CampLejeune\MapFiles\CTO_080\ARSR\Figure 2-5 - Historical Aerial - 1962.mxd



Legend

- Off-Base SDZs MRA
- Camp Lejeune Installation Boundary

N

0 500 1,000 2,000 Feet

1 inch = 1,000 feet

Figure 2-5
Historical Aerial - 1962
Off-Base SDZs MRA
Archival Records Search Report
MCB Camp Lejeune
North Carolina

CH2MHILL

\\aphrodite\proj\USNavFacEngCom\CampLejeune\MapFiles\CTO_080\ARSR\Figure 2-6 - Historical Aerial - 1989.mxd



Legend

- Off-Base SDZs MRA
- Camp Lejeune Installation Boundary

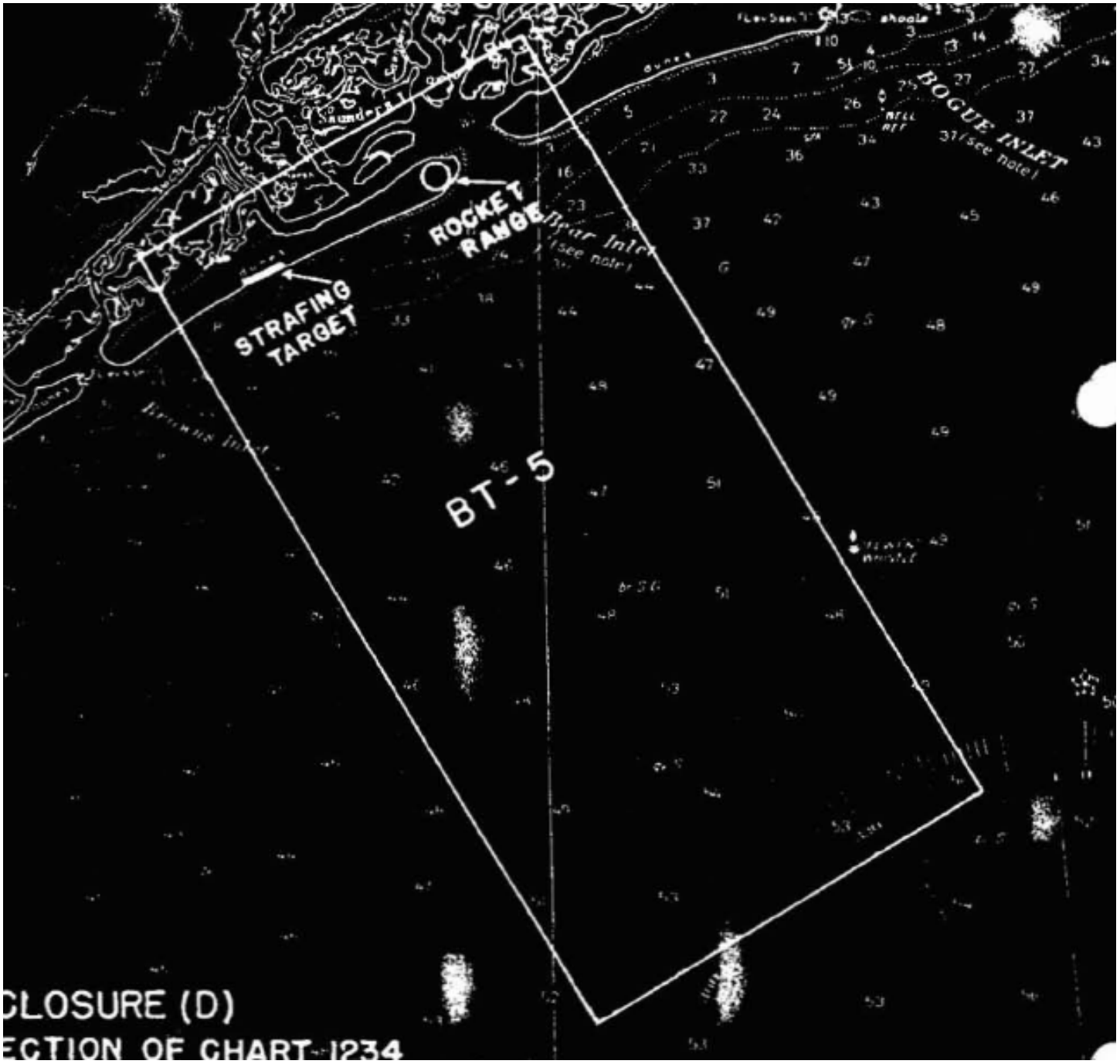
N

0 1,500 3,000 6,000 Feet

1 inch = 3,000 feet

Figure 2-6
Historical Aerial - 1989
Off-Base SDZs MRA
Archival Records Search Report
MCB Camp Lejeune
North Carolina

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N

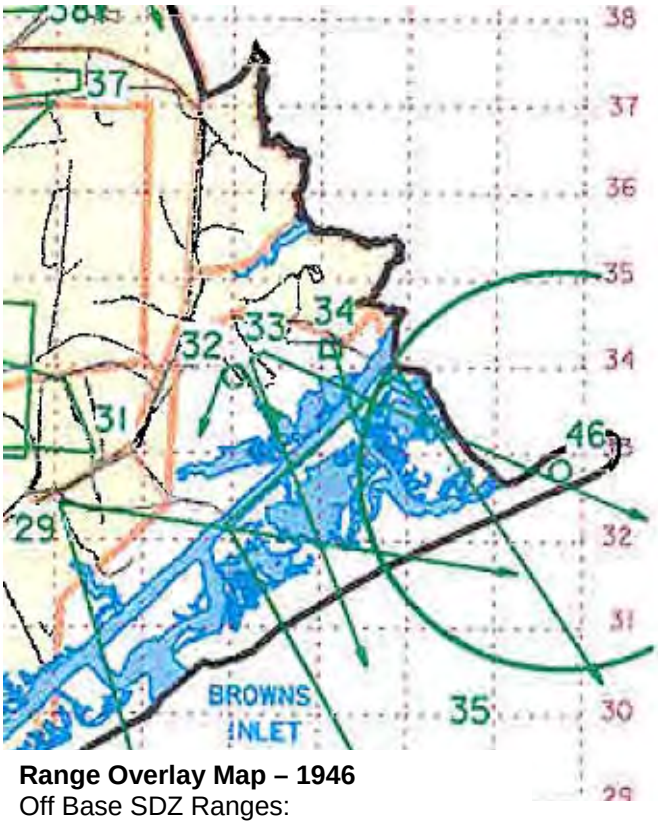
0 2 4

Approximate Scale in Miles

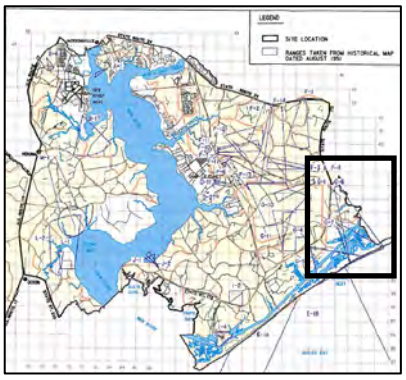
Figure 2-7
Cherry Point Range Map – Rocket Range 1
Off-Base SDZs MRA
Archival Records Search Report
MCB Camp Lejeune
North Carolina

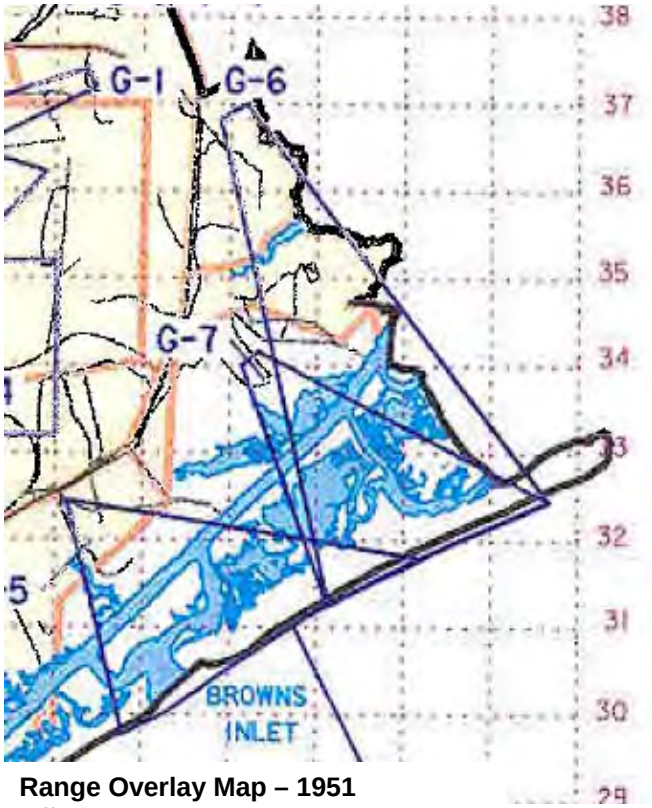
Source: USACE, 2001b, Appendix C-20

CH2MHILL

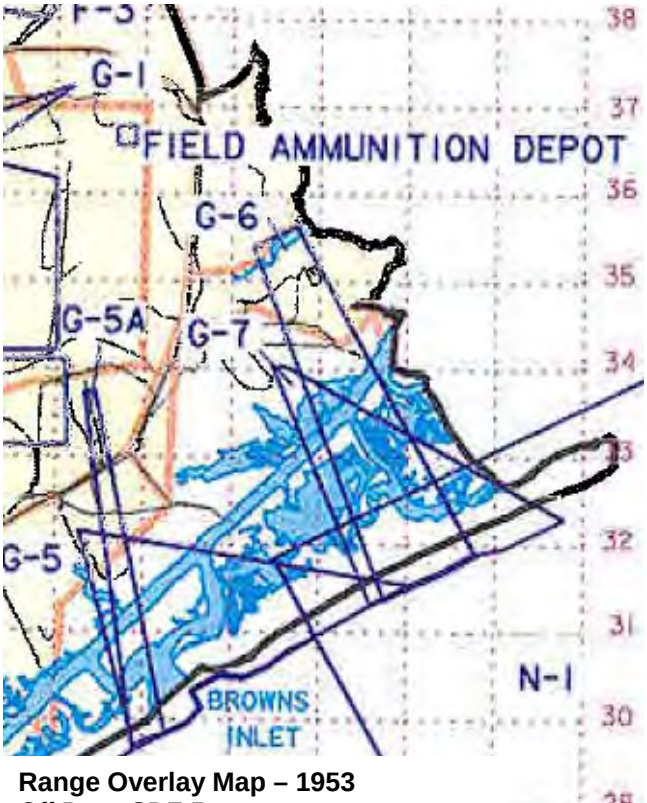


Range Overlay Map – 1946
Off Base SDZ Ranges:
33 Direct Fire Artillery Range (G-7)
35 Strafing Target #2
46 Rocket Range #1





Range Overlay Map – 1951
Off Base SDZ Range:
G-6 Artillery Range



Range Overlay Map – 1953
Off Base SDZ Range:
N-1 Impact Area

0 2000 4000

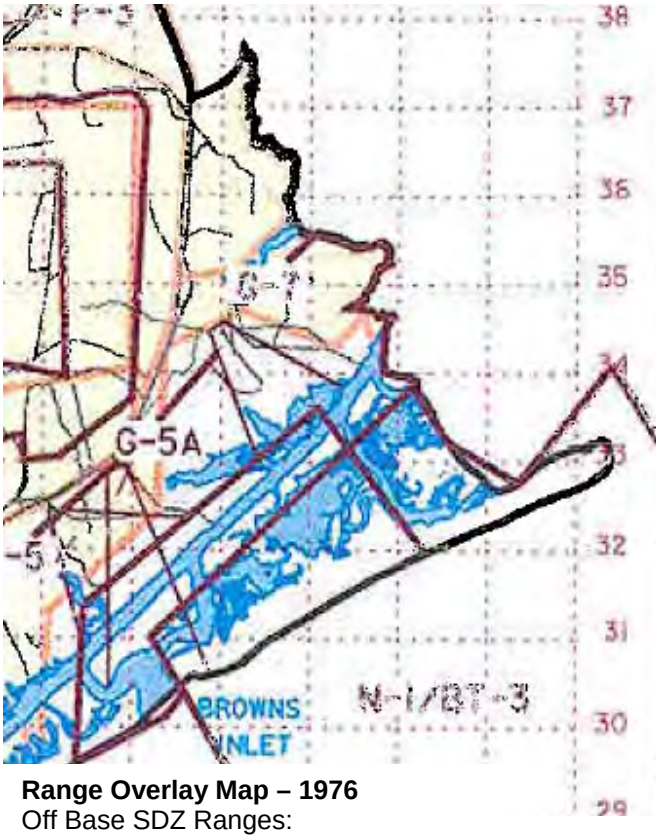
Approximate Scale in Meters

N

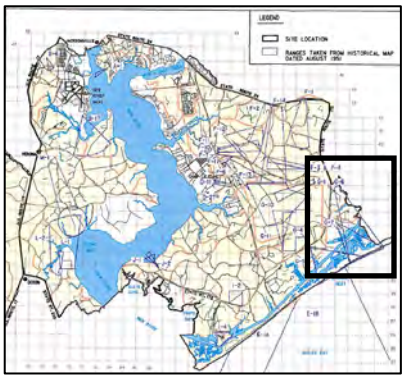
Figure 2-8
Range Overlay Maps, 1946-1953
Off-Base SDZs MRA
Archival Records Search Report
MCB Camp Lejeune
North Carolina

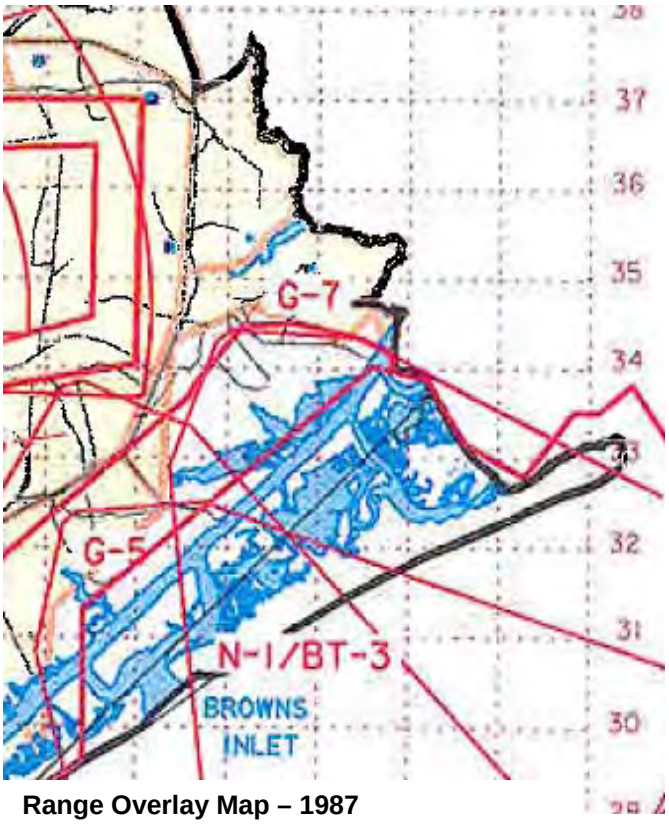
Source: USACE, 2001

CH2MHILL

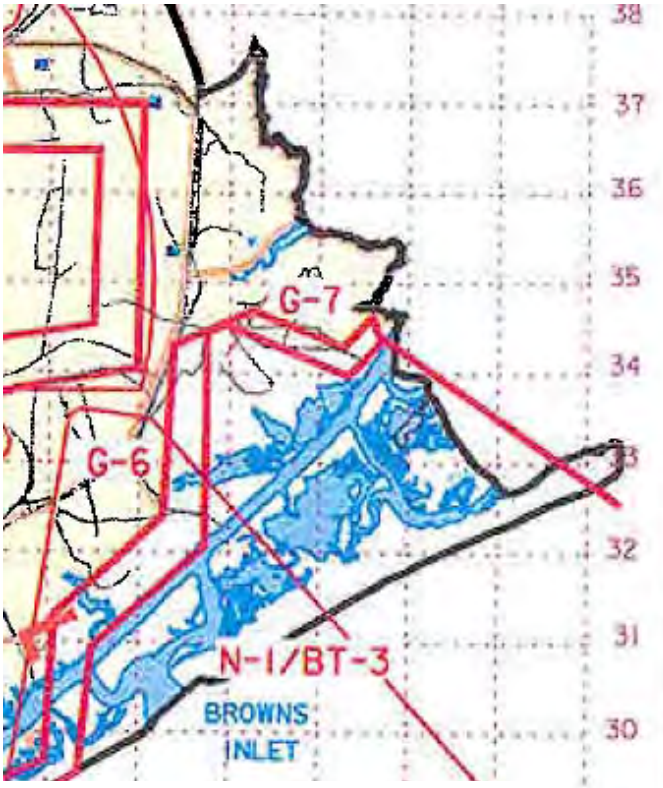


Range Overlay Map – 1976
Off Base SDZ Ranges:
N-1/BT-3 Impact Area





Range Overlay Map – 1987
Off Base SDZ Range:
G-7 Direct Fire Artillery Range
N-1/BT-3 Impact Area



Range Overlay Map – 1993
Off Base SDZ Range:
N-1/BT-3 Impact Area
G-7 Direct Fire Artillery Range

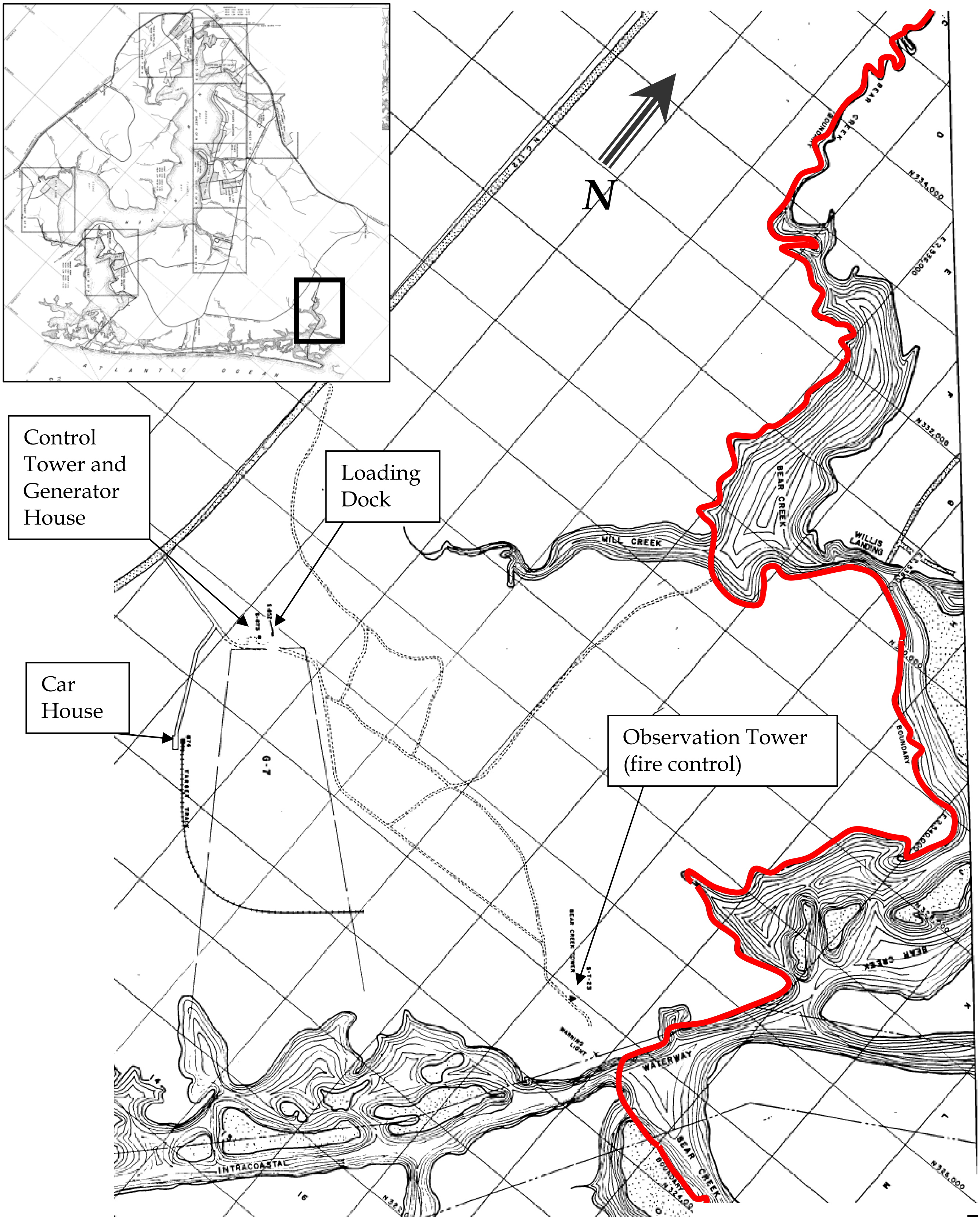
0 2000 4000
Approximate Scale in Meters

N

Figure 2-9
Range Overlay Maps, 1976-1993
Off-Base SDZs MRA Archival
Records Search Report
MCB Camp Lejeune
North Carolina

Source: USACE, 2001

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Approximate Base Boundary

0 1000 2000

Approximate Scale in Feet

LEGEND

BUILDINGS

ASPHALT SURFACE

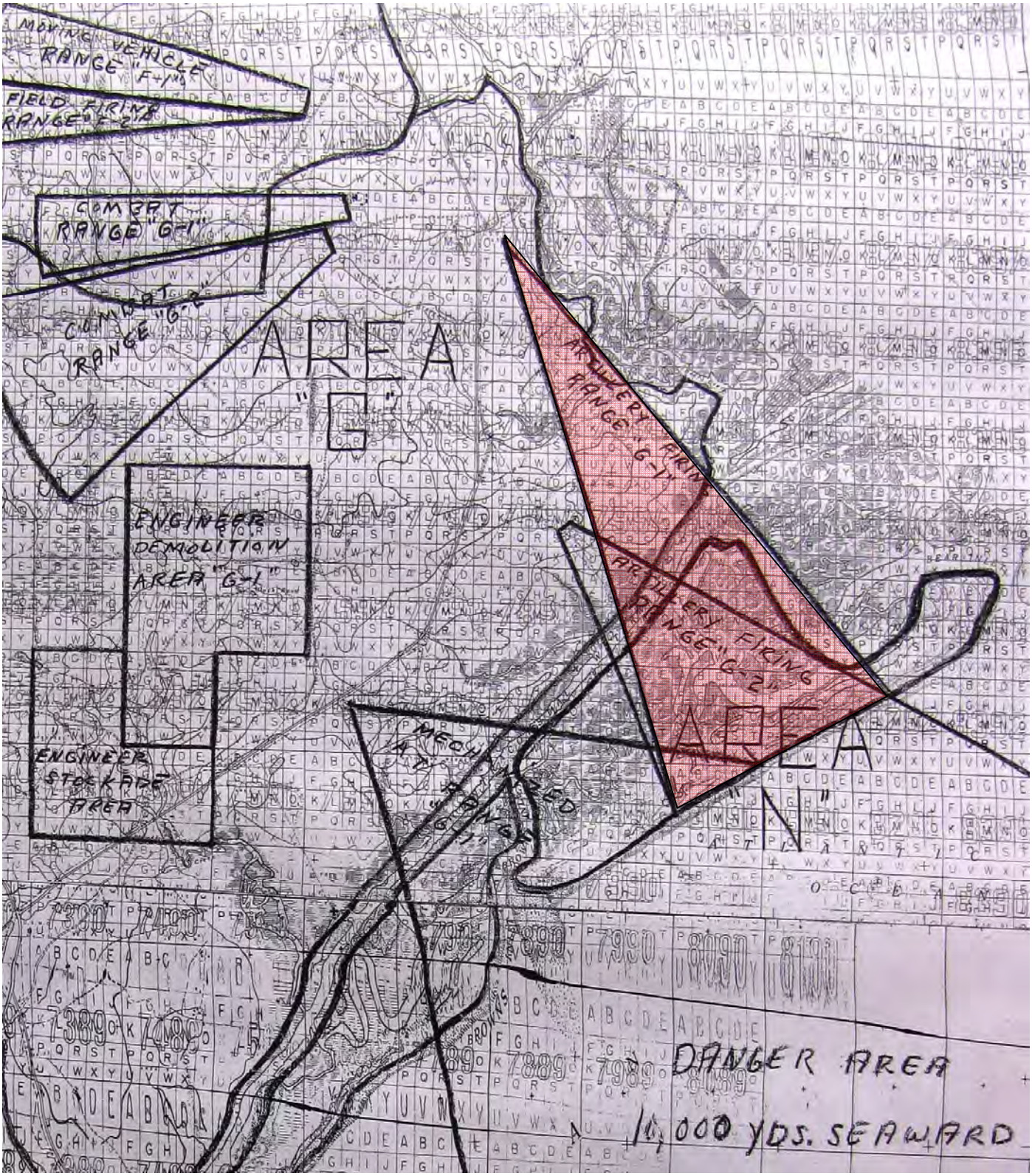
SHELL ROCK SURFACE

RAILROADS

Figure 2-10
Existing Conditions, 1979
Off-Base Surface Danger Zones
Archival Records Search Report
MCB Camp Lejeune
North Carolina

CH2MHILL

Source: MCB Camp Lejeune, 1979



Artillery Firing Range "G-1"

N

0 1 2

Approximate Scale in Miles

Source: USMC, 1947a

Figure 2-11
Camp Lejeune Historical Map - 1947
Off-Base SDZs MRA
Archival Records Search Report
MCB Camp Lejeune
North Carolina

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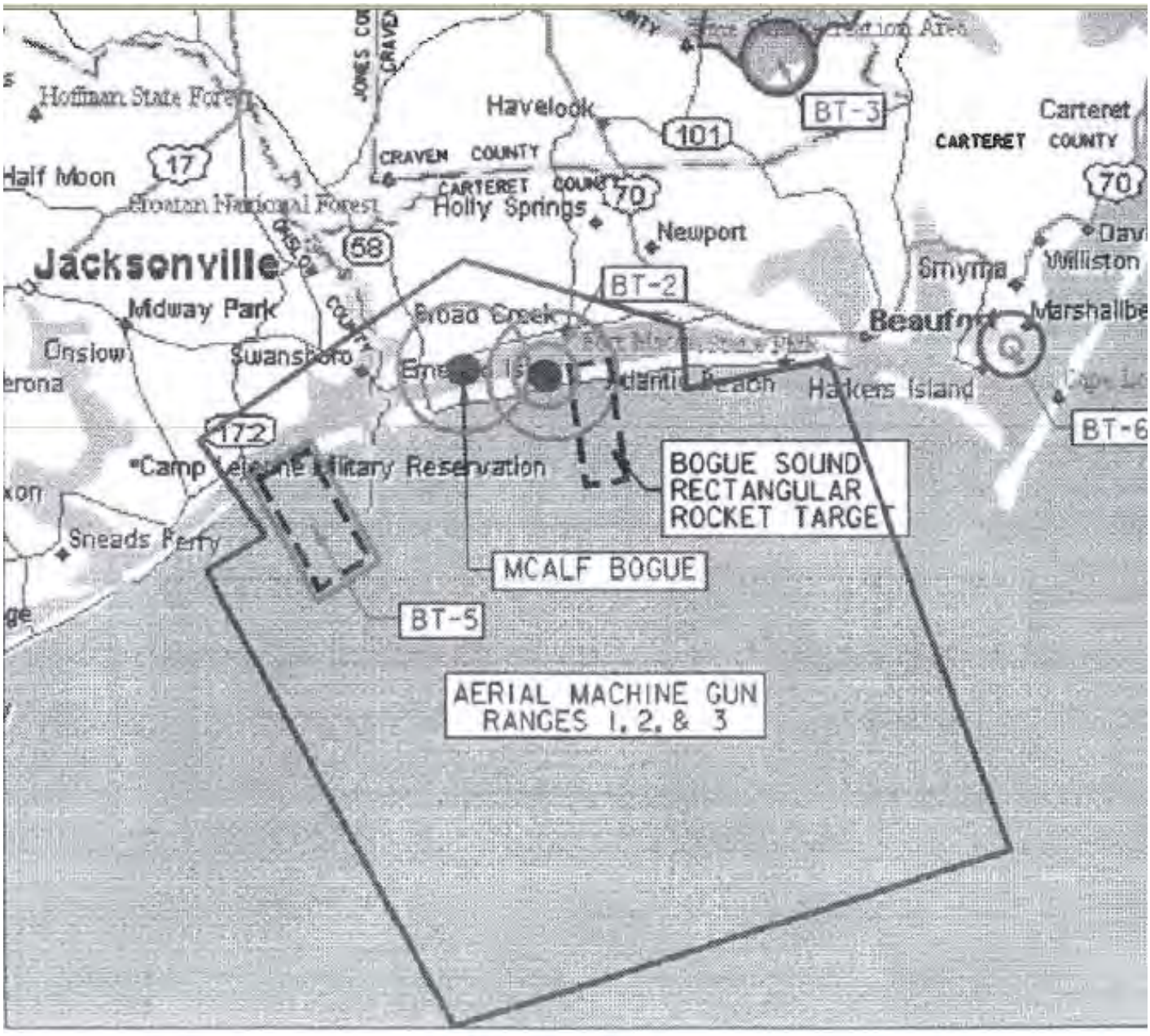
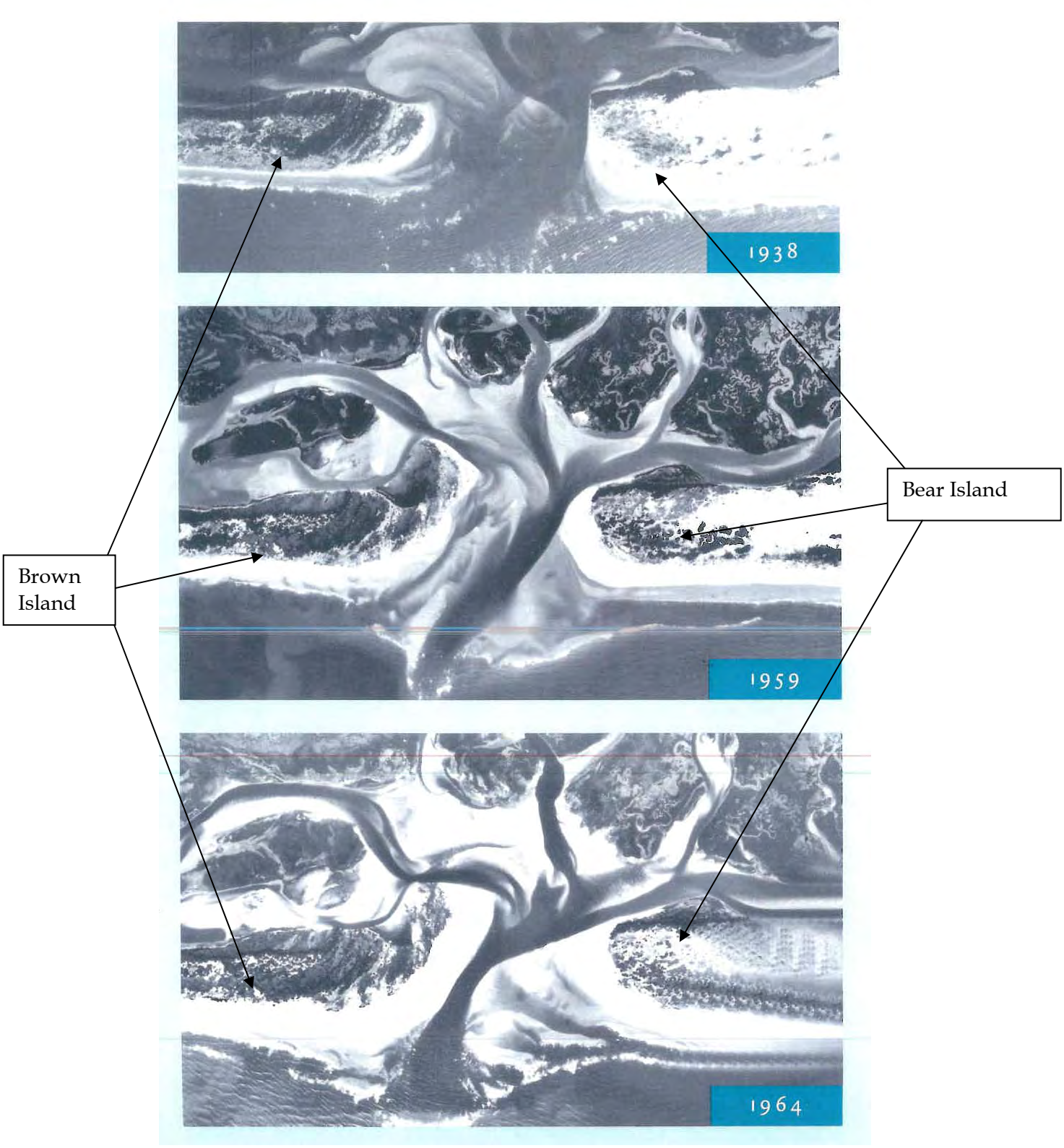


Figure 2-12
Cherry Point Range Map – BT-5, MG-1,2 & 3
Off-Base SDZs MRA
Archival Records Search Report
MCB Camp Lejeune
North Carolina

Source: USACE, 2001c

CH2MHILL



N

0 1000 2000

Approximate Scale in Feet

Source: Coastal Science and Engineering, 2006

Figure 2-13
Aerial Photographs – 1938, 1959, 1964
Off-Base SDZs MRA
Archival Records Search Report
MCB Camp Lejeune
North Carolina

CH2MHILL

Attachment A
Resource Review Summary

Resource Review Summary

The following table provides a summary of the specific references identified for review, interview, or contact for the archival report.

Resource	Actions Completed
Quantico, Virginia, Marine Corps Library, Gray Research Center – Archives and Special Collections	Reviewed files related to Camp Lejeune. Made copies of relevant historic maps and text. April 27, 2009.
Quantico, Virginia, Marine Corps Library, Gray Research Center - Histories department	Reviewed text and photographs related to Camp Lejeune. Made copies of relevant text and photos. April 28, 2009.
United States National Archives (NARA II) Historical Files	Reviewed text and aerial photographs from Text and Cartographic Divisions. Made copies of relevant files, maps and photos. April 28 – May 1, 2009.
Onslow County Public Library	Reviewed documents and spoke with personnel in relation to historical land use for site. April 21, 2009.
Swansboro Branch Public Library	Reviewed documents and spoke with personnel in relation to historical land use for site. April 21, 2009.
Camp Lejeune Personnel	
Andrew Smith/Environmental Management Division	Contacted via e-mail and phone. Provided historical aerials from Base GIS. May 6, 2009.
Dennis Dunham/ Public Works Technical Records	Contacted via e-mail and received land acquisition property maps. December 23, 2008.
Julie Rowe/MCB Camp Lejeune Archivist	Phone interview and e-mail conversation. April 27, 2009.
Duane Richardson/ Base Range Safety Officer	Contacted via e-mail and conducted personal interviewed. April 21, 2009.
MCB Camp Lejeune Base Library	Reviewed documents and spoke with personnel in relation to historical land use for site. April 21, 2009.

Marine Corp Library Review

Archives and Special Collections: Text Division

United State Marine Corps Archives & Special Collections
2040 Broadway Street
Quantico, Virginia 22134

Site Visit: April 27, 2009
File review at Marine Corps Base, Quantico, Virginia, Gray Research Center, Marine Corps Archives and Special Collections.

Reviewed command chronologies from 1976-1986.

Box 420: Command Chronologies, MCB Camp Lejeune, 1976-1979

Box 421: Command Chronologies, MCB Camp Lejeune, July – December 1979 to January – June 1982

Box 422: Command Chronologies, MCB Camp Lejeune, July – December 1982 to January – June 1984

Box 423: Command Chronologies, MCB Camp Lejeune, July – December 1984 to July – December 1985

Box 424: Command Chronologies, MCB Camp Lejeune, January – June 1986

Boxes contained general chronological information for various branches at MCB Camp Lejeune. Most relevant to munitions response sections were in Base Training Facilities Branch.

List of Documents Obtained from Archives and Special Collections

- Excerpt from Command Chronology, MCB Camp Lejeune, Training Facilities Division, July – December 1978
- Excerpt from Command Chronology, MCB Camp Lejeune, Training Facilities Division, July – December 1979
- Excerpt from Command Chronology, MCB Camp Lejeune, Training Facilities Division, January – June 1980
- Excerpt from Command Chronology, MCB Camp Lejeune, Training Facilities Division, July – December 1980
- Excerpt from Command Chronology, MCB Camp Lejeune, Training and Operations, January – June 1983
- Excerpt from Command Chronology, MCB Camp Lejeune, Training and Operations, July – December 1983
- Excerpt from Command Chronology, MCB Camp Lejeune, Training and Operations (Section IV: Annex B) , July – December 1984
- Excerpt from Command Chronology, MCB Camp Lejeune, Training and Operations, January – June 1986

Historical Reference Branch

Photo Historian: Lena Kaljot
Text Historian: Robert V. Aquiilina
3079 Moreell Avenue
Quantico, Virginia 22134
www.history.usmc.mil

Site Visit: April 27, 2009
Reviewed documents, photographs and maps related to Camp Lejeune.

List of Maps Obtained from Historical Reference Branch

- "Artillery Firing Problems Occurring Frequently, Camp G-3 Section", Camp Lejeune, N.C. undated
- "Camp Lejeune General Area Map" Marine Barracks, New River. February 19, 1942
- "Long Range Firing, 155 and 90mm Gun BN's, Camp G-3 Section" Camp Lejeune, N.C. undated
- "Camp Lejeune Ranges and Maneuvering Areas" Reference Map, North Carolina Approaches to New River. August 2, 1952
- "Training Areas and Facilities" February 16, 1953

List of Documents Obtained from Historical Reference Branch

- "Semper Fidelis: A history of Onslow County and Camp Lejeune, N.C." Louis J. Berger Group, 2006
- "Syllabus for Combat Engineer Course, Fiscal Year 1958" Engineer School Batttalion, MCB Camp Lejeune. Dated December 10, 1956 – Specific page refers to Demolitions Course
- "Packard X: Informational Handbook" May 24-29, 1959

List of Aerial Photographs Obtained from Historical Reference Branch

- "Camp Lejeune, NC – Looking East" 5/6/48
- "Camp Lejeune, NC – Looking South" 5/6/48
- "Engineer Area, Camp Lejeune, NC – Looking East" 9/21/48
- "Engineer Area, Camp Lejeune, NC – Looking South" 9/21/48
- "Engineer Area, Camp Lejeune, NC – Looking West" 9/21/48

National Archives and Records Administration Review

National Archives at College Park
8601 Adelphi Road
College Park, MD 20740-6001
http://www.archives.gov/dc-metro/college-park/

Site visit: April 27 – May 1, 2009

Textual Records

Reviewed records of the Bureau of Yards and Docks relating to Naval property case files and records of the Marine Corps from 1939-1958; details are provided below.

Record Group 41: Records of the Bureau of Yards and Docks
Reviewed 8 boxes of files from Entry 1001 – Naval Property Case Files 1941-1958:

- Record Group 41 (Bureau of Yards and Docks), Entry 1001, Naval Property Case Files, North Carolina: New River, 1941 - 1958, Box 933
- Record Group 41 (Bureau of Yards and Docks), Entry 1001, Naval Property Case Files, North Carolina: New River, 1941 - 1958, Box 934
- Record Group 41 (Bureau of Yards and Docks), Entry 1001, Naval Property Case Files, North Carolina: New River, 1941 - 1958, Box 935
- Record Group 41 (Bureau of Yards and Docks), Entry 1001, Naval Property Case Files, North Carolina: New River, 1941 - 1958, Box 936
- Record Group 41 (Bureau of Yards and Docks), Entry 1001, Naval Property Case Files, North Carolina: New River, 1941 - 1958, Box 937
- Record Group 41 (Bureau of Yards and Docks), Entry 1001, Naval Property Case Files, North Carolina: New River, 1941 - 1958, Box 938
- Record Group 41 (Bureau of Yards and Docks), Entry 1001, Naval Property Case Files, North Carolina: New River, 1941 - 1958, Box 940
- Record Group 41 (Bureau of Yards and Docks), Entry 1001, Naval Property Case Files, North Carolina: New River, 1941 - 1958, Box 941

General Description: Documents related to original land acquisition for Camp Lejeune, expansion, easements, railroad, schools, and housing developments on Base etc.

Documents Obtained from Record Group 41:

- Letter to Judge Advocate General of the Navy from Newman A. Townsend Jr., dated February 27, 1942. "Acquisition of land for Marine Corps Training Area, Onslow County, North Carolina: Area N, Tracts #1 and #2", also includes property map of N-2A
- Case Report "Tract G-56" Offer to Settle recommendation, dated 1/21/43, includes enclosed property map
- Case Report "Tract G-63" Offer to Settle recommendation, dated 1/21/43, includes enclosed property map

Record Group 127: Records of the United States Marine Corps (USMC)
Reviewed 7 boxes from Entry 18A: General Correspondence, Office of the Commandant, January 1939-June 1950.

- Record Group 127 (USMC), Entry 18A, Office of the Commandant, General Correspondence, January 1939-June 1950, 1275/70-80: Camp Lejeune, Box 218.
- Record Group 127 (USMC), Entry 18A, Office of the Commandant, General Correspondence, January 1939-June 1950, 1275/70-80: Camp Lejeune, Box 219.
- Record Group 127 (USMC), Entry 18A, Office of the Commandant, General Correspondence, January 1939-June 1950, 1275/70-80: Camp Lejeune, Box 220.

General Description: Correspondence related to Camp Lejeune. Copied correspondence files on Cherry Point bombing targets at Camp Lejeune.

- Record Group 127 (USMC), Entry 18A, Office of the Commandant, General Correspondence, January 1939-June 1950, 1520-30-7: Education- Marine Corps Schools-Engineers School (Quantico), Box 507.
- Record Group 127 (USMC), Entry 18A, Office of the Commandant, General Correspondence, January 1939-June 1950, 1520-30-7: Education- Marine Corps Schools-Engineers School (Quantico), Box 508.

General Description: Correspondence related to Engineers school, primarily at Camp Lejeune. Several references to demolitions courses include: lists of enlisted men who completed courses, course syllabi. By 1949, demolitions course was incorporated in the Basic Construction Course. Copied recommended syllabus for Basic Construction Course.

- Record Group 127 (USMC), Entry 18A, Office of the Commandant, General Correspondence, January 1939-June 1950, Education- Naval Engineers School, Box 545.
- Record Group 127 (USMC), Entry 18A, Office of the Commandant, General Correspondence, January 1939-June 1950, 2000-20-2: Ordnance – explosives, dynamite, TNT, Box 1205.

General Description: Correspondence related to supply of ordnance for various bases. Copied ordnance disposal and handling document.

Reviewed 2 boxes from Entry 24: Correspondence Files of the Office of the Commandant and Headquarters Support Division

- Record Group 127 (USMC), Entry 24, Correspondence Files of the Office of the Commandant and Headquarters Support Division, Box 9.
- Record Group 127 (USMC), Entry 24, Correspondence Files of the Office of the Commandant and Headquarters Support Division, Box 10.

General Description: Education files – primarily related to curriculum for several bases. No copies made from this entry.

Reviewed 2 boxes from Entry 50: Real Estate

- Record Group 127 (USMC), Entry 50: Real Estate, Box 2.
- Record Group 127 (USMC), Entry 50: Real Estate, Box 3.

General Description: Real estate files associated with Camp Lejeune, similar to Bureau of Yards and Docks, no copies made from this entry.

Reviewed 10 boxes from Entry 59: Correspondence files of the Office of the Commandant and Headquarters Support Division, January 1939 – June 1950

- Record Group 127 (USMC), Entry 59, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1939-June 1950, Box 1.
- Record Group 127 (USMC), Entry 59, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1939-June 1950, Box 2.

- Record Group 127 (USMC), Entry 59, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1939-June 1950, Box 3.
- Record Group 127 (USMC), Entry 59, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1939-June 1950, Box 4.
- Record Group 127 (USMC), Entry 59, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1939-June 1950, Box 5.
- Record Group 127 (USMC), Entry 59, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1939-June 1950, Box 6.
- Record Group 127 (USMC), Entry 59, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1939-June 1950, Box 7.
- Record Group 127 (USMC), Entry 59, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1939-June 1950, Box 8.
- Record Group 127 (USMC), Entry 59, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1939-June 1950, Box 9.
- Record Group 127 (USMC), Entry 59, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1939-June 1950, Box 10.

General Description: "Unclassified" correspondence from 1939-1950, incorporates information for several bases, research reports on flame throwers. Primarily regarding administrative issues (i.e. personnel, course quotas, supplies for bases/schools etc.) No copies made from this entry.

Reviewed 17 boxes from Entry 102: Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950 – June 1958

- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 20.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 21.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 71.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 72.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 73.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 320.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 321.

- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 328.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 329.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 330.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 331.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 332.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 333.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 334.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 400.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 401.
- Record Group 127 (USMC), Entry 102, Correspondence Files of the Office of the Commandant and Headquarters Support Division, January 1950-June 1958, Box 402.

General Description: Administrative correspondence for several Marine Corps bases: rifle/pistol competition awards/results, personnel transfers, establishing/disestablishing various operations, class quotas, curriculum, Advanced Research Group frequently discussed in education files. Boxes 400-402 were related to Camp Lejeune, primarily about personnel transfers and tables of organization.

Documents Obtained from Record Group 127:

- Letter from Commandant of the Marine Corps to Commanding General, Marine Barracks, Camp Lejeune. January 4, 1951. Letter MC-1277568. Regarding Engineer School Batallion quotas and control dates for courses.
- Letter from Commandant of the Marine Corps to Commanding General, Marine Corps Base, Camp Lejeune. May 3, 1956. Subject: Training Directive, Engineer School Battalion, Fiscal Year 1957
- Letter from Commandant of the Marine Corps to Commanding General, Marine Corps Air Station, Cherry Point, North Carolina. October 28, 1947. Subject: Assignment of Space in Camp Lejeune Area to be Utilized for the Construction of Bombing and Strafing Targets for use of Air, Fleet Marine Force, Atlantic Units attached to Marine Corps Air Station, Cherry Point, N.C.

- Conference Report. May 24, 1946. Subject: Inter Air Traffic Control Board Cast 593 (review) (Camp Davis) Camp Lejeune, N.C. and Marine Corps Air Base, Cherry Point, N.C. Air Space Danger Area.
- Letter from The Commanding General to The Chief of Naval Operations (via: Commandant of the Marine Corps). June 3, 1947. Subject: Danger Zones in Navigable Waters

Cartographic and Architectural Records

Site Visit: May 1, 2009

Copied aerial photographs of Onslow County, North Carolina for the years 1938 and 1949. Record Group 145: ASCS – Agricultural Stabilization and Conservation Service

Focus area: Brown Island, Bear Inlet, and Eastern Boundary of Camp Lejeune

Onslow County Public Library

Onslow County Public Library
58 Doris Avenue East
Jacksonville, NC 28540
910.455.7350
http://www.co.onslow.nc.us/library/

Site visit: April 21, 2009
Documents Reviewed at Onslow County Public Library:

1. Daniel, Randolph Jr. Principal Investigator. (1999). Archaeological Excavations at Hammocks Beach West (31 on 665): A Woodland and Shell-Midden on the North Carolina Coast; NC Division of Parks and Recreation. June.

   Discussed an archeological dig covering 6 acres in Hammocks Beach State Park. Dig was conducted on mainland portion of park (outside of SDZ Range) and no evidence of munitions debris was discussed.

2. Loftfield, Thomas, C. Principal Investigator. (1981). *Archeological and Historical Survey of USMC Base, Camp Lejeune*; Naval Facilities Engineering Command Norfolk, Coastal Zone Resources Corp., Volumes I and II, Contract No. N62470-79-C-4273. August.

   Discovered one figure that showed the N-1 impact area over Bear Island. First known public information displaying this range extending off Base.

3. Watson, Alan. (1995). *Onslow Country: A Brief History*. Division of Archives and History. North Carolina Department of Cultural Resources. Raleigh.

   No pertinent information found.

Swansboro Branch Public Library

Swansboro Branch Library
1460 West Corbett Avenue
Swansboro, NC 28584
Phone: 910-326-4888

Site visit: April 21, 2009
Documents Reviewed at Swansboro Public Library:

1. 1.Biggs, Walter and James Parnell. (1989). *State Parks of North Carolina*. Winston Salem, NC.

   No pertinent information found.

2. Stallman, David. (1996). *Echoes of Topsail: Stories of the Islands Past*. Rutledge Books, Bethel, CT.

   Discusses secret missile test site located on Topsail Island. Claims about 200 rockets 3-13 inches in diameter by 3-15 ft in length were fired from island from 1946 to 1948. Dubbed "Flying Stovepipe", part of Operation Bumblebee. Contains interview with Irvine Irving of John Hopkins Laboratory; claimed that rockets were fired in a Northeast direction along a range that ran approximately 20 miles.

MCB Camp Lejeune Base Records Review

Contact:
Duane Richardson
Base Range Safety Officer
Marine Corps Base, Camp Lejeune
(910)451-1240
Duane.richardson@usmc.mil

Per personal interview on April 21, 2009, Duane discussed the areas as follows:
"I have the same information that you have (referring to the Final Range Identification and Preliminary Range Assessment document) and little else. I do know that Range Development conducted an aerial DGM survey over the marshes in the Brown Island area 2 or 3 years ago. The purpose of this investigation was to test the equipment/new technology, not necessarily looking for UXO. As far as I know, there was no follow up on the results of the investigation. Contact Mark Maloney and/or David Lynch for more information on this investigation. I don't believe that there is any UXO on Bear Island, but I am almost certain that there is UXO in the marshes, but there is no way to get it out."

Contact:
Dennis Dunham
Technical Records, Public Works Office
Marine Corps Base, Camp Lejeune
(910) 451-2818 ext 273
Dennis.dunham@usmc.mil

Per e-mail conversations existing conditions maps and land acquisition property maps. All maps have been converted to electronic files and Dennis is happy to look up any information needed on builds and any civil work, sewage, electrical, etc.

Existing Conditions Maps for the Off-Base SDZ area for the following years:

- 1979

Contact:
Linda Rose Futrell
Realty Specialist, Public Works Division
Marine Corps Base, Camp Lejeune
(910) 451-2818 x271
(910) 545-9269 (cell)

Provided map of the land the Government purchased in 1941 for Off-Base SDZ area.

Property Map, Area G. Marine Barrack, New River, NC. Bureau of Yards and Docks, July 26, 1941.

Property Map, Area N. Marine Barrack, New River, NC. Bureau of Yards and Docks, July 26, 1941.

Contact:
Julie Rowe
Archivist, Combat Camera
Marine Corps Base, Camp Lejeune
Julie.rowe.ctr@usmc.mil
(910) 451-1238

The archivist position at MCB Camp Lejeune was created fairly recently and is still in development. Currently the office holds photos and oral histories of the main area of MCB Camp Lejeune and the collection is growing. Specifically to the off-Base SDZ area, no documents we found.

MCB Camp Lejeune Base Library

1401 West Road
Camp Lejeune, NC 28547-2539
http://library.usmc-mccs.org/Lejeune/index.htm

Site visit: April 21, 2009
Documents Reviewed at MCB Camp Lejeune Base Library:

1. Marine Corps Gazette. (1946). Volume 30. United State Marine Corps. Quantico, VA.

   No pertinent information found.

2. Marine Corps Gazette. (1947). Volume 31. United State Marine Corps. Quantico, VA.

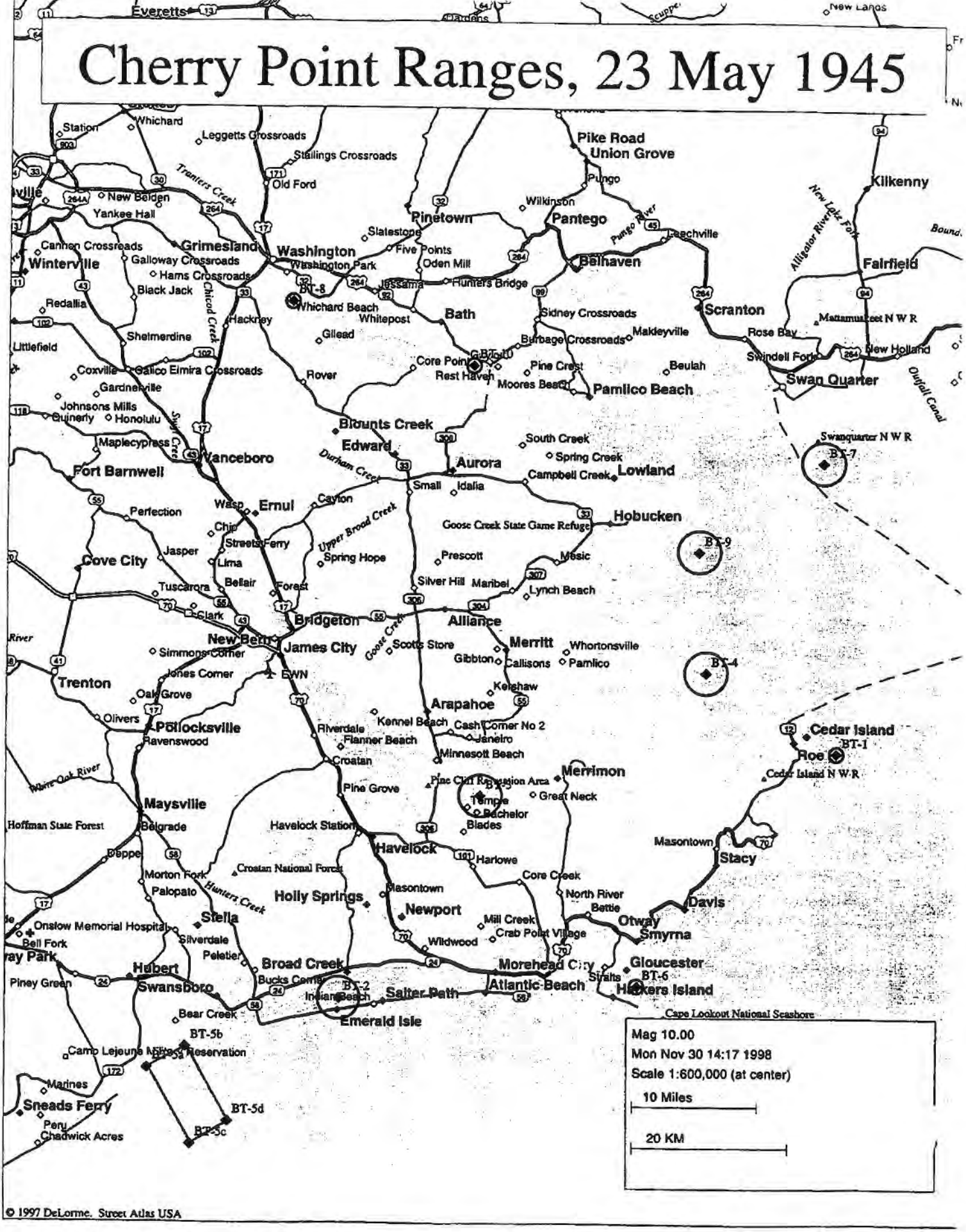
   No pertinent information found.

3. Marine Corps Gazette. (1948). Volume 32. United State Marine Corps. Quantico, VA.

   No pertinent information found.

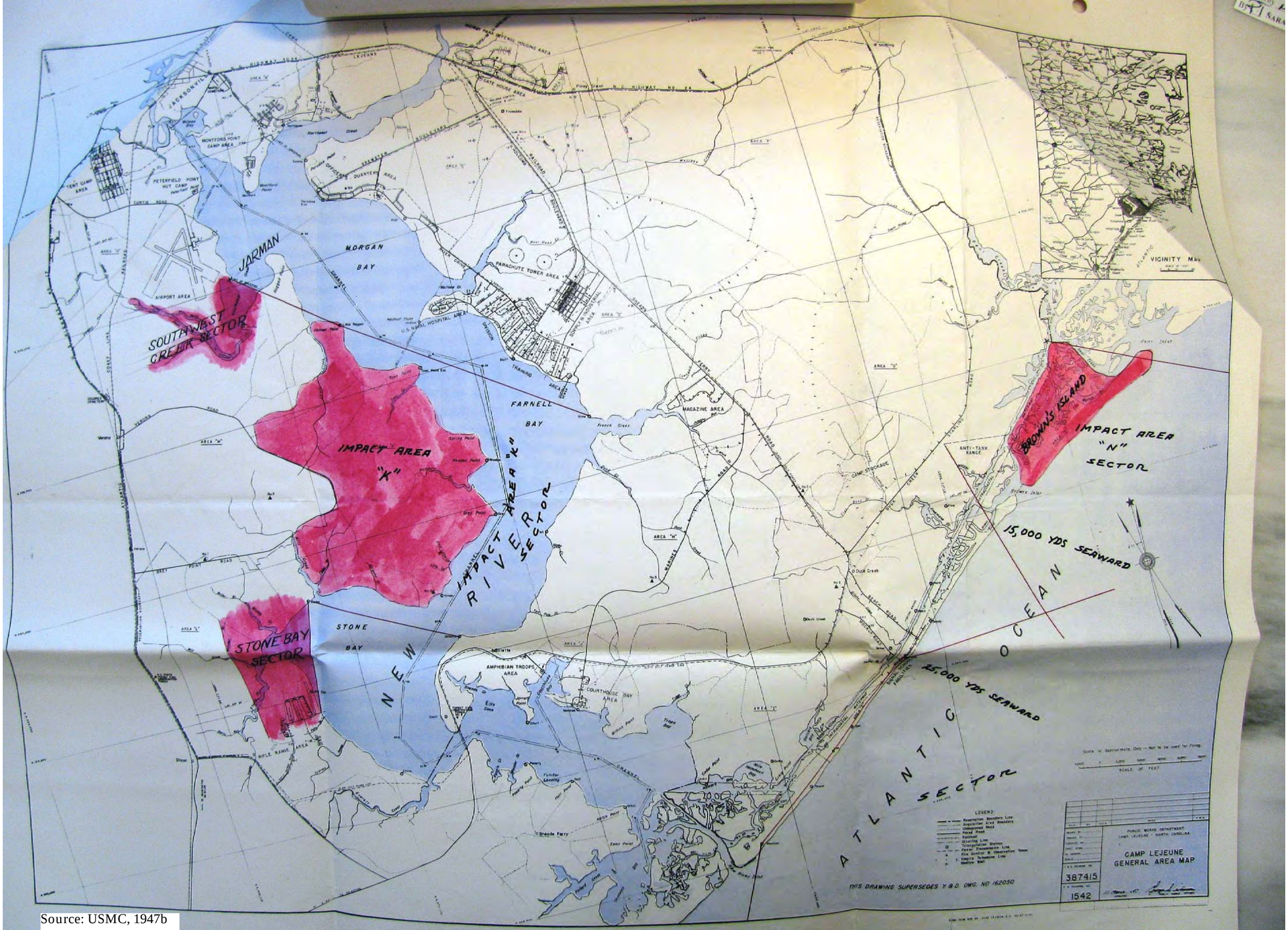
Attachment B
Copies of Historical Documents

Attachment B-1
Map: Cherry Point Ranges
23 May 1945



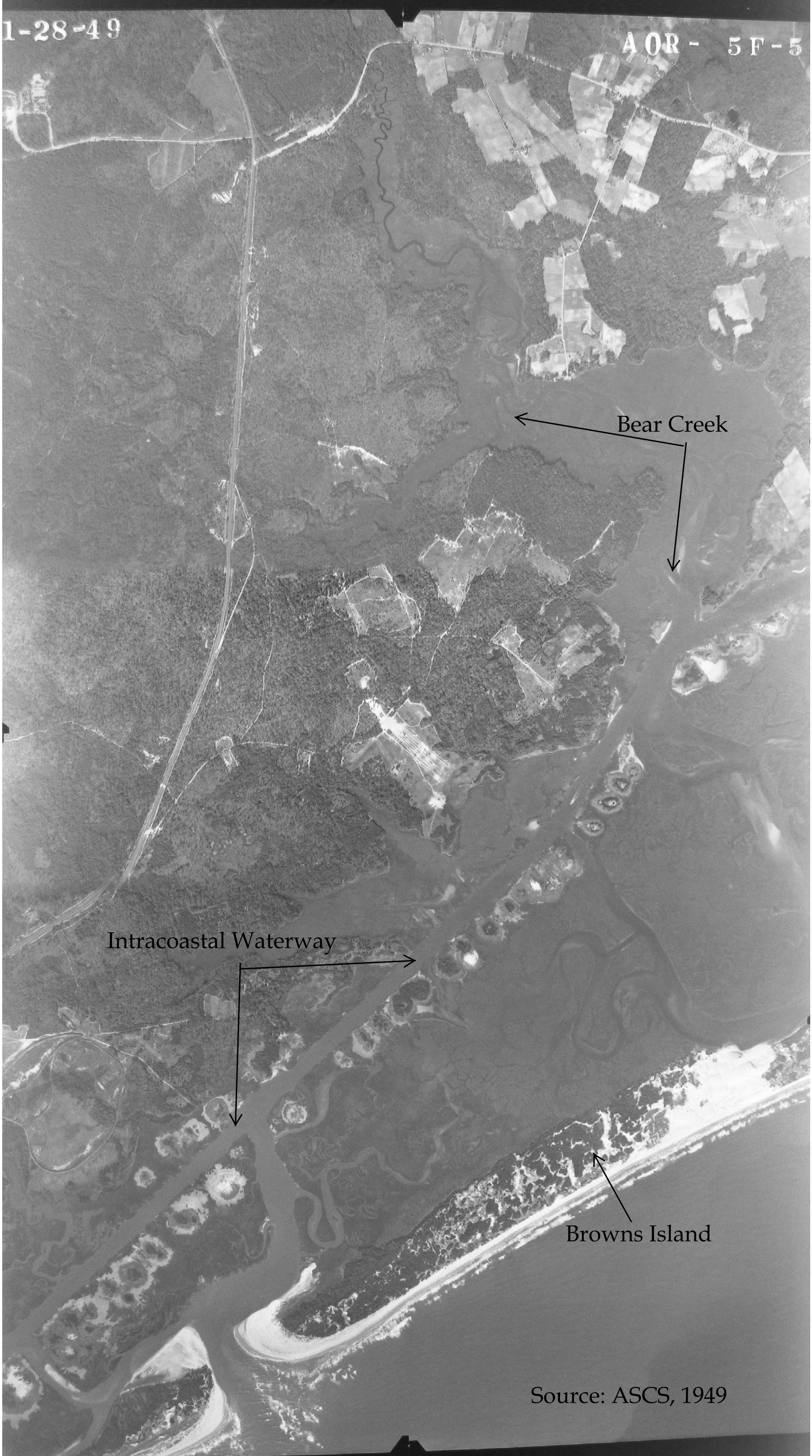
Source: USACE, 2001b, Appendix C-14

Attachment B-2
Map: Danger Zones
3 June 1947



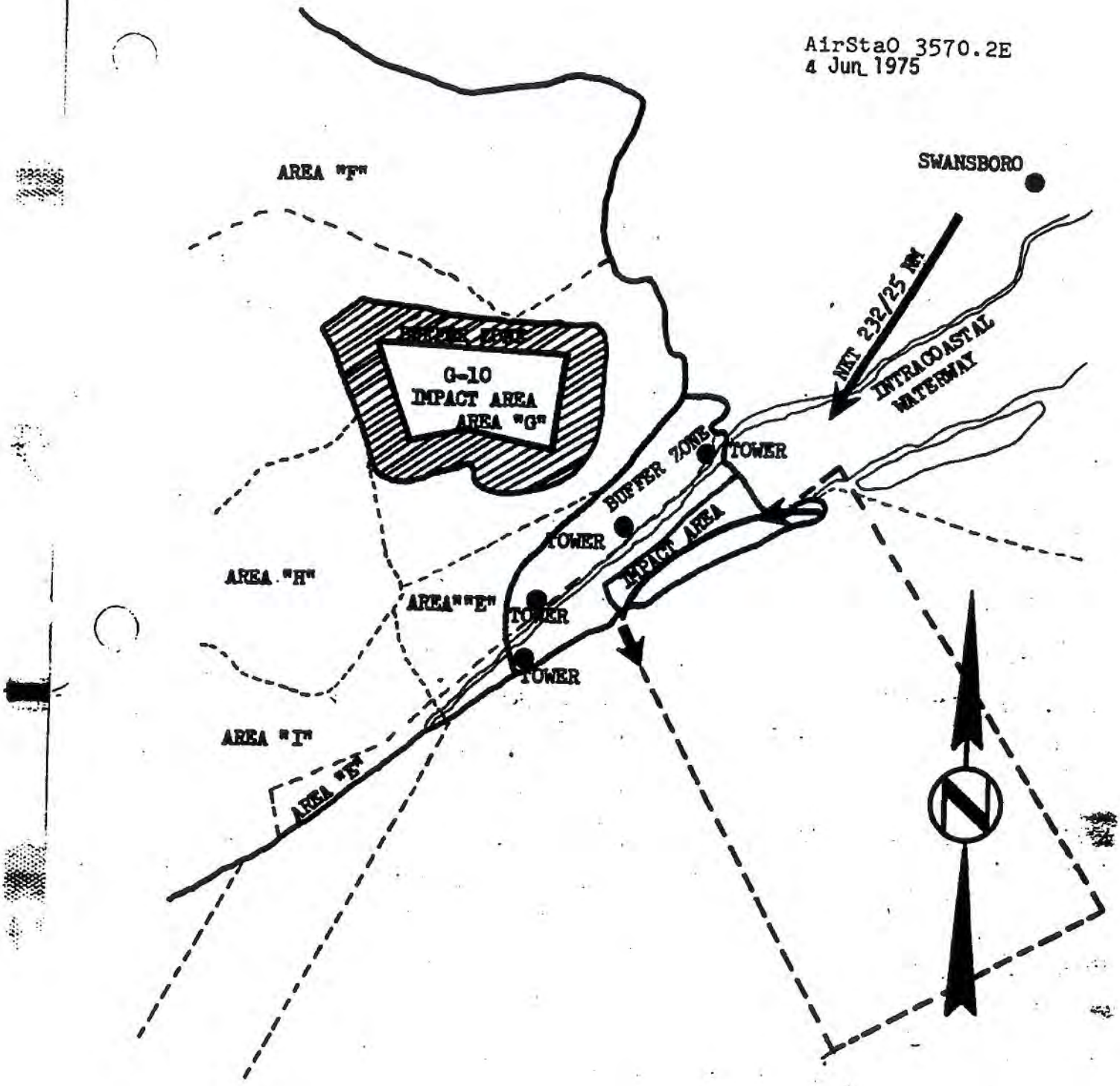
Source: USMC, 1947b

Attachment B-3
1949 Aerial Photographs


1-28-49
AOR- 5F-5
Bear Creek
Intracoastal Waterway
Browns Island
Source: ASCS, 1949


10-21-49
A0R-1F-36
Bear Creek
Sanders
Island
Bear Island
Bear Inlet
Browns Island
Source: ASCS, 1949

Attachment B-4
Map: Air Station Order 3570.2E 4
4 June 1975



BT-3

FIG 3-1

ENCLOSURE (3)

Source: USACE, 2001b, Appendix C-30

Appendix C
Technical Memorandum – Intentional Detonation

Synopsis of the Explosive Demolition Event on 27 January 2010 on Bear Island at the Off-Base Surface Danger Zones (SDZs) Project (Navy CLEAN 1000, CTO-080)

PREPARED FOR: Bryan Beck/Naval Facilities Engineering Command (NAVFAC); Robert Lowder/MCB Camp Lejeune (MCB Cam Lej)/Environmental Management Division

DATE: 28 January 2010

As part of the preliminary assessment/site investigation (PA/SI) for potential munitions and explosives of concern (MEC) or munitions constituents (MC) at the Off-Base SDZs project site, a CH2M HILL field crew conducted site preparation activities for environmental sampling on Bear Island on 21 January 2010. While traversing through a vegetated area, the field team discovered a Mk 45 mod 0 Aircraft Flare (see photo and map). The CH2M HILL unexploded ordnance (UXO) escort discovered and reported the item. After a second UXO escort verified the item was MEC, the MEC item was scheduled for explosive demolition for Monday, 25 January 2010. However, stormy weather on Monday and high winds on Tuesday postponed the event until 27 January 2010.

Upon verification that the item was MEC, Bear Island was guarded by a two-person team in rotating shifts. During the time between discovery and demolition, CH2M HILL coordinated with outside agencies including the Onslow County Sheriff, Onslow County Emergency Management Service, the United States Coast Guard (USCG) North Carolina Sector, and the Hammocks Beach State Park site superintendent (Mr. Paul Donnelly). CH2M HILL also coordinated with various agencies at Marine Corps Base Camp Lejeune (MCB CamLej), including Range Control (Mr. Duane Richardson) who helped generate the notice to airmen (NOTAM) for the date, time, and space above the demolition operation.

On 26 January 2010, a CH2M HILL biologist, Dr. Richard Reaves, met with Mr. Paul Donnelly at the Hammocks Beach State Park visitor center to discuss the explosive demolition operations. Both Mr. Donnelly and Mr. Reaves met with Chris Renkema, CH2M HILL's senior unexploded ordnance supervisor (SUXOS) at the proposed demolition site on Bear Island. Mr. Renkema explained the explosives demolition procedure: the item would be moved from the heavily wooded area to a sandy clearing, a 3 ft deep pit would be dug, the item would be placed with explosives in the pit, and sand bags would be placed over the pit to suppress the force of the detonation. Mr. Donnelly verified that no sensitive species or habitats were in the area and that demolition could proceed as specified above.

On 27 January 2010, representatives from USA Environmental (USAE), CH2M HILL's explosives demolition subcontractor, met at Shell Rock Landing in Hubert, NC. This location is the closest public landing to the Off-Base SDZs project site. USAE and CH2M HILL prepared the detonation by digging a pit (4 ft by 1.5 ft by 3 ft deep) and using the sand from this pit to

generate sand bags. The sand bag mitigation technique allows the intentional detonation exclusion zone to be decreased to 220 ft, as specified in the approved Explosives Safety Submission (ESS). CH2M HILL conducted pre-demolition soil sampling in the pit as a baseline to determine if the explosive demolition operation produced any contamination to the surrounding soils.

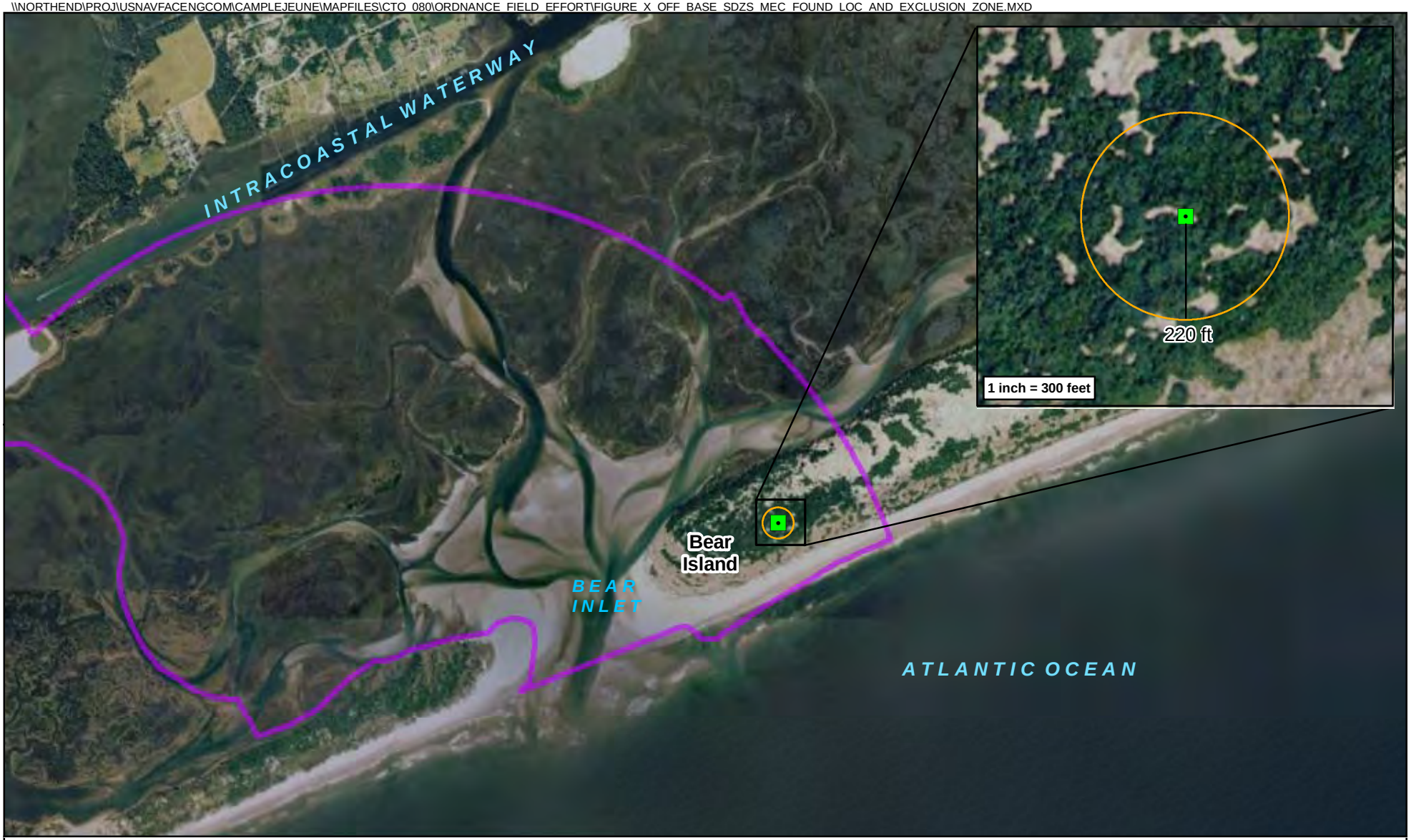
At 1107, USAE received explosives from their supplier, Scarborough Farms, Inc. USAE received five PETN boosters (explosives), 50 ft detonating (det) cord, and electric blasting caps. USAE placed the boosters and det cord in one day box, and the electric blasting caps in a separate day box. USAE placed both day boxes in separate locations on the boat, and the boat captain hoisted a bravo (red) flag indicating dangerous cargo on board (see photo). The boat left Shell Rock Landing at 1122.

At 1225, the team arrived with the explosives to the disposal site. The team secured the MEC item by taping and securing the lanyards which is this item's trigger mechanism (see photo). The team moved the MEC item approximately 75 yards from the wooded area to the demolition site. The team placed donor charges (5 lbs) and det cord around the MEC item, and then the team put the MEC and explosives into the pit (see photo). The team covered the pit with plywood and 3 ft of sand bags.

The CH2M HILL SUXOS contacted MCB CamLej Range Control, and Mr. Richardson granted permission for detonation to be conducted at 1300, one hour earlier than scheduled. CH2M HILL accounted for all personnel, including the guard boats posted along the waterways. The shot was primed with the two electric blasting caps, and at 1300, the shot was fired. After waiting five minutes, the all clear was given, and the appropriate organizations were contacted that the MEC item was destroyed. CH2M HILL conducted post-demolition soil sampling in the small crater (see photo) to determine if the explosive demolition operation produced any contamination to the surrounding soils.


LOCK UNLOCK
ILLUMINATING

\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\CTO_080\ORDNANCE_FIELD_EFFORT\FIGURE_X_OFF_BASE_SDZS_MEC_FOUND_LOC_AND_EXCLUSION_ZONE.MXD



Legend

- MEC Found
- Intentional Detonation EZ (with Sandbag Mitigation), All Personnel, 220 ft
- Off-Base SDZs

N

0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet (1:24,000)

Off-Base SDZs MEC Found Location
and Exclusion Zone
Ordnance Field Effort
MCB CamLej
North Carolina

CH2MHILL



LOCK UNLOCK



Appendix D
Aerial Geophysical Investigation Report and Geophysical Prove-Out



HeliMag Survey Report

Camp Lejeune Off-Base Surface Danger Zones
Onslow County, North Carolina

Prepared by:

Sky Research, Inc.

Prepared for:

CH2M HILL

March 30, 2010

Version 1.0

FINAL

EXECUTIVE SUMMARY

This report describes the airborne geophysical survey of the Off-Base former range Surface Danger Zones (SDZ) adjacent to the southeastern boundary of Marine Corps Base (MCB) Camp Lejeune located in Onslow County, North Carolina. This work was performed by Sky Research Inc (SKY), under contract to CH2M HILL for the Mid-Atlantic Division of the Naval Facilities Engineering Command under Contract Task Order 080 of the Navy CLEAN 1000 contract. This survey utilized helicopter magnetometry (HeliMag) to provide efficient low-altitude digital geophysical mapping (DGM) capabilities for ferrous metal detection and feature discrimination.

SKY personnel mobilized to Jacksonville, NC on November 29th and 30th, 2009. Data acquisition started on December 3, and finished, including re-flights on December 8, 2009. A total of 1,593 acres of survey data were collected at an average of 400 acres per survey day. After processing, a total of 1720 anomalies were identified within the survey boundary. These anomalies were classified with respect to their apparent size and dipole orientation. Based upon these detections, anomaly density maps were produced to provide an image of the spatial distribution of ferrous material on the site. This analysis identified 3 elevated anomaly density areas (EADA's).

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ACRONYMS AND ABBREVIATIONS

3D	3-Dimensional
A/D	Analog to Digital
AGL	Above Ground Level
AMS	Aerial Magnetometer Survey
AMSOP	Aerial Magnetometer Survey Operations Plan
AMSWP	Aerial Magnetometer Survey Work Plan
AOI	Area of Interest
AP	Armor Piercing
APDS-T	Armor Piercing Discarding Sabot-Tracer
ASR	Archives Search Report
cm	centimeter(s)
Cs	Cesium
DAS	Data Acquisition System
DGM	Digital Geophysical Mapping
EADA	Elevated Anomaly Density Area
FPGA	Field Programmable Gate Array
GP	General Purpose
GPS	Global Positioning System
HE	High Explosive
HEAT	High Explosive Anti-Tank
HeliMag	Helicopter Magnetometry
HEP	High Explosive Plastic
Hz	Hertz
IMU	Inertial Measurement Unit
IVS	Instrument Validation Survey
lb	pound(s)
m	meter(s)
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MEC	Munitions and Explosives of Concern
mm	millimeter

MRA	Munitions Response Area
m/s	meter(s) per second
nT	nanotesla
PPS	Pulse Per Second
PRA	Preliminary Range Assesment
QC	Quality Control
RTK GPS	Real Time Kinematic Global Positioning System
SDZ	Surface Danger Zone
SKY	Sky Research, Inc.
S/N	Signal to Noise
TNT	Trinitrotoluene
TOW	Tube-Launched Optically-Tracked Wire-Guided
TP-T	Target Practice - Tracer
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
VLS	Validation Lane Survey
WP	White Phosphorus

1 Introduction

This report describes the airborne geophysical survey of the Off-Base former range Surface Danger Zones (SDZ) adjacent to the southeastern boundary of Marine Corps Base (MCB) Camp Lejeune located in Onslow County, North Carolina (Figure 1). This work was performed by Sky Research Inc (SKY), under contract to CH2M HILL for the Mid-Atlantic Division of the Naval Facilities Engineering Command under Contract Task Order 080 of the Navy CLEAN 1000 contract.

This survey utilized helicopter magnetometry (HeliMag), which provides efficient low-altitude digital geophysical mapping (DGM) capabilities for ferrous metal detection and feature discrimination. This document summarizes the technology, data collection, processing, analysis, and quality control (QC) activities associated with the survey. The Aerial Magnetometer Survey Work Plan (AMSWP) (Sky Research, 2009) provided prior to deployment to the survey area describes the data collection procedures, QC specifications, data processing and target analysis processes used for the survey.

1.1 Background and Objectives

The explicit purpose of this project is to identify areas containing high densities of ferrous metallic objects on the surface and/or subsurface at the SDZ, an area of interest (AOI) that might contain munitions related metallic material, including munitions and explosives of concern (MEC). The survey did not differentiate metallic anomalies associated with munitions related material from other manmade ferrous metallic objects such as boat anchors and crab pots.

1.2 Scope of Work

SKY performed 100% coverage surveys over accessible areas for the detection of surface and subsurface ferrous material consistent with possible MEC items of interest. These data were used to characterize the site with respect to the density distribution of ferrous material across the site. Following completion of data collection activities, processing, analysis and target picking were performed to identify areas of interest. The results of the analysis and assessment are presented in this report. Geophysical maps have been prepared to visually represent the results and identify the areas that may require further investigation and clearance.

1.3 Site Location and Description

The Off-Base SDZ Munitions Response Area (MRA) is located adjacent to MCB Camp Lejeune (Figure 1) and encompasses approximately 1,632 acres, most of which (less 182 acres of Bear Island) was investigated during the aerial DGM survey. Figure 1 shows the MRA and Bear Island (Bear Island was not surveyed).

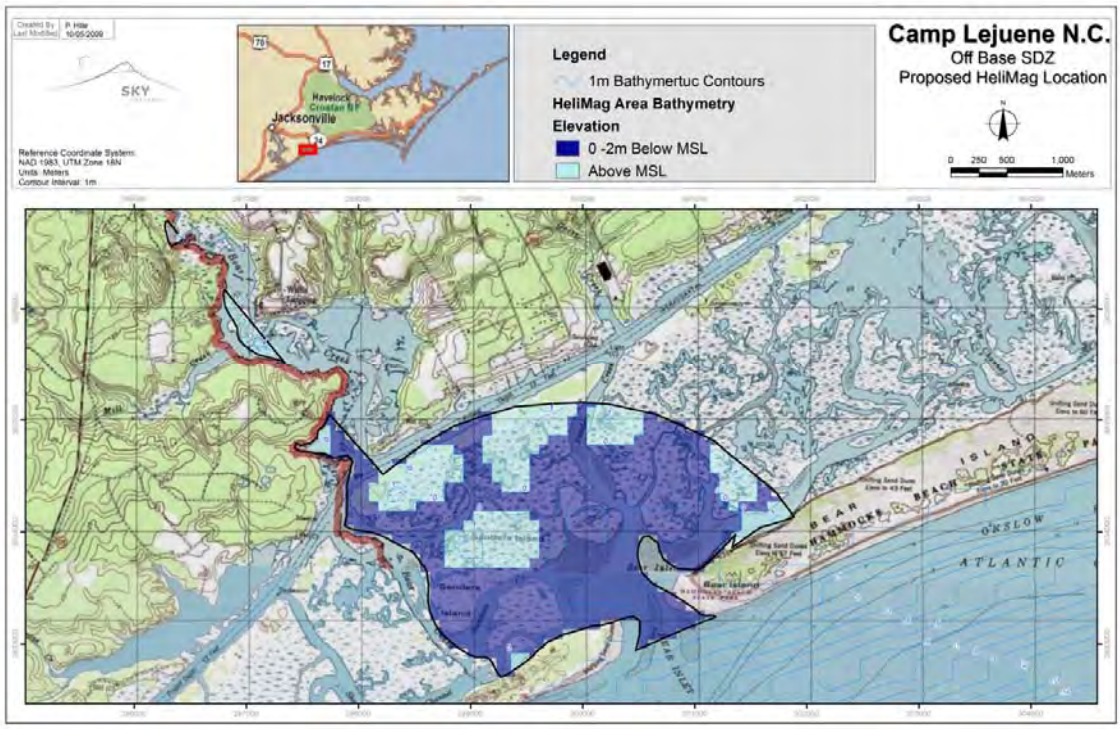


Figure 1. Off-Base Surface Danger Zones (SDZ) HeliMag survey area boundaries.

1.3.1 Topography and Vegetation

Topography and vegetation are the primary determinants of the HeliMag survey altitude. Approximately 95% of the MRA acreage consists of waterways or coastal wetlands, and the remaining 5% is upland and intertidal land. Much of the upland areas are heavily vegetated with trees and dense undergrowth. No vegetation clearance was conducted prior to the aerial DGM survey. As a consequence, a small percentage of the upland acreage was flown at a higher than optimal altitude above the ground. In response, the HeliMag data collected higher than 3m above ground level (AGL) have been masked from the final maps.

1.3.2 Geologic Conditions

Geological information and site observations suggest the majority of the site consists of geologic strata with low ferrous-mineral content. The geologic magnetic signature was considered benign and conducive to HeliMag investigations for detection of MEC.

1.4 Known Ordnance History

The following section describing the ordnance history of the Off-Base SDZs is taken directly from the initial project statement of work (filename "CTO-080_Aerial DGM_SOW v2.doc"):

The Off-Base SDZs MRA consists of the following former ranges (Figure 2):

- Rocket Range Number 1
- G-7 Direct Fire Artillery Range

- G-6 Artillery Range, and
- Impact Area BT-3/N-1

The Off-Base SDZs MRA was used jointly by MCB Camp Lejeune and Marine Corps Air Station (MCAS) Cherry Point. The danger zones related to activities within MCB Camp Lejeune are primarily from land-based artillery ranges, and the danger zones related to MCAS Cherry Point were used for airborne strafing, rocket firing and bombing. The following sections present a summary of the available information pertaining to the four former ranges.

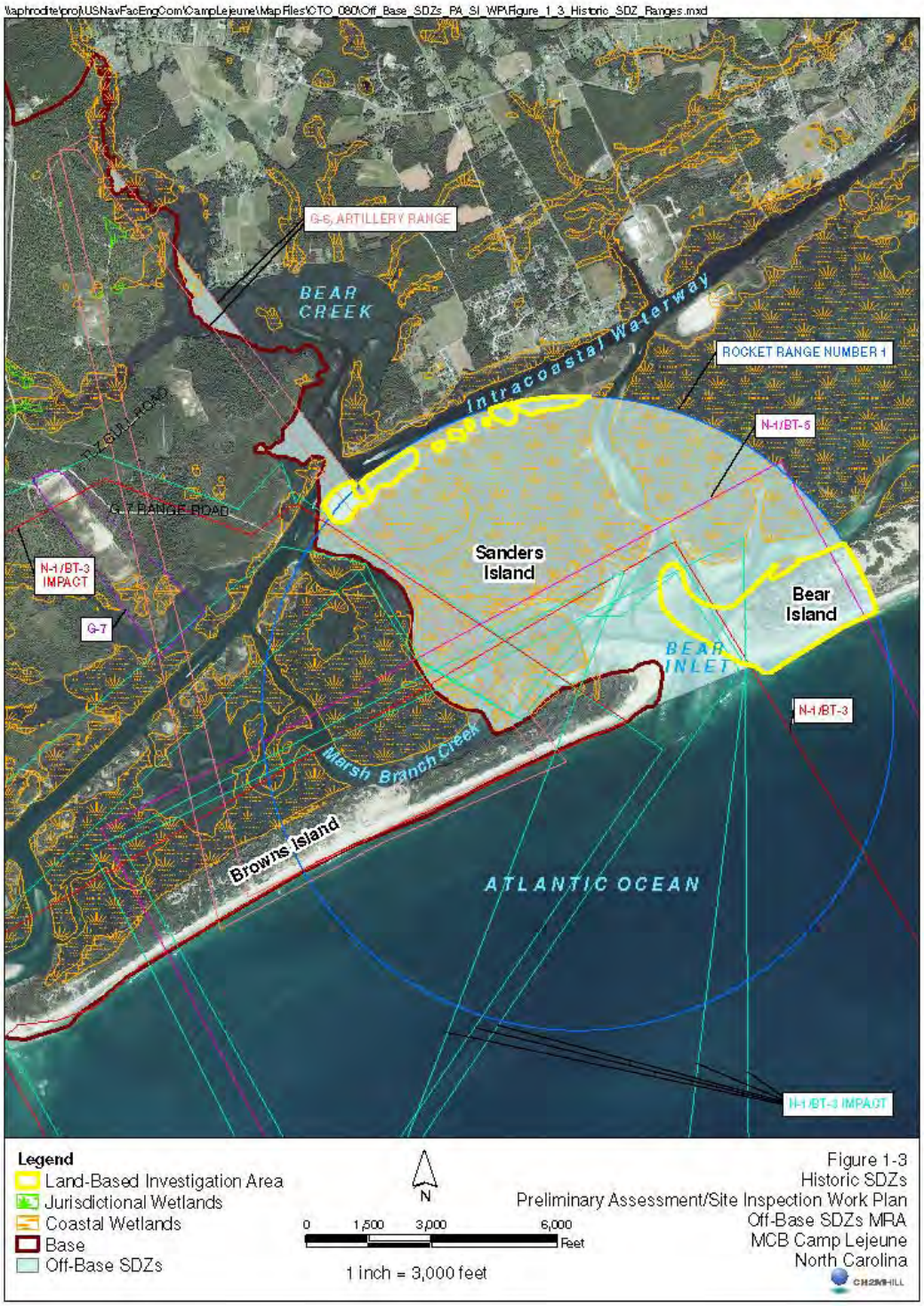


Figure 2. Off-Base SDZ Munitions Response Area and former ranges.

1.4.1 Rocket Range Number 1

Rocket Range Number 1 affects approximately 1,564 acres, the most acreage of any historic SDZ. This range has been identified as an aviation range for rocket firing only during 1945-1947. MCAS Cherry Point controlled air operations on this range, although the target was actually located within Camp Lejeune. The range is described as a circle with a 2,500-yard radius from the target; however, the SDZ of Rocket Range Number 1 extends off-base because of the 2,500 yard description of its SDZ.

According to the Range Identification and Preliminary Range Assessment (PRA), the following munitions may have been used:

- 2.25-inch aircraft rocket, sub-caliber
- 5-inch aircraft rocket, amour piercing (AP)
- 5-inch aircraft rocket, high explosive (HE)
- 5-inch aircraft rocket, high explosive anti-tank (HEAT)
- 5-inch aircraft rocket, white phosphorus (WP)
- 11.75-inch aircraft rocket, general purpose (GP)

1.4.2 G-7 Direct Fire Artillery Range

The Direct Fire Artillery Range was used from approximately 1945 to 2001. While an active firing range is still used at this firing location, the SDZs have been configured so as to remain within the bounds of MCB Camp Lejeune. Camp Training Orders and Base Orders from 1946 to 1994 identified this area for various direct fire activities including but not limited to tanks, landing vehicles tracked, field artillery, recoilless rifles, and machine guns. The following munitions may have been used at this range:

- Small arms (.50 caliber, 5.56 millimeter [mm], 7.62mm)
- 25mm, target practice-tracer (TP-T)
- 37mm: HE; AP and target practice (TP)
- 40mm: HE, gun; and grenade, practice
- 57mm recoilless rifle: TP; HE; WP; and HEAT
- 75mm Howitzer, HE; and WP
- 75mm gun, HE; AP; and WP
- 75mm recoilless rifle, HEAT; WP; HE; and high explosive-plastic (HEP)
- 76mm gun, HE; HEAT; WP; and AP
- 90mm recoilless rifle, HE; and HEAT
- 90mm gun, HE; AP; WP; and HEAT
- 105mm Howitzer, HE; smoke; WP; illumination; and HEAT
- 105mm gun, HEAT; HE; WP; and TP
- 106mm recoilless rifle, HEAT
- 120mm gun, HEAT; and TP
- 155mm Howitzer and gun, HE; WP; and illumination

1.4.3 G-6 Artillery Range

The PRA states that the G-6 Artillery Range was used from 1950 to 1960, and that various types of artillery were assumed to have been fired on this range. The Archives Search Report (ASR) describes G-6 as a Tank Gunnery Range and lists munitions types as the following:

- 105mm tank main gun, artillery (direct fire)
- Machine guns (including vehicle mounted)
- M16, 25mm cannon, and tube-launched optically-tracked wire-guided (TOW) missiles (1986)
- .50 caliber, 5.56mm, 7.62mm, 20mm (TP)
- 25mm TP-T or armor-piercing discarding sabot–tracer (APDS–T)
- 105mm, 155mm, 120mm, 40mm grenade (practice or multiple projectile round [1994])

In addition to the above, the following items may have been used at this range:

- 75mm Howitzer, HE, and WP
- 105mm Howitzer, HE, WP, and illumination
- 155mm Howitzer, HE, WP, and illumination

1.4.4 Impact Area BT-3/N-1

Impact Area N-1 (also known as BT-3) represents the main beach impact area from Brown's Inlet to Bear Inlet that has been utilized from World War II to the present day. Impact Area N-1 coincides with several historical ranges and danger zones and has a complex history of use as an aviation range for strafing, an impact area for various artillery firing points and anti-tank activities, bomb disposal training, aerial machine gun practice, and other military training activities. The ASR states that the impact area included historic bombing, strafing, and rocket targets that received various aerial rockets and bombs. In 1944, the pre-Bomb Disposal School conducted at MCB Camp Lejeune reportedly dropped seven 500-pound GP bombs in Browns Island as part of a training exercise where some of the bombs were rigged not to explode. Aerial Machine Gun Ranges were established in September 1945 over an area encompassing the whole of the Off-Base SDZs MRA. Training in the 1960s included the use of mortars, tank and anti-tank guns, rockets, and 106mm recoilless rifles. BT-3 was authorized for aircraft ordnance less than 250 pounds of trinitrotoluene (TNT) equivalency, all types of artillery, all types of mortars, all ground weapons authorized for Ranges G-7/6/5 and TOW missiles fired from rotary-wing aircraft.

A 1994 Base Training Order authorized the firing of the following ammunition into BT-3/Impact Area N-1:

- .50 cal, 5.56mm, 7.62mm, 20mm TP-T
- 25mm TP-T
- 25mm TP-T/APDS-T
- 30mm TP-T
- 2.75-inch rockets

- 105mm, 120mm, 155mm, MK 76 practice bombs
- MK 80 series inert filled bombs
- 40mm practice grenades

1.4.5 Summary and Predicted Magnetic Dipole Characteristics:

To summarize from all past range activities, the following items may have been used at this range:

- Rockets: 2.75-inch, 3.5-inch, 5-inch, and 11.75-inch
- Artillery: 37mm, 57mm, 90mm, 105mm
- Mortars: 60mm, 81mm, 4.2mm (all types), 75mm cannon
- Recoilless rifle (all types unless specified): 57mm, 75mm, 90mm, 105mm (HEP-T), 106mm
- AA (all types): 37mm, 40mm, 90mm, 120mm
- Tank gun (all types): 90mm, 105mm (all types except toxics), 120mm, 40mm grenades
- Howitzer (all types except toxics): 75mm, 105mm, 8-inch, 155mm (Howitzer/gun), TOW
- missile
- HE bombs (old style): 100-pound, 250-pound, 500-pound
- HE bombs (low drag): 250-pound, 500-pound, practice bombs

The magnetic response for a given ordnance can be approximated as a magnetic dipole. The apparent size and orientation (wrt the Earth's field) of this dipole depends heavily on the physical orientation of the ordnance. So there are many possible combinations of size and angle for a given ordnance. These responses comprise a set of feasible responses for each target type. If, for each feasible response, we plot the amplitude of the response that is aligned with the Earth's field versus the amplitude that is normal to the Earth's field we get a 'feasibility curve' for that specific ordnance type. Figure 3 presents the feasibility curves for selected ordnance types taken from the list above.

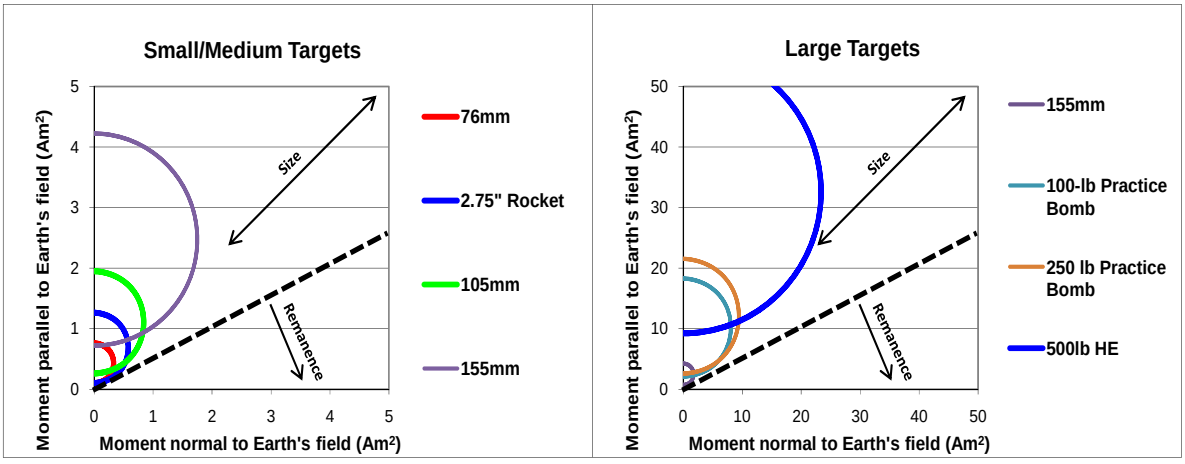


Figure 3. Theoretical dipole feasibility curves for selected ordnance of interest. Each curve represents a set of possible dipole size and orientation (wrt the Earth's field) combinations.

2 Equipment and Methodology Description

The HeliMag system includes a helicopter-borne array of magnetometers and system specific hardware and software designed to process data and perform physics-based analyses (Table 2). These technologies are described in greater detail in the following subsections.

Table 1. Sky Research HeliMag Technology Components

Technology Component	Specifications
Geophysical Sensors	7 Geometrics 822 cesium vapor magnetometers, 0.001 nanotesla (nT) resolution
GPS Equipment	2 Trimble MS750 GPS receivers, 2-3 centimeter horizontal precision
Altimeters	1 Optech laser altimeter and 4 acoustic altimeters, 1 centimeter resolution
Data Acquisition System	SKY Data Acquisition System
Aircraft	Hughes MD530F

2.1 System Components

2.1.1 Helicopter Survey Platform

SKY uses a Hughes MD530F helicopter (Figure 4) for data collection. The helicopter platform deploys the geophysical sensors, global positioning system (GPS) equipment, altimeters, inertial measurement unit (IMU), and data acquisition system (DAS) technologies listed in Table 2. The helicopter typically flies at survey altitudes of 1-3 meters (m) AGL.



Figure 4. SKY HeliMag system in flight. The lateral boom contains an array of 7 Cs magnetometers spaced at 1.5m increments. Positioning in 3 dimensions is performed using two GPS antennas mounted near each end of the boom.

An onboard navigation display (Figure 5) supported by a navigational computer provides pilot guidance. The computer delivers real-time kinematic global positioning system (RTK GPS) data streams to both the pilot display and the DAS. On the pilot display screen, the survey course is plotted in real time. The sensor operator monitors the DAS display presentation which shows the data quality for the altimeter and GPS and the GPS navigation fix quality. Via limited communication between the pilot and sensor operator the pilot is able to respond to both visual cues on the ground and to the survey guidance information.



Figure 5. HeliMag pilot steering display and mount. The pilot is given position and altitude information updates at 10Hz.

2.1.2 Sensors and Boom

The airborne HeliMag system hardware includes an array of seven DAS-interfaced cesium (Cs) vapor total-field magnetometers (a variant of the Geometrics 822 sensor, designated as the Model 822A) mounted in a Kevlar boom affixed to the helicopter. The sensor boom is mounted forward of the helicopter to minimize interference from the aircraft rotor blades, engine components, and avionics. This design puts the boom in clear view of the pilot allowing safe and precise low-level flying. The boom is 9 m long, and the sensors are mounted 1.5 m apart. Two GPS receivers (see next section) are mounted at either end of the boom and allow the magnetometer data to be precisely positioned.

2.1.3 Positioning Technologies

Two Trimble MS750 RTK GPS receivers provide real-time position updates (at 20 Hz) and platform attitude updates (at 10 Hz) while four acoustic altimeters record platform altitude. The GPS receivers provide positions with a horizontal accuracy of ~2 centimeter (cm) and a vertical accuracy of ~ 4 cm. The GPS satellite clock time is used to time-stamp position and sensor data, allowing seamless merging of these asynchronous data streams.

In addition to serving as the platform velocity and positioning method, RTK GPS is also used to compute ground survey positions. Procedures for GPS measurements are

overseen by an in-house professional land surveyor to ensure that geospatial data maintains accurate ties to the local coordinate system(s).

2.1.4 Data Acquisition System

The DAS for the helicopter is made up of two primary components: 1) the Linux CerfCube and Field Programmable Gate Array (FPGA), which provide the timing and controlling procedures for the platform sensors, and 2) the magnetometer power distribution unit, which provides clean 28-volt power for the magnetometer Larmor frequency counters. A Panasonic Toughbook Tablet PC laptop operated by the sensor operator controls the CerfCube/FPGA and is used to start and stop surveys. In addition, it displays sensor data in graphical and numerical formats.

All data are time stamped to 10-microsecond accuracy, slaved to the pulse per second (PPS) input from the GPS, ensuring a rigorous master-slave relationship between the positioning and sensor subsystems. This precision results in constant, unambiguous synchronization of the GPS positions and sensor readings, which facilitates precise positioning of the sensor data. The system has eight serial ports, eight frequency counters, and seven 16-bit analog-to-digital (A/D) converters. The DAS supports fully-adjustable data collection parameters to optimize data resolution and sampling rates for various deployment needs.

The magnetometer data are acquired at 400 Hz and then decimated to 100 Hz, providing a nominal down-the-track sample interval of 0.15 m at a standard survey speed of 15 m/second (m/s).

2.2 Aerial Magnetometer Survey (AMS) Overview

Survey altitude is a critical parameter for this type of investigation as the ability to detect objects of a given size is dependent upon the survey altitude above the object. Therefore, the objective for any HeliMag data collection survey is to maintain a safe altitude while still supporting a significant level of detection. Under ideal topographic and vegetation conditions, survey data are collected at a nominal sensor altitude of 1 to 3 m AGL. Rugged topography and tall vegetation cover can present significant challenges to the collection of low-level survey data. Flying at extremely low altitudes above the ground is much more challenging than conventional helicopter surveys. Although the helicopter can hover, the ‘lift’ available to a helicopter in a hover is significantly less than that available when the helicopter is traveling faster than its ‘translation’ speed (i.e., the speed at which the aircraft is gaining additional lift from its forward speed). During HeliMag survey operations a minimum speed must be maintained to ensure safety of the aircraft and crew. Maintaining this minimum speed entails that our ability to ‘drape’ the topography/vegetation is compromised in favor of maintaining a reasonable safety margin. Rugged terrain will also result in complex and dangerous wind conditions thus exacerbating the difficulties of maintaining survey altitudes and adding to the need for airspeed sufficient to maintain a prudent safety margin. The final decision of survey altitude/speed is made by the helicopter pilot. Although the pilot is made aware of the technical importance of maintaining low survey altitudes, it is SKY’s policy to never request that a pilot fly at altitudes/speeds below his personal and professional comfort level. Violation of this policy elevates the inherent risk involved in HeliMag surveys to

an unacceptable level. Because we are performing unexploded ordnance (UXO) remediation surveys to ultimately reduce risk, this policy is assumed to be in keeping with those of the client.

Theoretical survey lines are generated at 7 m line spacing, which allows for significant overlap between adjacent lines so that complete coverage is achieved with a minimal number of re-flights.

Initial data processing is completed daily. Daily processing of the data involves a series of standardized and quality controlled procedures to transform raw sensor data into a geo-referenced total magnetic field data set. SKY utilizes custom application software (SkyNet) to merge the position data with the magnetometer and altitude sensor data. During each day of the survey, the on-site Project Geophysicist conducts an initial review of the geophysical data to ensure that these data are within a reasonable range, free from excessive dropouts/spikes and timing errors, and otherwise appear to be valid. These data are then reviewed by the Project QC Geophysicist.

2.3 HeliMag System Quality Control

The QC procedures typically used for the HeliMag system are described in the following subsections.

2.3.1 Instrument Validation Survey Lane

An Instrument Validation Survey (IVS) test lane is used to validate the system response prior to the commencement of data acquisition as well as daily monitoring of system performance. The IVS test lane is comprised of a number of targets of interest or suitable surrogates emplaced along a line approximately 500 m long that may be conveniently flown at the start and end of each survey day. Precise ‘ground truth’ location measurements, made using established surveying techniques, are used to assess the performance of the system with respect to accuracy of detected target positions.

2.3.2 Instrument Standardization

To document the proper operation of the sensors and data processing, the Project Geophysicist performed the following QC checks and procedures. These tests documented the functionality of the airborne survey equipment and monitored the instruments for noise, stability, and repeatability.

2.3.2.1 Validation Lane Test

The IVS is surveyed twice daily for testing and verification of system performance. In addition, the IVS is surveyed after any sensor changes that are required during a day’s survey activities.

2.3.2.2 Equipment Warm-up

Most geophysical instrument readings drift for a couple of minutes after starting up. All sensors are allowed to warm up for at least 10 minutes prior to testing or data collection. Each time the instrument is started (e.g., at the start of the day, after breaks, refueling, etc.), this procedure is followed.

2.3.2.3 Record Sensor Position

Proper sensor geometry is important to the spatial registration of data during processing. The sensor positions relative to the helicopter and master GPS antenna are measured and recorded prior to the survey system installation. These spatial relationships remain fixed. At the beginning of the survey, the field crew performs a spike test under each sensor to ensure that the sensor's cables are connected to the appropriate data input channel. This test is repeated every time the system is disassembled and reassembled.

2.3.3 Standard Logs

All field and data processing activities are reported using web-enabled reports. The following reports are generated:

- Validation Lane Survey Log: This log documents the results from the Daily Validation Lane Flights and QC checks. Validation Lane Survey (VLS) logs were prepared and delivered on a daily basis during the deployment.
- Data Acquisition Log: This log documents information about each survey event and summarizes crew, equipment, filenames and surveyed areas. It was updated and delivered on a daily basis.
- Data Processing Log: This log documents by sortie the data processing steps performed on each sortie as well as visual and statistical data quality checks. It was updated and delivered on a daily basis. The tracking sheet incorporated the sortie tracking information, as well as the processing steps and output.

2.4 Data Processing and Interpretation

Data are downloaded via computer disks and uploaded via the Internet after each survey mission. SKY's custom in-house software, SkyNet, is used to transcribe, filter, decimate and position the airborne geophysical data. The output from SkyNet is an ASCII xyz file that can then be imported into the Geosoft Oasis Montaj geophysical processing environment. Oasis is used to visualize the data and apply advanced processing where required. The SkyNet/Montaj combination facilitates data review, merging, correction, filtering, interpolation and target picking while also providing an industry-standard data management system. The advanced analysis of all detected HeliMag anomalies is conducted with the UXOLab software package, which is a validated UXO discrimination package developed jointly by SKY and the University of British Columbia. The following sections describe the processing and QC steps that were used for data processing and analysis. The Data Processing Report (Appendix B) documents the parameters used and statistics from the review and processing steps.

2.4.1 Data Transcription/Merge

The raw data are transcribed from their native data file formats into ASCII xyz files using SkyNet. At this point, the geophysical data are subjected to a lowpass/notch filter and decimated to a sample rate of 100 Hz and assigned 3-dimensional (3D) positions based upon the GPS master antennae positions, aircraft attitude and the system geometry. Each magnetometer reading is positioned in three dimensions by interpolating and translating the master GPS antennae positions to a position for each sensor, based upon the system

geometry and attitude. Because the geophysical and position data are collected asynchronously, they must be aligned with respect to their time of applicability. This is performed automatically during the merge process based upon highly precise time stamps associated with each data channel.

2.4.2 Initial Data Review/Processing

The Data Processor performs the initial review of the geophysical data. If problems exist, the Data Processor notifies the Airborne Survey Geophysicist. The Airborne Survey Geophysicist assesses the problem(s) and makes adjustments to the field operations or data processing as needed to ensure quality data collection. The sections below detail the initial review of each data type.

2.4.2.1 Geophysical Data

The initial review of geophysical (magnetometry) data ensures that the data are within a reasonable range (35,000 – 75,000 nT), are free from dropouts/spikes and timing errors, and otherwise appear to be valid. Invalid data are removed, and, where appropriate, requests for re-flights are passed to the acquisition team.

2.4.2.2 Positional Data

The initial review of positional data involves checking line profiles for position dropouts/spikes. A GPS fix quality indication is recorded as part of the GPS data string. Data tagged with a fix status that indicates the GPS was not operating in ‘RTK-fix’ mode (nominally 2 cm level accuracy) are rejected automatically.

2.4.3 Site-Specific Processing

After the initial data review described above, the data follows a site-specific processing procedure, as discussed below.

2.4.3.1 Sensor Data Filtering

Spatial and/or timebased filters are used to remove long wavelength signal from the dataset. Some of the sources of this long wavelength response are diurnal variations, geologic response, sensor heading errors and aircraft maneuver noise. The specific parameters of the filters are determined by site conditions such as geologic response and survey altitude above ground.

2.4.4 Gridding and Visualization

To convert the data into an image map, an interpolation algorithm converts xyz data into an evenly-spaced grid image at 1 m intervals. The Data Processor reviews the grids to determine the completeness and accuracy of prior data manipulation steps. A color distribution range is selected to accentuate the areas/anomalies of interest. The same color scheme is used for each block in order to avoid confusion and to enhance the ability to easily compare the anomaly densities across the site.

2.4.5 Data Interpretation and Analysis

HeliMag data are used in UXO investigations to characterization a site with respect to the distribution and character of detected ferrous material. Limits to the detection performance imposed by the sensor stand-off distance, physical obstacles and geologic responses limit the size and density of metallic items that can be detected. Anomaly density maps are used to augment existing knowledge about historical site usage to provide a preliminary assessment of the location and extent of large munitions related materials to guide future munitions response actions.

These maps can be simple density analyses of all of the ferrous material detected or they can be 'refined' density maps. Each target can be classified based upon inferred features (e.g., target size, depth, dipole orientation) derived through analysis of the magnetic response of each target. These classifications are used to create subsets of 'targets of interest' that are then used to create the refined density maps.

2.4.6 Anomaly Selection

For each dataset, the Airborne Survey Geophysicist assesses each of the following factors prior to generating an anomaly list: (a) geophysical response (amplitude) of targets of interest, as measured in the validation lane; and (b) the local geologic/anthropogenic background conditions after filtering.

Based upon the site conditions, the Airborne Survey Geophysicist elects to select targets using automated or manual techniques. Under most conditions, automatic picking algorithms perform well; however, in areas with challenging background magnetic response or a great deal of anthropogenic clutter, manual selection techniques are required. The automated technique uses a 'peak detection' algorithm to select anomalies based upon the magnitude of the geophysical response. Because the total magnetic field response to ferrous material is dipolar in nature, the peak detection is performed on an 'analytic signal' grid derived from the gridded total magnetic field grid. The 'analytic signal' is the square root of the sum of the squares of the derivatives in the x, y, and z directions and thus is monopolar in nature. A manual review of the data and targets is used to locate additional anomalies or to delete anomalies. Anomalies are deleted if they are obviously due to cultural features or are well outside of the size/depth envelopes of the targets of interest.

2.4.7 Target Analysis/Classification

Each selected anomaly is analyzed. The target analysis algorithms have been adapted to run within the University of British Columbia UXOLab software environment developed specifically to conduct target analysis and picking. Within the analysis environment, the processor selects mapped anomalies interpolated from the magnitude-corrected XYZ sensor data points. The software extracts sensor data points associated with the selected target. Each sensor reading is an input datum used in a seven-parameter, iterative calculation to derive the parameter values that describe a dipole model that best fits the observed data. These parameters include dipole position (3 dimensions), dipole angle (2 dimensions), dipole magnitude (size) and an offset parameter to account for any bias in the magnetometer data. These derived dipole parameters are then compared to training datasets developed from inert ordnance to perform target classification (discussed further

in section 3). Final outputs from this step are XYZ points in ASCII format, which have associated dipole parameters and target classification declarations.

2.4.8 Target Density Distribution Analysis

Target density distribution maps represent a final product of the HeliMag data processing. To aid in visualizing the distribution of metallic items across the site, a density raster is computed using a 100 m radius neighborhood kernel that assigns anomaly densities (in anomalies per hectare) to each cell in the raster. The target classification results are used to provide refined target lists and density distributions.

Although it is not possible to determine which specific anomalies are due to the targets of interest, it is possible to refine the list by excluding some anomalies based upon the character or 'features' of the anomaly. Each anomaly is characterized by performing a dipole fit analysis as per section 2.4.7. The dipole parameters are then used as 'feature' estimates for each target (e.g., the dipole model positions are accurate estimates of the object position and depth of each target). The target list can then be refined by excluding anomalies based upon one or more of these features. Dipole size and orientation with respect to the Earth's field are the most useful features for refining targets lists.

The utility of the dipole orientation relative to the Earth's field is as follows: The magnetic response of ferrous material has two sources, 'induced' magnetism and 'remanent' magnetism. Objects that have undergone mechanical shock (such as ordnance that have been fired) will become demagnetized – i.e., the remanent magnetization is removed. In addition, 'induced' magnetic dipoles are aligned within 75° of the Earth's magnetic field vector, while remanent dipole responses are not similarly constrained. Thus targets with dipole orientations greater than 75° from parallel with the Earth's field can be assumed to have significant remanent magnetization and as such, are not likely to be associated with ordnance usage.

Dipole size is an obvious feature to use to refine the target list. Unfortunately the dipole fit size estimate for any given object will depend heavily on the orientation of the object in question. Figure 6 presents feasibility curves for a selection of ordnance items listed as possible items of interest at Vernon Range, an ordnance site in British Columbia. These curves show how the dipole response for any given ordnance can vary depending upon its physical orientation with respect to the Earth's field. The dipole response is non-unique for any shape other than a sphere. The maximum moment is achieved when the target is aligned with the Earth's field and the minimum moment is achieved when the target is normal to the Earth's field. (Note the image in Figure 6 depicts the dipole angle, not the physical angle of the object). It is also apparent from this image that multiple ordnance types occupy the same location on the graph, thus they may provide identical responses. Furthermore, there are an infinite number of non-ordnance ferrous objects whose responses may also overlap with responses of the objects of interest. For this reason total magnetic field techniques cannot be used to definitively declare an object as ordnance. However, to the extent that a given target response does not come close to the feasibility curves of the objects of interest, these features can be used to exclude these targets from the refined target list.

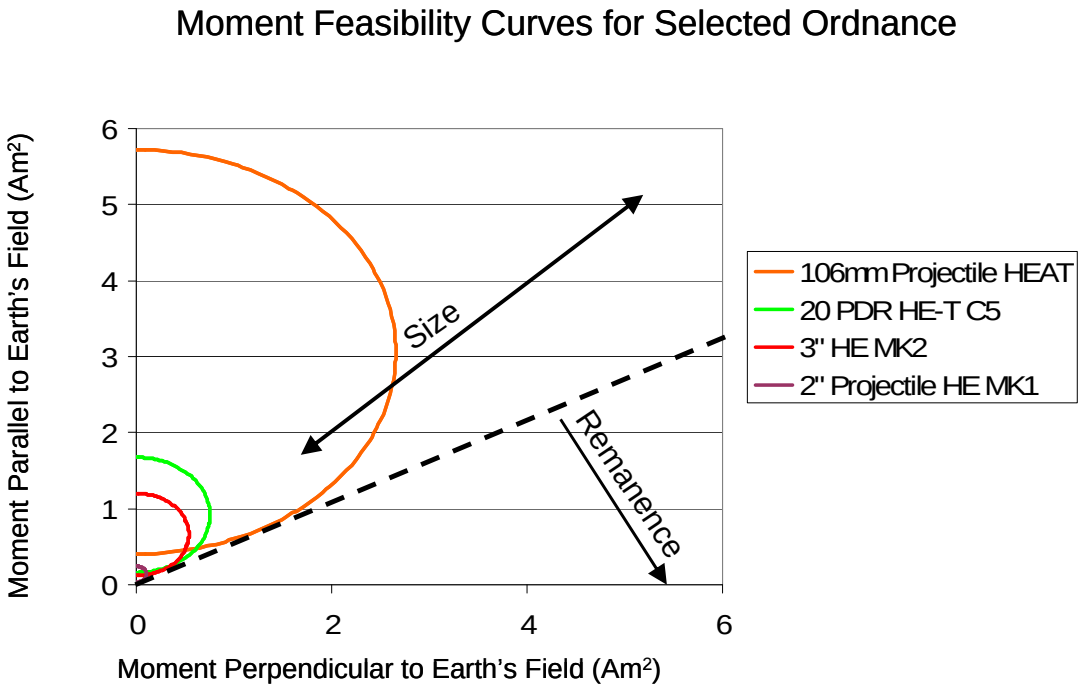


Figure 6. Dipole response feasibility curves. The predicted dipole moment for given UXO types are plotted relative to the Earth's magnetic field vector. Dipole response angles greater than 75º indicate the presence of remanent magnetization. Note that the dipole angle presented here, although related, does not directly represent the physical angle of the object

3 Data Acquisition

The data collection effort was carried out in accordance with the AMSWP developed during the planning phase prior to mobilization to the site. The following sections describe in detail the data acquisition including mobilization, initial validation lane testing, survey data acquisition activities and challenges.

3.1 Mobilization

SKY personnel mobilized to the site on Nov 30th 2009. The HeliMag system was installed into the helicopter on Dec 1st, and high altitude calibration data were collected. The validation lane was established on Dec 1st and flown on Dec 2nd. Survey data acquisition started on Dec 3rd and finished, including re-flights, on Dec 8th.

3.1.1 Base of Operations

The Helicopter was based out of Robert J Ellis Airport, Jacksonville Flying Service.

The main GPS base station was set up Shell Rock HLZ

Base station coordinates in WGS84 Universal Transverse Mercator [UTM] Zone 18 are:

Point Name: LANIER 1

Northing: 3836979.959 meters

Easting: 301496.465 meters

Height above Ellipsoid: 5.279 meter

3.1.2 Instrument Validation Survey

The initial IVS was conducted over the validation lane established by SKY personnel at Robert J Ellis Airport. Data collected over these lines were used for initial instrument validation as well as daily monitoring of the system performance.

3.1.2.1 Validation Lane Description

The Validation Lane was seeded with inert ordnance and ordnance simulants as listed in Table 2. All targets were placed on the surface, and positioning measurements were taken from the center of the object.

Table 2. Validation Lane Seed Items:

ID	Northing	Easting	Description
1	261261.55	3857047.35	Weapons Cache
2	261271.83	3857057.36	100# Practice Bomb
3	261283.23	3857067.65	Rice Cooker
4	261293.80	3857079.32	155mm Projectile
5	261302.97	3857089.33	2x2.75 Rockets with Plate
6	261312.15	3857097.95	Simulated Propane Tank
7	261320.77	3857106.51	100# Practice Bomb
8	261329.66	3857115.47	Simulated Pipe Bombs
9	261339.39	3857124.64	155mm Projectile Vertical
10	261348.01	3857132.71	CH2M HILL Seed-2 Pipes and Mushroom Anchor
11	261358.30	3857141.05	Weapons Cache
12	261366.36	3857150.78	2.75 Rocket
13	261375.26	3857161.06	155mm Projectile
14	261386.38	3857171.63	100# Practice Bomb

ID	Northing	Easting	Description
15	261395.28	3857181.08	Weapons Cache
16	261404.73	3857189.7	2.75 Rocket
17	261413.91	3857198.88	155mm Projectile
18	261422.53	3857206.94	100# Practice Bomb

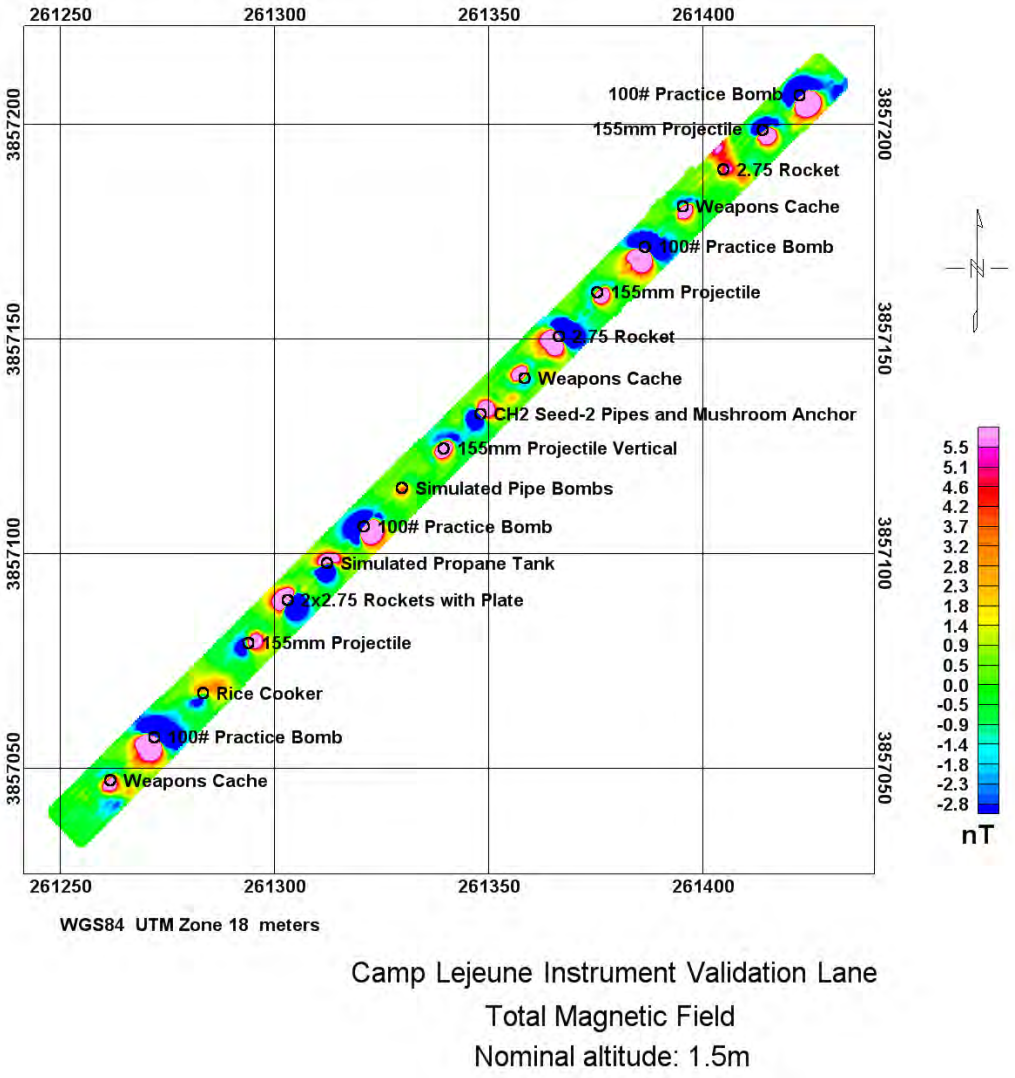


Figure 7. IVS layout and total magnetic field response.

3.1.2.2 Initial Validation Lane Results

One of the purposes of the initial validation survey was to determine the maximum altitude at which the HeliMag system can detect the ordnance of interest. Prior to the start of the site survey, the validation lane was flown at altitudes from 2 to 6 m, and the data were analyzed to determine the peak anomaly amplitude. In Figure 8 the peak amplitude of all of the emplaced targets are graphed as a function of sensor altitude. These data illustrate the dependency of detection on survey altitude. Large targets such as 100 pound (lb) bombs may be detected as far away as 6m while small UXO classes are only detectable when the sensor-target stand-off distance is less than 3m.

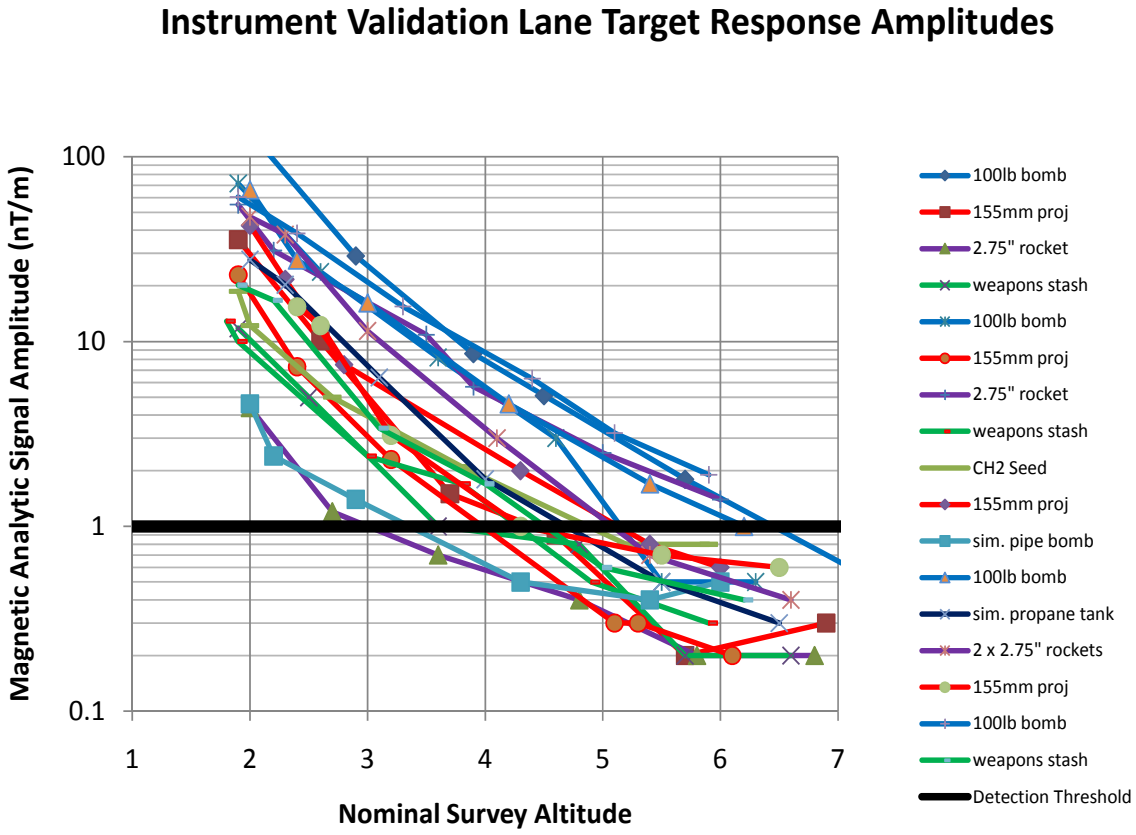


Figure 8. IVS response as a function of sensor altitude. The response is measured as the total magnetic gradient (analytic signal).

3.2 Survey Data Acquisition

After two days of set up and testing, data acquisition activities commenced on Dec 3rd, 2009 and were completed on Dec 8th, 2009. Daily acquisition logs for each data production day are provided in Appendix A. The SKY field team performed the data acquisition as prescribed in the Aerial Magnetometer Survey Operations Plan (AMSOP). The survey was flown at the lowest altitude possible, consistent with the safety of the aircraft and crew. The survey data quality was monitored on a daily basis in accordance with the QC procedures outlined in the AMSWP.

Figure 9 presents a chart used to track the daily production rate of the HeliMag team at the SDZ. The total area surveyed was estimated during production at 1,593 acres; the production rate at the site was just under 400 acres per survey day, excluding two days for set-up, one weather day, and one day for re-flies. Daily field notes for each day are provided in Appendix E.

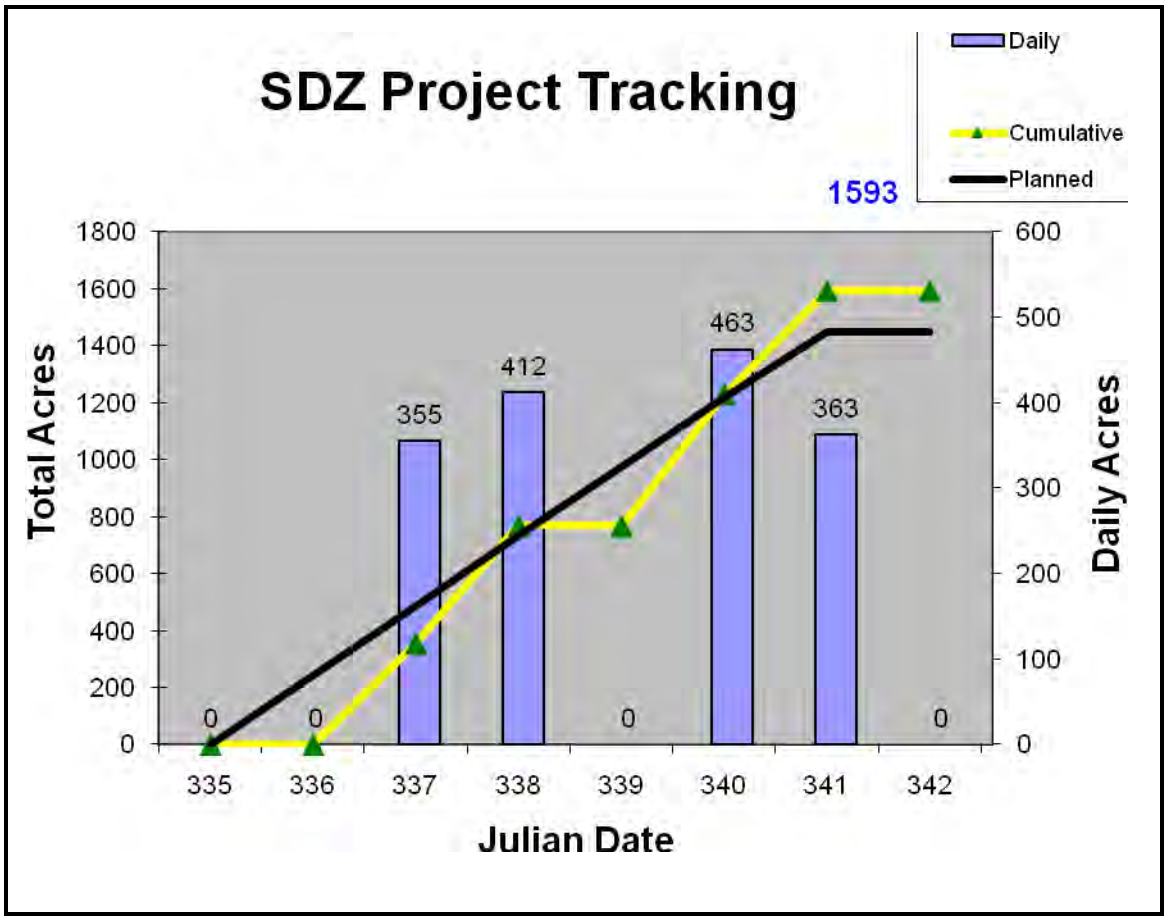


Figure 9. HeliMag survey productivity graph.

3.2.1 Quality Control Results

At the beginning and end of each survey day, flight lines were flown over the validation lane in order to confirm that all system components were operating within required parameters. In addition, two daily high altitude sensor noise tests were performed to guarantee that all magnetic sensors were operating within pre-established noise threshold limits. The following subsections briefly describe the tests performed. There were two occasions where the end of day QC checks were not performed due to GPS availability. These omissions are deemed to be acceptable because they are beyond the control of SKY and do not indicate problems with the system performance.

3.2.1.1 Validation Lane

The SKY Quality Control Geophysicist used the validation lane data to monitor the performance of the system with respect to accuracy of target positioning and repeatability of dipole analysis derived target features. For each of the items with sufficient signal to noise (S/N) to support accurate dipole fit analysis, a model dipole was fit to the observed data. The parameters describing this model were used as estimates of the position, size and orientation of the dipole response of each of these targets. These derived feature estimates were monitored for validity and consistency, and the results are provided in the Validation Lane Survey Log (Appendix D). The average position error was 0.14m – well under the 0.5m pass/fail threshold. The average target size variation was 5%, and the average dipole angle variation was 1.34°. These values were well under their respective pass/fail thresholds of 20% and 20 degrees.

3.2.1.2 Lag Test

Accurate positioning of the geophysical data requires that the time of applicability of the magnetometer sensor data is aligned with that of the positioning data. The architecture of the HeliMag data acquisition system is designed to automatically ensure that these data are aligned appropriately. Misalignment of these data results in a recognizable 'herringbone' pattern of distortion where reciprocal passes are flown over the same anomaly. The Validation Lane tests were performed at reciprocal headings, and images of the data were inspected to ensure that no apparent lag existed. The results of these tests are reported as part of the Validation Lane Survey Log (Appendix D). No tell tale herringbone signatures were evident in the test data.

3.2.1.3 High Altitude Magnetic Sensor Noise Test

Two daily high altitude magnetic sensor noise tests were performed; the first after the initial Validation Lane flight and the second before the final Validation Lane flight. These tests were conducted at altitudes where ground source response is negligible for a minimum duration of 20 seconds. The high altitude test results are presented in the Validation Lane Survey Log (Appendix D). The average standard deviation of the high altitude tests was 0.14nT, and all results were well under the 1nT pass/fail threshold.

3.2.2 Data Quality

The quality of geophysical survey data as it relates to the survey objectives is determined by both the intrinsic quality of the instrumentation and methodologies used (as monitored by the QC program described above) as well as extrinsic site conditions that are beyond control of the survey team. A small portion of the SDZ site was effectively not surveyed due to vegetation. To avoid misinterpretation of the results, the geophysical data for these areas have been masked (Figure 10) from the final map products using a threshold of thee meters AGL. Also where data was collected over deep portions of the water, the system will not be sensitive to smaller objects. These regions have not been isolated and removed from the presentation maps because we do not have access to bathymetry data with sufficient resolution to identify deep water.

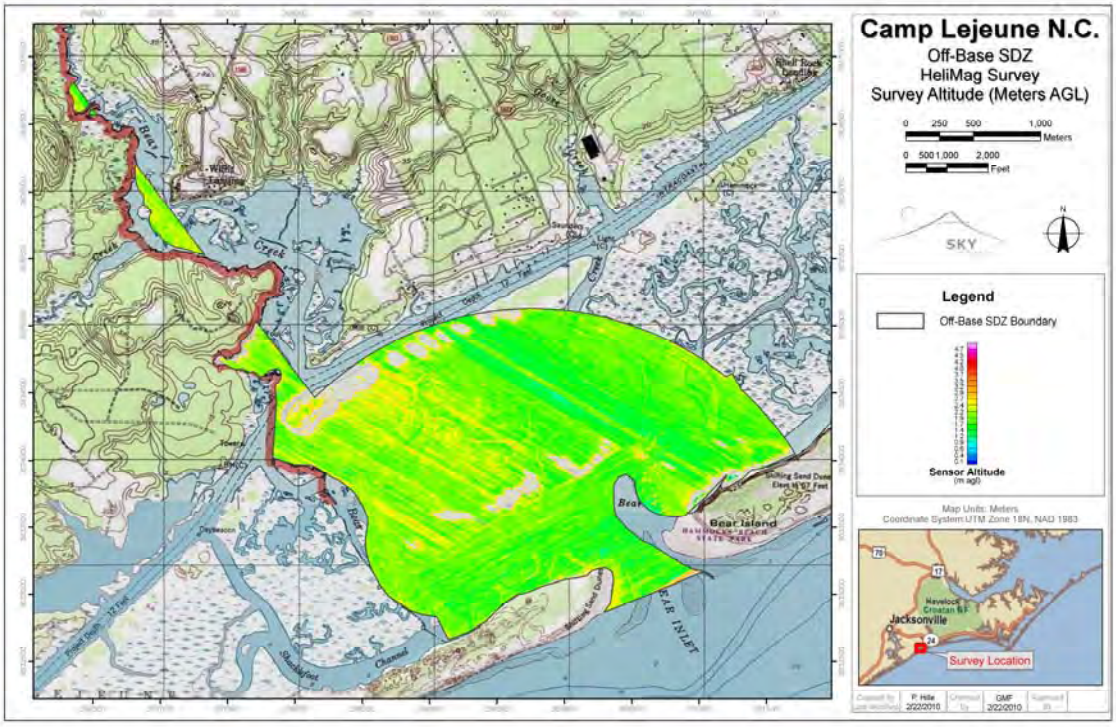


Figure 10. Sensor survey altitude above ground level/water surface. Data collected at altitudes higher than 3m AGL have been rejected

4 Data Analysis

4.1 Data Processing, Enhancements

4.1.1 Data Pre-Processing

As described previously, an initial processing stage was completed daily. During this stage, raw data were down-sampled to 100 Hz, reviewed as part of the initial QC, time-aligned, transcribed into a database, and mapped to X, Y, and Z UTM coordinates accurate to better than 5 cm. The data were positioned in UTM Zone 18 coordinates projected from the WGS84 ellipsoid. After processing, the along-track sample interval was nominally 0.15 – 0.25 m. The maximum across track interval is 1.5 m, but due to the overlap required to ensure complete coverage, the average cross track sample density was significantly higher.

4.1.2 Data Processing

The raw magnetic data were corrected for aircraft orientation induced errors using an industry standard aeromagnetic compensation routine (described in Appendix F). A site-specific ‘de-median’ filter was applied to the magnetic data to remove unwanted, long wavelength signals (primarily due to geology and diurnal variations in the Earth’s magnetic field).

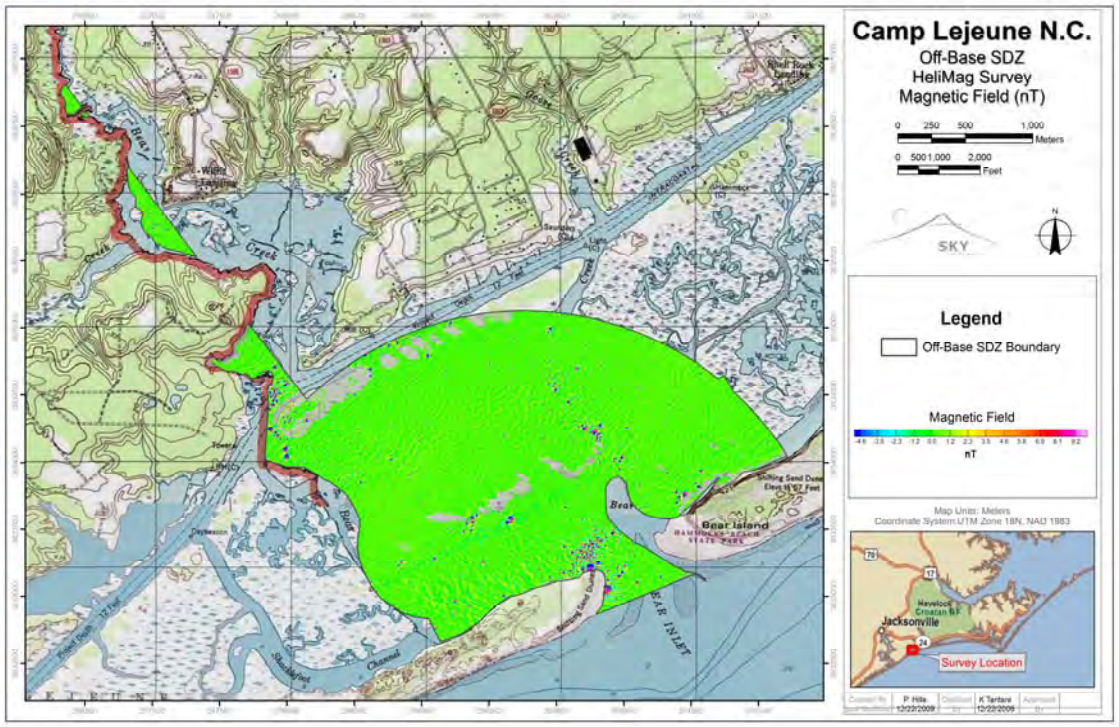


Figure 11. De-median filtered total magnetic field image. Areas where the helicopter was forced to fly higher than 3m AGL have been excluded from the final image.

4.2 Anomaly Selection and Density Mapping

4.2.1 Anomaly Selection

The target selection process was performed using Geosoft's Oasis Montaj software. As with all target selection methods, a total magnetic field grid was generated for each area. An analytical signal grid was derived from the total magnetic field grid. After application of two passes of the 3x3 Hanning filter (in order to reduce the number of multiple picks over the same anomaly) all peaks over a predefined threshold were automatically selected. A threshold of 1.5 nT/m was found to maximize the number of valid selections while minimizing the number of false, geology-related picks.

Because the responses to the targets of interest were at times less than the geologic noise levels, additional manual target selections were made by an experienced analyst. In many cases, the analyst can discriminate between valid anomalies and those due to geology. Additionally, many of the auto-detected targets that were obviously associated with linear features were removed from the target list. A total of 1,720 targets were selected inside the survey boundary. A list of the final selected targets and their locations is provided in the file 'Camp_Lejeune_OffBase_SDZ_target_list.csv' delivered with the final deliverables described in Section 6, HeliMag Deliverables. In Figure 12 the anomaly locations are plotted over an ortho-photo of the site.

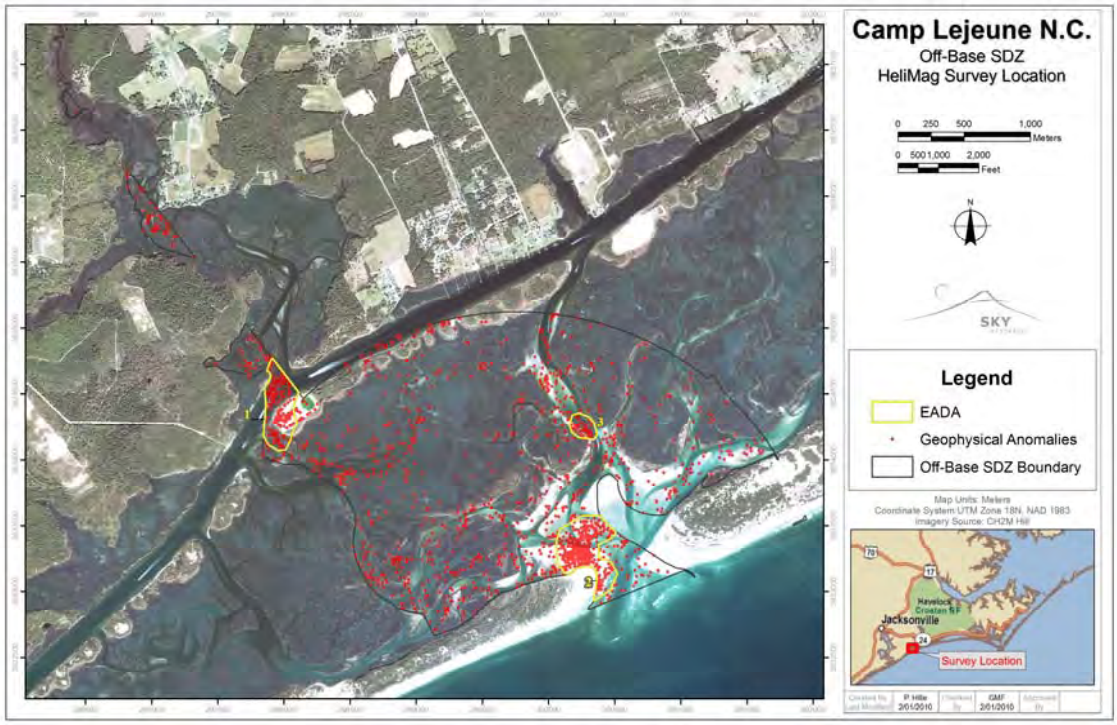


Figure 12. Anomaly locations overlaying an ortho-photographic image of the survey site.

4.2.2 Target Density Mapping

The initial set of anomalies consists of those anomalies potentially due to the targets of interest as well as anomalies caused by other metallic debris and localized geology. The spatial distribution of these targets is presented as density images in Figure 13. These maps are derived from a density raster computed using a 100 m radius neighborhood kernel that assigns anomaly densities in anomalies per hectare to each cell in the raster.

Density images using all selected targets are useful for differentiating between areas of high use and areas that have only background levels of ferrous material distributions.

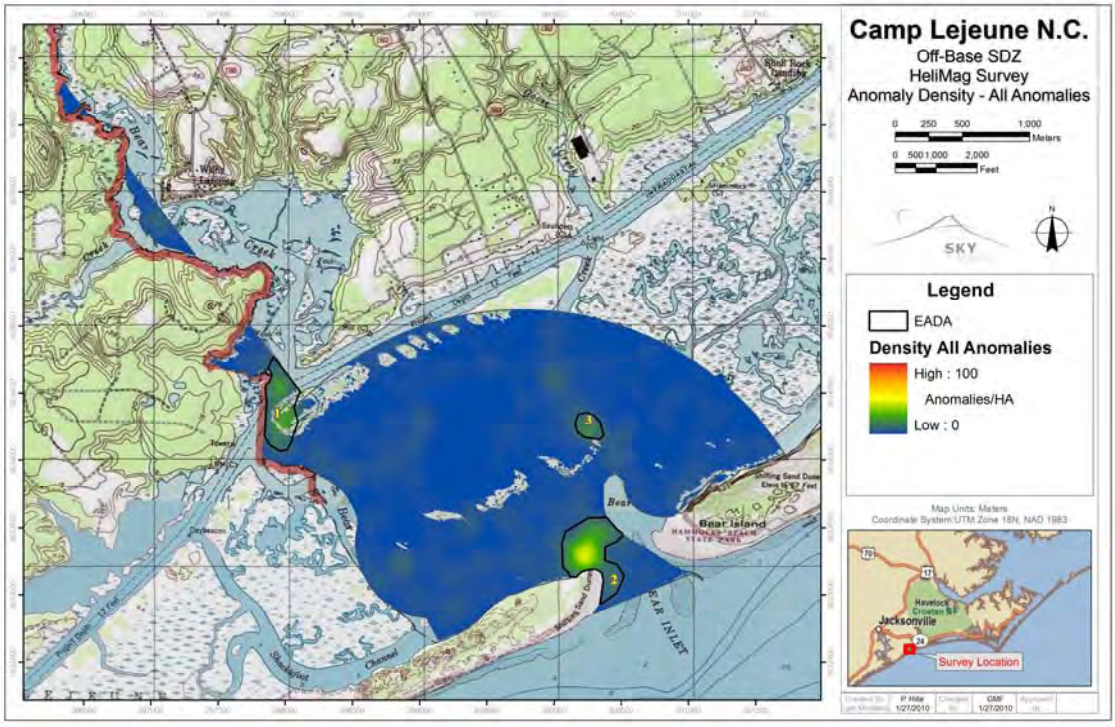


Figure 13. Anomaly density map. 3 EADAs are identified. Gaps in the density maps are due to lack of survey coverage at 3m AGL or below.

4.3 Advanced Analysis and Results

4.3.1 Target classification

As described in section 2.4.7, each detected anomaly is subjected to a dipole fit analysis. This analysis, through an iterative process, finds the model dipole that best fits the observed anomalous response. This model is described by seven parameters: position (x, y and z), orientation (inclination and declination relative to the earth's field), size, and quality of fit (a measure of how well the observed data fit the dipole model). The position results of this analysis are used to refine target position and depth estimates – generally localizing the target to within 0.25m. The size and orientation of the dipole model may be used to classify the anomalies with respect to their apparent size and magnetic remanence. The targets were sorted into Categories 1 through 7 as follows:

1 - Small (<1.5 Am^2), low remanence (dipole angle <60 degrees)

2 - Medium (>1.5 and <5.0 Am^2), low remanence

3 - Large (>5.0 Am^2), low remanence

4 - Small, high remanence (dipole angle >60 degrees)

5 - Medium, high remanence

6 - Large, high remanence

7 - Invalid fit (either due to poor signal to noise ratio or overlapping signatures)

Small items are items similar in size to 2.75” rockets or smaller. Medium items are similar in size from 105mm to 155mm projectiles, and Large denotes anything larger than a 155mm projectile. Items identified as having high remanence (categories 4-6) are less likely to be ordnance.

Figure 14 presents the dipole fit results for all of the targets plotted on the same graph as the dipole feasibility curves presented in section 1.4.5.

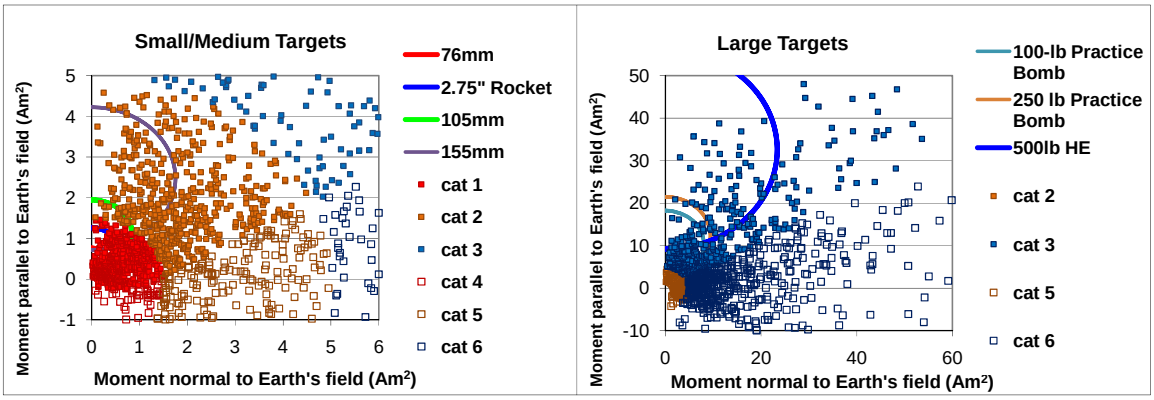


Figure 14. Detected anomaly dipole size/orientations plotted with dipole feasibility curves of items of interest.

4.3.2 Discussion of Results

Often the density distribution maps can be refined by rejecting a subset of anomalies based upon the classification results. At this site, the spatial density distribution of the various classes did not differ significantly from that of the entire set. As seen in Figure 12, the majority of the targets are located within or very close to water channels running through the site. This is consistent with expectations of the presence of ferrous clutter that is associated with non-UXO related activities that rely upon water access.

4.3.2.1 Dipole Angle Distribution

The magnetic response of ferrous material has two related sources, induced magnetism and remanent magnetism. For cylindrical bodies, the dipole angle due to induced magnetism is aligned with the Earth’s field +/- 60 degrees. The orientation of the remanent magnetization component is not related to the Earth’s field and thus is randomly distributed. UXO related activities (explosions) commonly result in shock demagnetization of ferrous material leaving only the induced magnetic response. Thus, areas where a large percentage of the dipoles are aligned within 60 degrees of the Earth’s field have an increased likelihood to be associated with UXO related activities. Figure 15 shows that the dipole angle distribution of the detected anomalies is skewed towards being aligned with the Earth’s field, consistent with the presence of UXO related material at this site.

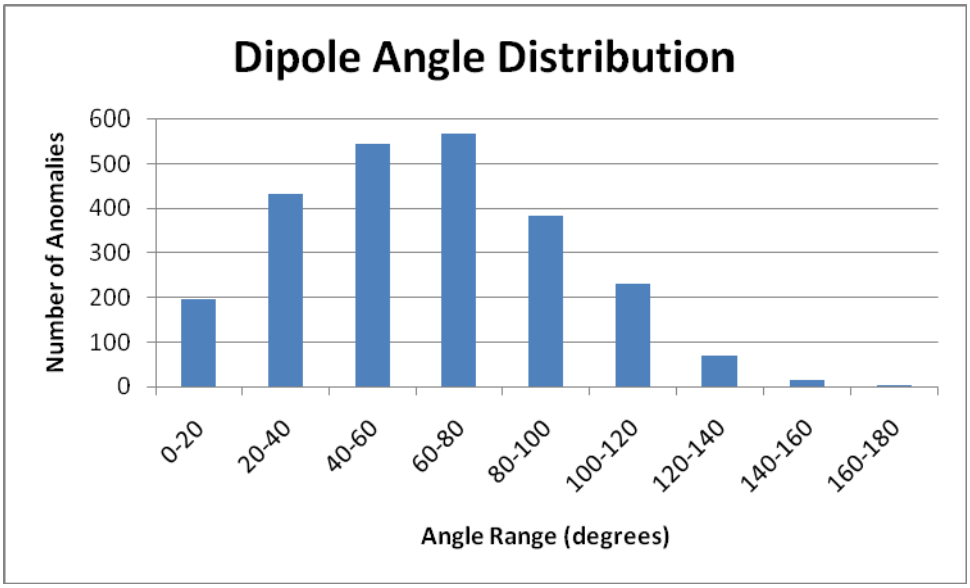


Figure 15. Histogram of the detected targets dipole angle relative to the Earth's field.

4.3.2.2 Elevated Anomaly Density Areas

The SKY analyst identified three elevated anomaly density areas. These areas are identified in Figure 13 as EADA 1, 2 and 3. All three areas are located along waterways.

EADA1 is associated with the intracoastal waterway as well as a small clearing on the south side of this waterway. Most of the anomalies in this area are actually in the waterway or in the clearing, as would be expected where additional non-UXO related material has been deposited by users of the waterway.

EADA2 is a large region of higher density anomalies that is located on what appears to be a sand bar at the mouth of one of the major estuaries connecting the intracoastal waterway to the Atlantic Ocean. The presence of the sand bar leads to the supposition that this increased density is due to deposition of material that is being washed out of the estuaries, but the possibility that this is evidence of an impact area cannot be ruled out.

EADA3 is a very small region of elevated density along one of the main estuaries, consistent with the depositional patterns expected in the estuary. Although this is an area with elevated anomaly density, the small spatial extent and anomaly density of this area is not typical of an impact area.

5 Conclusions

The goal of the AMS at the Off-base SDZ was to identify areas containing high densities of ferrous metallic objects on the surface and/or subsurface that may be indicative of munitions related metal objects. Results of the AMS are not intended to be used for eliminating areas from the possibility of containing MEC.

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6 HeliMag Data Deliverables

The following data deliverables specific to the HeliMag survey are provided as part of the overall project deliverables package:

- An Excel™ workbook containing a list of the raw target selections, the dipole analysis fit results and the target classification. A spreadsheet describing the contents of each column of the target list spreadsheets is included.
- For the SDZ survey area, a high resolution jpg of:
    - The final magnetometer data
    - The magnetic analytic signal data (figure 16 in Appendix G)
    - The anomaly density image
    - Anomaly locations (over ortho-photographic base)
    - Achieved survey altitude
- HeliMag geophysical data archives (zipped ASCII Geosoft XYZ format including headers). These data are presented in WGS84 UTM Zone 18 coordinates.
- Geosoft™ grids of the final magnetic data.
- For each flight over the validation lane:
    - HeliMag geophysical data archives (zipped ASCII Geosoft XYZ format including headers) and a Geosoft™ grid of the final data. These data are presented in WGS84 UTM Zone 18 coordinates (filenames are provided in the Validation Lane Survey Log, Appendix D).
    - Images of the dipole fit results (filenames are provided in the Validation Lane Survey Log, Appendix C).

REFERENCES

Sky Research, Inc., 2008. Aerial Magnetometer Survey Operations Plan. Final.

Sky Research, Inc. 2005. Post Collection Final Report, Former Vieques Naval Training Range, LiDAR / Orthophotography Collection. Final. September

Sky Research, Inc. 2008. Final Report: Demonstration of Helicopter Multi-Towed Array Detection System (MTADS) Magnetometry Technology at Pueblo Precision Bombing Range #2, Colorado. ESTCP Project No. 200535: Innovative Multi-Sensor Airborne Wide Area Assessment of UXO Sites. August

APPENDIX A – DATA ACQUISITION LOG

Note: this log is also provided in combination with the data processing log as an Excel[tm] spreadsheet called "CL_SDZ_Data_Acquisition_Data_Processing_log.xls"

Date	Sortie	Site	Line File	Lines	Sensor Operator	Pilot	Gound Support	Data Processor	Project Geophysicist	Comments
12/1/2009	AA	Compensation	OAJ	1	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	Bad Test
12/1/2009	AB	Compensation	OAJ	1	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	300m AGL
12/1/2009	AC	IVS	OAJ	3-6	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	Background Survey
12/1/2009	AD	IVS	OAJ	1-4	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	Background Survey
12/2/2009	AA	IVS	OAJ	1,2	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	1.5m AGL, ignore first line 1
12/2/2009	AB	IVS/Noise	OAJ	1,2	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	2m
12/2/2009	AC	IVS	OAJ	1,2	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	3m
12/2/2009	AD	IVS	OAJ	1,2	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	4m
12/2/2009	AE	IVS	OAJ	1,2	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	5m
12/2/2009	AF	IVS	OAJ	1,2	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	6m
12/2/2009	AG	IVS	OAJ	1,2	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	7m
12/2/2009	AH	IVS	OAJ	1,2	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	8m
12/2/2009	AI	IVS	OAJ	1,2	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	9m
12/2/2009	AJ	IVS	OAJ	1,2	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	10m
12/2/2009	AK	IVS	OAJ	1,2	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	1.5m
12/2/2009	AL	Compensation	OAJ	1	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	300m AGL
12/2/2009	AM	IVS/Noise	OAJ	1,2	Raul Fonda	John Olson	Lars Lofgren	Rob Mehl	Raul Fonda	1.5m bi-directional
12/3/2009	AA	Static	OAJ	1-2	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AB	IVS/Noise	OAJ	1-2	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AC	SDZ	Beta_NN_1	1001-1029	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	

Date	Sortie	Site	Line File	Lines	Sensor Operator	Pilot	Gound Support	Data Processor	Project Geophysicist	Comments
12/3/2009	AD	SDZ	Beta_NN_1	1030-1050	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AE	SDZ	Beta_NN_2	2001-2011	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AF	SDZ	Beta_NN_2	2012-2041	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AG	SDZ	Beta_SS_1	1001-1007	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AH	SDZ	Beta_SS_1	1008-1011	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AI	SDZ	Beta_SS_1	1012-1019	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AJ	SDZ	Beta_SS_1	1020-1028	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AK	SDZ	Beta_SS_1	1029-1039	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AL	SDZ	Beta_SS_1	1040-1047	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AM	SDZ	Beta_SS_1	1048-1049	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AN	SDZ	Beta_SS_1	1050	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AO	SDZ	Beta_SS_2	2001-2009	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AP	SDZ	Beta_SS_2	2010-2021	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AQ	SDZ	Beta_SS_2	2022-2041	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AR	SDZ	Beta_SS_2	2042-2050	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AS	SDZ	Beta_SS_3	3001-3015	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	

Date	Sortie	Site	Line File	Lines	Sensor Operator	Pilot	Gound Support	Data Processor	Project Geophysicist	Comments
12/3/2009	AT	SDZ	Beta_SS_3	3016-3030	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AU	SDZ	Beta_SS_3	3031-3047	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AV	IVS/Noise	OAJ	1-2	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/3/2009	AW	Static	OAJ	1-2	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AA	Static	OAJ		Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AB	IVS/Noise	OAJ		Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AC	SDZ	Beta_SS_3	3048-3050	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AD	SDZ	Beta_SS_4	4001-4008	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AE	SDZ	Delta	1-16	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	strobe on for first 4 lines
12/4/2009	AF	SDZ	Delta	1-4	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AG	SDZ	Charlie	1-18	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AH	SDZ	Charlie	19-25	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AI	SDZ	Alpha_1	1001-1015	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AJ	SDZ	Alpha_1	1016-1023	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AK	SDZ	Alpha_1	1024-1033	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AL	SDZ	Alpha_1	1033-1039	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AM	SDZ	Alpha_1	1040-1046	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AN	SDZ	Alpha_1	1047-1050	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	

Date	Sortie	Site	Line File	Lines	Sensor Operator	Pilot	Gound Support	Data Processor	Project Geophysicist	Comments
12/4/2009	AO	SDZ	Alpha_2	2001-2005	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AP	SDZ	Alpha_2	2006-2013	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AQ	SDZ	Alpha_2	2014-2019	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	Diverting around a house
12/4/2009	AR	SDZ	Alpha_2	2018-2026	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AS	SDZ	Alpha_2	2027-2032	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AT	SDZ	Alpha_2	2033-2045	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AU	SDZ	Alpha_2	2046-2050	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AV	SDZ	Alpha_3	2041-2036	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AW	SDZ	Alpha_3	3001-3008	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/4/2009	AX	IVS/Noise	OAJ	1-2	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	problems with RTK base at OAJ, RTK fix 4 for IVS due to sat issue, too dark to fly once Link came back
12/4/2009	AY	Static	OAJ	1-2	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/5/2009	Weather Day				Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AA	Static/IVS/Noise	OAJ	1-2	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AB	SDZ	Beta_SS_2	2005, 2007, 3035	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AC	SDZ	Alpha_3	3009-3021	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AD	SDZ	Alpha_3	3022-	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	

Date	Sortie	Site	Line File	Lines	Sensor Operator	Pilot	Gound Support	Data Processor	Project Geophysicist	Comments
				3033						
12/6/2009	AE	SDZ	Alpha_3	3034-3040	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AF	SDZ	Alpha_3	3041-3045	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AG	SDZ	Alpha_3	3046-3050	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AH	SDZ	Alpha_4	4001-4009	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AI	SDZ	Alpha_4	4010-4018	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AJ	SDZ	Alpha_4	4019-4024	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	4025-4030 data gap due to boat, will recollect later
12/6/2009	AK	SDZ	Alpha_4	4031-4038	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AL	SDZ	Alpha_4	4039-4048	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AM	SDZ	Alpha_4	4049	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AN	SDZ	Alpha_4	4050	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AO	SDZ	Alpha_5	5001-5008	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AP	SDZ	Alpha_5	5009-5017	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AQ	SDZ	Alpha_5	5018-5023	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AR	SDZ	Alpha_5	5024-5030	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AS	SDZ	Alpha_5	5031-5036	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AT	SDZ	Alpha_4	4025	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	boat in way

Date	Sortie	Site	Line File	Lines	Sensor Operator	Pilot	Gound Support	Data Processor	Project Geophysicist	Comments
12/6/2009	AU	SDZ	Alpha_5	5037-5042	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AV	SDZ	Alpha_5	5043-5050	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AW	SDZ	Alpha_6	6001-6006	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AX	SDZ	Alpha_6	6007-6011	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AY	SDZ	Alpha_6	6012-6018	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	AZ	SDZ	Alpha_6	6019-6025	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/6/2009	BA	Compensation/ noise	OAJ	1-4	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	strobes on no data
12/6/2009	BB	Compensation/ noise	OAJ	1-4	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	strobes off
12/6/2009	BC	IVS	OAJ	1-2	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	GPS Fix 4
12/6/2009	BD	Static	OAJ	1-2	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	GPS Fix 4
12/7/2009	AA	Static	OAJ	1-2	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AB	IVS	OAJ	1-2	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AC	Noise	OAJ	12	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AD	SDZ	Alpha_4	4025-4030	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AE	SDZ	Alpha_6	6026-6033	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AF	SDZ	Alpha_6	6034-6041	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AG	SDZ	Alpha_6	6042-6050	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	

Date	Sortie	Site	Line File	Lines	Sensor Operator	Pilot	Gound Support	Data Processor	Project Geophysicist	Comments
12/7/2009	AH	SDZ	Alpha_7	7001-7010	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AI	SDZ	Alpha_SW	1-39	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AJ	SDZ	Delta_East	1-9	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AK	SDZ	Beta_SW	1-12	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AL	SDZ	Beta_SW	13-34	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AM	SDZ	Beta_SW	35-36	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	Birds
12/7/2009	AN	SDZ	Beta_SW	36-50	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AO	SDZ	Beta_W	1001-1015	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AP	SDZ	Beta_W	1016-1025	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AQ	SDZ	Beta_W	1026-1035	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AR	SDZ	Beta_W	1036-1050	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AS	SDZ	Beta_W	2001-2015	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AT	SDZ	Beta_W	2016-2039	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AU	Compensation	IVS	1	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AV	Noise	IVS	1	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AW	IVS	IVS	1-2	Lars Lofgren	John Olson	Raul Fonda	Rob Mehl	Raul Fonda	
12/7/2009	AX	Static	IVS	1	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	
12/8/2009	AA	Static	IVS	1-2	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	
12/8/2009	AB	IVS	IVS	1-2	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	
12/8/2009	AC	Noise	IVS	1	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	

Date	Sortie	Site	Line File	Lines	Sensor Operator	Pilot	Gound Support	Data Processor	Project Geophysicist	Comments
12/8/2009	AD	SDZ	Beta_NN	1-5,7,9,11,13,15,17,19	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	Re-flights
12/8/2009	AE	Noise	IVS	1	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	
12/8/2009	AF	IVS	IVS	1-2	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	
12/8/2009	AG	Static	IVS	1-2	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	Lars Lofgren	

APPENDIX B – DATA PROCESSING LOG

Note: this log is also provided in combination with the data Acquisition log as an Excel[tm] spreadsheet called "CL_SDZ_Data_Acquisition_Data_Processing_log.xls"

Field Notes		Data Processing Notes						
Date	Sortie	Demedian Window	Low Pass Window	Aeromag. Comp.	Site Database	Grid name	Archive name	Gaps >0.4
12/1/2009	AA	30 pt	5 pt	Yes				
12/1/2009	AB	30 pt	5 pt	Yes				
12/1/2009	AC	30 pt	5 pt	Yes				
12/1/2009	AD	30 pt	5 pt	Yes				
12/2/2009	AA	30 pt	5 pt	Yes				
12/2/2009	AB	30 pt	5 pt	Yes				
12/2/2009	AC	30 pt	5 pt	Yes				
12/2/2009	AD	30 pt	5 pt	Yes				
12/2/2009	AE	30 pt	5 pt	Yes				
12/2/2009	AF	30 pt	5 pt	Yes				
12/2/2009	AG	30 pt	5 pt	Yes				
12/2/2009	AH	30 pt	5 pt	Yes				
12/2/2009	AI	30 pt	5 pt	Yes				
12/2/2009	AJ	30 pt	5 pt	Yes				
12/2/2009	AK	30 pt	5 pt	Yes				
12/2/2009	AL	30 pt	5 pt	Yes				
12/2/2009	AM	30 pt	5 pt	Yes				
12/3/2009	AA	30 pt	5 pt	Yes				
12/3/2009	AB	30 pt	5 pt	Yes				
12/3/2009	AC	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AD	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AE	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AF	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AG	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%

Field Notes		Data Processing Notes						
12/3/2009	AH	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AI	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AJ	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AK	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AL	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AM	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AN	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AO	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AP	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AQ	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AR	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AS	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AT	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AU	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/3/2009	AV	30 pt	5 pt	Yes				
12/3/2009	AW	30 pt	5 pt	Yes				
12/4/2009	AA	30 pt	5 pt	Yes				
12/4/2009	AB	30 pt	5 pt	Yes				
12/4/2009	AC	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/4/2009	AD	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/4/2009	AE	30 pt	5 pt	Yes	CL_Delta.GDB	SDZ_Delta_final.GRD	SDZ_Delta_final.XYZ	<0.1%
12/4/2009	AF	30 pt	5 pt	Yes	CL_Delta.GDB	SDZ_Delta_final.GRD	SDZ_Delta_final.XYZ	<0.1%
12/4/2009	AG	30 pt	5 pt	Yes	CL_Charlie.GDB	SDZ_Charlie_final.GRD	SDZ_Charlie_final.XYZ	<0.1%
12/4/2009	AH	30 pt	5 pt	Yes	CL_Charlie.GDB	SDZ_Charlie_final.GRD	SDZ_Charlie_final.XYZ	<0.1%
12/4/2009	AI	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AJ	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AK	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AL	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%

Field Notes		Data Processing Notes						
12/4/2009	AM	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AN	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AO	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AP	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AQ	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AR	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AS	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AT	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AU	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AV	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AW	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/4/2009	AX	30 pt	5 pt	Yes				
12/4/2009	AY	30 pt	5 pt	Yes				
12/5/2009	Weather Day							
12/6/2009	AA	30 pt	5 pt	Yes				
12/6/2009	AB	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/6/2009	AC	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AD	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AE	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AF	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AG	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AH	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AI	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%

Field Notes		Data Processing Notes						
12/6/2009	AJ	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AK	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AL	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AM	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AN	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AO	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AP	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AQ	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AR	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AS	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AT	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AU	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AV	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AW	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AX	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AY	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	AZ	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/6/2009	BA	30 pt	5 pt	Yes				
12/6/2009	BB	30 pt	5 pt	Yes				
12/6/2009	BC	30 pt	5 pt	Yes				
12/6/2009	BD	30 pt	5 pt	Yes				
12/7/2009	AA	30 pt	5 pt	Yes				
12/7/2009	AB	30 pt	5 pt	Yes				
12/7/2009	AC	30 pt	5 pt	Yes				

Field Notes		Data Processing Notes						
12/7/2009	AD	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/7/2009	AE	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/7/2009	AF	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/7/2009	AG	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/7/2009	AH	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/7/2009	AI	30 pt	5 pt	Yes	CL_Alpha.GDB	SDZ_Alpha_final.GRD	SDZ_Alpha_final.XYZ	<0.1%
12/7/2009	AJ	30 pt	5 pt	Yes	CL_Delta.GDB	SDZ_Delta_final.GRD	SDZ_Delta_final.XYZ	<0.1%
12/7/2009	AK	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/7/2009	AL	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/7/2009	AM	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/7/2009	AN	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/7/2009	AO	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/7/2009	AP	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/7/2009	AQ	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/7/2009	AR	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/7/2009	AS	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/7/2009	AT	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/7/2009	AU	30 pt	5 pt	Yes				
12/7/2009	AV	30 pt	5 pt	Yes				
12/7/2009	AW	30 pt	5 pt	Yes				
12/7/2009	AX	30 pt	5 pt	Yes				
12/8/2009	AA	30 pt	5 pt	Yes				
12/8/2009	AB	30 pt	5 pt	Yes				
12/8/2009	AC	30 pt	5 pt	Yes				
12/8/2009	AD	30 pt	5 pt	Yes	CL_Beta.GDB	SDZ_Beta_final.GRD	SDZ_Beta_final.XYZ	<0.1%
12/8/2009	AE	30 pt	5 pt	Yes				
12/8/2009	AF	30 pt	5 pt	Yes				
12/8/2009	AG	30 pt	5 pt	Yes				

APPENDIX C – DATA ANALYSIS LOG

Note: this log is also provided in combination with the data Acquisition log as an Excel[tm] spreadsheet called "CL_SDZ_Data_Analysis_Log.xls"

Total Magnetic Field Data			Target Selections							Dipole Fit Analysis		
Site	Grid (*.grd)	Archive (*.xyz)	Method	Analytic Signal Grid (*.grd)	AS Threshold (nT/m^2)	Manual Selection Analyst	Prelim. List Name (*.xyz)	Target Selection QC	Final List Name (*.xyz)	Dipole Fit Analyst	Dipole Fit QC	Output file (*.csv)
Alpha	SDZ_Alpha_Final	SDZ_Alpha_Final	AS pk /manual	SDZ_Alpha_AS_Final	1.5	RMehl	SDZ_Anomalies	DWright	SDZ_Anomalies_QC	SMcNamara	Dwright	CL_SDZ_Target_list_QC
Beta	SDZ_Beta_Final	SDZ_Beta_Final	AS pk /manual	SDZ_Beta_AS_Final	1.5	RMehl	SDZ_Anomalies	DWright	SDZ_Anomalies_QC	SMcNamara	Dwright	CL_SDZ_Target_list_QC
Charlie	SDZ_Charlie_Final	SDZ_Charlie_Final	AS pk /manual	SDZ_Charlie_AS_Final	1.5	RMehl	SDZ_Anomalies	DWright	SDZ_Anomalies_QC	SMcNamara	Dwright	CL_SDZ_Target_list_QC
Delta	SDZ_Delta_Final	SDZ_Delta_Final	AS pk /manual	SDZ_Delta_AS_Final	1.5	RMehl	SDZ_Anomalies	DWright	SDZ_Anomalies_QC	SMcNamara	Dwright	CL_SDZ_Target_list_QC

GIS Mapping		
Map Products	GIS Production	GIS QC
Survey Altitude	PHille	DWright
De-median Filtered TMF	PHille	DWright
Analytic Signal	PHille	DWright
Anomaly Locations (orthophoto base)	PHille	DWright
Anomaly Density	PHille	DWright

APPENDIX D – VALIDATION LANE SURVEY LOG

Note: this log is also provided in combination with the data Acquisition log as an Excel[tm] spreadsheet called "Validation_Lane_Survey_Log_Final.xls"

Client: CH2M Hill Site: Camp Lejeune								Data Quality Objectives					
		Dipole Fit Results											
		Target Positioning		Target Size		Dipole angle		Lag test		Intrinsic Noise			
Date	File	Average Error (m)	< 0.5m ?	Average Variation (%)	<20% ?	Average Variation (degrees)	<20 degrees ?	Complete / Incomplete	Reference Image (.pdf)	20 sec Stdev	<1.0 nT ?	xyz Data Files	notes
2-Dec-09	D336AA	0.14	Pass	3%	Pass	0.83	Pass	Complete	D336AA_report	0.18	Pass	D336AA_Noise	
2-Dec-09	D336AM	0.17	Pass	2%	Pass	0.76	Pass	Complete	D336AM_report	0.13	Pass	D336AM_Noise	
3-Dec-09	D337AB	0.15	Pass	10%	Pass	3.88	Pass	Complete	D337AB_report	0.16	Pass	D337AB_Noise	
3-Dec-09	D337AV	0.12	Pass	3%	Pass	0.92	Pass	Complete	D337AV_report	0.12	Pass	D337AV_Noise	
4-Dec-09	D338AB	0.13	Pass	6%	Pass	1.13	Pass	Complete	D338AB_report	0.13	Pass	D338AB_Noise	
4-Dec-09	D338AX	Bad GPS						Incomplete	NA	0.19	Pass	D338AX_Noise	No GPS at end of day (poor constellation)
6-Dec-09	D340AA	0.12	Pass	3%	Pass	1.04	Pass	Complete	D340AA_report	0.11	Pass	D340AA_Noise	
6-Dec-09	D340BC	Bad GPS						Incomplete	NA	0.1	Pass	D340BB_Noise	No GPS at end of day (poor constellation)
7-Dec-09	D341AB	0.12	Pass	3%	Pass	1.25	Pass	Complete	D341AB_report	0.12	Pass	D341AC_Noise	
7-Dec-09	D341AW	0.13	Pass	3%	Pass	0.88	Pass	Complete	D341AW_report	0.15	Pass	D341AV_Noise	
8-Dec-09	D342AB	0.14	Pass	9%	Pass	1.48	Pass	Complete	D342AB_report	0.13	Pass	D342AC_Noise	
8-Dec-09	D342AF	0.14	Pass	7%	Pass	1.24	Pass	Complete	D342AF_report	0.17	Pass	D342AE_Noise	

APPENDIX E – DAILY FIELD NOTES

November 30, 2009
Below is an updated schedule for the next few days.

Tuesday
HeliMag system assembly, setup GPS control point at OAJ, background survey IVS, layout IVS Items

Wednesday
IVS surveys, GPS IVS items
80% chance of rain

Thursday
Begin SDZ Survey

December 1, 2009
Left hotel 0800, unpacked equipment trailer, setup GPS base station for OAJ IVS, 0930 started system assembly at OAJ, continued assembly until 1300, trailer fuel tank arrived, system (DAS) boot no issues. After sensor checks, started helicopter and collected high alt compensation flight and background surveys over the 2 possible IVS areas at OAJ. Returned to hotel at 1800.

John Olson contacted and visited Duane Richardson with Camp Lejeune Range Control for a pilot briefing. Andy Gascho with CH2 was at OAJ for HeliMag assembly and test flight, Andy accompanied John on base to the meeting with Duane Richardson.

Plan for Wednesday Dec 2nd D09336.
Leave Hotel 0600
Setup GPS base at Shell Rock HLZ 0700
Continue to OAJ, GPS Survey IVS Items
HeliMag IVS survey 1-10m AGL
Begin SDZ if weather allows, will start in Delta Work area.

December 2, 2009
Left hotel 0630 setup GPS Base Station at HLZ, dropped off repeater for CH2. Mobilized to OAJ, arrived 0900, John notified Camp Lejeune and Cherry Point Range Control of our possible survey work. Lifted 0945 conducted IVS surveys from 1 to 10m AGL. Landed 1030, started to rain hard, did not mobilize to SDZ work area. Called day due to weather at 1100. Picked up Base at HLZ returned to hotel.

Tomorrow Thursday D09337
Prepared to lift 0645
Raul and Rob to HLZ to setup GPS Base and Repeater.
Based on discussions with range control the restricted weekend airspace is available for collection.
Raul and Rob to OAJ to shoot in IVS items after SDZ survey begins.
Danny will remain at HLZ for refueling.

December 3, 2009
Great Day, 7.9 hours of flying 455 acres.

Issues getting on OAJ ramp, will contact fuel guy directly for access. Lift from OAJ @0720, Surveyed IVS, headed to H1 Restricted Airspace. Surveyed in H1 Restricted Airspace entire day, only 22 acres remain in the H1 Restricted Airspace. Used 250 gallons of Jet-A from the 150 gallon portable tank this required a mid-day trip to OAJ. Landed for last fuel at 16:15 headed back to OAJ for IVS.

Fuel stops at 0845, 1040, 1230 lunch, 1430, 1615.
GPS located at HLZ and 1 Repeater located at Willis Landing.
IVS lane at OAJ was GPS surveyed this afternoon.
Plan for Friday D09338
Prepared to lift 0645
Continue in H1 Restricted Airspace if Blackburn allows.
Move to Small Survey areas to the NW, then large area.
GPS base and repeaters same locations.

December 4, 2009
Another Great Day, 7.9 flight hours, 460 acres, 915 acres total.

0630 Helicopter crew at OAJ, issues again getting on ramp and access to the helicopter, complete preflight, contact range control, Lift from OAJ @ 0720, collect IVS and head to site. During First Flight completed collection in the H1 Restricted Airspace and one of the smaller areas on Bear River. Vegetation was an issue on some of the lines in the Bear River Survey Areas. During the next flights completed data collection in the second area on the Bear River and started the long lines in the main portion of the site not affected by the H1 Airspace Restriction. Off site for demob to OAJ at 1620, helicopter on ground after IVS @ 1700.

GPS base station was set up at LZ, with a repeater at Willis Landing. Used 248 gallons of Jet-A with the portable tank. Raul and Rob attended the morning safety brief with CH2MHill, provided site safety an Air-2-Ground Radio for flight operations and avoidance monitoring.

Data Collection Plan
Tomorrow Saturday D09339
Rain and strong winds most of the day, will assess in the AM.

Sunday D09340
Continue working in large area outside H1 Airspace Restriction.
Prepared to lift at 0645
GPS base set up at LZ, with a repeater at Willis Landing.

December 5, 2009
Due to rain we will not be able to collect any data today.

Plan for Sunday D09340
Continue working in large area outside H1 Airspace Restriction.
Prepared to lift at 0645
GPS base set up at LZ, with a repeater at Willis Landing.

December 6, 2009
Another Great Day 8.1 hours, 499 acres. Very cold morning, below freezing at OAJ.

Lift from OAJ @ 0720, onsite @ 0750 land to fix helmet mic. Noise on RTK GPS Freq, changed to 462.1250. Collected 3 reflights in H1 Restricted Airspace then surveyed outside the H1 Restricted Airspace the entire day. Problem with a boat on 5 lines, during the afternoon. Landed for Fuel at 0835, 1020, 1205, Lunch, 1430 and 1615. Helicopter left LZ at 1630. GPS Base and Repeater setup at LZ and Willis Landing.

Plan for Monday D09341
50% Chance of Rain
Finish remaining acreage.
Reflights, gap fill-ins if necessary.

December 7, 2009
Lift 0820 from OAJ, finish up collection in non restricted airspace, discovered shape file boundary issue with HeliMag survey, once correct boundary found, created new flight areas to fill in the data gaps. Completed data collection of SDZ and data gaps at 1600.

Fuel Stops at 1015, 1330, 1600.
Collected 363 acres, in 6.1 hrs.

Tomorrow D09342
Wait for GPS and altitude data gaps that need to be collected.

December 8, 2009
Completed reflights due to GPS and altitude gaps.

APPENDIX F – AIRCRAFT MANEUVER NOISE COMPENSATION

Each of the magnetometers on the boom of the helicopter senses not only the magnetic field of the earth but also distortions caused by the helicopter platform itself. The platform magnetic field is of no interest and can represent a significant noise source. Because the platform magnetic field depends primarily on the attitude of the vehicle relative to the earth's magnetic field, the effects of the platform are often called "heading errors". For low-level surveys for detection of ordnance we are only concerned about changes in the magnetic field of the helicopter that have spatial scales comparable to the wavelengths of the items of interest. We thus prefer to use the term maneuver noise.

There are three major components to the maneuver noise in a helicopter:

1) Permanent magnetization: So-called "permanent fields" actually arise from two sources: the permanently magnetized material in the helicopter, and the effects of current-carrying conductors, usually the major electrical feeds in the aircraft. As far as a magnetometer is concerned, these are indistinguishable.

2) Induced magnetization: The induced fields arise because of the interaction between the earth's magnetic field and the magnetically permeable material in the helicopter.

3) Eddy currents: Metallic surfaces of the helicopter act as conductive loops. When the helicopter orientation in the earth's magnetic field changes, so does the magnetic flux contained by these loops, and a secondary magnetic field is generated according to Lenz's Law. Unless the magnetometer is very close to a large conductive surface, these eddy current effects are generally at most a few tenths of a nanoTesla under normal survey conditions.

The first two effects can be modeled with knowledge of the attitude of the helicopter (easily measured with a flux-gate magnetometer), while the eddy current effect requires the rate of change of the helicopter attitude (obtained through the time-history of the flux-gate data).

In order to evaluate the components of the helicopter magnetic field as just described, it is necessary to acquire data in which these effects are enhanced and the interference of other sources, such as geology, is minimized. For this purpose, a compensation flight is performed in an area with low geological gradients. For aircraft, the compensation flight is carried out at as high an altitude as is feasible. The aircraft flies along the four sides of a square surrounding the compensation point, turning sharply at the end of each leg. Along each leg of the pattern, it is desirable to acquire roughly 30 seconds of data while performing each of: yaws of at least 5 degree amplitude, pitches of at least 5 degree amplitude, and rolls of at least 10 degree amplitude.

The magnetic field data from each sensor, along with the aircraft attitude and altitude are continuously recorded. A well-known 18 term model is then fit to the observed data and defines the maneuver noise characteristics of the helicopter. As shown in Figure F-1, the maneuver effects are on the order of ± 25 nT for the outer sensors and ± 150-200 nT for the inner sensors. After compensation, the standard deviation in each of the sensors was around 0.4 to 0.5 nT, with Improvement Ratios (ratio of standard deviations before/after compensation) of between 40 and 220. It is of note that the maneuvers conducted during

the compensation calibration flights are much more severe than those generally encountered during data acquisition. Thus the residual signal of 0.4 to 0.5 nT are expected to be well beyond the 'worst case' scenario encountered during the course of the survey.

(a) Outer sensor (b) Inner sensor

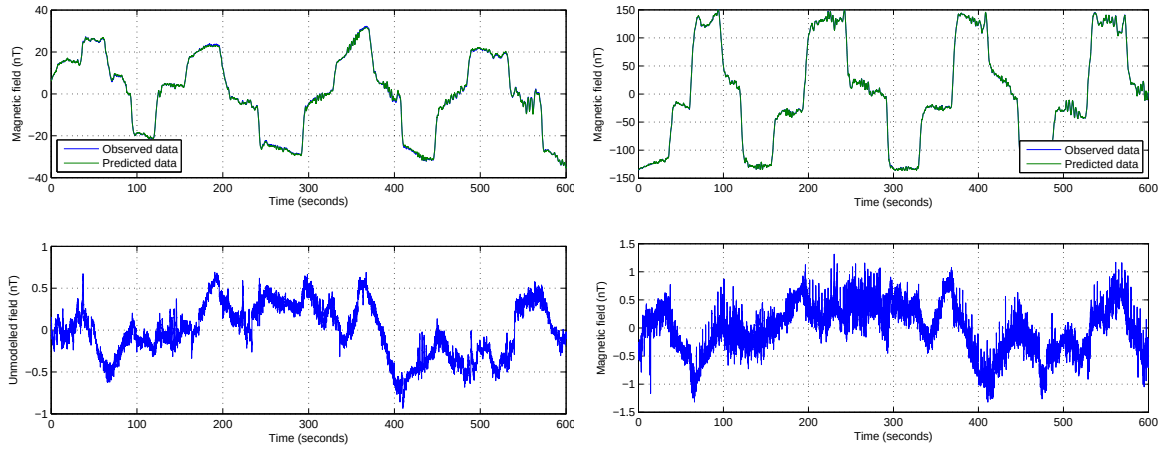


Figure F-1. Top panels show the observed and predicted data during the aeromagnetic compensation calibration flight for (a) outer sensor and (b) inner sensor. The bottom panels show the corrected magnetic field data (observed minus predicted data). For the outer sensor the standard deviation was 18.5 nT before compensation and 0.45 nT afterwards (giving an Improvement Ratio of 41). For the inner sensor the Improvement ratio was 219, with before/after standard deviations of 94 nT and 0.43 nT respectively.

APPENDIX G – MAP PRODUCTS

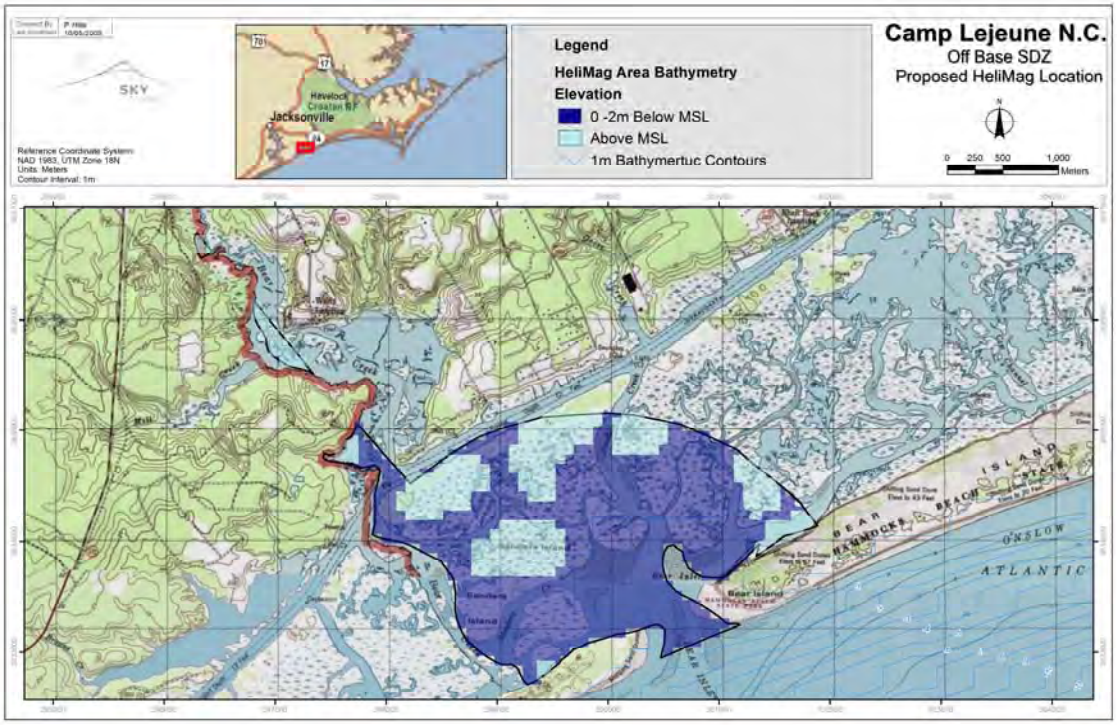


Figure 16. Off-Base SDZ HeliMag survey area boundaries

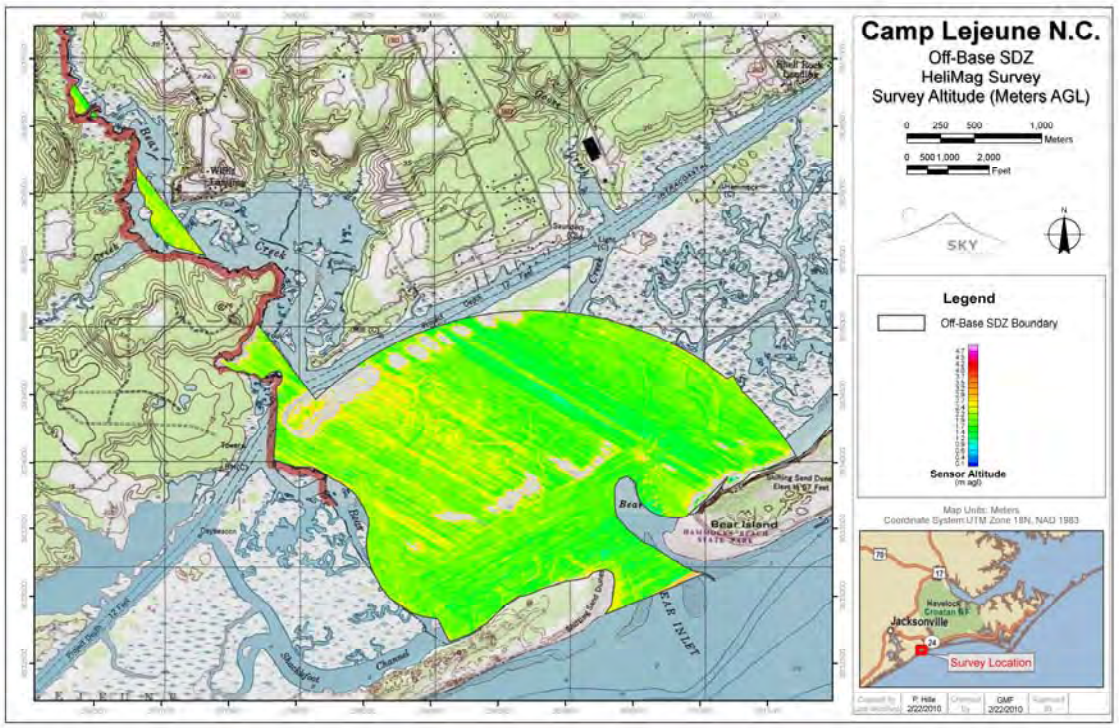


Figure 17. Sensor survey altitude above ground level/water surface. Data collected at altitudes higher than 3m AGL have been rejected

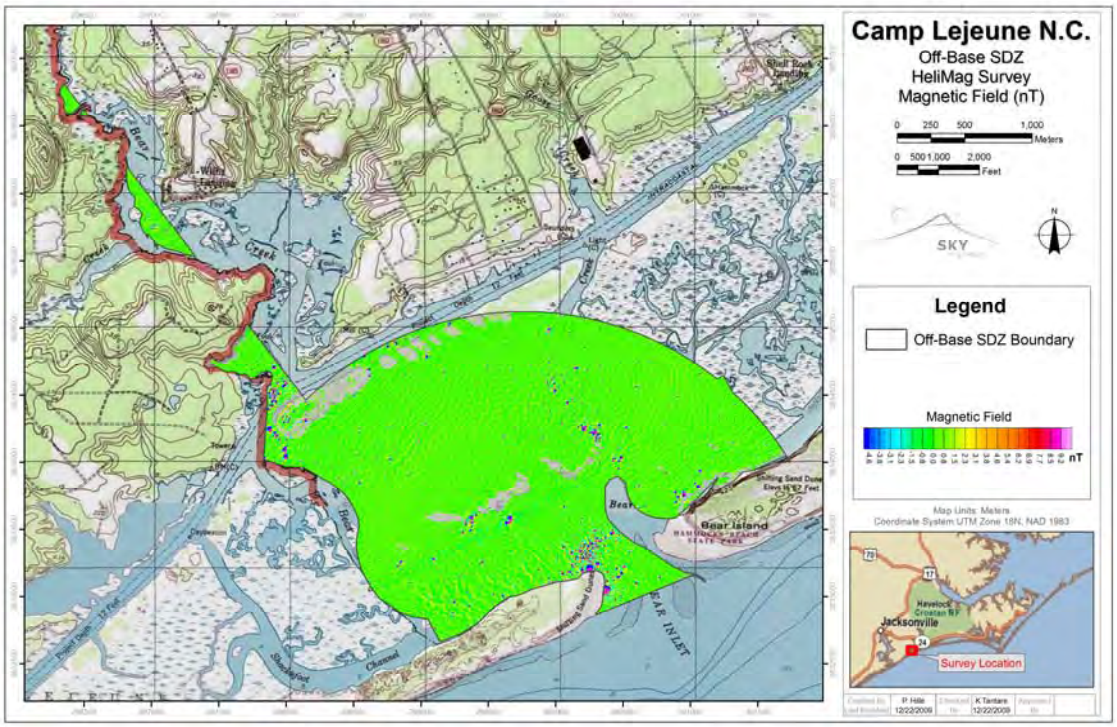


Figure 18. De-median filtered total magnetic field image. Areas where the helicopter was forced to fly higher than 3m AGL have been excluded from the final image.

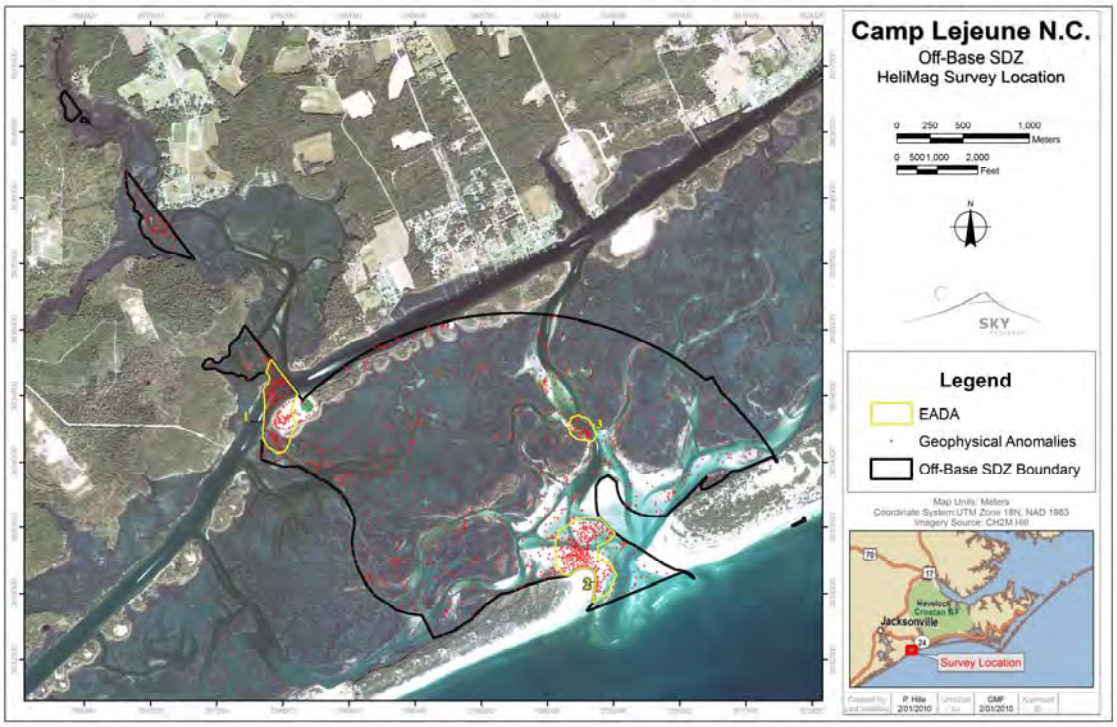


Figure 19. Anomaly locations overlaying an ortho-photographic image of the survey site.

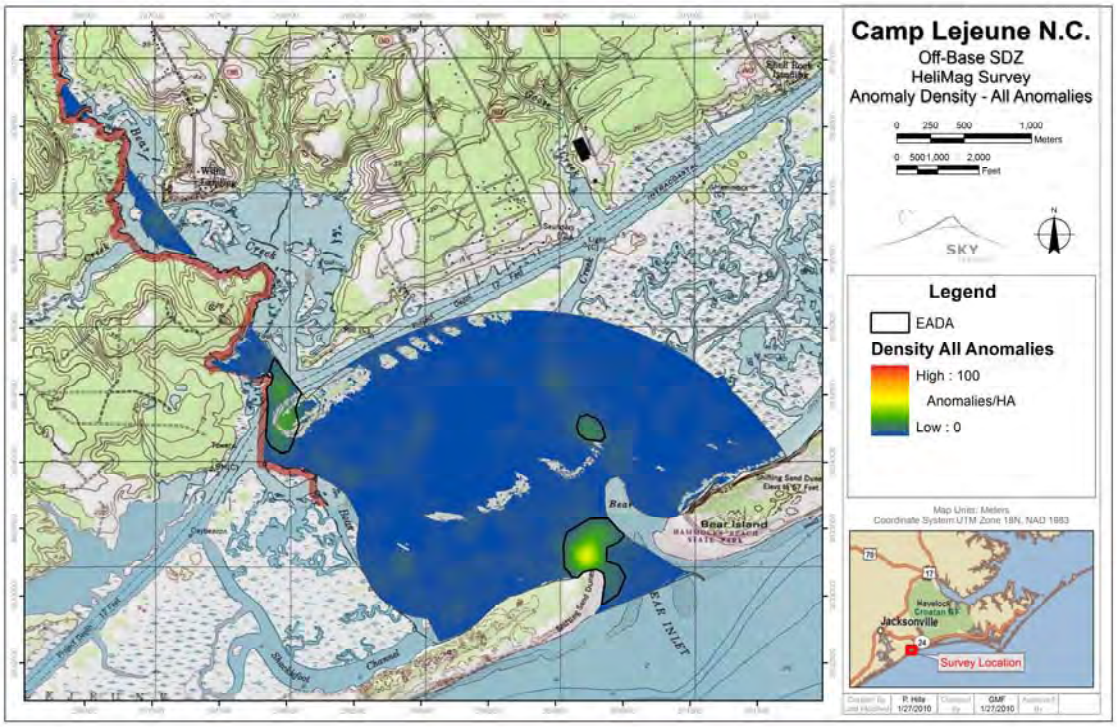


Figure 20. Anomaly density map. 3 EADAs are identified. Gaps in the density maps are due to lack of survey coverage at 3m AGL or below.

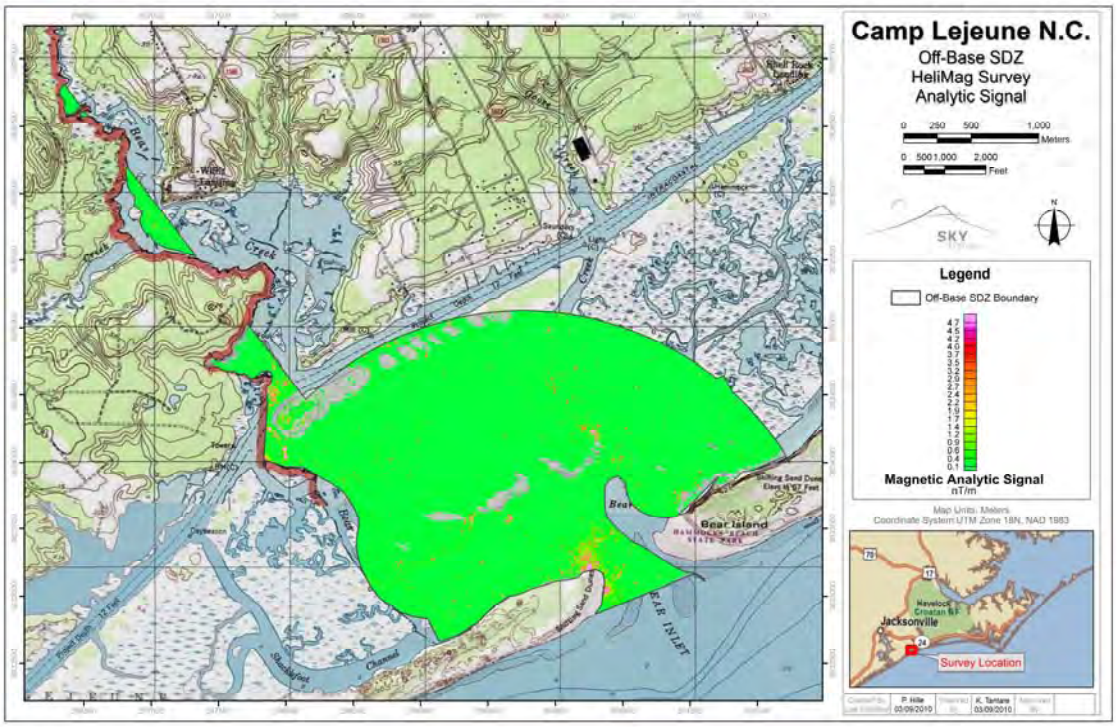


Figure 16. Magnetic Analytic Signal Data

Final Report

Airborne Geophysical Survey

over

Bear Island, North Carolina

January 2010

Version 2

Prepared for

Bristol Construction Services, LLC

by

Battelle-Oak Ridge Operations



Executive Summary

In October, 2009, Battelle flew a low-altitude airborne geophysical survey over Bear Island, on the North Carolina coast, about eighteen miles southeast of Jacksonville, NC. The objective of the survey was to detect and map both surface, underwater, and buried munitions and explosives of concern (MEC) and munitions debris (MD) over approximately 200 acres of Bear Island at Camp Lejeune, North Carolina on behalf of Bristol Construction Services, LLC ("Bristol"). The detection objectives included individual, groupings, and clusters of MEC and MD ranging from 40mm grenades to 2000-lb bombs.

This project involved the application of an airborne vertical magnetic gradient system and an airborne time-domain electromagnetic system that have been successfully deployed at a number of MEC- and MD-contaminated sites, including neighboring Browns Island at Camp Lejeune, North Carolina. Both of these systems were successfully deployed here in a 2007 airborne project.

The vertical magnetic gradient survey used the Battelle boom-mounted VG-22 high-resolution system, with a 1.0m sensor spacing. Background magnetic variation was low, and 208 magnetic anomalies were detected equal to or above a threshold of 0.25nT/m. The electromagnetic survey used the Battelle TEM-8 time-domain induction system with a 0.75m sensor spacing. Background conductivity was highly variable with strong conductors running parallel to the shore caused by saltwater channels. These effects were very broad and were successfully removed prior to data analysis. A total of 136 electromagnetic anomalies were detected equal to or above a threshold of 0.3ppm. A total of 5 anomalies included both magnetic and electromagnetic responses. No immediate excavation was conducted to pursue subsurface anomalies.

Survey altitudes above ground level varied with vegetation for both systems. Large portions of the site were covered with dense brush that forced flight heights of several meters above normal UXO detection levels. These areas have been marked on the final maps to indicate that an absence of response does not necessarily indicate a low risk of ordnance encounter.

A Geophysical Prove-Out (GPO) line of inert ordnance items was established at Ellis Airport to verify proper system operation. To our knowledge, no blind seed control items were placed in the survey area.

Final data deliverables include digital data, geophysical maps of the collected data and a prioritized list of target anomalies.

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Appendix A – Target Anomaly List

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Attachment 3 – Anomaly Maps
Attachment 4 – Digital data (on DVD)

List of Acronyms

AS	Analytic signal
ASCII	American Standard Code for Information Interchange
EOD	Explosive Ordnance Disposal
GIS	Geographic Information System
GPO	Geophysical Prove-Out
GPS, DGPS	(Differential) Global Positioning System
HAE	Height Above Ellipsoid
Hz	Hertz, a unit of frequency
IMU	Inertial Measurement Unit
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
NAD83	North American Datum 1983
NAVD88	North American Vertical Datum 1988
NOAA	National Oceanic and Atmospheric Administration
nT/m	nanoTeslas per meter, a unit of magnetic gradient
ppm	parts per million, a unit of EM response
QA	Quality Assurance
QC	Quality Control
TEM-8	Time-domain Electromagnetic airborne system
TIF, GeoTIF	(Geographically referenced) Tagged Information File
UTM	Universal Transverse Mercator
UXO	Unexploded ordnance
VG	Vertical gradient (magnetic)
VG-16	Magnetic Vertical Gradient airborne system with 16 total sensors in 8 gradient pods
VG-22	Magnetic Vertical Gradient airborne system with 22 total sensors in 11 gradient pods

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1. Introduction

1.1. Background and Project Objectives

This report describes an airborne geophysical survey using Battelle's high-resolution magnetic gradient helicopter geophysical system and Battelle's time-domain electromagnetic helicopter system.

The objective of the survey was to detect and map surface, underwater, and buried munitions and explosives of concern (MEC) and munitions debris (MD) over approximately 200 acres of Bear Island at Camp Lejeune, North Carolina on behalf of Bristol Construction Services, LLC ("Bristol"). The detection objectives included individual, groupings, and clusters of MEC and MD ranging from 40mm grenades to 2000-lb bombs. Although the data are sufficient to localize potential sources to an accuracy of a few 10s of cm so as to permit subsequent reacquisition of anomalies of interest, the primary purpose of the wide-area assessment was to determine potential areas of concern with respect to ordnance-related contamination.

It is important for users of these data to understand the limitations in using airborne geophysical data. A lack of geophysical anomalies in an area should not be used to infer that an area is entirely devoid of ordnance contamination. A lack of anomalies may indicate ordnance types too small to be detected – such as scattered 20mm rounds – or that magnetic responses were not strong enough because survey altitudes were too high (e.g., over some islands and other obstacles) or that ordnance were buried too deeply to be detected.

1.2. Project Site History and Description

Bear Island is located adjacent to the BT-3/N-1 impact area, within Hammocks Beach State Park and adjacent to Browns Island, a former bombing and artillery range at Camp Lejeune, in use from the 1940's through the 1980's. Unexploded ordnance (UXO), ranging from 40mm grenades to 2000-lb bombs were used at Browns Island, and were thought to be located throughout the salt marsh, tidal creek, and tidal flats areas of the southern end of Bear Island.

The survey area consists of a single survey block totaling approximately 200 acres. This survey block is relatively flat, free of tall vegetation, and consists of salt marsh, tidal creeks, and tidal flats. The survey area is denoted as "Area B" in Figure 1.

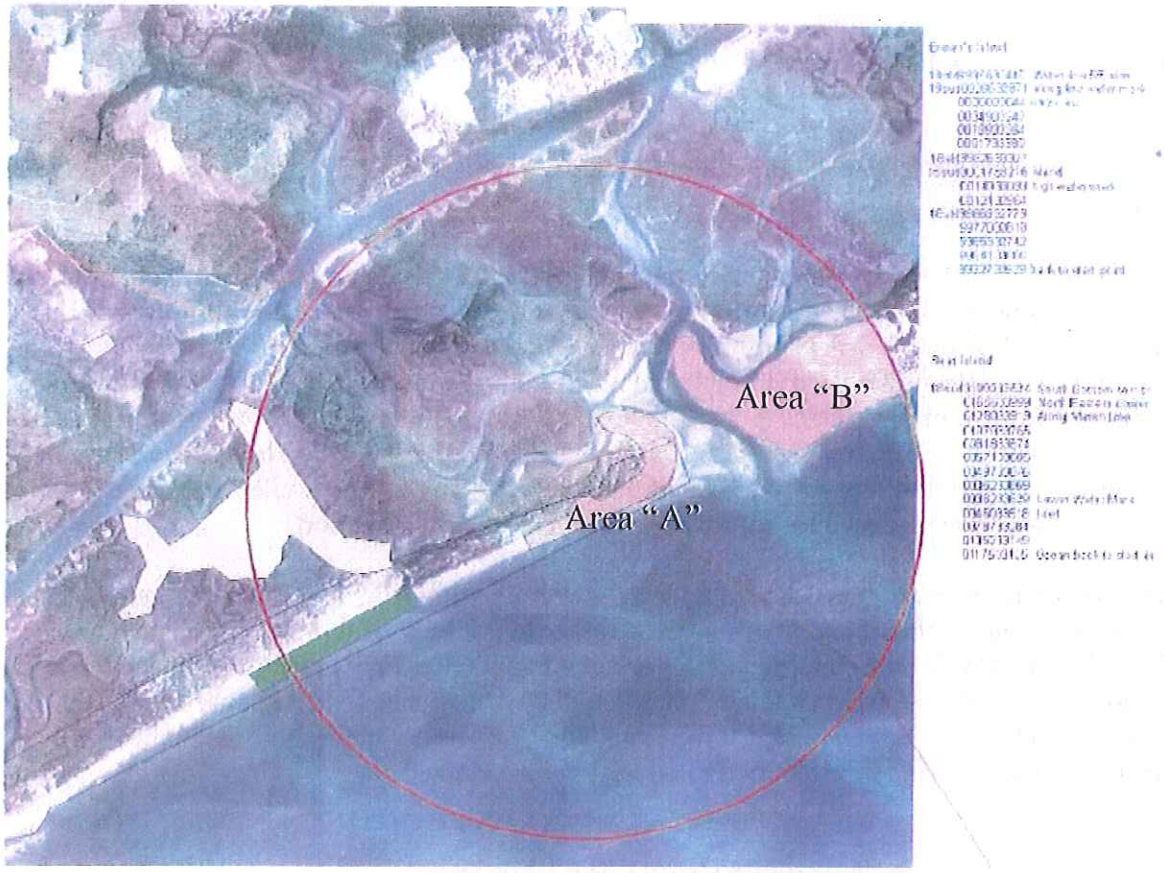


Figure 1: Airphoto of Bear Island survey site (Area B). Area A is not part of the survey area.

1.3. Site Geology

The geology is largely fine grain sands and sediments without strong magnetic signatures, although previous work in the area has uncovered a quantity of magnetic rocks and cobbles that appear in the airborne magnetic data. The electromagnetic system is largely immune to these geologic effects, but is more sensitive to vegetation and salt water.

1.4. Site Weather, Vegetation and Topography

Bear Island vegetation is largely salt marsh reeds and a few isolated shrubs and trees. The topography is relatively flat with sandy dunes. Battelle was unable to visit the site prior to mobilization, and the vegetation was denser and much taller than anticipated. This forced an increase in survey elevation above 5m over much of the site.

Historically, wind speeds at this time of year are near their lowest annual levels (average 8 mph), as is precipitation (3.5 inches/month). Temperatures range from an average overnight low of 50°F to daytime highs of 70°F. During the actual survey time, winds were sufficiently high to

restrict flying to a single direction and occasionally prohibited flying altogether. Rain and fog also caused noticeable delays. Ultimately, the survey was completed without requiring a schedule extension on range, due largely to the early completion of Navy exercises (October 29) which provided the necessary additional flight window, and availability of a remote refueling site in close proximity to the survey site.

2. Airborne Vertical Magnetic Gradient System

The airborne system used for magnetic data acquisition was the VG-22, developed and operated by Battelle. This system, shown in Figure 2.1, consists of eleven vertical gradiometers; each consisting of a pair of cesium magnetometers vertically offset 50 cm from one another. The gradient arrangement serves to reject much of the magnetic noise caused by the magnetized helicopter rotor. The seven gradient pods mounted in the forward boom have 1.0m horizontal separation and constitute the primary sensor array. This provides the greatest possible sensitivity and positional accuracy for detection of small targets or weak signals. The lateral booms have 1.7m spacing and are used to supplement small gaps in the data coverage.

The VG-22 system has been certified by the Federal Aviation Agency for use on a Bell 206 Long Ranger helicopter. It is flown as low to the earth's surface as safety permits, typically 1-2 meters above ground level, in pre-programmed traverses over the survey areas. Typical survey speeds are 20 m/s. Flight lines were spaced 6m apart. Airborne magnetic data are acquired during daylight hours only.

The data positioning and system orientation (pitch, roll, azimuth) is based on an integrated Global Positioning System (GPS) / Inertial Measurement Unit mounted on the centerline of the helicopter. A fluxgate magnetometer is mounted in the forward assembly to compensate for the magnetic signature of the aircraft. A laser altimeter is mounted beneath the helicopter to monitor sensor height above the ground, or in this survey, water. Data are recorded digitally on the console inside the helicopter in a binary format. The magnetometers are sampled at a 1200Hz sample rate and desampled to 120Hz to allow sufficient bandwidth to eliminate helicopter rotor noise.



Figure 2: The Battelle VG-22 vertical magnetic gradient system.

3. Airborne Electromagnetic System

The Battelle TEM-8 system is contained within a 3 by 12 m rectangular boom structure with a two-lobed transmitter loop composed of two 3 by 4 m rectangles. There are four receivers on each side of the aircraft, located within 4 m tube segments that are oriented parallel to the long axis of the boom structure (Figure 3). A current is established in the transmitter loop, then rapidly switched off, inducing a secondary magnetic field in the earth, the decay of which is measured in the receiver coils. Because the central third of the boom structure directly under the helicopter is inactive, it is necessary to interleave flight lines in order to achieve full coverage of the underlying subsurface.

The TEM-8 transmitter produces an alternating "castle" type waveform with a 225Hz base frequency. Alternating positive and negative "on-time" current pulses with linear on- and off-ramps are separated by "off-time" periods during which the transient measurements are made. During the waveform's on-time, the transmitted magnetic field interacts with nearby conductive objects. When the transmitted field is rapidly turned off, eddy currents are generated at the surface of the conductive object. These currents migrate into the object and attenuate in amplitude as the off-time progresses. Three time gates are recorded at each of the receivers. Times are roughly 0.1ms (bin 1), 0.2ms (bin 2) and 0.5ms (bin 3) after the transmitter shut-off.

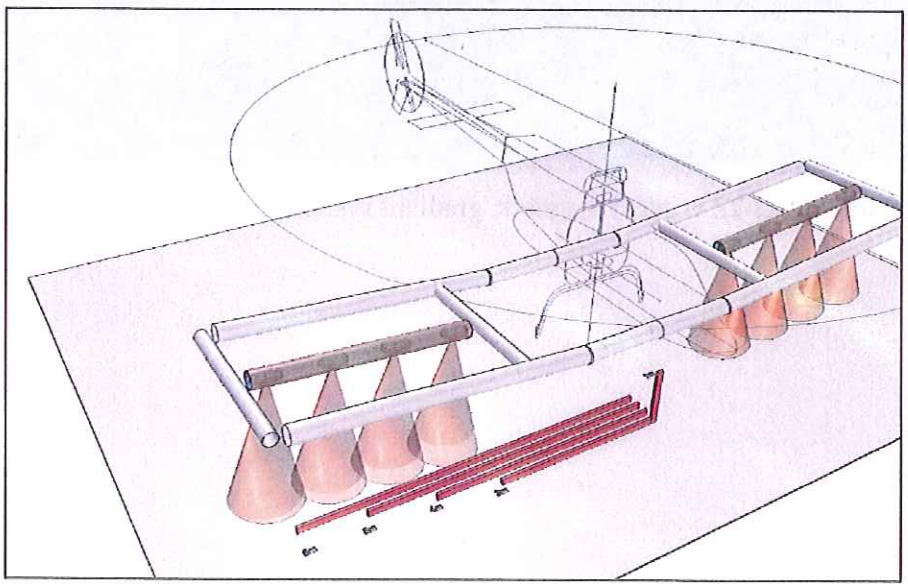


Figure 3: Diagrammatic sketch of the TEM-8 system showing transmitter and receiver positions.

The TEM-8 system has been certified by the Federal Aviation Agency for use on a Bell 206 Long Ranger helicopter. It is flown as low to the earth's surface as safety permits, typically 1-2 meters above ground level, in pre-programmed traverses over the survey areas. Typical survey speeds are 20 m/s. Flight lines were spaced 6m apart. Airborne electromagnetic data are acquired during daylight hours only.

The data positioning and system orientation (roll, yaw) is based on a pair of Global Positioning System (GPS) antennae mounted on the rear booms of the array. A moving baseline calculation allows the measurement of aircraft azimuth and roll. This is sufficient to calculate receiver locations and altitudes. A laser altimeter is mounted beneath the helicopter to monitor sensor height above the ground, or in this survey, water. Data are recorded digitally on the console inside the helicopter in a binary format. The receivers are sampled at a 225Hz to allow sufficient bandwidth to eliminate helicopter rotor noise.

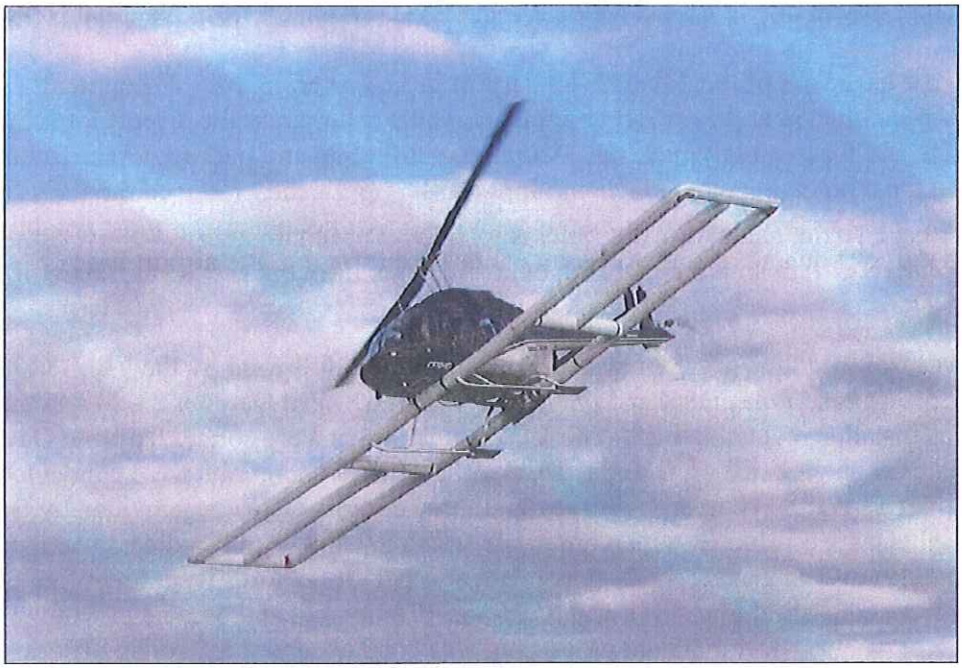


Figure 4: Photograph of Battelle TEM-8 time-domain electromagnetic system.

4. Survey Parameters and Procedures

4.1. Survey Logistics

A comprehensive Work Plan was developed and approved prior to mobilization to manage field survey operations. This included Quality Control and Operational Emergency Response Plans. Field operations for the airborne survey was completed during the seven (7) day period (on-site) between October 26 and November 1, 2009. The geophysical survey crew included Jeff Gamey, David Bell and William Doll from Battelle. The flight crew consisted of Doug Christie (pilot), Marcus Watson (system operator) and Milos Kapetanovic (engineer) from National Helicopters.

Operations were based out of the Albert Ellis Airport in Jacksonville, NC. Equipment installation was conducted at the airport and the helicopter returned to the airport for refueling between flights and for overnight parking. Alternative refueling and parking arrangements were made with the local hotel operator (Parkerton Inn). This significantly reduced the ferry time required for each flight, and avoided problems with local weather patterns – most notably intervening bands of rain and/or fog which cut off the site from the safe airport base of operations.

The VG-22 vertical magnetic gradient system was flown first, followed by the TEM-8 electromagnetic system. Equipment and personnel were mobilized October 23-24 and the VG-22 system was installed on October 25. The VG-22 operations were conducted from October 26-29. The systems were changed on October 30, and the TEM-8 operations were conducted between October 31 and November 1. Survey boundary coordinates were provided by Bristol. All survey flights were conducted with a 6m swath width to achieve 100% data coverage of the site. Gaps in data coverage, excessively noisy data or other QC failures were identified on site and reflights were conducted to resolve any problems. Equipment and personnel were demobilized November 2-3. Final data processing was conducted at the Battelle offices.

Ground and water access to the site was restricted by Marines and Park Services personnel. Air access was granted by Camp Lejeune's Blackburn air traffic control on a flight-by-flight basis.

4.2. Geophysical Prove Out

Following arrival in Jacksonville, NC, Battelle personnel set up a calibration grid at the Albert Ellis Airport. The calibration grid or Geophysical Prove-Out (GPO) consisted of ten items laid out on a single N-S line. The items were placed roughly 10 meters apart with gaps for existing anomalies such as taxiways and sewer pipes. Test lines were flown over the GPO at the start and end of each survey day when possible. There were days where access to the airport was cut off due to weather or daylight and it was deemed more important to collect survey data than QC data.

4.3. Positioning

The pilot was guided during flight by an on-board navigation system using Omnistar satellite corrections. This provides sufficient accuracy for data collection (approximately 1m). To increase the accuracy of the post-processed data positions to an accuracy of a few decimeters, a GPS base station was established at the Parkerton Inn base of operations and was used throughout the survey. The final latitude and longitude data were projected onto an orthogonal grid using the NAD83 datum, UTM Zone 18N (meters) for presentation. While these location data are considered accurate to within 10cm, care should be taken by re-acquisition teams if local monuments are used as a reference point. Battelle's experience with local monuments in the area is that they are inconsistent, with errors up to 50m.

4.4. Data Processing

Initial field data processing and QC was conducted in the field at the hotel base of operations. This provided a QC assessment of the data each night and preparation of lists of reflights or maintenance issues for the following morning. Final data processing and report writing was conducted at Battelle's offices in Oak Ridge TN.

5. Magnetic Data Processing

The magnetic data were processed in several stages. This included correction for time lags, removal of sensor dropouts, compensation for dynamic helicopter effects, correction for sensor heading error, array balancing, and removal of helicopter rotor noise. The vertical magnetic gradient was calculated by subtracting readings from pairs of total field magnetometers. The magnetic analytic signal (total gradient) was derived from the vertical gradient through a fast Fourier transform integral algorithm.

5.1. Quality Control

The data were examined in the field to ensure sufficient data quality for final processing. The adequacy of the compensation data, heading corrections, time lags, orientation calibration, overall performance and noise levels, and data format compatibility were all confirmed during data processing. During survey operations, flight line locations were plotted to verify full coverage of the area. Missing lines or areas where data were not captured were rejected and reacquired. Data were also examined for high noise levels and data drop outs. Lines deemed to be unacceptable were re-flown during the acquisition stage. Occasional lines deviated from a straight flight path due to obstacle avoidance.

5.2. Time Lag Correction

There is a lag between the time the sensor makes a measurement and when it is time-stamped and recorded. Accurate positioning requires a correction for this lag. Time lags between the magnetometers, fluxgate and GPS signals were measured by a proprietary utility. This utility sends a single electromagnetic pulse that is visible in the data streams of all three instruments. This lag was corrected in all data streams before processing.

5.3. Sensor Drop-outs

Cesium vapor magnetometers have a preferred orientation to the Earth's magnetic field. As a result of the motion of the aircraft, the sensor dead zones will occasionally align with the Earth's field. In this event, the readings drop out, usually from a local average of 50,000nT to 0nT. This usually occurs only during turns between lines, and rarely during on-line surveying (<1sec of data loss per day). All dropouts were removed manually during processing.

5.4. Aircraft Compensation

The presence of the helicopter in close proximity to the sensors causes considerable deviation in the readings, which requires compensation. The orientation of the aircraft with respect to the sensors and the motion of the aircraft through the earth's magnetic field are contributing factors. A calibration flight is flown to record the information necessary to remove these effects. The maneuver consists of flying a box-shaped flight path at high altitude to gain information in each of the cardinal directions. During this procedure, the pitch, roll and yaw of the aircraft are varied. This provides a complete picture of the effects of the aircraft at all headings in all orientations. The entire maneuver was conducted twice for comparison. The information was

used to calculate coefficients for a 19-term polynomial for each sensor. The fluxgate data were used as the baseline reference channel for orientation. The polynomial is applied post flight to the raw data, and the results are referred to as the compensated data.

5.5. Rotor Noise

The aircraft rotor spins at a near constant rate of about 400rpm. This introduces noise to the magnetic readings at a frequency of approximately 6.6Hz. Harmonics at multiples of this base are also observable, but have much smaller amplitudes. This frequency is usually higher than the spatial frequency created by near-surface metallic objects and is removed with a frequency filter.

5.6. Heading Corrections

Cesium vapor magnetometers are susceptible to heading errors. The result is that one sensor will give different readings when rotated about a stationary point. This error is usually less than 0.2nT. Heading corrections are applied to adjust readings for this effect.

5.7. Vertical Magnetic Gradient

The vertical magnetic gradient is measured as the difference between measured values in each gradiometer pod (bottom magnetometer minus top). This is a distinction from total magnetic field surveys in which vertical magnetic gradient is calculated, rather than measured. In addition to reducing the effects of aircraft and rotor noise, this technique removes the necessity of monitoring and subtracting diurnal variations in the Earth's field. These data were gridded using a 0.5m interval.

5.8. Analytic Signal

The analytic signal is calculated from the gridded vertical magnetic gradient data as the square root of the sum of the squares of three orthogonal magnetic gradients. It represents the maximum rate of change of the magnetic field in three-dimensional space – a measure of how much the magnetic field would change by moving a small amount in the direction of maximum change.

There are several advantages to using the analytic signal. It is generally easier to interpret than total field or vertical gradient data for small object detection because it has a simple positive response above a zero background. The amplitude of the response depends on the strength of the magnetic anomaly. In comparison, total field and vertical gradient maps typically display a dipolar response to small, compact sources (having both a positive and negative deviation from the background). The actual source location is at a point between the two peaks that is dependent upon the magnetic latitude of the site and the properties of the source itself. Analytic signal is essentially symmetric about the target, is always a positive value and is less dependent on magnetic latitude. More generally, the analytic signal highlights the corners of source objects, but for small targets at the latitude of this survey, these corners converge into a single peak almost directly over the target.

The dominant noise source in analytic signal is residual line-to-line inconsistencies in the gridded data which impact the horizontal gradients. These may be caused by residual heading error, altitude variation or uncompensated aircraft effects.

5.9. Anomaly Picks

Anomalies were picked from the gridded analytic signal. The minimum anomaly threshold was set above the analytic signal noise floor at 0.25nT/m for single peaks. This represents the 25:1 signal-noise ratio based on a measured noise floor of 0.01nT/m (standard deviation). Some low amplitude dipole anomalies were picked manually and added to the list. Anomalies were checked manually and compared to the TEM results before developing the final consolidated anomaly list.

6. Electromagnetic Data Processing

The electromagnetic data were processed in several stages. This included correction for time lags, removal of helicopter rotor noise and removal of ground conductivity effects. The individual bins (time gates) were gridded and plotted and anomalies were picked from the grid peaks. Anomalies were prioritized based on the decay constants of the response.

6.1. Quality Control

The data were examined in the field to ensure sufficient data quality for final processing. The adequacy of the time lags, overall performance and noise levels, and data format compatibility were all confirmed during data processing. During survey operations, flight line locations were plotted to verify full coverage of the area. Missing lines or areas where data were not captured were rejected and reacquired. Data were also examined for high noise levels and data drop outs. Lines deemed to be unacceptable were re-flown during the acquisition stage. Occasional lines deviated from a straight flight path due to obstacle avoidance.

6.2. Time Lag Correction

There is a lag between the time the sensor makes a measurement and when it is time-stamped and recorded. Accurate positioning requires a correction for this lag. Time lags between the receivers and GPS signals were measured by a proprietary utility. This utility sends a single electromagnetic pulse timed to the GPS pulse per second (PPS). This lag was corrected in all data streams before processing.

6.3. Rotor Noise

The aircraft rotor spins at a near constant rate of about 400rpm. In a two-blade helicopter, this introduces a periodic signal to the electromagnetic readings at a frequency of approximately 13Hz. Harmonics at multiples of this base are also observable, but have much smaller amplitudes. This frequency is higher than the spatial frequency created by near-surface metallic objects and is removed with a frequency filter.

6.4. Ground Response

This site includes salt marsh and open salt water areas. These are extremely conductive and produce a high response, particularly in early time gates. Broad channels were visible across the area. These were considerably larger amplitude than the observed metallic responses (approximately 10x larger) and were subsequently removed by a frequency filter in order to emphasize the potential UXO anomalies in the gridded data.

A plot of the raw TEM data has been provided at the intermediate stage before the ground conductivity was removed (Figure 5). This is not a final data product, but is provided to demonstrate the location of the conductive channels.

6.1. Anomaly Picks

Anomalies were picked from the gridded Bin2 TEM response, measured 250 microseconds after transmitter turnoff. The minimum anomaly threshold was set at 0.3ppm for single peaks. This represents a 7.5:1 signal-noise ratio based on a measured noise floor of 0.04ppm (standard deviation). Anomalies were checked manually and compared to the magnetic results before developing the final consolidated anomaly list.

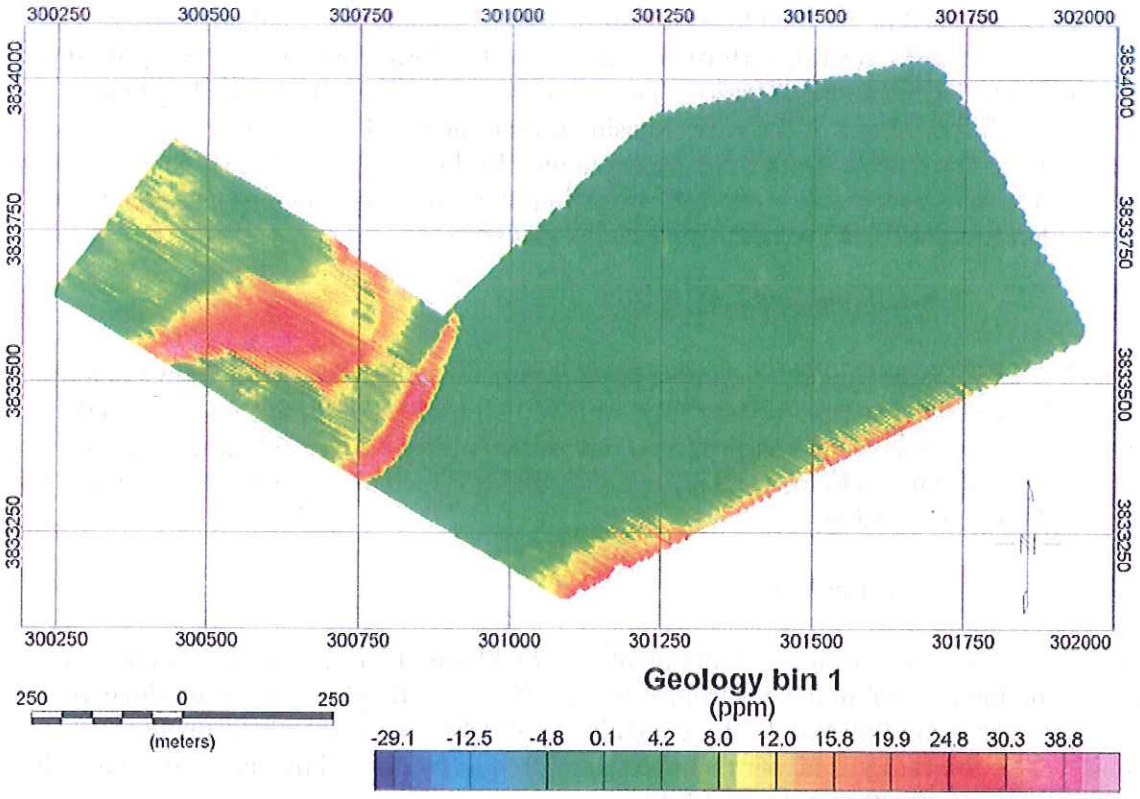


Figure 5: TEM-8 Bin1 amplitude before removal of high conductivity geologic response. High amplitudes indicate strong local conductors. Data have not been processed for conductivity mapping, and therefore retain significant altitude dependence on a line-line basis.

7. Quality Control

7.1. Geophysical Prove-Out

A line of ten calibration items was used for daily QC of field operations and to verify target response against the local geologic background. The items were placed roughly 10 meters apart with gaps for existing anomalies such as taxiways and sewer pipes. From north to south targets included the following: one 105mm projectile, one 155mm projectile, one 81 mm mortar round, one 60 mm mortar with nose cone, one 3.5 inch projectile, one 2.5 inch rocket warhead, one 81 mm mortar round, two BLU26 submunitions, one 60 mm mortar without nose cone, and one 2.5 inch rocket warhead. Prior to placement of the calibration targets, the area was swept with a hand held Schonstedt magnetic detector to avoid pre-existing shallow subsurface anomalies. Test lines were flown over the GPO at the start and end of each survey day when possible. There were days when access to the airport was cut off due to weather or daylight and it was deemed more important to collect survey data than QC data.

Figure 6 shows the vertical gradient and Figure 7 the analytic signal map from a typical pass over the GPO at low altitude, while Figure 8 shows the comparable TEM response from Bin1. Circles represent the picked target locations for the VG data and squares represent the target locations from the TEM data. All test items were detected on all low altitude QC passes, with the following exceptions:

- VG – all detected on each pass
- TEM – middle 2.5" rocket missed on one pass due to masking by nearby structure
- TEM – 60mm mortar w/o nose cone missed on two passes

The feature near the middle 2.5" rocket is presumed to have been too deep to be detected during the pre-emplacement surface sweep. VG target picks had a 0.62m standard deviation in the positioning. The TEM target picks had a 0.37m standard deviation in positioning. This demonstrates the consistency of the targeting accuracy after including GPS measurements, orientation calculations for roll and azimuth, time synchronization and lag corrections.

7.2. Positioning

The pilot was guided during flight by an on-board navigation system using Omnistar satellite corrections. This provides sufficient accuracy for data collection (approximately 1m). To increase the accuracy of the post-processed data positions to an accuracy of a few decimeters, a GPS base station was established at the Parkerton Inn base of operations and was used throughout the survey. Three different methods were used to determine the coordinates of the base station. The most reliable was a post-processed location provided by the National Geodetic Survey of NOAA through their Online Positioning User Service (OPUS). This calculated a position with a reported accuracy of 2.9cm. Over the course of the entire week, the average position calculated from the raw data was within 16cm of the computed location. Finally, this site was surveyed by reference to two different first order civil survey monuments. Recent development has destroyed many of the local monuments and the results from the monuments used showed no consistency with their published locations. One monument (EA2147) was

apparently mislocated by approximately 50m. The second monument (EA2244) was mislocated by 1.0m. The OPUS solution was taken to be the definitive location at

Lat 34° 43' 05.5264" N
Long 77° 04' 09.11809" W
HAE -29.375m

The locations of each magnetometer or electromagnetic sensor were measured relative to the GPS antenna and the location of each data point was determined by using the GPS antenna location and the aircraft orientation, as measured by the IMU (VG-22) or moving baseline processing routine (TEM-8). The IMU system outputs pitch, roll and azimuth, whereas the moving baseline process outputs only roll and azimuth. These data are combined with the physical geometry of the array to calculate the position and relative height of each sensor. Vertical positioning was monitored by laser altimeter with an accuracy of 2cm, although this resolution can be degraded by reflections from vegetation and may be inaccurate over water. It is usually possible to identify errant altimeter data, discard it, and interpolate between accurate points. Alternately, GPS data can be used to establish or interpolate survey altitudes. In any case, altitude inaccuracy does not affect anomaly amplitudes or mapping products produced from them.

The final latitude and longitude data were projected onto an orthogonal grid using the NAD83 datum, UTM Zone 18N (meters) for presentation. While these location data are considered accurate to within 0.10m, care should be taken by re-acquisition teams if local monuments are used as a reference point. Battelle's experience with local monuments in the area is that they are inconsistent, with errors up to 50m.

GPS quality can be measured by several parameters. Horizontal Dilution of Precision (HDOP) is one such measure. Typically, the HDOP should be maintained at values less than 2.5. Low altitude surveys over salt water settings have been shown to produce higher HDOP than normal. This is attributed to reflections of the incoming GPS signal from the conductive water surface, and varies with satellite constellation, survey direction and possibly tidal conditions (water level, salinity and conductivity). Maps of the HDOP for the VG-22 and TEM-8 survey collections are shown in Figure 9 and Figure 10.

7.3. Altitude

Survey altitude was kept as low as possible for all lines in order to maximize target signal:noise ratios. Much of the survey area was covered with dense vegetation which forced ground clearances of several meters higher than is practical for UXO detection. Altitude maps for the VG-22 and TEM-8 survey collections are shown in Figure 11 and Figure 12.

When actual flight altitudes exceed 7m for VG-22 or 4m for TEM-8, sensitivity to moderate-sized ordnance (e.g. 155m projectiles) becomes uncertain. Areas of high altitude, based on these somewhat arbitrary thresholds, have been shaded on all data products to indicate that the data presented here cannot be used to declare an area free of ordnance.

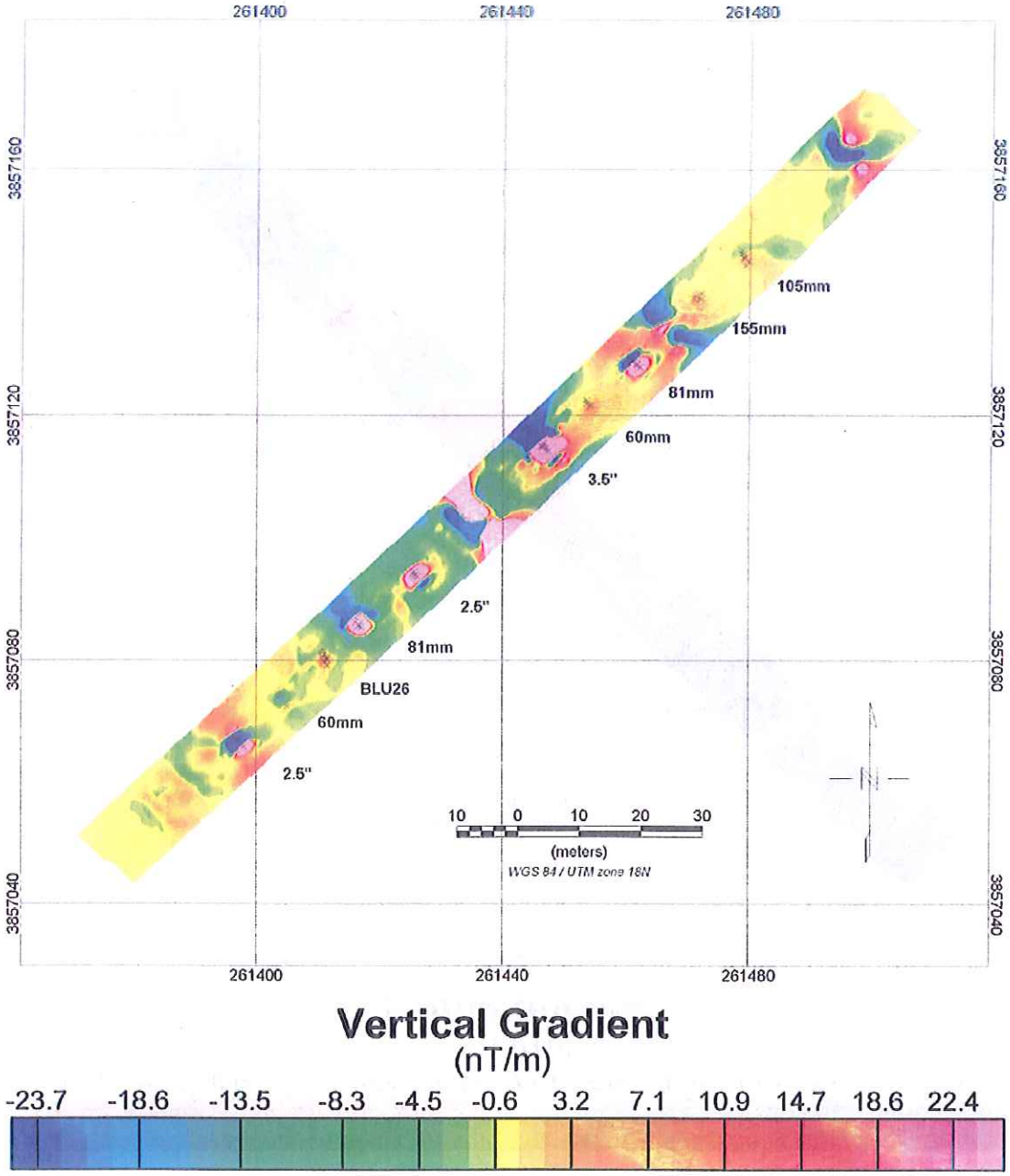


Figure 6: Typical vertical gradient map over GPO test strip. Anomaly picks from subsequent passes are shown as crosses.

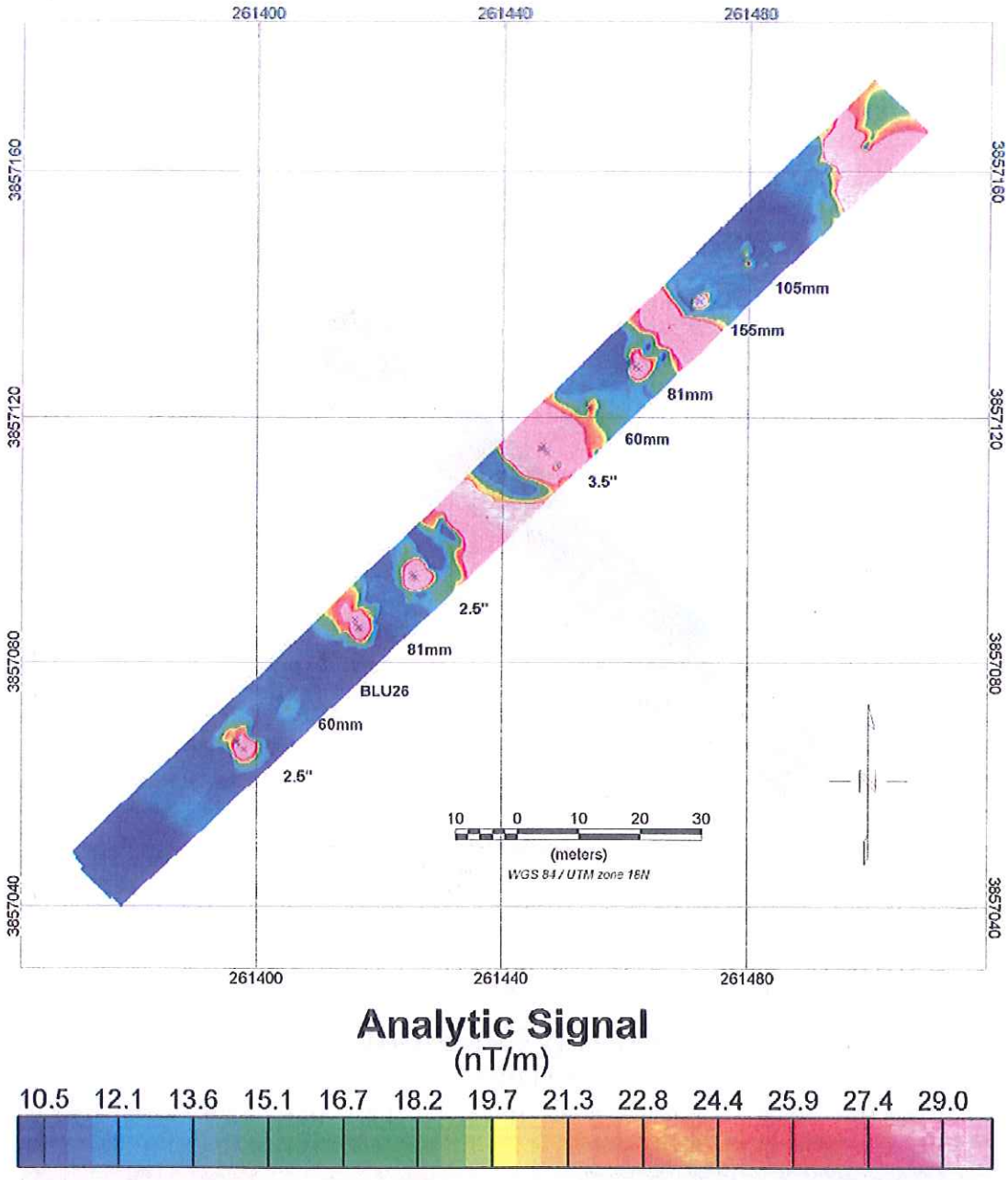


Figure 7: Typical analytic signal map over GPO test strip. Anomaly picks from subsequent passes are shown as crosses.

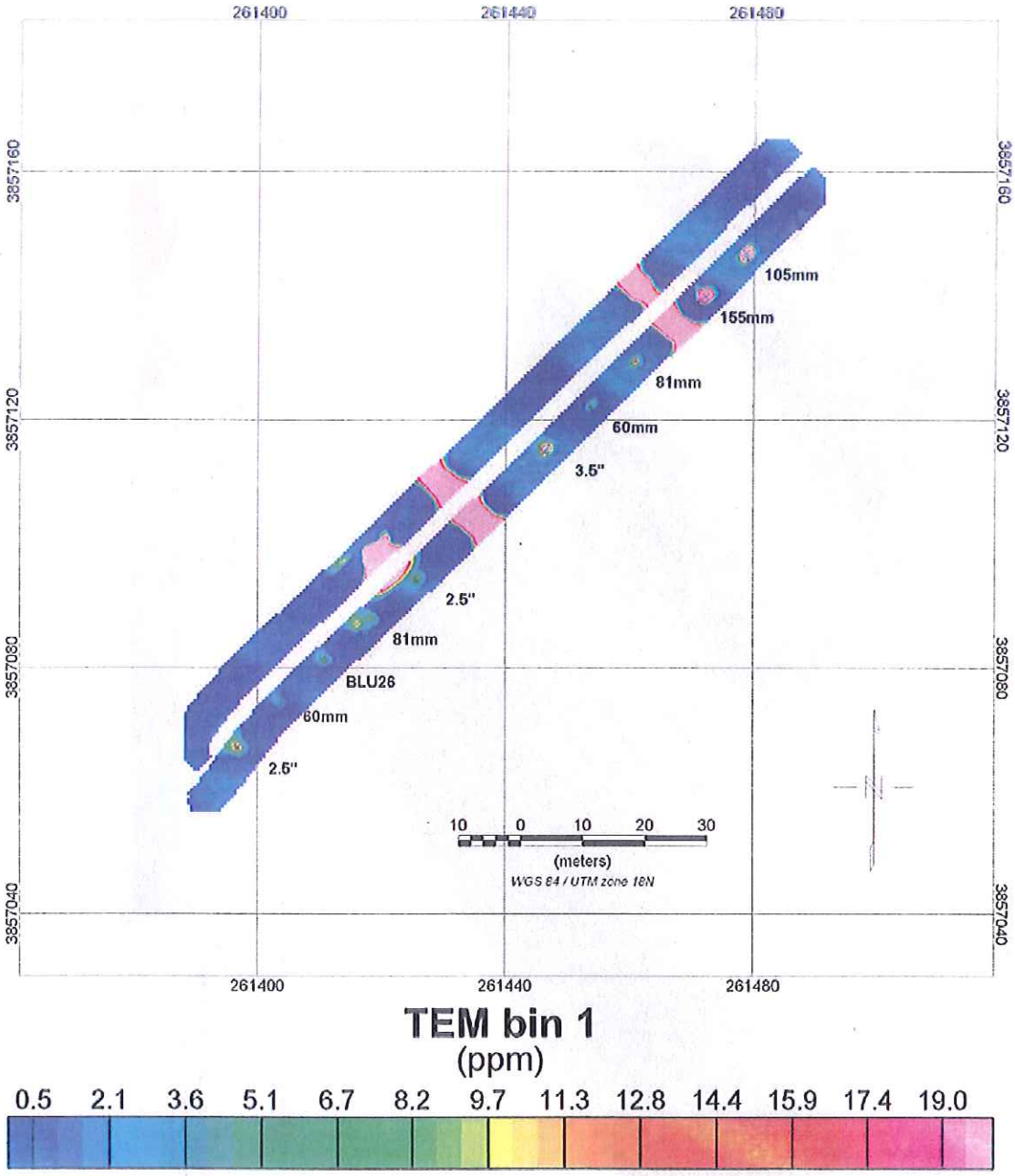


Figure 8: Typical Bin1 electromagnetic response over GPO test strip. Anomaly picks from subsequent passes are shown as crosses.

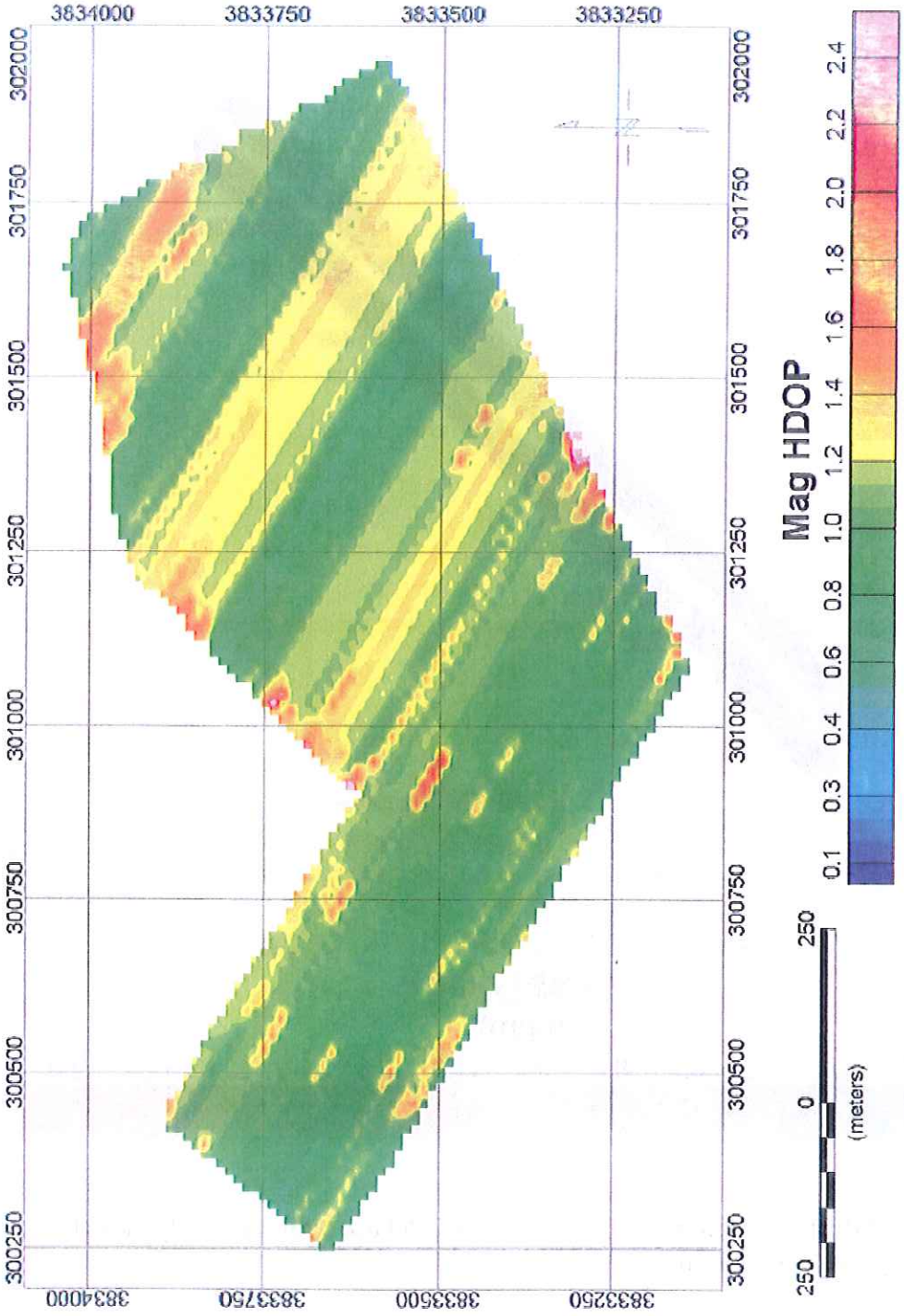


Figure 9: GPS HDOP measurements across the survey area during the VG-22 data collection. Values less than 2.5 are considered acceptable.

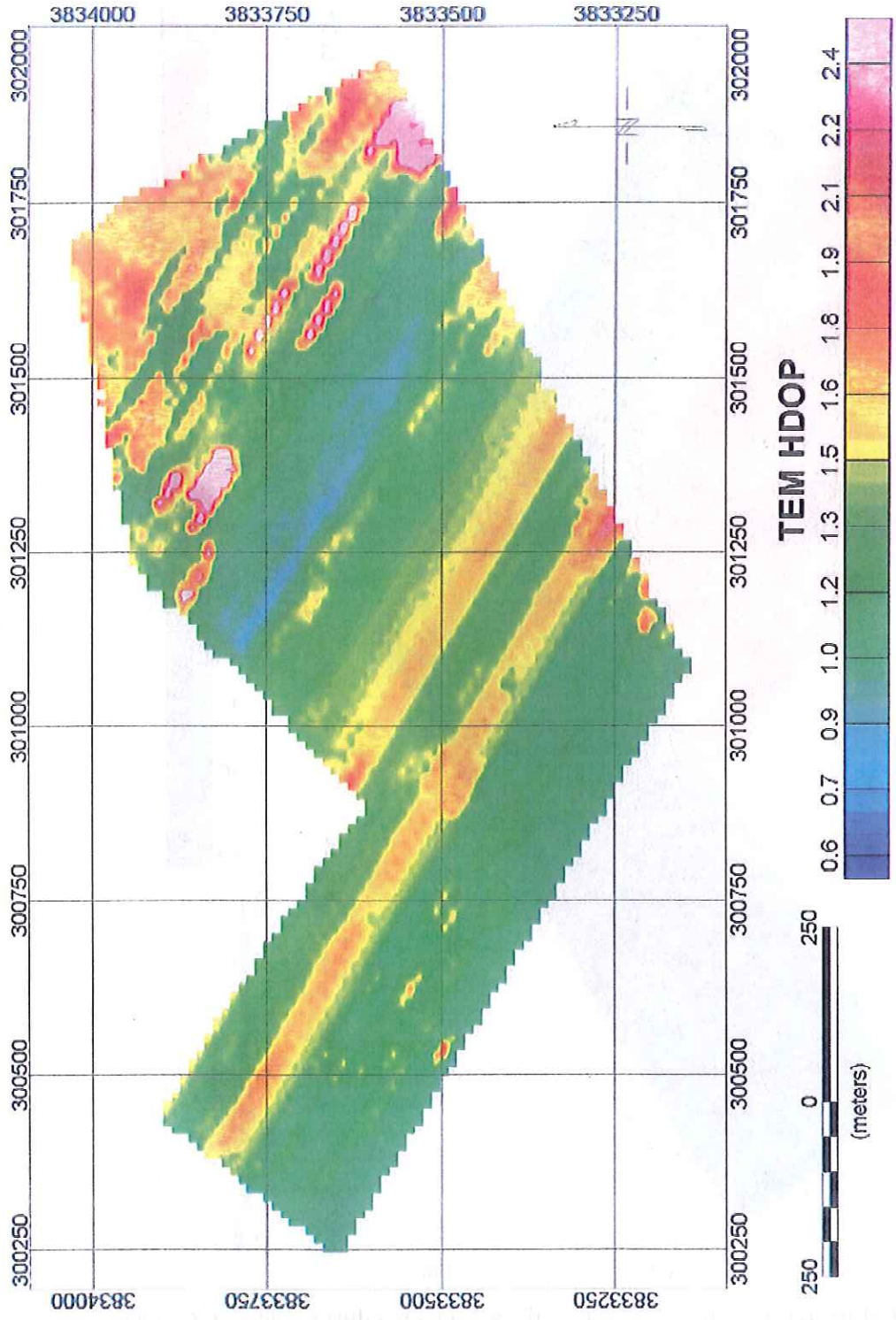


Figure 10: GPS HDOP measurements across the survey area during the TEM-8 data collection. Values less than 2.5 are considered acceptable.

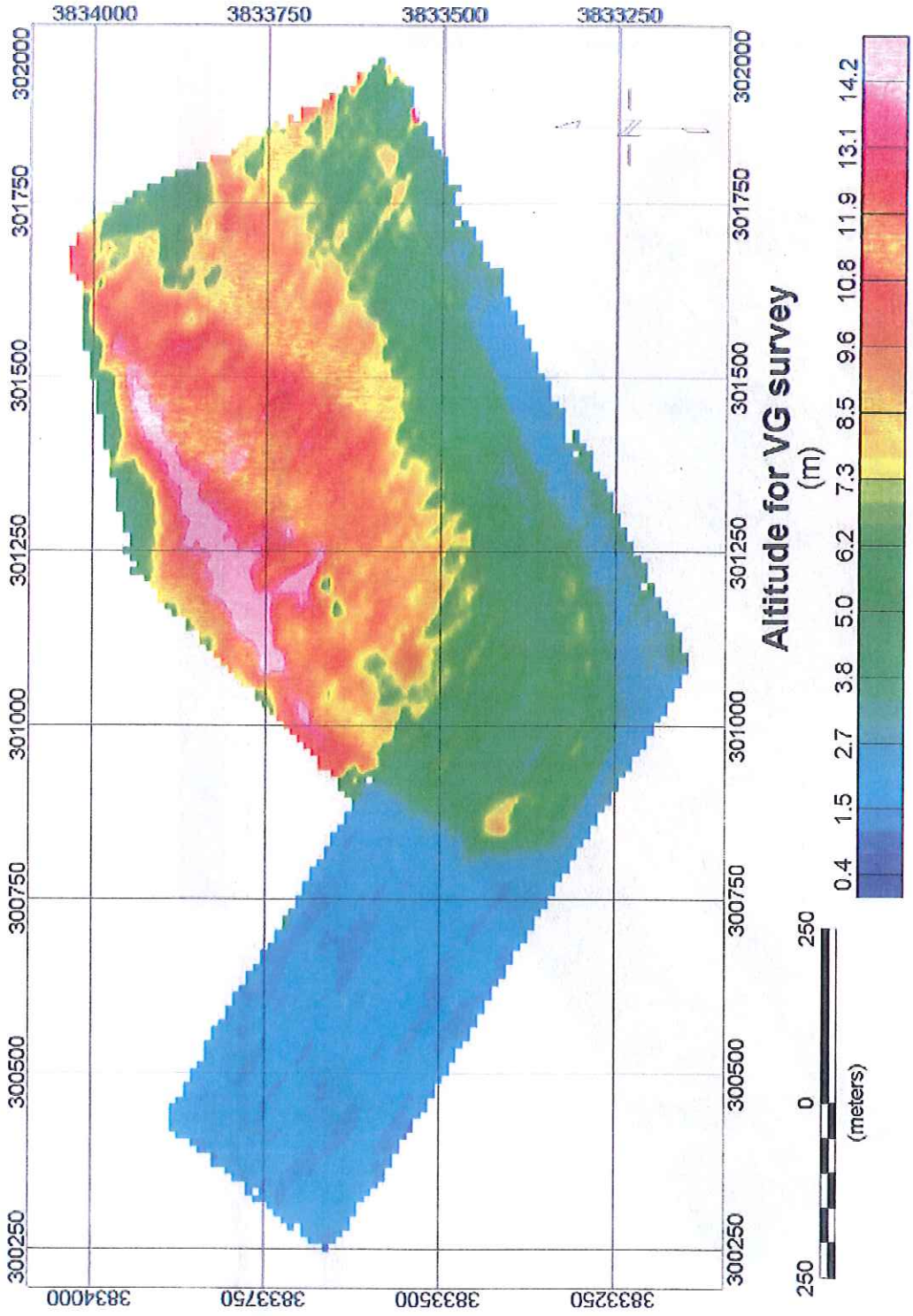


Figure 11: Laser altimeter measurements across the survey area during the VG-22 data collection. Values less than 7m are considered acceptable for detection of large ordnance.

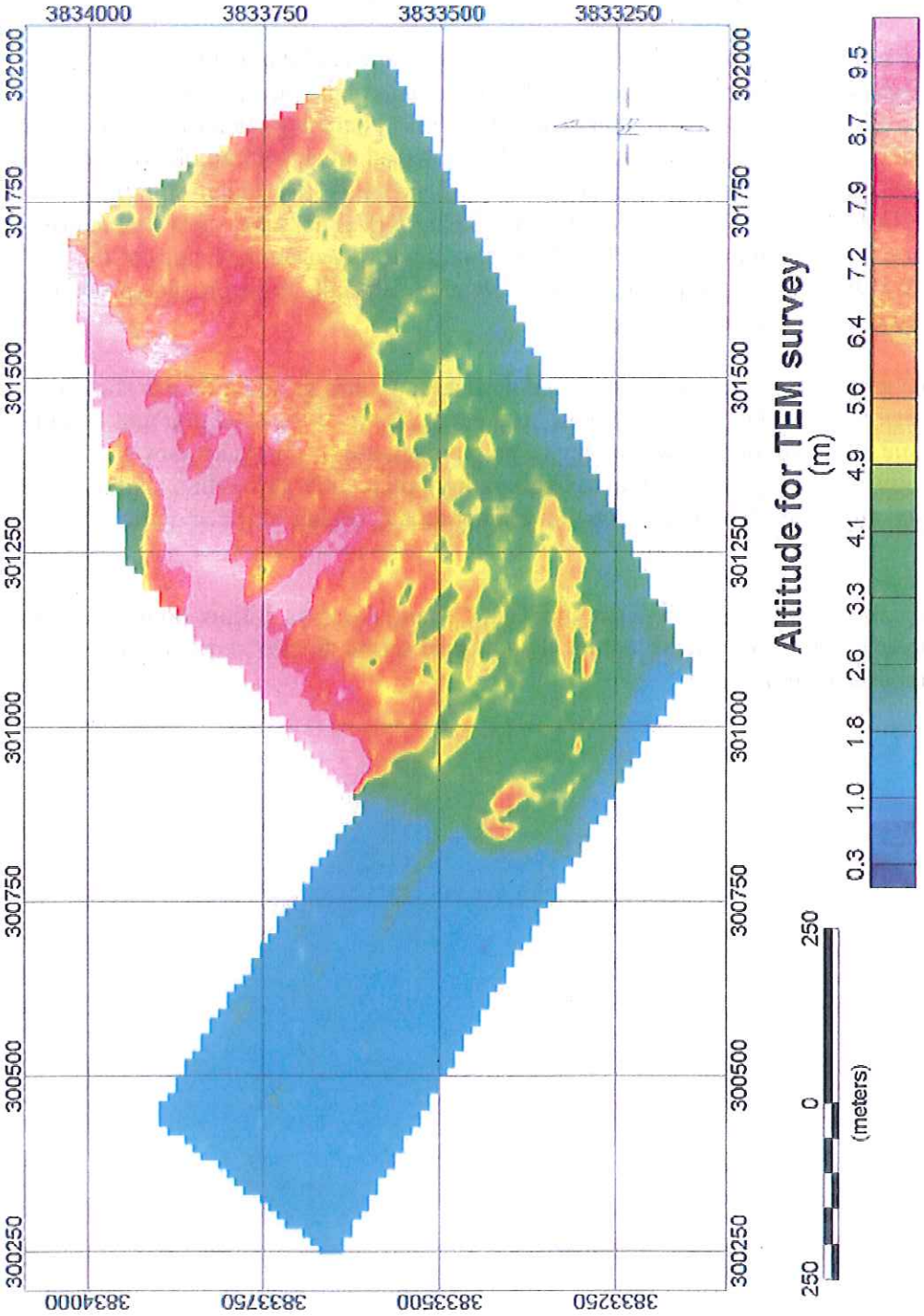


Figure 12: Laser altimeter measurements across the survey area during the TEM-8 data collection. Values less than 4m are considered acceptable for detection of large ordnance.

8. Data Interpretation

8.1. Vertical Gradient and Analytic Signal Maps

Figure 13 shows a map of the measured vertical gradient data at Bear Island. Overall noise levels are low, which allows the detection capabilities to remain high even at moderate altitudes of 3m-5m. The shading indicates areas of high altitude (>7m) where detection of large ordnance is unreliable. A few moderately size anomalies dot the unshaded areas with no obvious pattern. A few large irregular anomalies were detected near (300575E 3833475N) and (300600E 3833675N) and (300675E 3833675N) and (301250E 3833325N). These are more characteristic of clustered ferrous debris than ordnance. Two large anomalies appear in the center of the shaded area that are characteristic of point sources. Given the altitude, these are also probably debris such as sign posts rather than ordnance.

An analytic signal map computed from the gridded vertical magnetic gradient data is shown in Figure 14. The analytic signal can be understood as the magnitude of the total gradient. Unlike the vertical gradient, the analytic signal is always a positive quantity. This map shows effectively the same anomaly pattern as the vertical gradient map, although with a slightly exaggerated "halo" around each anomaly due to the inherent smoothing of the analytic signal calculation.

Anomalies were picked from the gridded analytic signal. Candidates for follow-on investigation based on the magnetic data alone would include any of the discrete dipolar vertical gradient signatures with moderate amplitudes.

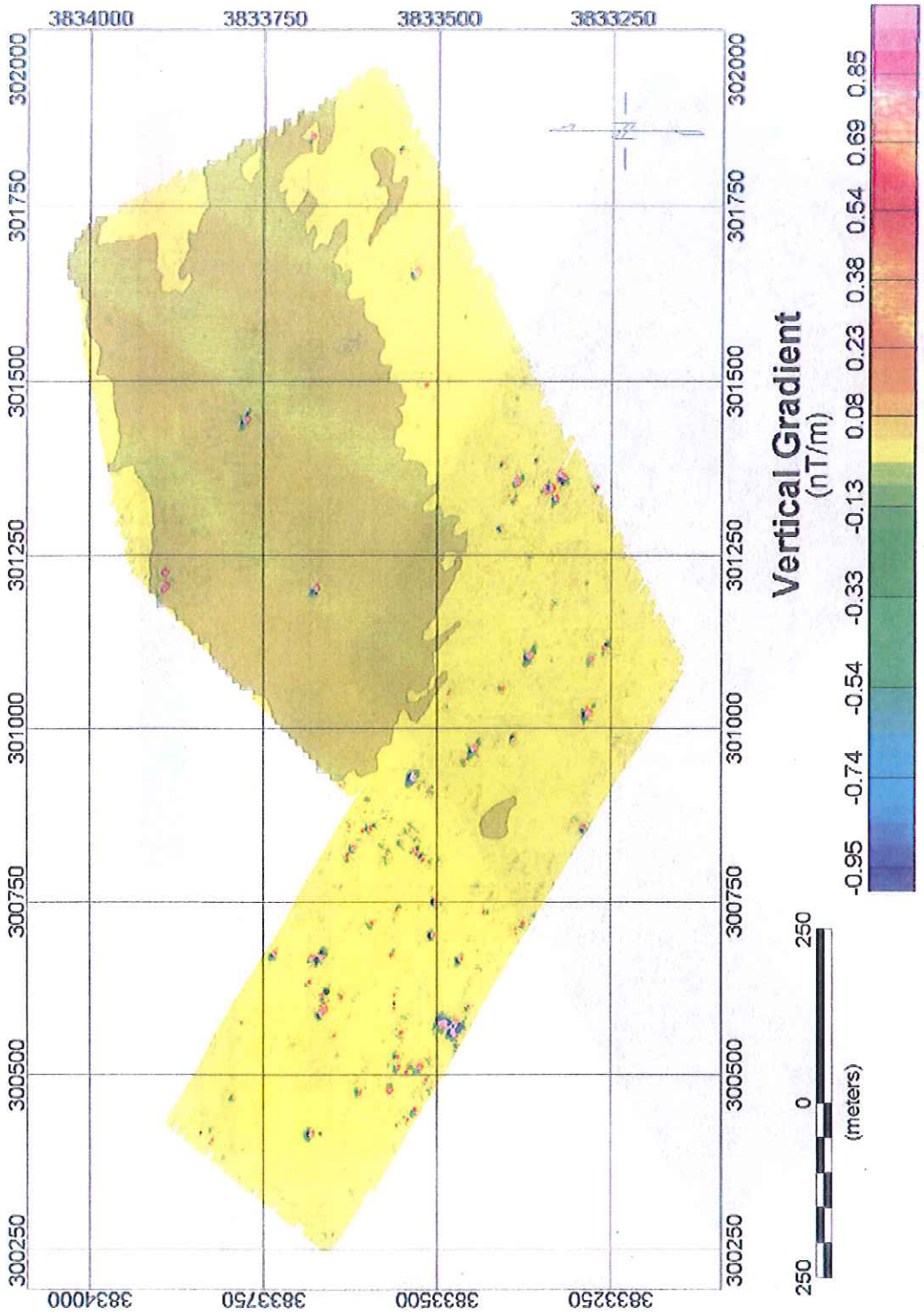


Figure 13: Vertical Gradient data across Bear Island survey site. Shaded area has sensor altitudes above 7m.

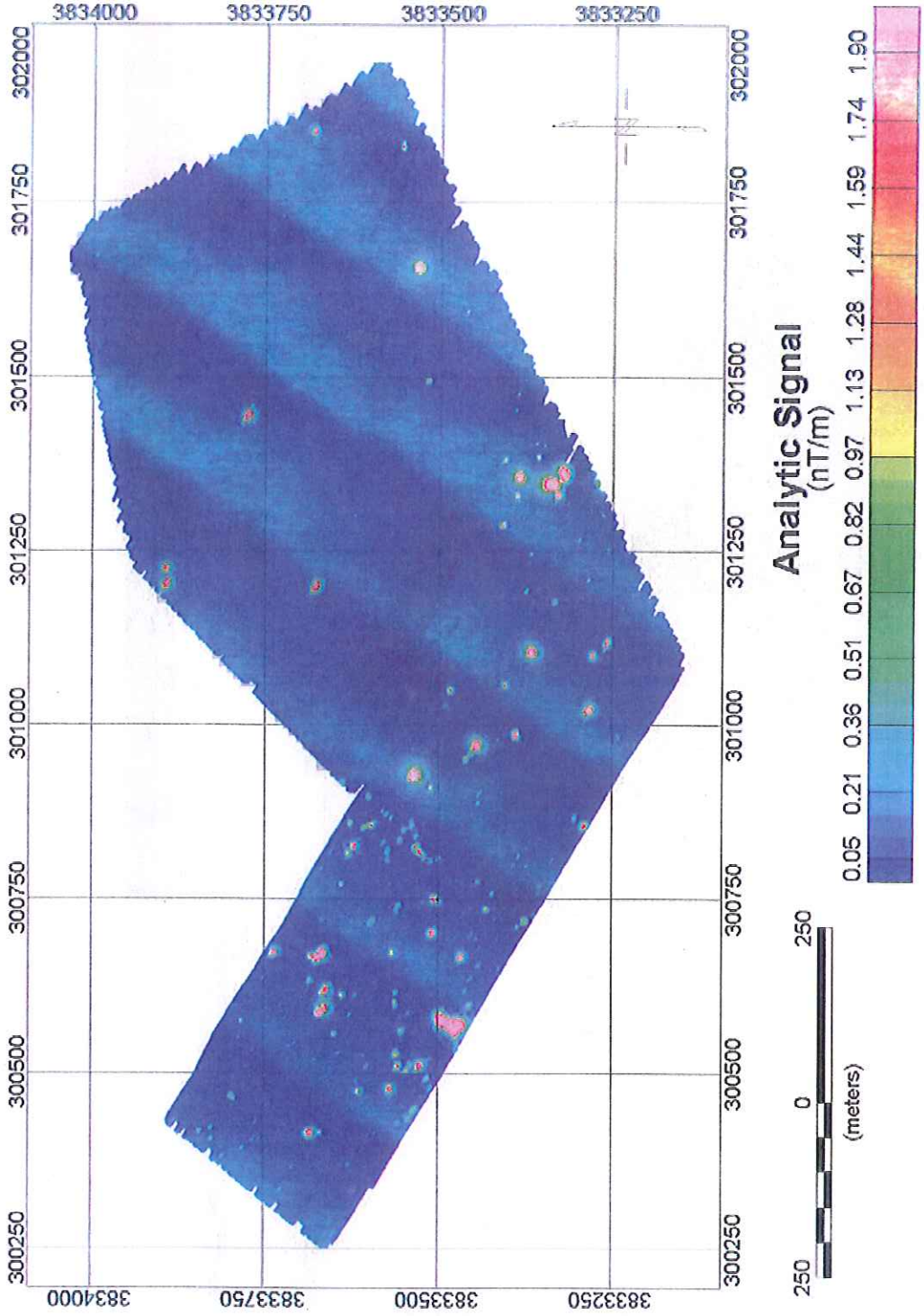


Figure 14: Analytic Signal data derived from Vertical Gradient across Bear Island survey site. Shaded area has sensor altitudes above 7m.

8.2. TEM Response Maps

Figure 15 through Figure 17 show the TEM response from Bin1 through Bin3 at Bear Island. The shading indicates areas of high altitude (>4m) where detection of large ordnance is unreliable. Overall noise levels are moderate, primarily due to the conductive salt water environment. This is most evident in the earliest times of Bin1. Usually the response amplitude drops quickly with each successive time gate until it drops below the system noise level. In this case, the strong early response from the conductive geology/salt water has increased the relative noise levels in Bin1. Fortunately, this signal decays even faster than the metallic response. By the time Bin2 data are measured, the conductive geologic response has dropped significantly leaving the metallic response as the dominant feature. For example, the irregular anomalies near (300575E 3833475N) and (300725E 3833575N) appear strongly in Bin1 but not at all in Bin2. The same is true for the string of anomalies along the southeastern boundary centered on (301150E 3833175N). Anomalies were therefore picked from the gridded Bin2 data. Candidates for follow-on investigation based on the electromagnetic data alone would include any of the stronger responses in Bin2.

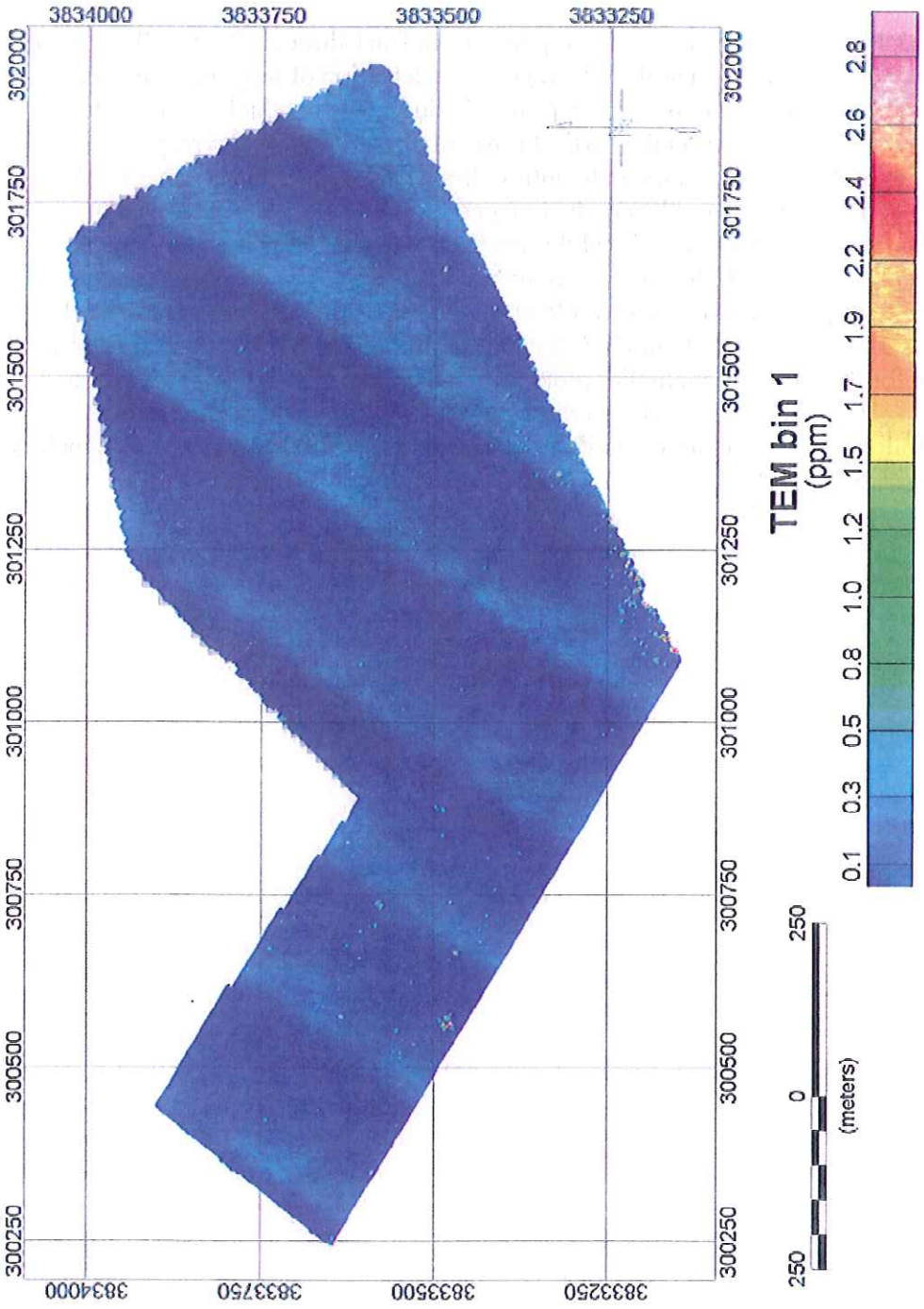


Figure 15: TEM Bin1 response data across Bear Island survey site. Shaded area has sensor altitudes above 4m.

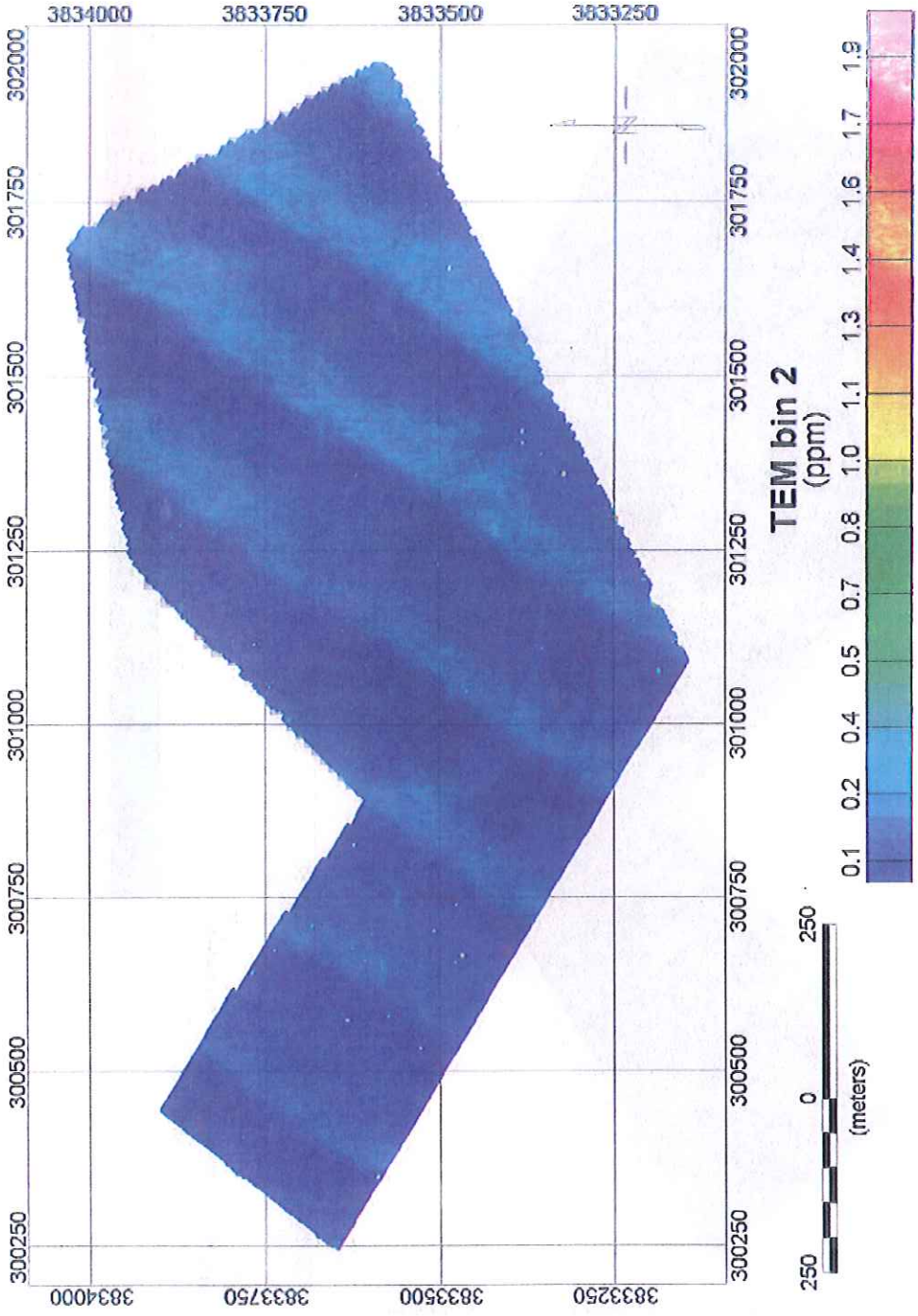


Figure 16: TEM Bin2 response data across Bear Island survey site. Shaded area has sensor altitudes above 4m.

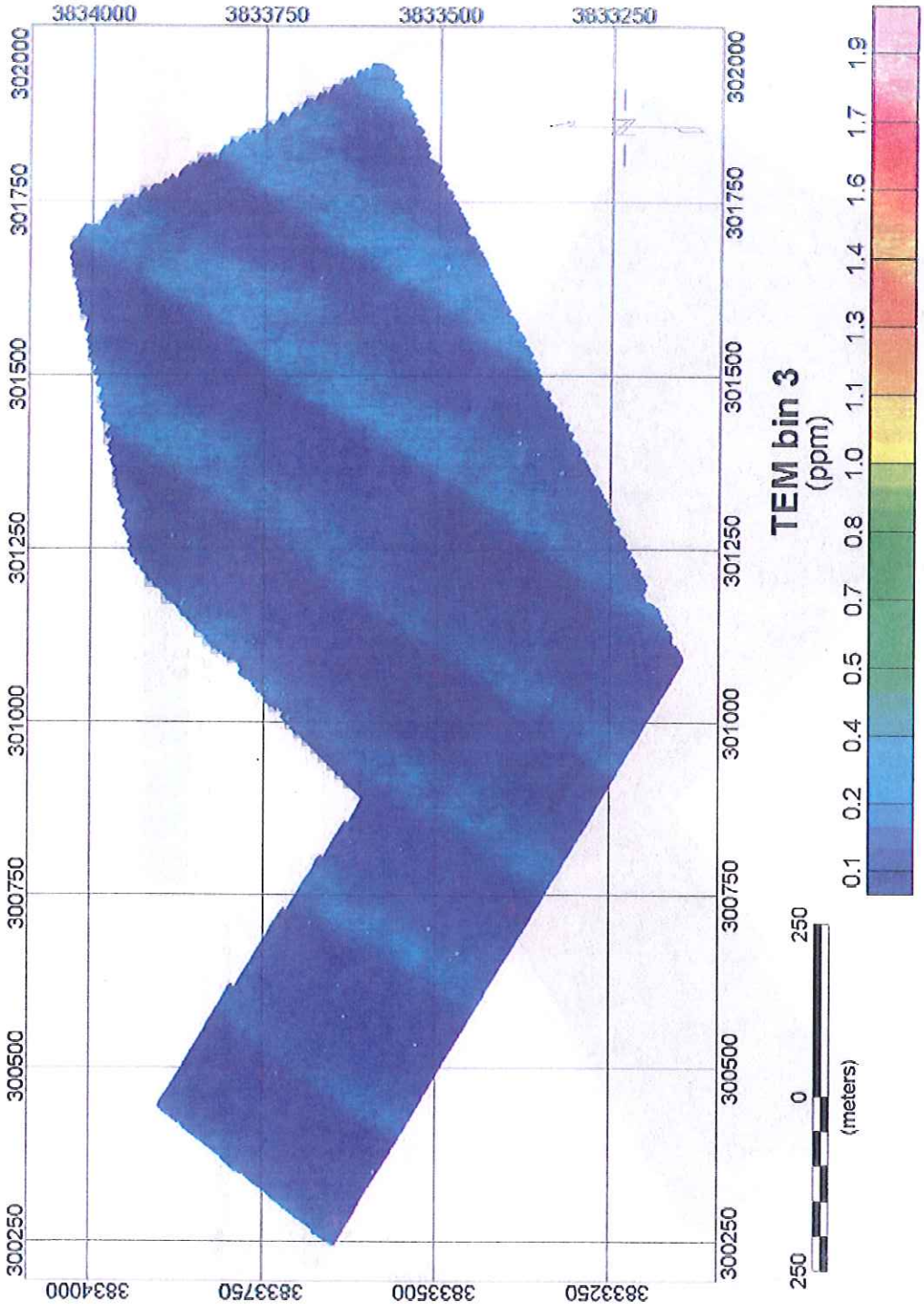


Figure 17: TEM Bin3 response data across Bear Island survey site. Shaded area has sensor altitudes above 4m.

8.3. Anomaly Lists and Joint Interpretation

Magnetic anomalies were picked from the gridded Analytic Signal data. Picks above a threshold of 0.25nT/m were retained for the final list. This threshold represents a 25:1 signal:noise ratio against the average background noise of 0.01nT/m (standard deviation). Additional low amplitude anomalies (0.07-0.25nT/m) were selected manually where the data showed distinct dipolar responses. Electromagnetic anomalies were picked from the gridded Bin2 data. A picking threshold of 0.3ppm was used against a background noise level of 0.04ppm (standard deviation). The two anomaly sets were then compared. Anomalies whose locations were within a 2.5m radius were considered to be due to a single source and were grouped together. The average location (between VG and TEM) is reported for these anomalies. Five (5) anomalies met this condition.

Anomalies in the magnetic data set are caused by ferrous targets. They may be metallic or geologic in origin. Anomalies in the electromagnetic data set are caused by electrically conductive targets. They may be ferrous or non-ferrous (aluminum, copper), but are rarely geologic. At this site, broad conductive responses were observed from salt water channels or paleochannels through the area. These were successfully removed before anomaly selection.

Anomalies that have both a magnetic and electromagnetic expression are therefore most likely to be ferrous metal targets. Anomalies with strong magnetic signatures only are potentially metallic targets that are either too small or too deep for the TEM system to see because the TEM system attenuates more quickly with altitude than the VG system. The magnetic anomalies in the shaded (high altitude) area would fall into this category of analysis. There is also a possibility that they are geologic in origin. Anomalies with electromagnetic signatures only may be non-ferrous targets such as aluminum. This is more likely to be the case with civilian debris (anchors, signs, small boats etc) than UXO.

The file labeled "BearIslandAnomalyList2009.xyz" is an ASCII file containing the locations and amplitudes of all reported anomalies. Locations are provided for magnetic and electromagnetic anomalies alike. Target coordinates are provided in NAD83, UTM Zone 18N (meters). The file includes combined VG/TEM, VG only and TEM only anomalies. The coincident anomalies are listed first, followed by the remaining anomalies sorted by normalized amplitude.

Figure 18 shows the anomaly pick locations. Red circles represent the magnetic anomalies. Blue circles represent the electromagnetic anomalies.

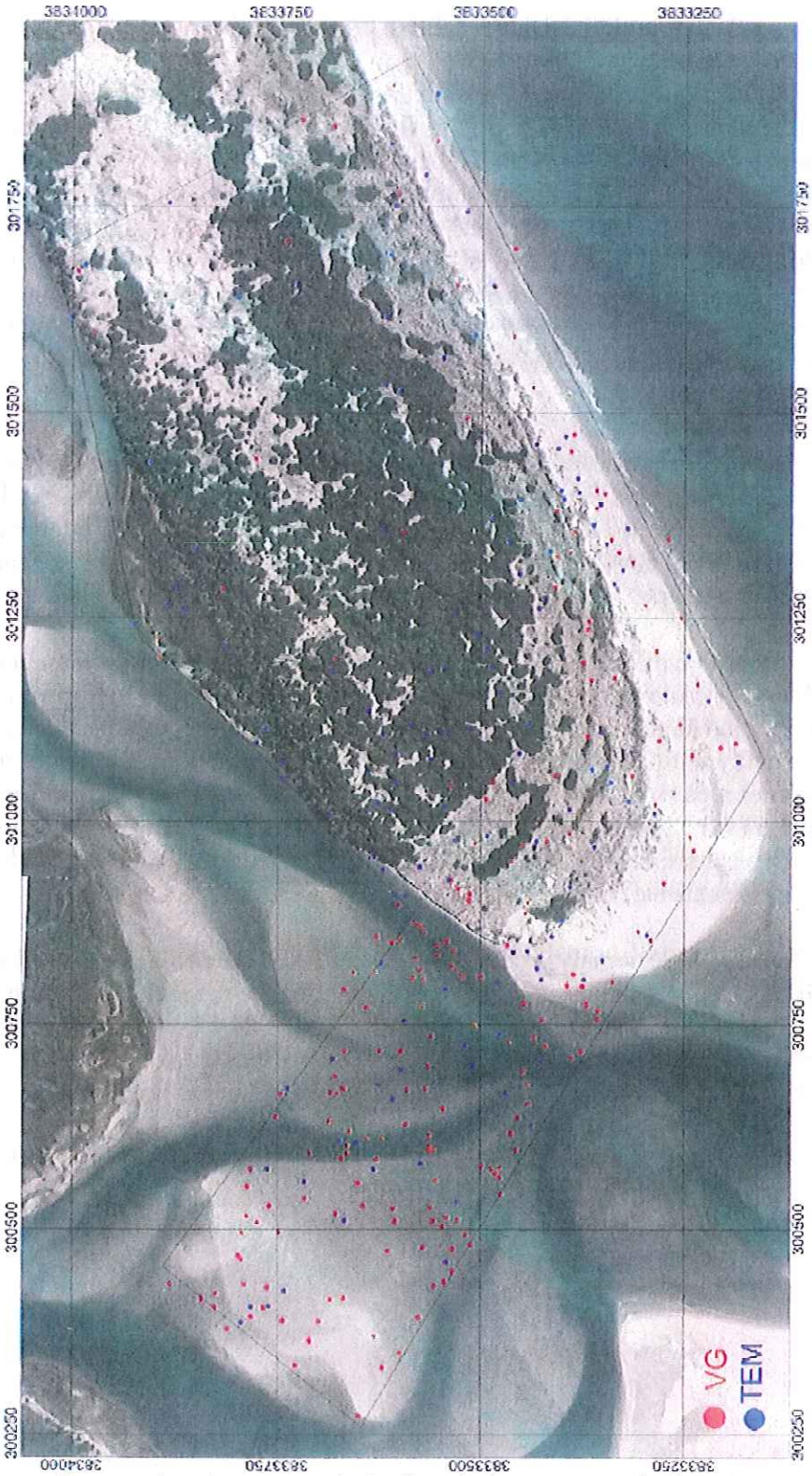


Figure 18: Anomaly map showing magnetic (red) and electromagnetic (blue) anomalies.

9. Data and Image Archive

Original Geosoft format files are provided as the principal digital format. This includes database files with georeferenced point data (GDB) and interpolated grid files (GRD). A free data viewer is included with the digital data and is also available online at www.geosoft.com (Oasis Montaj Viewer). Map data are provided as image files in Tiff format in addition to the smaller reproductions included in this report. These maps are provided with a digital resolution of 300 dpi. GeoTiff format files of the geophysical data alone are provided for quick inclusion into other GIS platforms, but the resolution is not as high as the original Geosoft GRD files. Image files are named as follows:

vg.grd	Vertical gradient grid (Geosoft format)
vg.tif	Vertical gradient map with surrounds and titles
vg only.tif	Vertical gradient map with data only (for GIS import)
as.grd	Analytic signal grid (Geosoft format)
as.tif	Analytic signal map with surrounds and titles
as only.tif	Analytic signal map with data only (for GIS import)
vgalt.grd	VG-22 altitude grid (Geosoft format)
vgalt.tif	VG-22 altitude map with surrounds and titles
vgalt only.tif	VG-22 altitude map with data only (for GIS import)
vgGPO.tif	Calibration line analytic signal with item locations
bin1.grd	Bin1 response grid (Geosoft format)
bin1.tif	Bin1 response map with surrounds and titles
bin1 only.tif	Bin1 response map with data only (for GIS import)
bin2.grd	Bin1 response grid (Geosoft format)
bin2.tif	Bin1 response map with surrounds and titles
bin2 only.tif	Bin1 response map with data only (for GIS import)
bin3.grd	Bin1 response grid (Geosoft format)
bin3.tif	Bin1 response map with surrounds and titles
bin3 only.tif	Bin1 response map with data only (for GIS import)
emalt.grd	TEM-8 altitude grid (Geosoft format)
emalt.tif	TEM-8 altitude map with surrounds and titles
emalt only.tif	TEM-8 altitude map with data only (for GIS import)
emGPO.tif	Calibration line Bin1 response with item locations
picks.tif	Consolidated pick map with surrounds and titles
picks only.tif	Consolidated pick map with data only (for GIS import)

Databases are provided in Geosoft format (GDB) and are the primary data source. They represent the highest data resolution, but have no visual component. Lines in the database represent the trace of a single sensor as it travels down the line. Lines are numbered "L####.S", where #### is the survey line number and S is the sensor number (1-8 from left to right across the array). Data columns or channels in the vertical gradient databases are bulleted below.

- Xm — Easting coordinate in UTM Zone 18N meters.
- Ym — Northing coordinate in UTM Zone 18N meters.
- hae — Height above ellipsoid.
- alt — Sensor altitude above ground level in meters.
- vg_scrb — Total field magnetic values in nanoTesla per meter.
- line — Flight line number.
- date — Date flown.

Data columns or channels in the electromagnetic databases are bulleted below.

- Xm — Easting coordinate in UTM Zone 18N meters.
- Ym — Northing coordinate in UTM Zone 18N meters.
- hae — Height above ellipsoid.
- alt — Sensor altitude above ground level in meters.
- bin1 — Bin1 response in ppm.
- bin2 — Bin2 response in ppm.
- bin3 — Bin3 response in ppm.
- line — Flight line number.
- date — Date flown.

The final data type provided is the anomaly list file (also known as a dig list or pick file) in ASCII format. This file is named "BearIslandAnomalyList2009.xyz" and contains the following columns. Coincident anomalies (those with hits in both VG and TEM) are listed first and have two sets of coordinates corresponding to the two data sets.

- ID — Number of the specific analytic signal anomaly
- X — X coordinate in meters (UTM zone 18N)
- Y — Y coordinate in meters (UTM zone 18N)
- as_anom — Magnitude of analytic signal response
- em_anom — Magnitude of bin2 response

10. Conclusions

10.1. Summary

Airborne vertical magnetic gradient data were acquired using Battelle's VG-22 system over a 200 acre portion of Bear Island, in the vicinity of Jacksonville, NC. The objective of the survey was to detect and map surface, underwater, and buried munitions and explosives of concern (MEC) and munitions debris (MD). A total of 208 magnetic anomalies and 136 electromagnetic anomalies were detected above a threshold of 0.25nT/m and 0.3ppm respectively. These levels were well above the estimated noise background of 0.01nT/m and 0.04ppm. Five (5) anomalies were coincident in both magnetic and electromagnetic data sets (339 total anomalies).

10.2. GPO Evaluation

The results from the Geophysical Prove-Out (GPO) line at Albert Ellis Airport demonstrated that the sensitivity of the VG-22 and TEM-8 systems was adequate for ordnance mapping at low altitudes. The VG-22 system detected all targets on each pass over the test line. The TEM-8 system missed the 2.5" rocket on one pass, and the 60mm mortar (w/o nose cone) on two passes.

10.3. Anomaly Distribution

Relatively few anomalies were detected in the eastern half of this survey block. This is partly the result of the small size of the area and the vegetation in the eastern half of the area which forced considerably higher altitudes than is practical for reliable ordnance detection. The distribution showed no particular pattern. Several of the larger magnetic anomalies were more representative of debris anomalies than ordnance anomalies. The early time Bin1 responses showed some strong irregular anomalies that were not evident in the later Bin2. These were attributed to the high ground/salt water conductivity conditions. Bin2 was therefore used to pick the TEM anomalies. Five anomalies showed coincident magnetic and electromagnetic responses. These should be the first targets for ground follow-up and are shown at the top of the anomaly list.

10.4. Deliverables

Original Geosoft format files are provided as the principal digital format. This includes database files with georeferenced point data (GDB), and interpolated grid files (GRD). Map data are provided as image files in Tiff or GeoTiff format in addition to the smaller reproductions included in this report. The databases in Geosoft (GDB) and ASCII are the primary data source. They represent the highest data resolution, but have no visual component. The final data type provided are anomaly list files (also known as dig list or pick files) in ASCII format.

All data presented in this report are suitable for follow-up and other analyses intended to understand the relationship between airborne anomalies and the presence of UXO at the site. The airborne data alone are *not* suitable for declaring an area completely free of ordnance contamination, as some ordnance types fall below the detection threshold of the system, and only a percentage of other ordnance types will be detected.

Appendix A
Target Anomaly List

Target coordinates in NAD83 UTM Zone 18N (meters).

ID	X(m)	Y(m)	AS(nT/m)	TEM(ppm)	Priority
1	301358.88	3833321.39	31.41	2.78	1
2	300700.79	3833508.94	7.55	2.89	1
3	300666.04	3833467.88	10.93	1.84	1
4	300672.19	3833736.70	5.36	1.65	1
5	300825.17	3833622.08	5.68	1.10	1
6	301344.75	3833340.75	603.14	*	1
7	300926.72	3833535.81	39.91	*	1
8	300562.63	3833475.49	24.11	*	1
9	300671.69	3833667.88	13.55	*	1
10	300563.20	3833474.71	13.32	*	1
11	301103.84	3833368.77	13.13	*	1
12	301354.38	3833385.28	13.06	*	1
13	300576.75	3833497.79	11.99	*	1
14	301655.59	3833531.44	11.97	*	1
15	300573.00	3833631.00	*	3.15	1
16	300573.03	3833486.20	10.31	*	1
17	301383.65	3833359.31	9.59	*	1
18	301655.00	3833487.00	*	2.82	1
19	300970.39	3833447.79	9.29	*	1
20	300533.00	3833528.00	*	2.77	1
21	300586.75	3833670.40	9.09	*	1
22	300568.12	3833480.56	8.09	*	1
23	300749.17	3833505.69	7.83	*	1
24	301443.54	3833777.41	6.98	*	1
25	300414.31	3833684.20	6.48	*	1
26	301287.05	3833408.98	5.95	*	1
27	301098.80	3833281.49	5.68	*	1
28	300910.24	3833512.65	5.66	*	1
29	300984.23	3833390.99	5.54	*	1
30	301380.39	3833407.36	5.53	*	1
31	301420.00	3833383.00	*	1.64	1
32	301328.61	3833390.77	5.34	*	1
33	301112.00	3833513.00	*	1.58	1
34	300666.01	3833676.60	5.20	*	1
35	301118.93	3833256.52	4.92	*	1
36	301329.37	3833331.36	4.90	*	1
37	301020.99	3833285.76	4.63	*	1
38	301403.00	3833381.00	*	1.37	1
39	300574.46	3833474.83	4.31	*	1
40	301114.00	3833764.00	*	1.21	1

41	300708.00	3833682.00	*	1.16	1
42	300819.00	3833430.00	*	1.13	1
43	300739.00	3833476.00	*	1.08	1
44	300667.47	3833683.98	3.56	*	1
45	301388.00	3833355.00	*	1.06	1
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47	300619.00	3833661.00	3.44	*	1
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49	300510.23	3833527.20	3.38	*	1
50	301358.00	3833619.00	*	0.99	1
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52	301440.00	3833905.00	*	0.91	1
53	301230.00	3833503.00	*	0.90	1
54	301827.00	3833613.00	*	0.87	1
55	301212.00	3833493.00	*	0.87	2
56	301363.00	3833363.00	*	0.86	2
57	301592.25	3833461.00	2.83	*	2
58	300957.00	3833631.00	*	0.84	2
59	301199.28	3833678.44	2.77	*	2
60	301848.14	3833683.36	2.61	*	2
61	301617.00	3834001.00	*	0.77	2
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79	300414.73	3833841.06	2.14	*	2
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126	301135.00	3833638.00	*	0.47	2
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178	301308.00	3833327.00	*	0.36	2
179	301097.00	3833776.00	*	0.36	2
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184	300794.00	3833542.00	*	0.34	2
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186	300897.11	3833600.29	1.14	*	2
187	301534.00	3833619.00	*	0.34	2
188	301751.00	3833607.00	*	0.34	2
189	301208.54	3833284.67	1.13	*	2
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195	300829.00	3833351.00	*	0.32	2
196	301187.00	3833546.00	*	0.32	2
197	300492.43	3833516.81	1.07	*	2
198	301340.00	3833347.00	*	0.32	2
199	300908.00	3833605.00	*	0.32	2
200	300919.00	3833390.00	*	0.32	2
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202	300557.00	3833716.00	*	0.31	2
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208	301073.00	3833743.00	*	0.31	2
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210	300805.00	3833425.00	*	0.30	2
211	301261.00	3833864.00	*	0.30	2
212	300510.00	3833667.00	*	0.30	2
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214	301618.00	3833617.00	*	0.30	2
215	300736.07	3833560.47	1.00	*	2
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218	300466.91	3833796.63	0.96	*	2
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221	301175.71	3833336.04	0.92	*	2
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228	300902.28	3833513.97	0.62	*	2

229	300665.88	3833745.14	0.58	*	2
230	300816.82	3833574.84	0.46	*	3
231	301090.43	3833206.59	0.41	*	3
232	301264.61	3833299.15	0.41	*	3
233	300846.64	3833552.31	0.39	*	3
234	300871.95	3833574.74	0.36	*	3
235	301401.63	3833349.60	0.36	*	3
236	301453.34	3833390.86	0.36	*	3
237	300841.24	3833532.45	0.35	*	3
238	301699.22	3833460.15	0.35	*	3
239	300348.43	3833597.43	0.35	*	3
240	301245.25	3833368.00	0.34	*	3
241	300333.60	3833726.30	0.34	*	3
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243	300886.40	3833444.28	0.33	*	3
244	301195.29	3833374.27	0.32	*	3
245	300596.82	3833557.01	0.32	*	3
246	300271.49	3833648.88	0.31	*	3
247	301405.67	3833359.39	0.31	*	3
248	300756.14	3833424.12	0.31	*	3
249	301672.00	3833994.75	0.30	*	3
250	300363.92	3833709.75	0.30	*	3
251	300652.84	3833440.54	0.30	*	3
252	300831.62	3833579.11	0.30	*	3
253	300420.98	3833824.54	0.29	*	3
254	300403.91	3833765.91	0.29	*	3
255	300900.02	3833441.44	0.29	*	3
256	301856.25	3833722.75	0.28	*	3
257	300863.74	3833569.68	0.27	*	3
258	300864.07	3833307.09	0.27	*	3
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261	300775.59	3833445.94	0.26	*	3
262	300815.00	3833656.30	0.26	*	3
263	300805.07	3833570.75	0.26	*	3
264	300518.59	3833677.66	0.26	*	3
265	300377.62	3833809.64	0.26	*	3
266	300808.89	3833498.92	0.26	*	3
267	300774.17	3833369.54	0.25	*	3
268	300616.70	3833461.36	0.25	*	3
269	300480.17	3833510.46	0.25	*	3
270	300432.93	3833879.62	0.25	*	3
271	300637.15	3833751.68	0.25	*	3
272	300527.51	3833643.65	0.24	*	3
273	301027.43	3833493.36	0.24	*	3
274	300551.37	3833785.62	0.23	*	3
275	300793.52	3833667.74	0.22	*	3

Appendix E
Digital Geophysical Investigation Report and Geophysical Prove-Out

NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

GPR
MAGNETICS
ELECTROMAGNETICS
SEISMICS
RESISTIVITY
UTILITY LOCATION
UXO DETECTION
BOREHOLE CAMERA
STAFF SUPPORT

GEOPHYSICAL INVESTIGATION REPORT

Preliminary Assessment / Site Inspection
Off-Base Surface Danger Zones
Marine Corps Base (MCB) Camp Lejeune, North Carolina

Contract Task Order 080

Dates of Investigation:

April 6th – April 27th, 2010

FINAL SUBMITTAL
May 26th, 2010

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APPENDICES & CD

Appendix A: IVS Results
Appendix B: Example QC Test Results

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- IVS – Seeded vs. background maps, processed ASCII XYZ files
- Mosaic –Geosoft map, grid, and PDF files of line path overview and ICW-7 mosaic
- Preprocessed Data
    - Preprocessed data XYZ files
    - Raw data delivery reports
    - Static, cable shake, and personnel test processed XYZ, Geosoft map, and PDF plots
    - Preliminary preprocessed repeat XYZ, map, and PDF files
- Processed Data
    - Final processed XYZ files by grid block
    - Final data delivery reports
    - Static, cable shake, and personnel test processed XYZ, map, and PDF plots
    - Final repeat XYZ, map, and PDF files
    - PDF and Geosoft map color coded gridding of instrument response data
    - Target lists in XYZ and Excel formats
    - Geosoft grid files
- Report –Report in Microsoft Word and PDF formats

ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
DGM	Digital Geophysical Mapping
DQOs	Data Quality Objectives
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Operations and Emergency Response
ICW	Intracoastal Waterway
ISO	Industry Standard Object
ITU	Intertidal Uplands
IVS	Instrument Verification Strip
MCB CamLej	Marine Corps Base Camp Lejeune
MEC	Munitions and Explosives of Concern
MRA	Munitions Response Area
mV	Millivolts
NAD83	North American Datum of 1983
NMEA	National Marine Electronics Association
NSRS2007	National Spatial Reference System of 2007
OSHA	Occupational Safety and Health Administration
PA/SI	Preliminary Assessment / Site Inspection
QA/QC	Quality Assurance / Quality Control
QC	Quality Control
SDZs	Surface Danger Zones
SOPs	Standard Operating Procedures
UTM	Universal Transverse Mercator

1.0 INTRODUCTION

NAEVA Geophysics, Inc. (NAEVA) was contracted by CH2M HILL to conduct Digital Geophysical Mapping (DGM) in support of a Preliminary Assessment / Site Inspection (PA/SI) at the Off-Base Surface Danger Zones (SDZs) munitions response area (MRA) north of Marine Corps Base Camp Lejeune (MCB CamLej). Field operations were conducted from April 6th through April 27th, 2010.

1.1 BACKGROUND AND OBJECTIVES

Though not located within the present bounds of MCB CamLej, the SDZs are associated with former ranges. The MRA encompasses 1,632 acres of which 231 are land-based. The primary objective was to map areas within the MRA for the purpose of identifying the extent of munitions and explosives of concern (MEC) that may pose a risk to people or the environment. The types of munitions known to have been used on various ranges within or adjacent to the MRA are numerous, including rockets, missiles, grenades, mortars, artillery shells, and bombs. The dates of use range from 1945 to the present. Results from this survey will aid in determining the approach of more in-depth investigations as needed.

1.2 SCOPE OF WORK

Geophysical operations included the following tasks: acquisition of geophysical data at the Instrument Verification Strip (IVS) to confirm system capabilities and proper operation, digital geophysical mapping of full coverage and transect areas across the MRA, data processing and anomaly selection, and preparation of data deliverables. DGM efforts were accompanied by a quality control (QC) plan in order to establish confidence in the accuracy of the geophysical data. Data were collected in areas offering ease of access with thin enough vegetation to allow traversal with the geophysical equipment as well as having favorable Global Positioning System (GPS) functionality. A full coverage survey was performed in the open sandy area on the seventh western dredge spoil island in the Intracoastal Waterway (ICW). Transect surveys were conducted on the ICW islands as well as accessible intertidal upland areas and sandbars in Bear Inlet.

All data were to be processed, interpreted and uploaded to the CH2M HILL FTP site on schedule and in the formats specified in the work plan.

1.3 SITE LOCATION AND DESCRIPTION

The SDZs MRA is located northeast of the boundary of MCB CamLej between the Intracoastal Waterway and the Atlantic Ocean, including Sanders Island and a western portion on Bear Island.

Areas covered in this investigation include seven dredge spoil islands in the Intracoastal Waterway along the northern boundary of the MRA, several marshy upland areas on and adjacent to Sanders Island, the western tip of Bear Island, and sandbars of varying tidal exposure in Bear Inlet. No part of the MRA is accessible by road, and the amount of exposed land in Bear Inlet is affected greatly by tidal influence.

Vegetation within the MRA is highly variable. The ICW islands are predominantly covered by grasses and small bushes with denser forest in the centers of each island. The westernmost island has an open sandy pit with drainage pond. The survey areas in Bear Inlet are mostly coastal wetlands covered in low grass and some scrub, while the sandbars are devoid of vegetation. Topography is generally flat, especially on sandbars, with some sand dunes on Bear Island and the seventh ICW island (ICW-7). The geology is composed of unconsolidated silts and sands, with shallow to surface groundwater, which does not affect the geophysical instruments.

2.0 EQUIPMENT

2.1 GEONICS EM61-MK2

The geophysical instrument used for the investigation at MCB CamLej is the Geonics EM61-MK2 metal detector. The EM61-MK2 is a high resolution time-domain electromagnetic instrument designed to detect, with high spatial resolution, shallow ferrous and non-ferrous metallic objects. Because of the large range of potential MEC within the MRA, the ability to detect non-ferrous metal is a benefit over using a magnetometer. The EM61-MK2 system consists of two 1 meter by 0.5 meter air-cored coils, a digital data recorder, batteries and processing electronics. The EM61-MK2's transmitter generates a pulsed primary magnetic field, which then induces eddy currents in nearby metallic objects. The receivers either measure the eddy currents at three distinct time intervals in the bottom coil and one time interval in the top coil or four intervals in the bottom coil if no top coil measurements are recorded. For this scope of work the latter method was chosen. Earlier time gates provide enhanced detection of smaller metallic objects. Secondary voltages induced in both coils are measured in millivolts (mV). The arrangement of coils is such that there is a vertical separation of 42 cm from the ground to the bottom coil. When used with GPS or odometer wheel and fiducial positioning based on known points, target resolution of approximately 0.5 meters can be expected. The data are collected using Geomar's NAV61MK2 program and temporarily stored in a Juniper Allegro CX data logger prior to downloading to a laptop computer.

2.2 TRIMBLE RTK GPS

A Trimble R8 Global Navigation Satellite System (GNSS) Real-Time Kinematic (RTK) GPS base station and rover were used for the real-time acquisition of positional data during geophysical data collection with the EM61-MK2. The GPS base station was used in conjunction with a rover mounted over the center of the EM61-MK2 coil. Real-time corrections were broadcast to the roving GPS unit via a radio link using a Trimble HBP450 UHF radio modem. This system provides positional corrections at a rate of 1 Hz, with an accuracy of 3 cm horizontal and 5 cm vertical when a minimum of 5 satellites are available. Data quality derived from a satellite can depend on local topography, the elevation of the satellite in the sky, weather, and other factors. However, as GPS surveying was only conducted in areas that would offer good RTK performance, there were no problems with dropouts or degraded periods during the day.

Due to the large area of concern, a repeater using another high-power (35W) radio was set up as needed on the berm surrounding the sandy pit on ICW-7 in order to extend the area of coverage of the base station's corrections. The GPS positions were streamed into the Allegro data logger once per second using a National Marine Electronics Association (NMEA) GGA message and were recorded simultaneously with the EM61 data in the NAV61MK2 program. A GPS QC check was performed at the beginning of each day to ensure accuracy. All GPS points and map data are presented in the Universal Transverse Mercator (UTM) coordinate system, Zone 18 North, North American Datum of 1983 (NAD83), National Spatial Reference System of 2007 (NSRS2007), meters.

3.0 METHODOLOGY

3.1 DGM SURVEY ACTIVITIES

Prior to NAEVA's arrival, transect lines on the ICW islands were cleared of vegetation and wooden stakes installed along the center of the cleared swaths. For the open sandy area a 30-meter grid system was generated and pin flags emplaced to aid in surveying complete grids, and ropes with marks painted every 75 cm were laid out to ensure proper line spacing. No ground markers were used in the intertidal areas. The method of geophysical surveying used for this scope of work was the EM61-MK2 mounted on wheels, using both fiducial and GPS positioning. Due to overhead canopy on the wooded transects the system was operated using fiducial positioning, with readings triggered by an odometer wheel every 20 cm and markers placed in the data over each stake, which varied in spacing depending on the straightness of a particular transect segment. Before processing the data the local positions were warped to geodetic

coordinates based on the locations of the stakes reported by the surveyor. In all other areas a tripod-mounted GPS was attached to the top coil and the data logger was operated in automatic mode at the standard rate of 10 readings per second. The position of each EM61-MK2 reading between the 1 Hz GPS updates is interpolated in the software.

3.2 DATA PROCESSING AND INTERPRETATION

3.2.1 Data Storage and Initial Editing

EM61-MK2 data were temporarily stored in an Allegro CX data logger using Geomar NAV61MK2 software version 1.22 and then downloaded into a laptop computer for further on-site processing using Geomar TrackMaker61MK2 version 1.67 and Geosoft Oasis Montaj software version 7.1.1.

Daily logs and field notes were input digitally into a Palm Treo device supplied by CH2M HILL using the MRSIMS series of forms. Initial data processing was performed by the field team, which included reviewing the data for integrity and completeness, and creating positioned XYZ files for each data file and QC test for use in further processing the geophysical data. Raw geodetic (Latitude-Longitude WGS84) coordinates were converted to projected UTM Zone 18 North NAD83 coordinates for the XYZ files. If an issue with a file was noted, such as a missing line or bad readings, the cause was investigated and corrected as necessary.

3.2.2 Preprocessing

Converted raw data files were imported into Geosoft's Oasis Montaj to perform the following:

- Review and finalize all QC tests (IVS lines, static, cable shake, personnel) prior to processing of the DGM data for that day
- Evaluate GPS positional accuracy and positioning
- Evaluate data density and speed
- Apply auto leveling and instrument drift corrections
- Apply default lag correction
- Generate preliminary contour map(s) from gridded data

3.2.3 Final Processing

After completion of preprocessing, the data were further evaluated and processed to generate final processed data files. Final processing steps included:

- Evaluation and refinement of auto leveling and instrument drift corrections in Channel 2
- Evaluation and refinement of lag correction in Channel 2

- Additional digital filtering and enhancement, as necessary, in Channel 2
- Targeting of data, as described in Section 3.2.4
- Generation of formatted ASCII files containing processed data by grid block
- Generation of final maps for each grid block showing contoured gridded data, target locations, and culture
- Generation of final original vs. repeat profiles by grid block

3.2.4 Analysis and Target Selection

The UX-Detect module within Oasis Montaj identifies peak amplitude responses associated with, but not limited to, MEC items. Initial target selections were made based on the minimum curvature gridded data. Data profiles corresponding to the anomalies selected by Geosoft were then analyzed by trained geophysicists, with the targets evaluated as to their validity and position, as single-source anomalies may generate multiple target designations depending on shape and orientation. Targets found to be invalid or incorrectly located were removed or adjusted. Additionally, anomalies that were not selected by the UX-Detect module, yet deemed to represent a potential MEC target, were manually selected. All target selection was performed on final processed data from Channel 2 of the bottom coil of the EM61-MK2.

Final processed XYZ (ASCII) files were created for each grid block. For transect "grid blocks" on the ICW islands individual geophysical maps and target lists were created for each transect. In the intertidal uplands (ITU) maps were created by grid block with targets sorted east to west. In the full coverage area on ICW-7 maps and target lists were prepared for each 30-meter grid and targets sorted by highest response amplitude to lowest. All anomalies occurring at or above the targeting threshold of 3 mV Channel 2 are identified using a unique ID number.

Each target list provides a Target ID, Grid ID, Easting (x) and Northing (y) UTM coordinate location for each target, anomaly type, and the recorded peak response in Channel 2 in millivolts. All raw and processed data have been submitted to CH2M HILL's project geophysicist and can be found on the enclosed CD.

4.0 RESULTS

4.1 SUMMARY OF WORK PERFORMED

The digital geophysical mapping of the MCB CamLej Off-Base SDZs took place from April 6th through April 27th. The first day on site was used to establish an IVS on the mainland in the vicinity of the Red Barn Grill and visit the various areas to be mapped. However, due to

logistical issues with receiving the GPS radio signal on the islands and some power line noise, the GPS base station and IVS were moved onto the western ICW island. Figure 1 displays the line paths collected across the entire site, identifying the nomenclature for each area. Figure 2 is a color contour mosaic of the full-coverage data collected on ICW-7. Figures 3 through 7 display transect mosaics on the ICW islands, Figures 8 through 12 the ITU transects. The transect survey on the ICW islands (Figure 13) was completed on April 7th and the full coverage area (Figure 14) on ICW-7 performed from April 8th through April 16th. Once these defined areas were completed, the remainder of time (April 16th through April 27th) was used to map regions in the intertidal upland via meandering transects. Transects were chosen in order to cover a large area in a limited amount of time and to allow for avoidance of vegetation, which would have been problematic in a full coverage survey. A total of 27 acres were surveyed in 13 working days; 10.5 by grid, 16.5 by transect. The open areas, generally easy ground conditions with few obstructions, and minimal grid setup allowed for a higher than normal production rate. Two days had no useable data due to heavy rain and instrument malfunctions after getting wet.

A few data gaps exist in the surveyed grids around steep sand dunes and some vegetation. All gaps were noted in the grid information forms. The meandering nature of the intertidal upland transects avoided obstacles, usually thick vegetation or pools of water. Data collection on the ICW transects was completed as staked out. In the full coverage area collection was stopped at the thicker vegetation line, though on the north side sand dunes prevented access to this boundary. This area likely offers little information, though, due to the presence of an erosion control netting causing a ring of anomalies around the perimeter of the area. In the intertidal uplands data were collected wherever practical. Large sand dunes on Bear Island were avoided, as traversal would be extremely difficult. Boundaries in the further inland wetlands (Figure 15) were usually very tall grass, extremely muddy ground, or pools and canals; on the sandbars (Figure 16) data were collected to the waterline, which often required taking advantage of low tide. All of the sandbars surveyed had at the time some portion exposed at high tide. Low tide exposure depends greatly on the tidal amplitude, especially closer to Bear Inlet. Tidal fluctuations at the time of the survey varied from approximately -0.3 feet to 2.1 feet mean sea level.

Noise levels in areas within the SDZ MRA were very low. There is noise present in QC tests and the IVS from April 6th through April 8th, when the IVS and morning tests were in a location near power lines. Spikes are evident in this data, though data quality objectives (DQOs) were still met. QC tests done in the vicinity of their associated grid block and the newly installed IVS on the island show little ambient noise. Smooth ground across the majority of surveyed areas

reduced the possibility of false positives due to coil vibration. Some lower areas of the sandbars have a scalloped texture from wave and current action, and in these areas collection speed was slowed to avoid excessive bouncing of the coil. However, with such a low targeting threshold it is possible very low amplitude targets in these areas may not have a ground source.

4.2 MOBILIZATION AND SITE SETUP

Prior to mobilization an Activity Hazard Analysis (AHA) and Standard Operating Procedures (SOPs) were provided to CH2M HILL. All personnel mobilized to the site had current 8-hour and/or 40-hour OSHA HAZWOPER training and medical monitoring examinations in accordance with OSHA 29 CFR 1910.120 and 29 CFR 1910.134. NAEVA mobilized one field crew on April 5th. Equipment was stored in the CH2M HILL trailer at Shell Rock Landing. Following one day of initial safety briefings, site orientation, and installation of an IVS, production surveying began on April 7th. Site-specific health and safety briefs were given each morning by the CH2M HILL safety officer. The first day on site equipment was assembled and tested; the GPS base station was set up on a point established by Lanier surveying company and checked against a second Lanier point. After the IVS was moved onto the island a control point established by Sepi Engineering was used and its accuracy checked on a nearby transect stake. The base station points utilized during this project were "LANIER 1" located in the open field northwest of the Red Barn Grill at 301,496.465 m Easting, 3,836,979.959 m Northing, 5.279 m elevation, and "IRS/CAP" (no witness stake) on ICW-7 at 298,213.866 m Easting, 3,834,532.400 m Northing, 0.330 m elevation, UTM Zone 18 North, NAD83 (NSRS2007).

4.3 DGM SURVEY ACTIVITIES

In 27 acres surveyed, 3,165 targets were selected above the targeting threshold of 3 mV in Channel 2, an average target density of 117 targets per acre, though this number is not representative of the density across the MRA as it is heavily skewed by cultural response from erosion netting staples around the perimeter of the sandy area on ICW-7. In contrast, the intertidal upland transects total 16 acres and 259 targets, a density of 16 targets per acre. Ignoring the perimeter responses in the sandy area, including transect T01, data densities in the ICW transects and grids are 71 and 29 (approximate) per acre, respectively. Out of a total of 2,808 targets in the grids on ICW-7, approximately 2,500 were suspected culture, leaving about 300 targets not in the area of the erosion netting. While these suspected cultural anomalies cannot be discounted without intrusive investigation, as it is possible for one source to mask the response of another, this number gives a more informative picture of the true background anomaly density.

Other than the landscaping staples, almost no cultural debris was noted. A large drainage pipe is present near the pond.

Anomaly distribution of other than likely cultural items does not seem to be clustered in any one area, but rather for the most part randomly distributed. There are a few areas in the intertidal uplands that display some clustering, but they are largely low amplitude. Block ITU002A has a higher amplitude cluster of anomalies to the south, targets 17 through 28. The southern part of block ITU003B also contains a higher concentration of anomalies. 68.7% of all targets in the intertidal upland areas are below 5 mV, and 85.7% below 10 mV. Given the large number of low-amplitude targets it is possible some of these may have been caused by noise. On the ICW islands 10.5% of the targets are below 5 mV, 33% below 10 mV, 58.2% below 15 mV, and 76.6% below 20 mV. This higher distribution is due to the numerous targets resulting from the erosion netting staples. Individual grid and grid block maps may be found on the data CD.

4.4 DATA PROCESSING AND INTERPRETATION

All data were processed as described in-depth in Section 3.2. Any anomalies suspected as originating from noise (e.g., channel readings out of phase) and not metallic objects are noted in the processing reports included on the CD. These reports list down-line data density statistics, leveling, lag, and gridding parameters used in processing each dataset. Processors examined all data prior to NAEVA demobilizing from the site.

The enclosed CD contains all raw and processed data, including processing reports, QC test results, target lists, and color contour maps for each grid block. A copy of this report may also be found in Adobe PDF and Microsoft Word formats.

5.0 QUALITY CONTROL

To establish confidence in the data reliability, QC tests were conducted throughout the project. Tests were conducted prior to, during, and after all data collection sessions. All QC tests for the EM61-MK2 were conducted after a minimum 15 minute warm-up period for the electronics. Sample graphical displays of QC data are included in Appendix B.

5.1 SYSTEM VALIDATION – INSTRUMENT VERIFICATION STRIP (IVS)

Prior to beginning the main survey of the transect lines an Instrument Verification Strip (IVS) was surveyed. The purpose of surveying the IVS is to demonstrate the effectiveness of all instrumentation, methods, and personnel prior to the initiation of fieldwork and document the site-specific noise and capabilities of a DGM system. Serial number identifications were

recorded for all instrumentation (i.e. data logger, coils, EM61-MK2 electronics), and the IVS was mapped using the same personnel, equipment, and methodologies employed for the DGM survey.

The IVS was initially established in a field near the Red Barn Grill and Shell Rock Landing. It was later moved to ICW-7 to ease logistics and avoid noise in the data. In both cases two inert seed items (small 1" by 4" industry standard objects [ISOs], part number 44615K466 from McMaster-Carr) were emplaced vertically 5" to the center of the object spaced 3 meters apart in order to test the geophysical instrument functionality. Before burying the items a background survey was performed to verify the location was free of metal objects in the locations where the items would be buried. The first time the IVS was surveyed in each location five lines were run in the following manner (see Figure 17): offset 0.75 m from the items, directly over the items, offset 0.375 m from the items, offset 0.75 m on the opposite side from the first line, and a background line 3 m from the items. See Appendix A for maps displaying the background and seeded surveys in both locations, as well as a comparison of GPS and fiducial positioning. Each subsequent day a single IVS line was run over the center of the ISOs in the same direction as was surveyed with multiple passes.

DQOs examined in the IVS and associated QC tests include positioning repeatability, system data repeatability, and dynamic detection repeatability. As defined in the work plan, positional error at known monuments will not exceed 10.2 cm (4 inches), response to a standardized item will not vary more than ± 20%, and the maximum amplitude of Channel 2 must be greater than 0.8 times the minimum amplitude on the least favorable orientation curve from the NRL validation test results. Other DQOs evaluated in production data include: downline data density having sufficient data collected to detect munitions items by at least 98% of possible sensor readings captured at 0.7 ft (0.213 m) or lesser spacing between points, and in 100% coverage areas lane spacing will not exceed 20% of 1 meter (coil width). The horizontal positioning accuracy must also be accurate enough to allow reacquisition. Selected anomalies must lie within 1 meter of blind seeds emplaced by CH2M HILL. All peak responses in Channel 2 over the ISOs were within specifications.

5.2 QC Test Descriptions and Acceptance Criteria

In addition to the IVS, the following QC procedures were performed and documented during the data collection process and reviewed by a qualified geophysicist on a daily basis:

GPS Check Point: At the beginning of the day after setting up the base station and before collecting any data, the GPS antenna was mounted on a survey pole and placed at a known point to check the accuracy. The measured position was compared to the reported location to check for

proper operation. The locations were stored in a Trimble Survey Controller unit and checked as verified in a daily DGM form on the PDA. Positional discrepancies within 10 cm were considered acceptable.

Static Background and Static Spike: Static tests were performed by positioning the survey equipment in an area free of metallic response and collecting data for a 3-minute period. During this time, the instrument was held in a fixed position. A static test is the primary measurement of instrument functionality and consists of one minute without a spike, one minute with a spike (a wooden board fitted to the bottom coil with a small ISO mounted 49 cm above the bottom coil on a PVC tube), and then one minute without a spike. The purpose of the static test is to determine whether unusual levels of instrument or ambient noise exist and to check for consistent response. The acceptance criterion was that the spike response after background correction be within ± 20% of the expected response according to the NRL response curve (14.35 mV in Channel 2); static tests were also plotted on a scale of ± 2 mV so that any abnormally high data spikes could be observed. The static background and static spike tests were conducted at the beginning and end of the day and between grid blocks. The first test of the day was conducted in the vicinity of the IVS.

Cable Shake Test: On a daily basis, the instrument connections were checked for their response to vibrations in the cables. The response was observed in the field for immediate corrective action, transmitted back to a processor, analyzed, and checked for spikes in the data that can possibly create false anomalies. Any data spike greater than 2 mV from the mean would constitute a QC failure. The cable shake test was conducted at the beginning of the survey operation for each workday.

Personnel Test: This test checks the response of instruments to personnel and their clothing/proximity to the system. On a daily basis, the instrument was checked for its response to the personnel operating the system. The response was observed in the field for immediate corrective action and transmitted back to a processor, and analyzed and checked for spikes in the data that can possibly create false anomalies. Any data spike greater than 2 mV from the mean would constitute a QC failure. The personnel test was conducted at the beginning of the survey operation for each workday.

Repeat Data: This test is performed to verify repeatability of the data and was performed at the end of each dataset. At least 2% of the survey lines were repeated and evaluated for consistency. Because of the difficulty of walking the exact same line twice, and because instrument response is

very sensitive to the distance of a metallic object from the coil, this test was evaluated qualitatively.

5.3 QC TEST RESULTS

QC data were evaluated using Geosoft's QA/QC software. Static, cable shake, and personnel test profiles were plotted on a scale of ± 2 mV from the mean. Any readings outside this range were flagged on the profiles, and an associated failure percentage was reported. Flagged readings are apparent in the static tests noted below. The following provides a summary of the QC results:

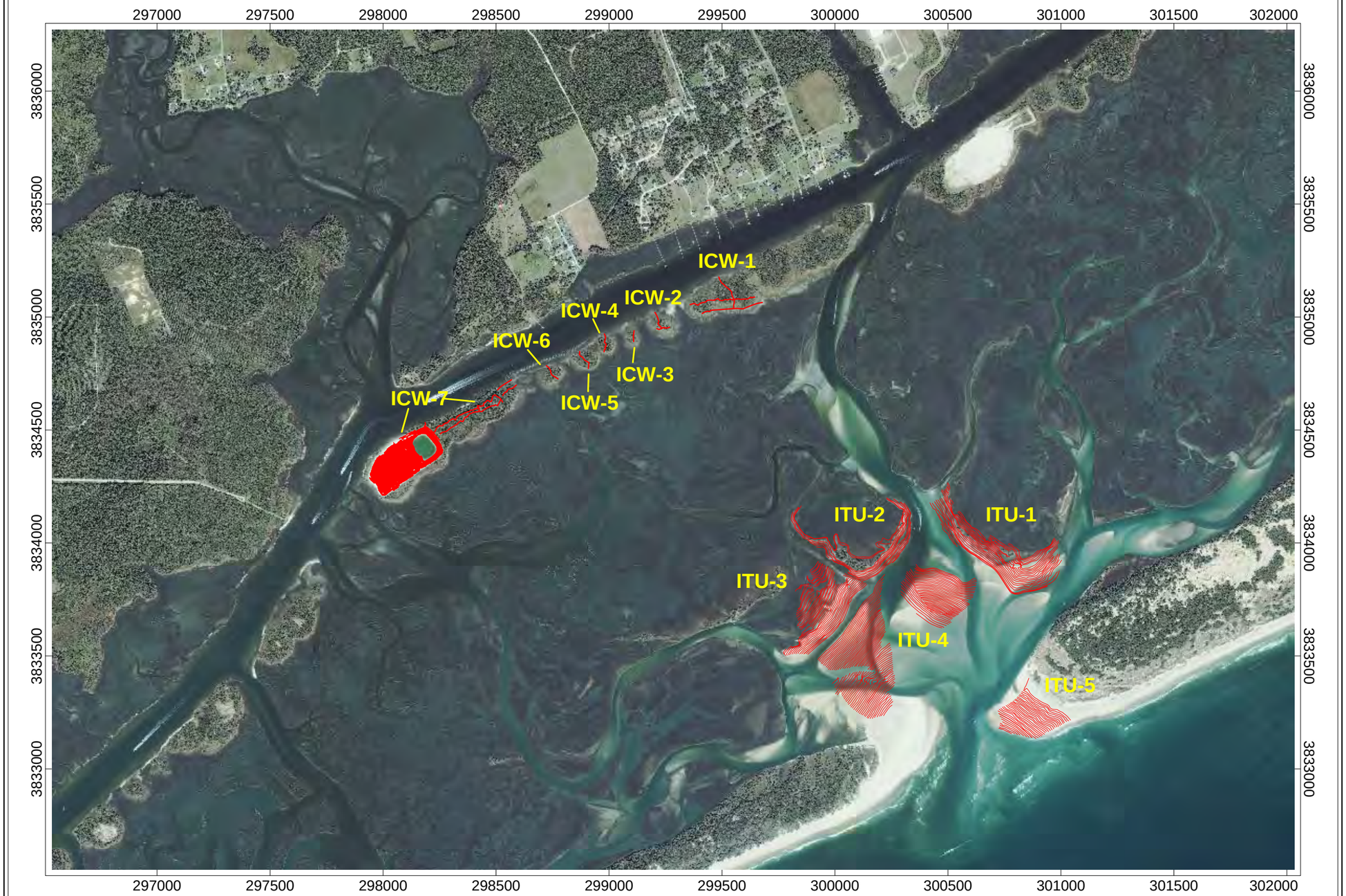
1. **GPS Check Point:** All recorded points were well within tolerance. The average distance from the reported location was 2.3 cm.
2. **Static Background / Spike Test:** All static and spike tests were within acceptance criteria; most were stable, repeatable, and without spikes. Some data spikes were evident in QC tests performed on the mainland (QC1 tests on April 6th through April 8th, and QC2 from April 6th) due to the proximity of power lines. The response with the ISO was still within specification. Included in Appendix B is a plot of all spike test responses with the expected response curve and upper and lower bounding curves.
3. **Cable Shake Test:** No spikes were observed in any of the tests.
4. **Personnel Test:** No deviation from background response was observed.
5. **Repeat Data:** Repeat lines generally showed good repeatability. Discrepancies in the response on some repeat lines were often a result of line path deviation, though in general the usually sandy ground allowed for the best possible results as the exact prior track was visible.

6.0 CONCLUSIONS

All tasks involved in the DGM of the Off-Base SDZs at MCB CamLej were completed as scoped. Supporting QC data and all other DQOs as outlined in the geophysical investigation plan were within specifications. The survey covered 27 acres in a variety of areas, including islands in the Intracoastal Waterway, uplands, marshland, and sandbars around Bear Inlet, and the western tip of Bear Island. Although some time was spent travelling to the different areas by boat, the largely favorable ground conditions resulted in high production rates and allowed for a sizeable area to be examined.

In general anomaly density is quite low, with large areas in the intertidal zone having little to no response. There are no obvious areas that could possibly represent a former target. On the ICW

islands, where one might not expect such features given they were created from dredging the waterway, anomaly density is again low and scattered, other than the cultural response around the perimeter of the sand pit on ICW-7. Statistical analysis and sampling based on the results of this investigation may aid in directing any further action within the MRA.



NOTE: See individual maps (Grid, Transect, Block) for colored contours, target locations and culture.

250 0 250 500 750

(meters)

NAD83 / UTM zone 18N

NAEVA GEOPHYSICS INC.

THE LEADER IN SUBSURFACE DETECTION

Subsurface Geophysical Surveys

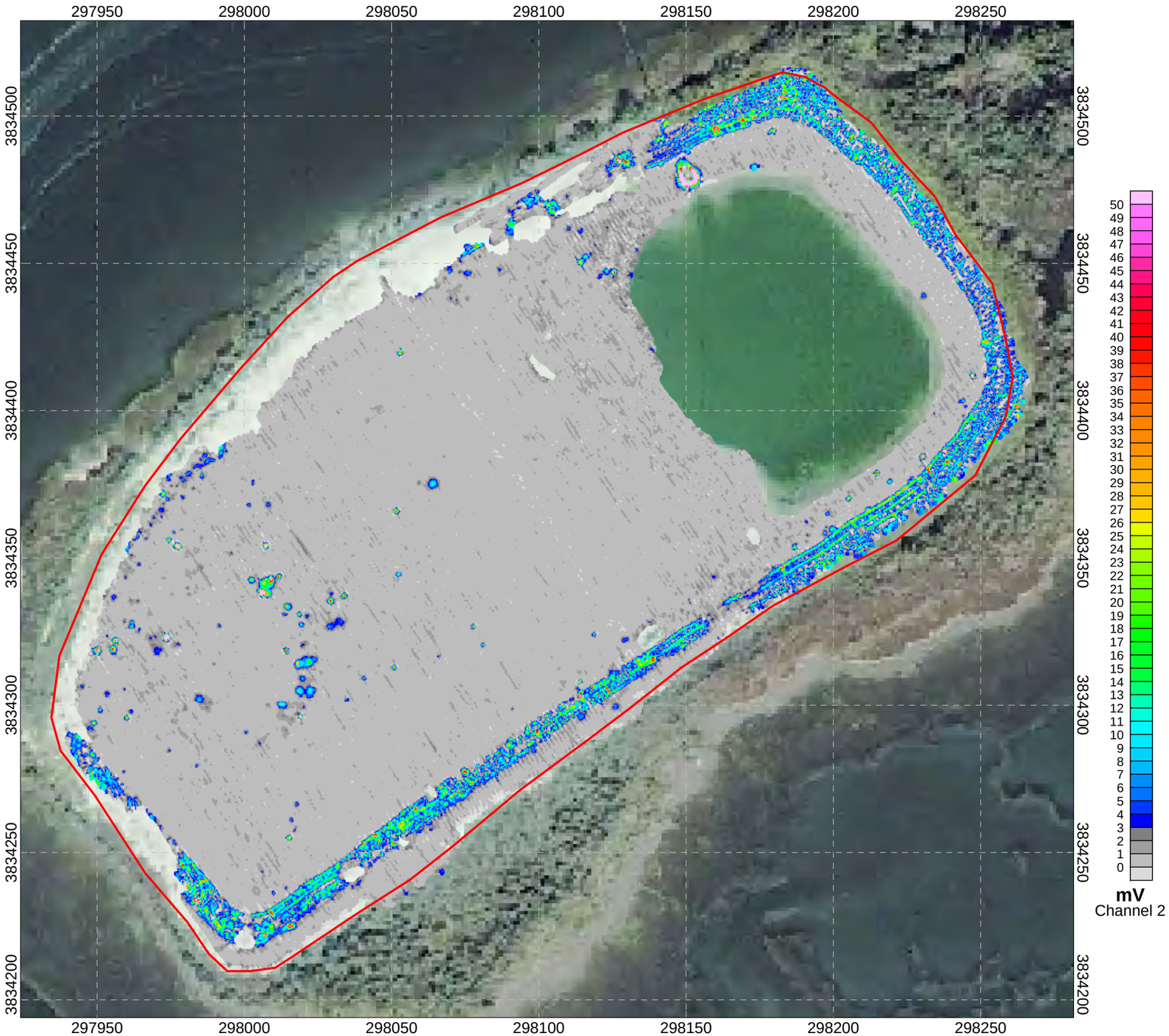
Figure 1

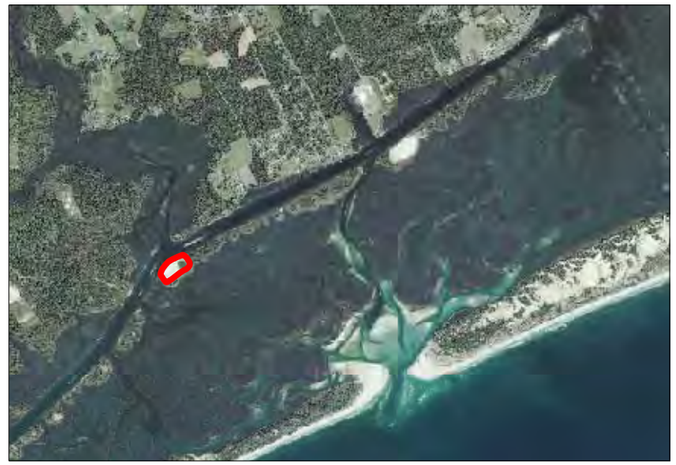
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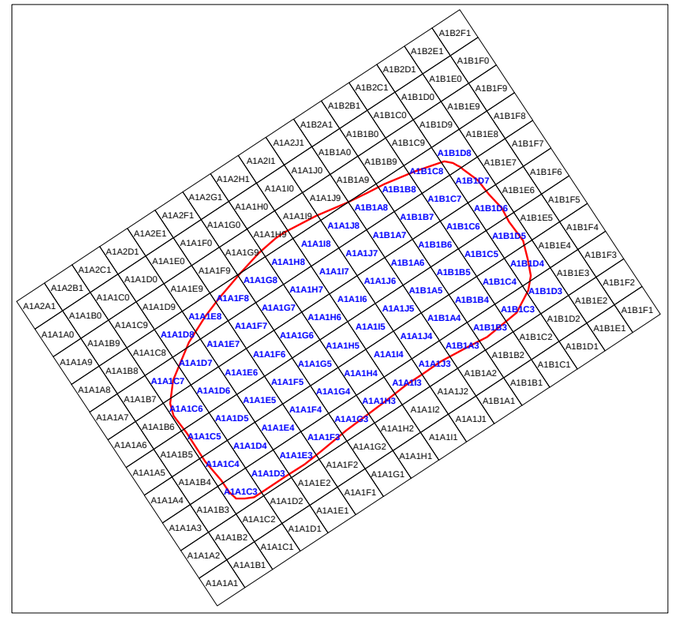
Collected DGM Line Path Overview
Off-Base Surface Danger Zone
Marine Corps Base, Camp Lejeune
Jacksonville, North Carolina

Dates of Survey: 04-07-2010 through 04-27-2010
Date of Map Creation: 05-07-2010

Map Approver: J. Guillard







NOTE: See individual maps for target locations and culture.

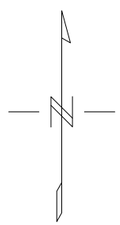
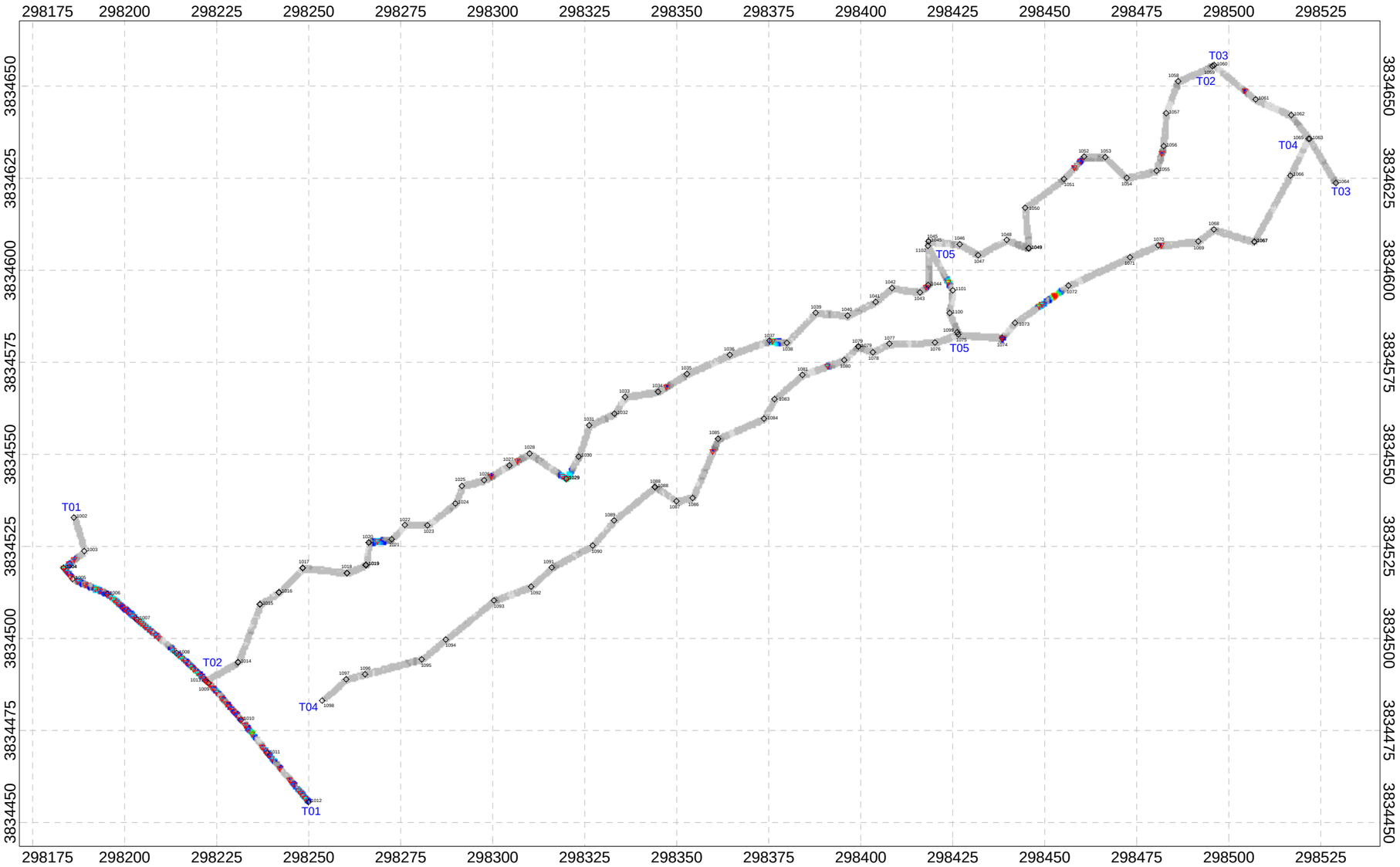


Figure 2

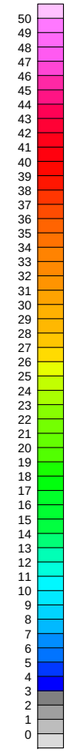
Client: CH2M HILL
EM61 MK2 - Bottom Coil Mosaic Off-Base Surface Danger Zone - ICW-7 Marine Corps Base, Camp Lejeune Jacksonville, North Carolina
Dates of Survey: 04-08-2010 through 04-16-2010 Date of Map Creation: 04-22-2010
Map Approver: J. Guillard

NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

25 0 25 50 75
(meters)
NAD83 / UTM zone 18N





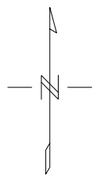


Legend

T01 Transect ID

1034 Surveyed Stake Location with ID

Selected Target
(See Individual Target Pick List for ID, Response & Location)



NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

25 0 25 50 75
(meters)
NAD83 / UTM zone 18N

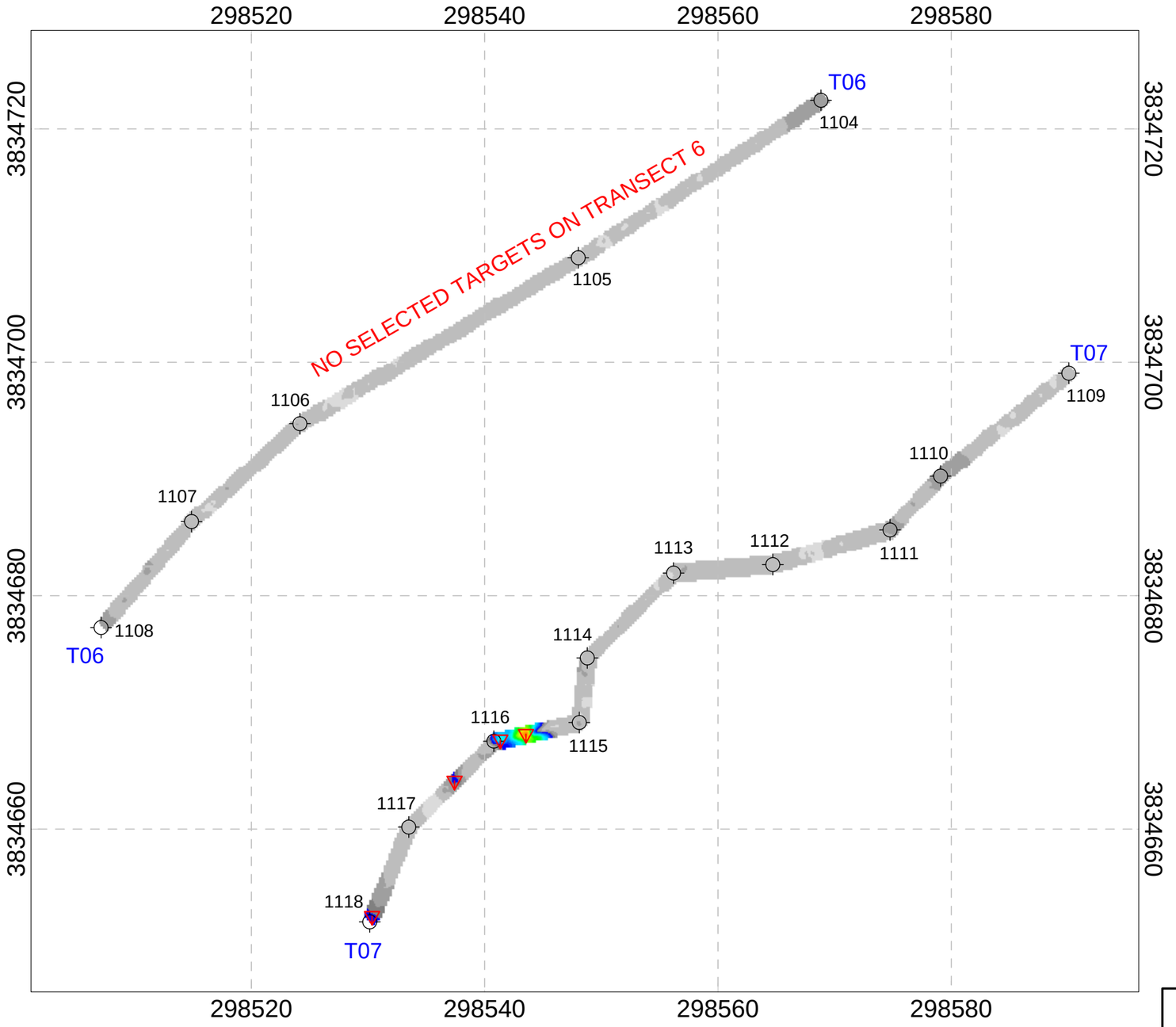
Figure 3

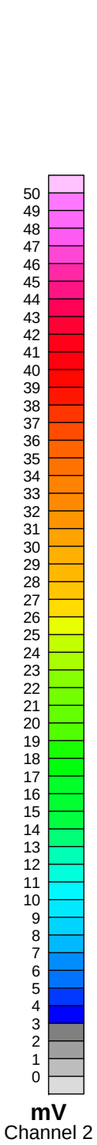
Client: CH2M HILL

EM61 MK2 Bottom Coil Mosaic
Intercoastal Waterway (ICW) - Island 7 - Transects 1 through 5
Off Base Surface Danger Zone
Marine Corps Base, Camp Lejeune
Jacksonville, North Carolina

Date of Survey: 04/07/2010
Date of Map Creation: 05/26/2010

Map Approver: J. Guillard







Legend

T01 Transect ID

1034 Surveyed Stake Location with ID

Selected Target
(See Individual Target Pick List for ID, Response & Location)

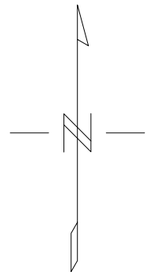


Figure 4

NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

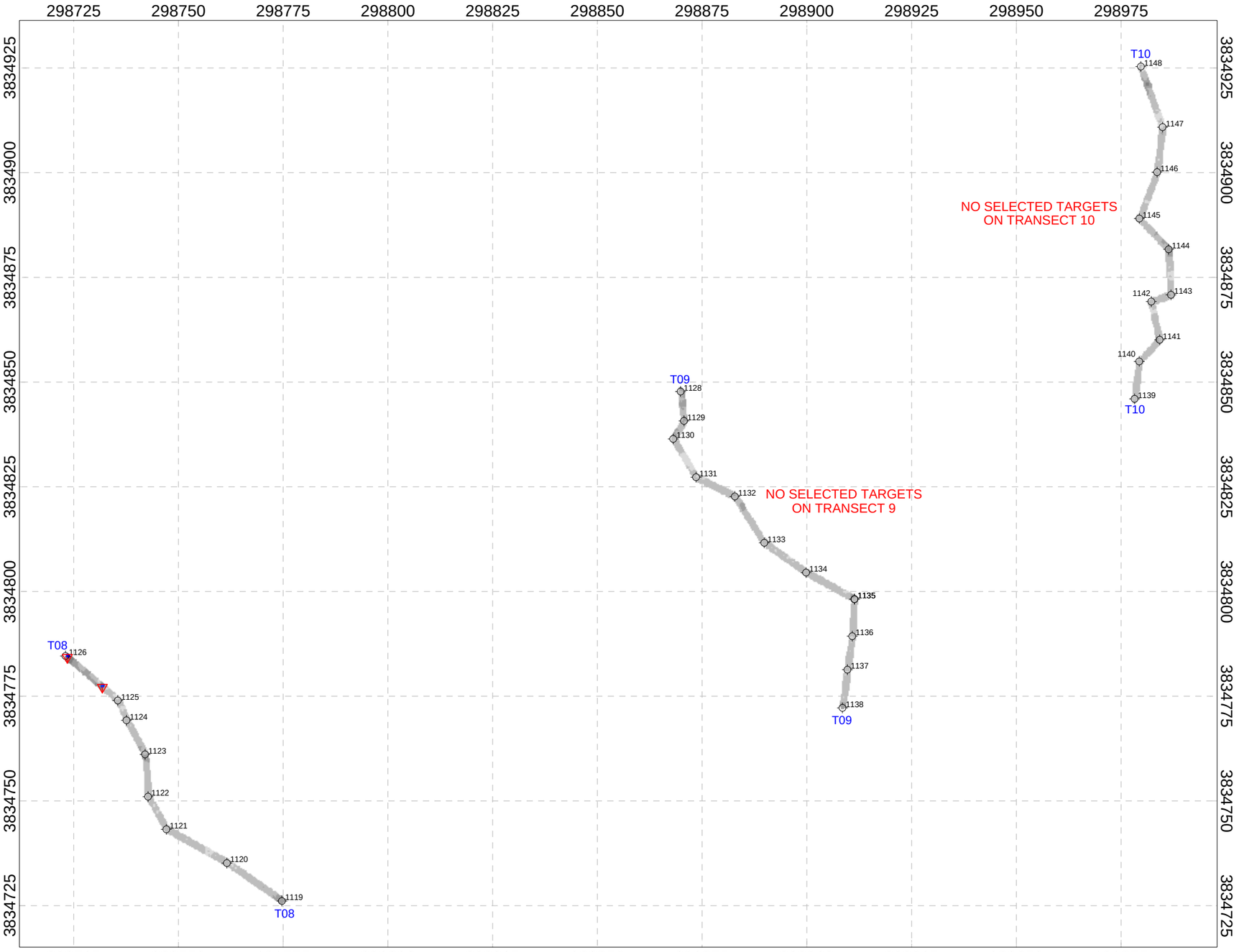
10 0 10 20
(meters)
NAD83 / UTM zone 18N

Client: CH2M HILL

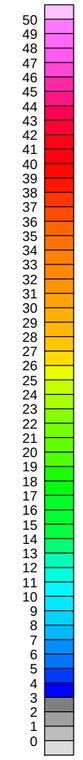
EM61 MK2 Bottom Coil Mosaic
Intercoastal Waterway (ICW) - Island 7 - Transects 6 through 7
Off Base Surface Danger Zone
Marine Corps Base, Camp Lejeune
Jacksonville, North Carolina

Date of Survey: 04/07/2010
Date of Map Creation: 05/26/2010

Map Approver: J. Guillard







Legend

- T01 — Transect ID
- 1034 — Surveyed Stake Location with ID
- Selected Target (See Individual Target Pick List for ID, Response & Location)

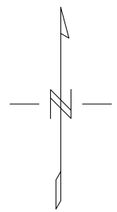


Figure 5

Client: CH2M HILL

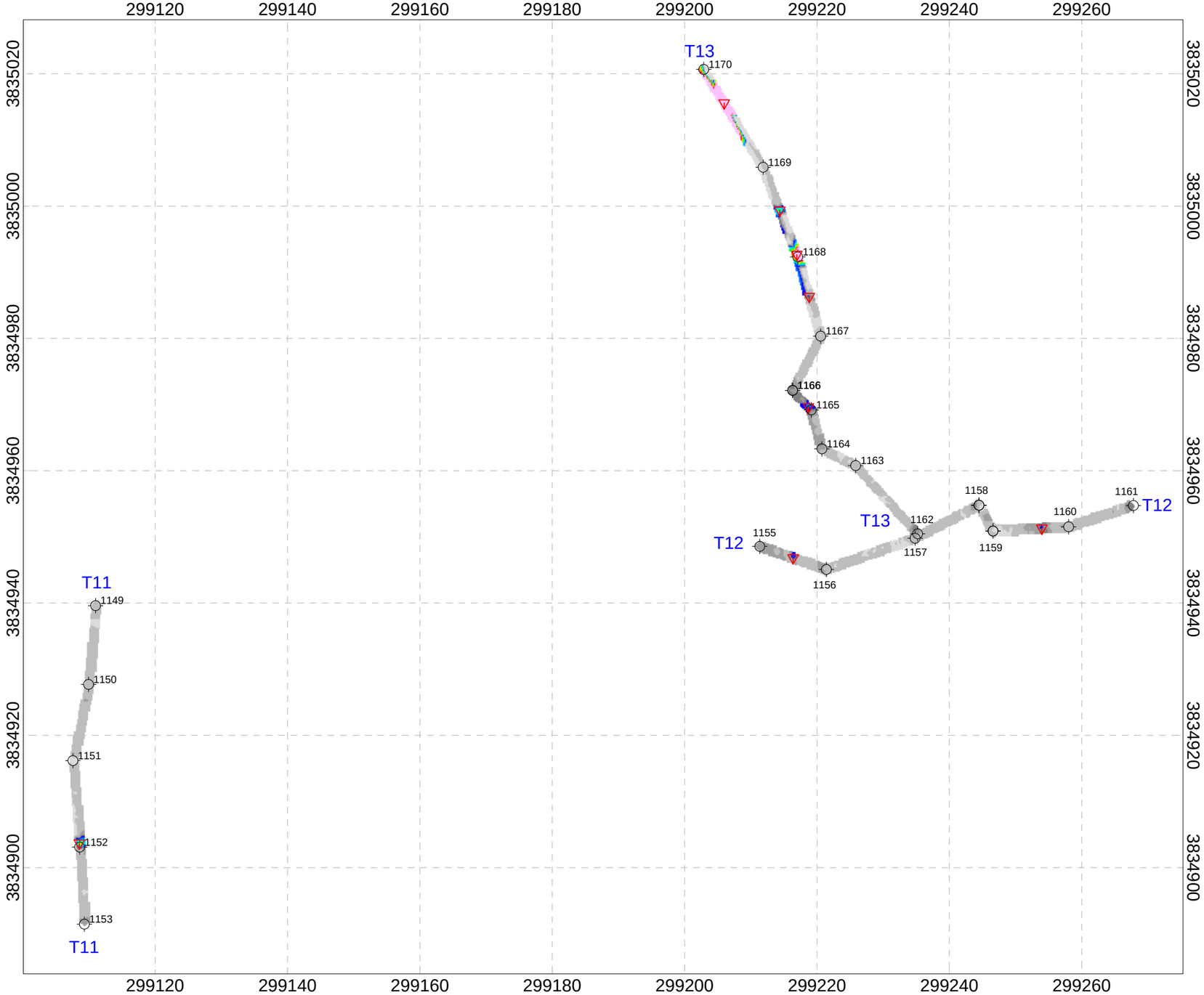
EM61 MK2 Bottom Coil Mosaic
Intercoastal Waterway (ICW) - Islands 4, 5, 6 - Transects 8 through 10
Off Base Surface Danger Zone
Marine Corps Base, Camp Lejeune
Jacksonville, North Carolina

Date of Survey: 04/07/2010
Date of Map Creation: 05/26/2010

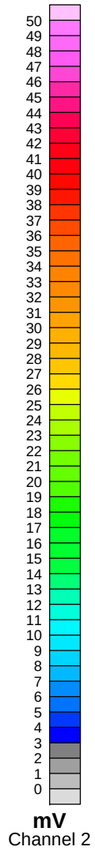
Map Approver: J. Guillard

NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

25 0 25 50
(meters)
NAD83 / UTM zone 18N







Legend

T01 Transect ID

1034 Surveyed Stake Location with ID

Selected Target
(See Individual Target Pick List for ID, Response & Location)

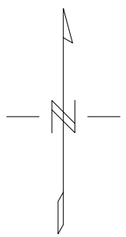


Figure 6

NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

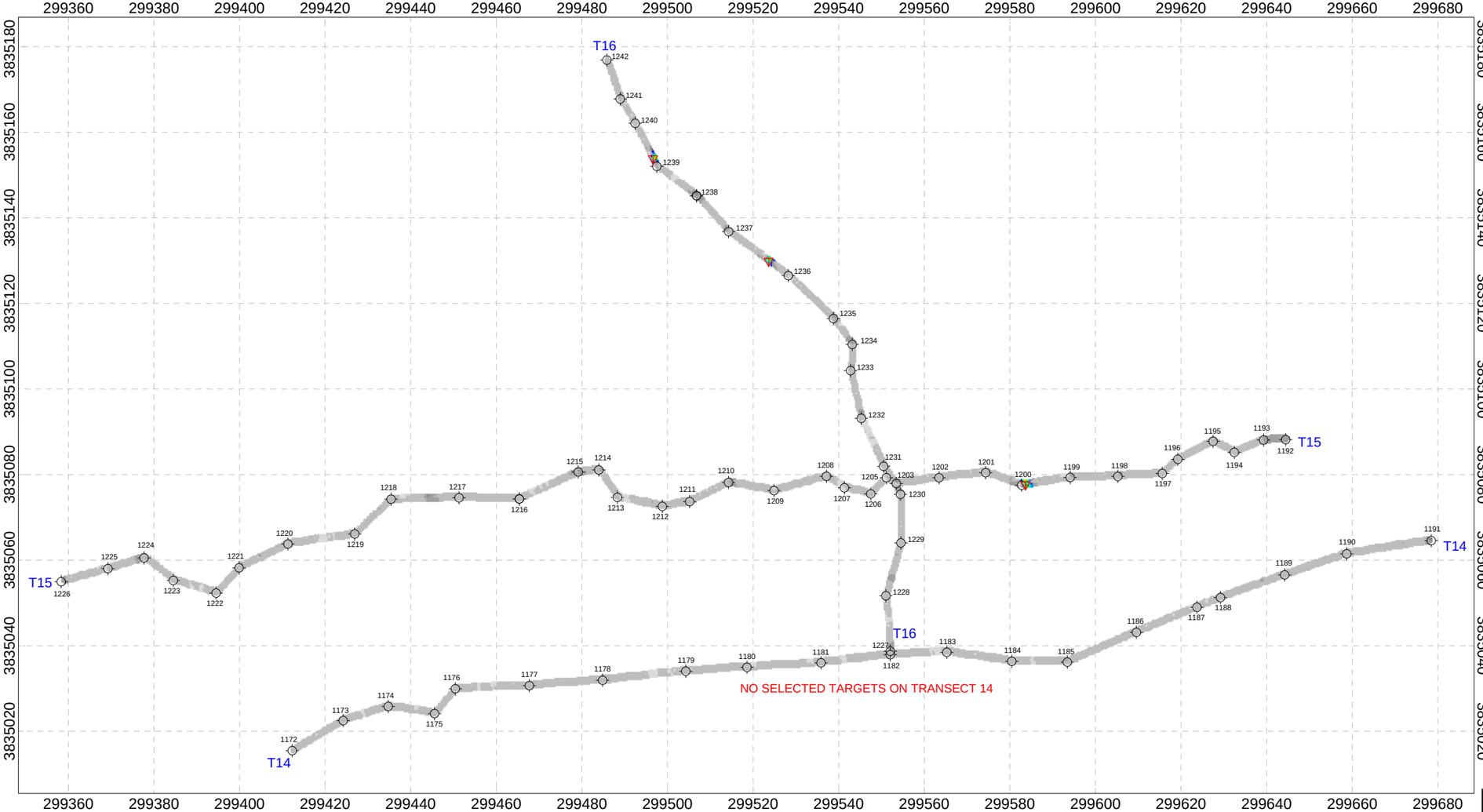
10 0 10 20 30 40
(meters)
NAD83 / UTM zone 18N

Client: CH2M HILL

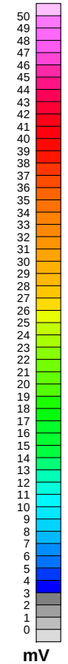
EM61 MK2 Bottom Coil Mosaic
Intercoastal Waterway (ICW) - Islands 2, 3 - Transects 11 through 13
Off Base Surface Danger Zone
Marine Corps Base, Camp Lejeune
Jacksonville, North Carolina

Date of Survey: 04/07/2010
Date of Map Creation: 05/26/2010

Map Approver: J. Guillard





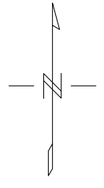


Legend

T01 Transect ID

1034 Surveyed Stake Location with ID

Selected Target
(See Individual Target Pick List for ID, Response & Location)



NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

20 0 20 40 60
(meters)
NAD83 / UTM zone 18N

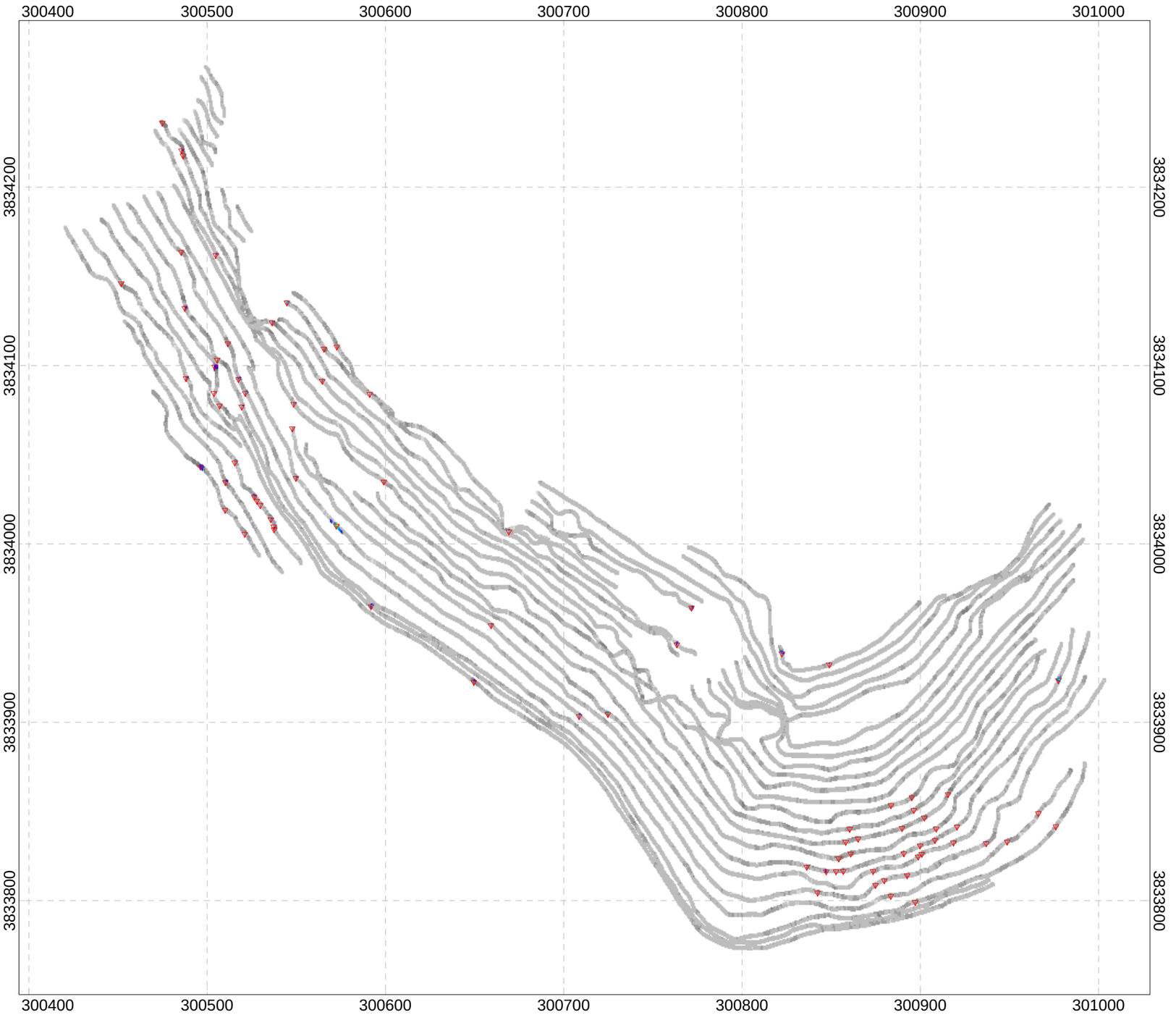
Figure 7

Client: CH2M HILL

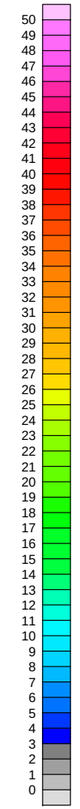
EM61 MK2 Bottom Coil Mosaic
Intercoastal Waterway (ICW) - Island 1 - Transects 14 through 16
Off Base Surface Danger Zone
Marine Corps Base, Camp Lejeune
Jacksonville, North Carolina

Date of Survey: 04/07/2010
Date of Map Creation: 05/26/2010

Map Approver: J. Guillard







Legend

Selected Target
(See Individual Target Pick List for ID, Response & Location)

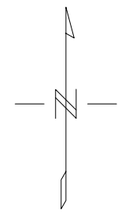


Figure 8

NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

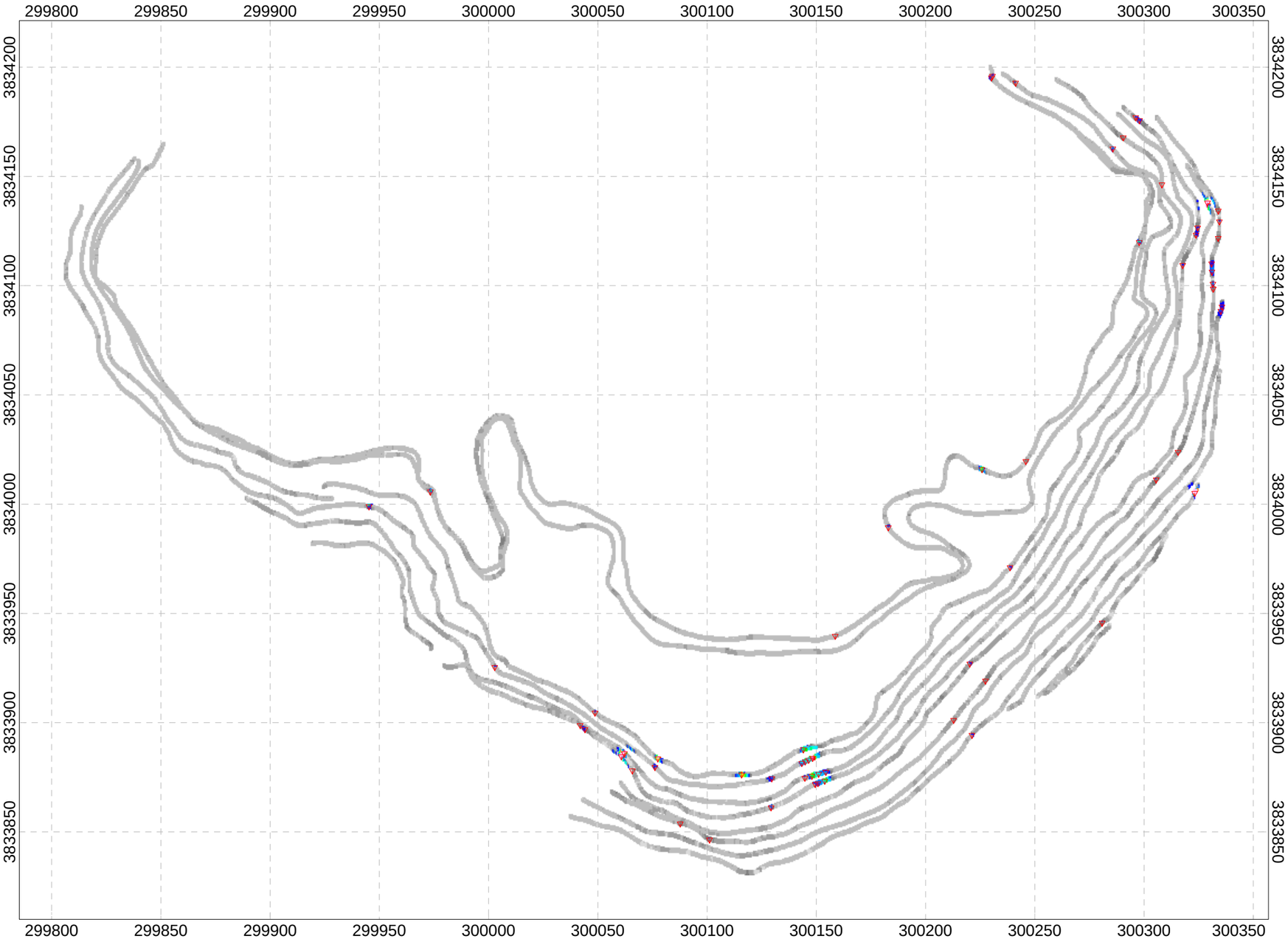
25 0 25 50 75 100 125 150 175
(meters)
NAD83 / UTM zone 18N

Client: CH2M HILL

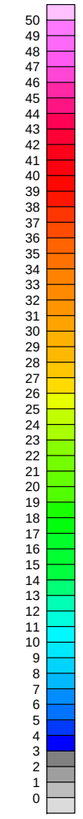
EM61 MK2 Bottom Coil Mosaic
Intertidal Uplands (ITU) - Area 1
Off Base Surface Danger Zone
Marine Corps Base, Camp Lejeune
Jacksonville, North Carolina

Date of Survey: 04/16/2010 & 04/19/2010
Date of Map Creation: 05/26/2010

Map Approver: J. Guillard

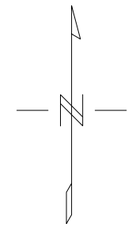






Legend

Selected Target
(See Individual Target Pick List for ID, Response & Location)



NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

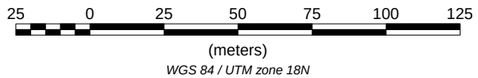


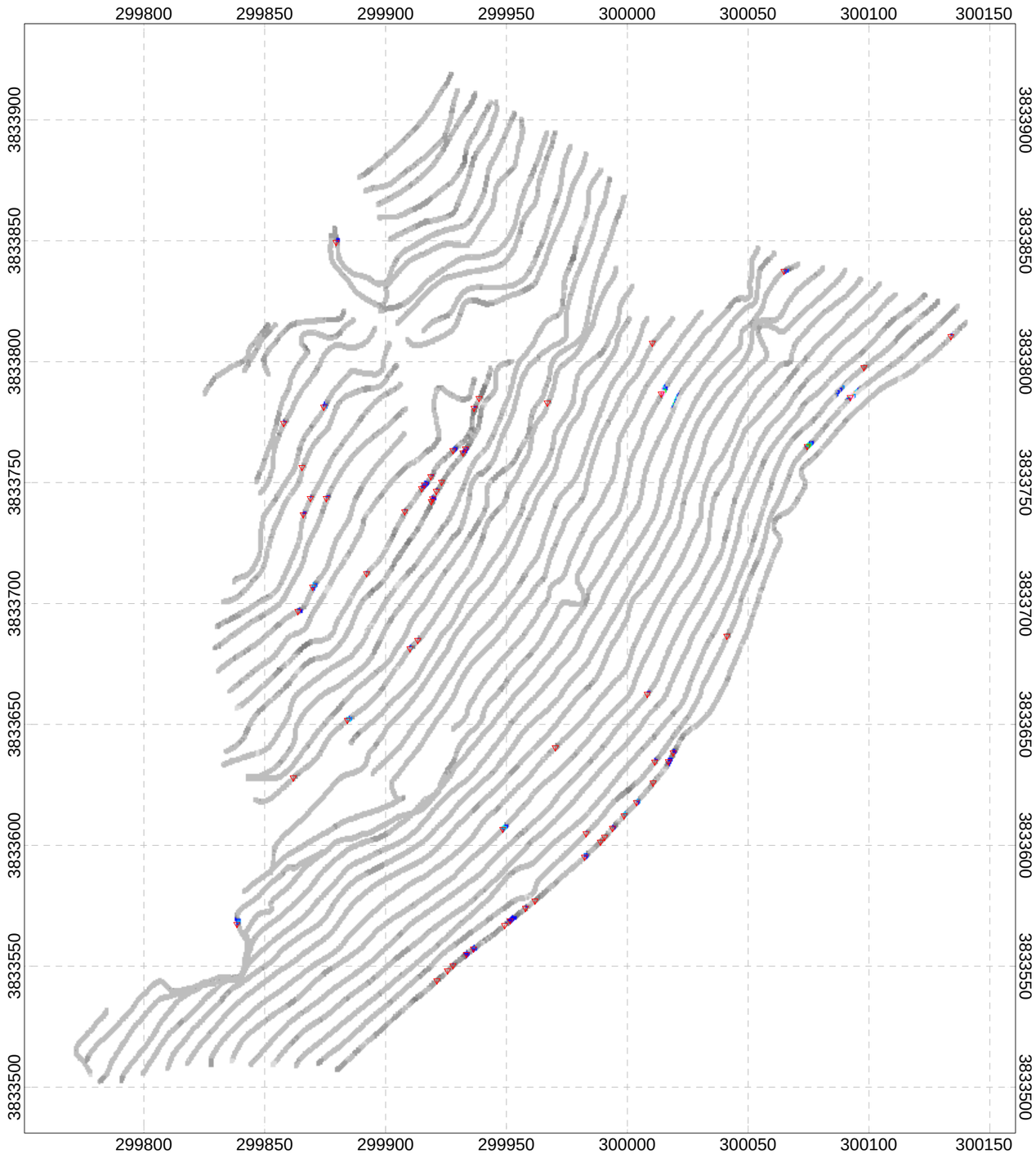
Figure 9

Client: CH2M HILL

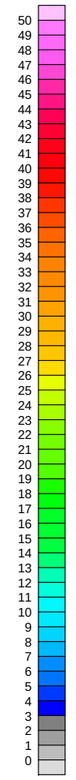
EM61 MK2 Bottom Coil Mosaic
Intertidal Uplands (ITU) - Area 2
Off Base Surface Danger Zone
Marine Corps Base, Camp Lejeune
Jacksonville, North Carolina

Date of Survey: 04/19/2010
Date of Map Creation: 05/26/2010

Map Approver: J. Guillard

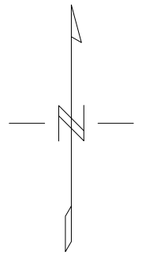






Legend

Selected Target
(See Individual Target Pick List for ID, Response & Location)

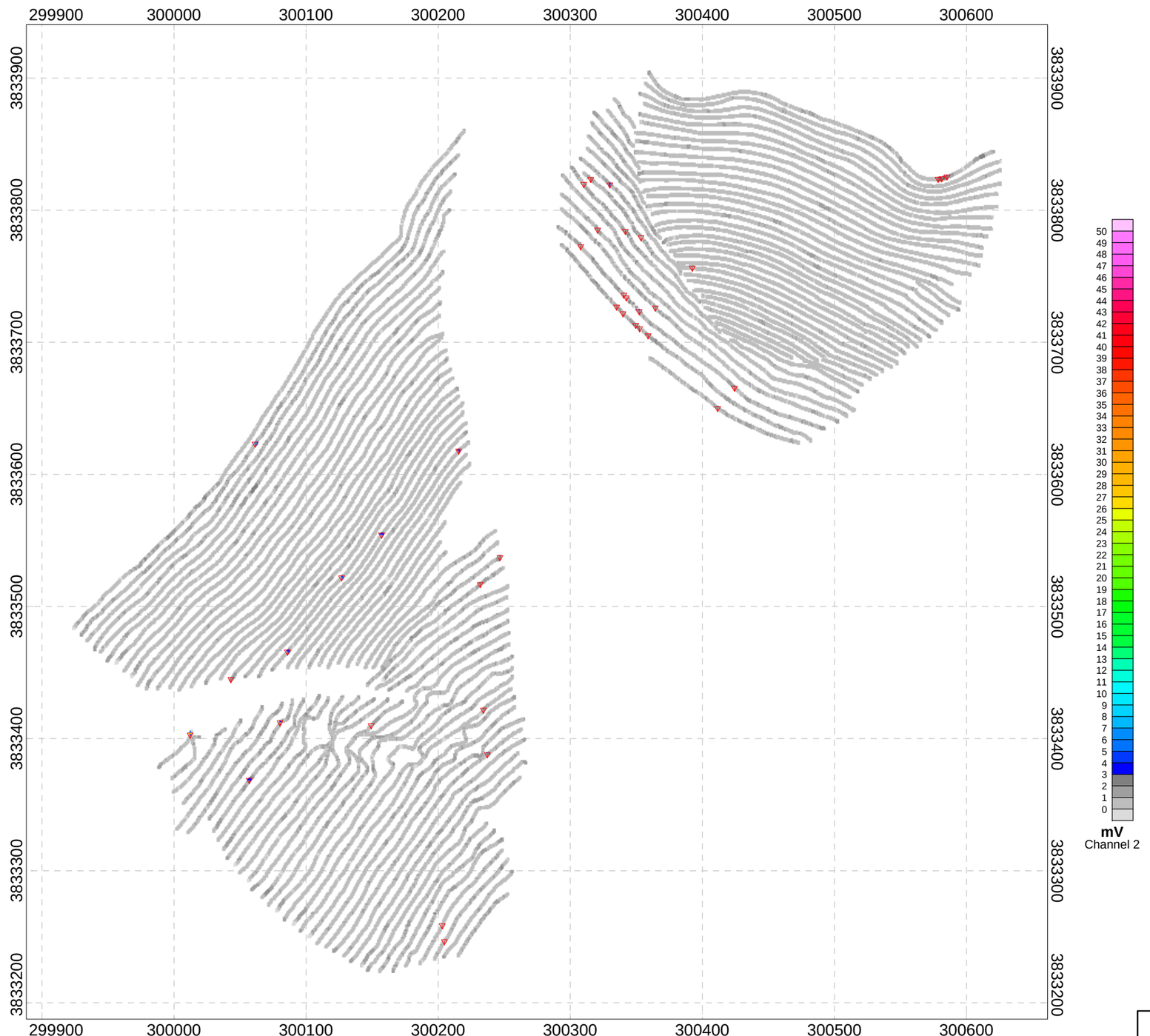


NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

25 0 25 50 75 100
(meters)
NAD83 / UTM zone 18N

Figure 10

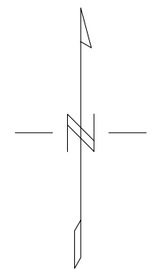
Client: CH2M HILL
EM61 MK2 Bottom Coil Mosaic Intertidal Uplands (ITU) - Area 3 Off Base Surface Danger Zone Marine Corps Base, Camp Lejeune Jacksonville, North Carolina
Date of Survey: 04/20/2010 Date of Map Creation: 05/26/2010
Map Approver: J. Guillard





Legend

Selected Target
(See Individual Target Pick List for ID, Response & Location)



NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

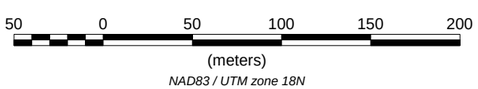


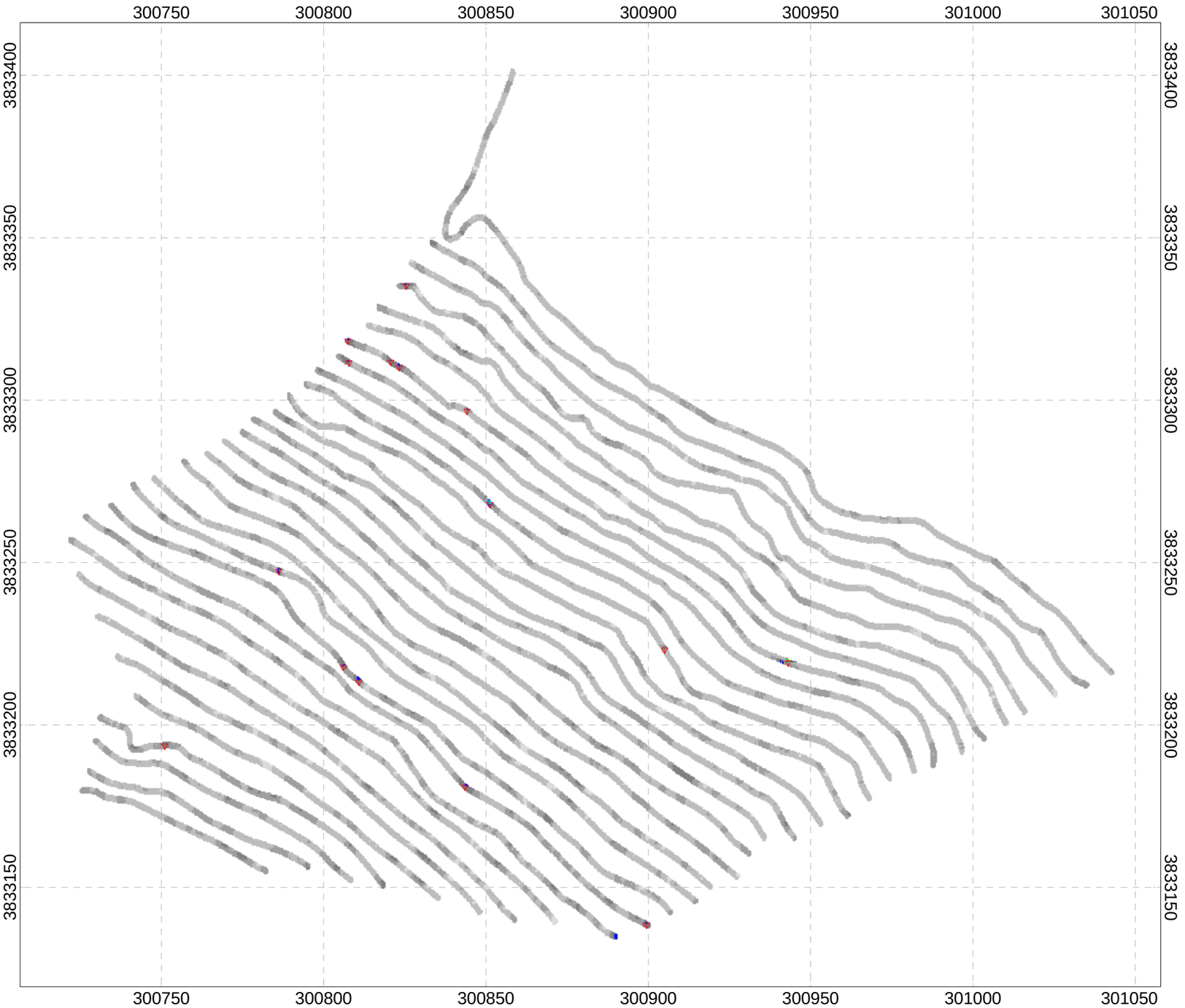
Figure 11

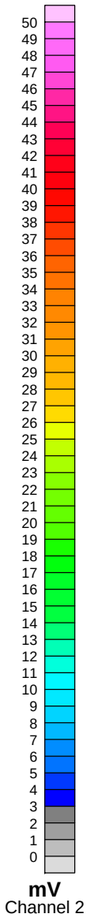
Client: CH2M HILL

EM61 MK2 Bottom Coil Mosaic
Intertidal Uplands (ITU) - Area 4
Off Base Surface Danger Zone
Marine Corps Base, Camp Lejeune
Jacksonville, North Carolina

Date of Survey: 04/22/2010 & 04/23/2010
Date of Map Creation: 05/26/2010

Map Approver: J. Guillard







Legend

Selected Target
(See Individual Target Pick List for ID, Response & Location)

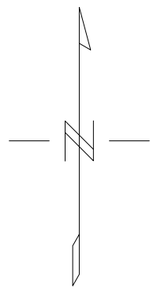


Figure 12

NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

25 0 25 50 75
(meters)
WGS 84 / UTM zone 18N

Client: CH2M HILL

EM61 MK2 Bottom Coil Mosaic
Intertidal Uplands (ITU) - Area 5
Off Base Surface Danger Zone
Marine Corps Base, Camp Lejeune
Jacksonville, North Carolina

Date of Survey: 04/27/2010
Date of Map Creation: 05/26/2010

Map Approver: J. Guillard



Figure 13: Wooded transect on one of the ICW islands



Figure 14: Sandy area where full coverage survey was performed



Figure 15: Marshy area in the intertidal uplands



Figure 16: Sandbar in the intertidal uplands

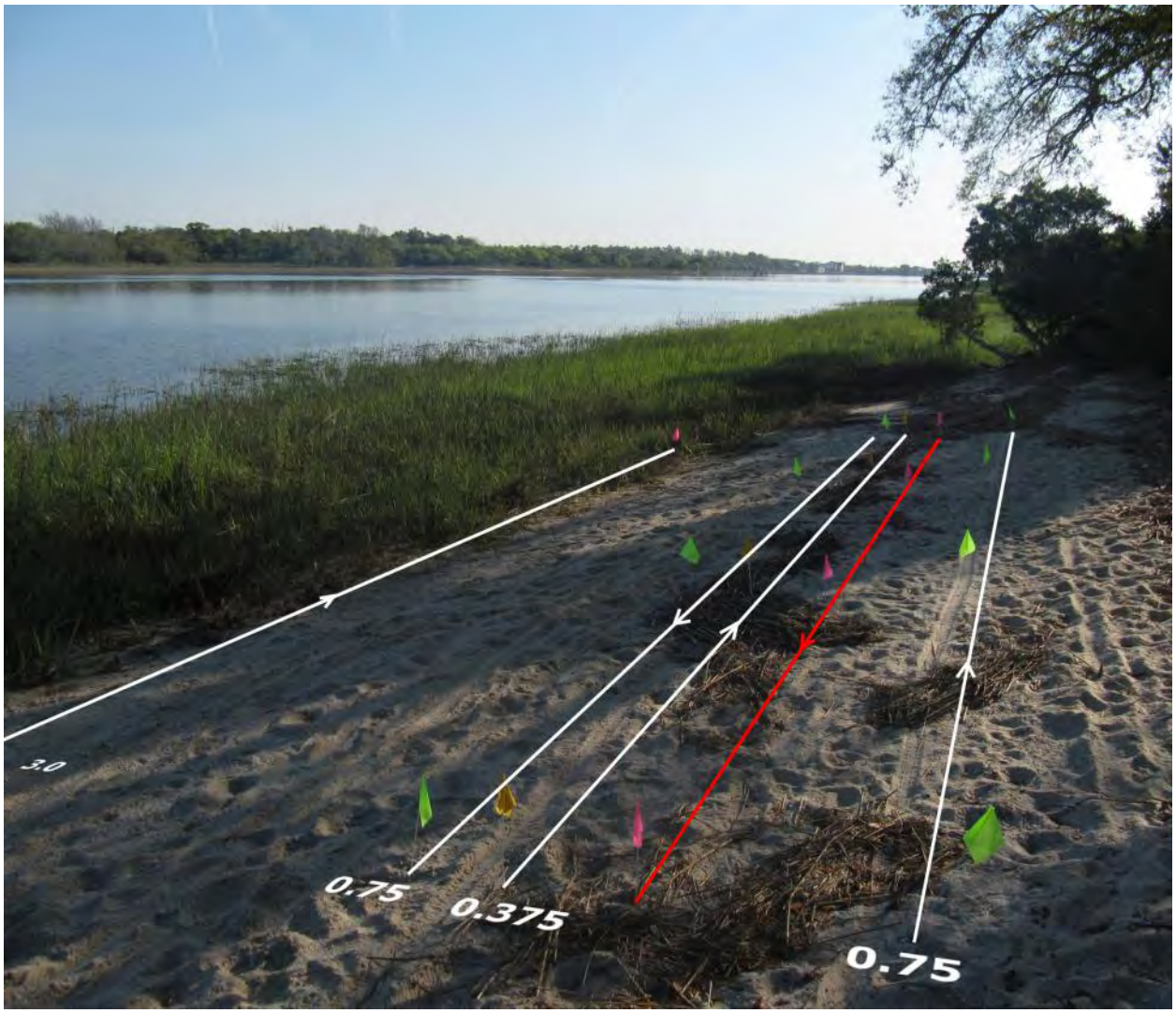
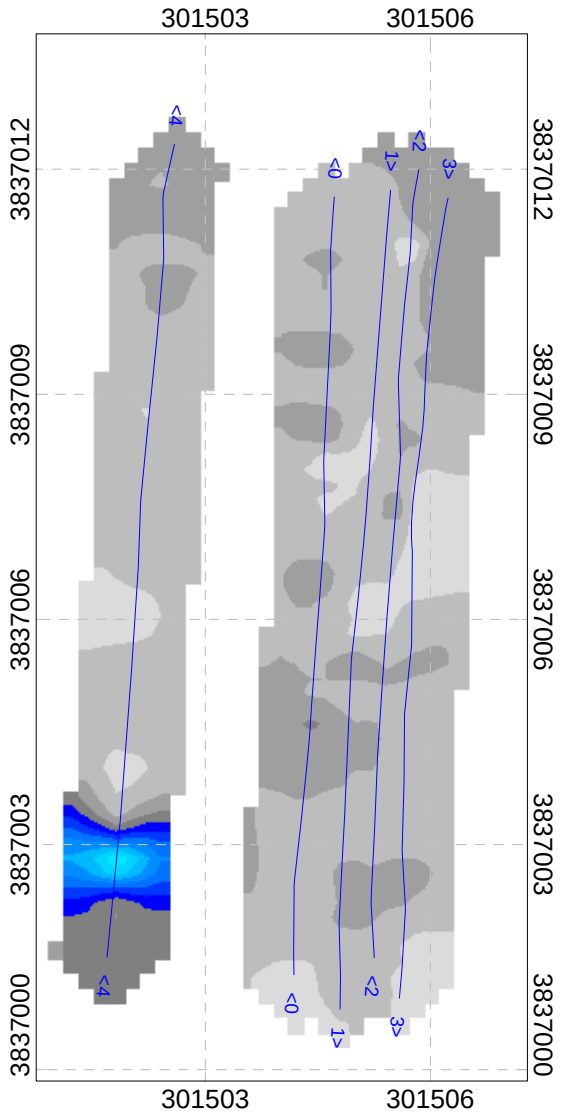


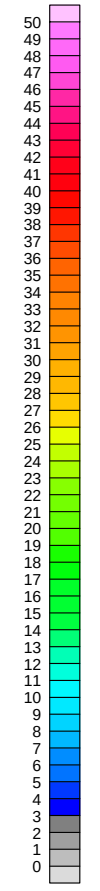
Figure 17: IVS on one of the islands showing the initial survey configuration

Appendix A

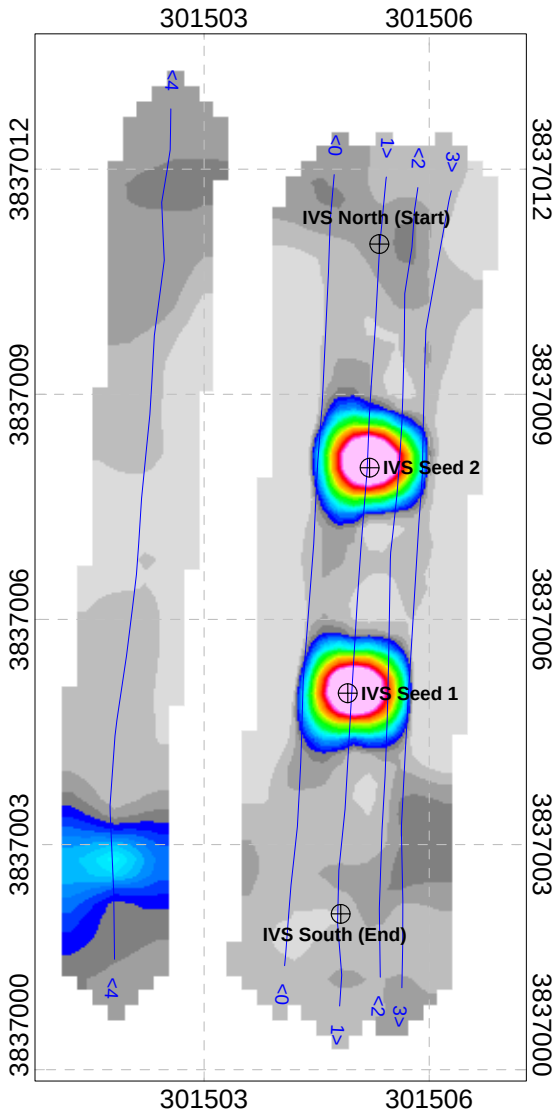
IVS Plots

0406IVSBG (April 06, 2010)
GPS Background





0406IVS1 (April 06, 2010)
GPS Seeded



Legend

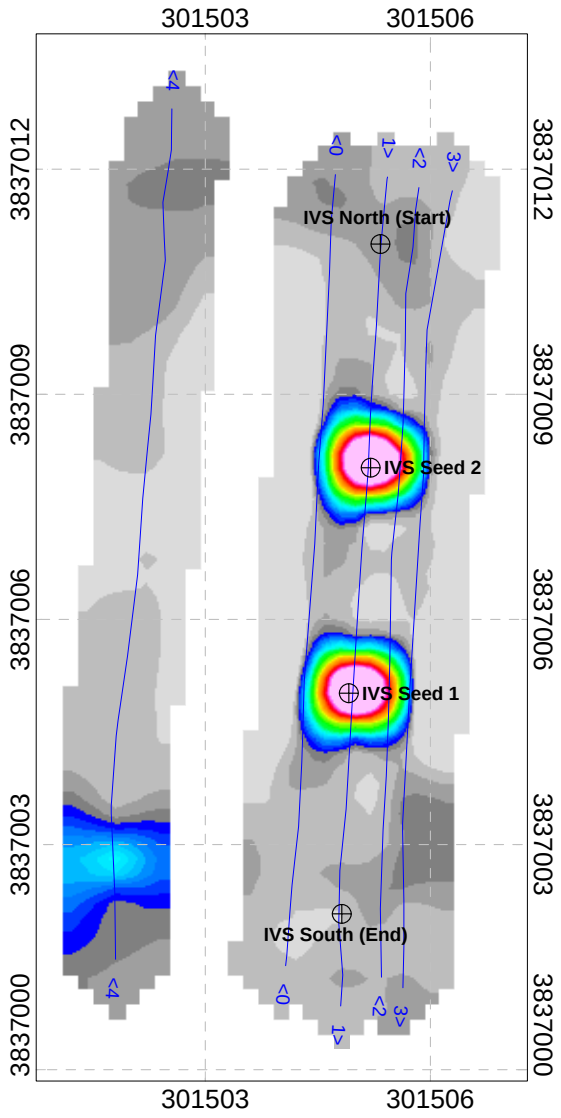
- Survey Point
- Seed Location
  IVS Seed Depth 12.7cm / 5 inches
- Line Path

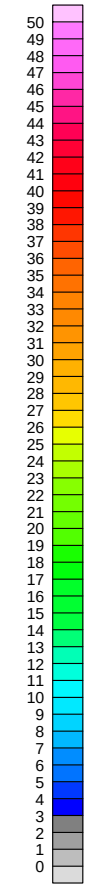
1 0 1 2 3
(meters)
NAD83 / UTM zone 18N

NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

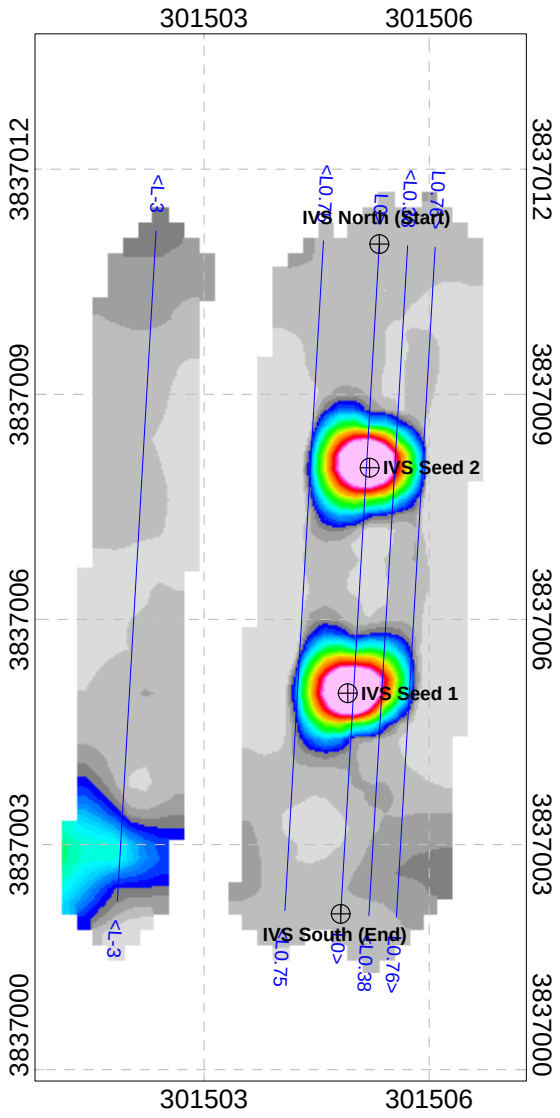
Client: CH2M HILL
EM61 MK2 Bottom Coil 0406IVS (IVS Test - 5 Lines) GPS Background vs. Seeded Off Base Surface Danger Zone Camp Lejeune, North Carolina
Date of Survey: 04/06/2010 Date of Map Creation: 04/07/2010
Map Approver: J. Guillard

0406IVS1 (April 06, 2010)
GPS Seeded





0406IVSFID (April 06, 2010)
Locals Warped Seeded



Legend

- Survey Point
- Seed Location
  IVS Seed Depth 12.7cm / 5 inches
- Line Path

1 0 1 2 3
(meters)
NAD83 / UTM zone 18N

NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

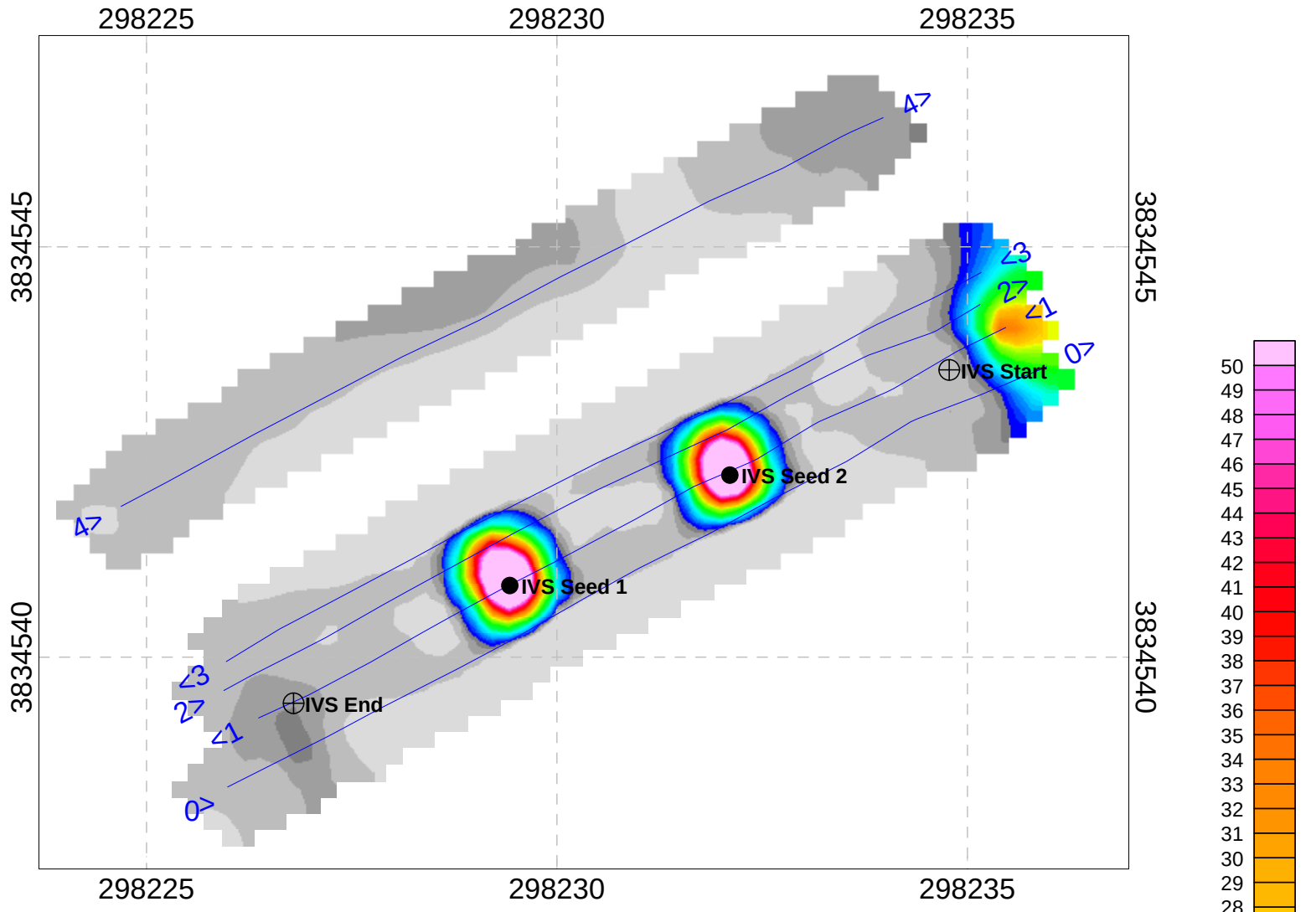
Client: CH2M HILL

EM61 MK2 Bottom Coil
0406IVS (IVS Test - 5 Lines) FID Locals Warped Seeded vs. GPS Seeded
Off Base Surface Danger Zone
Camp Lejeune, North Carolina

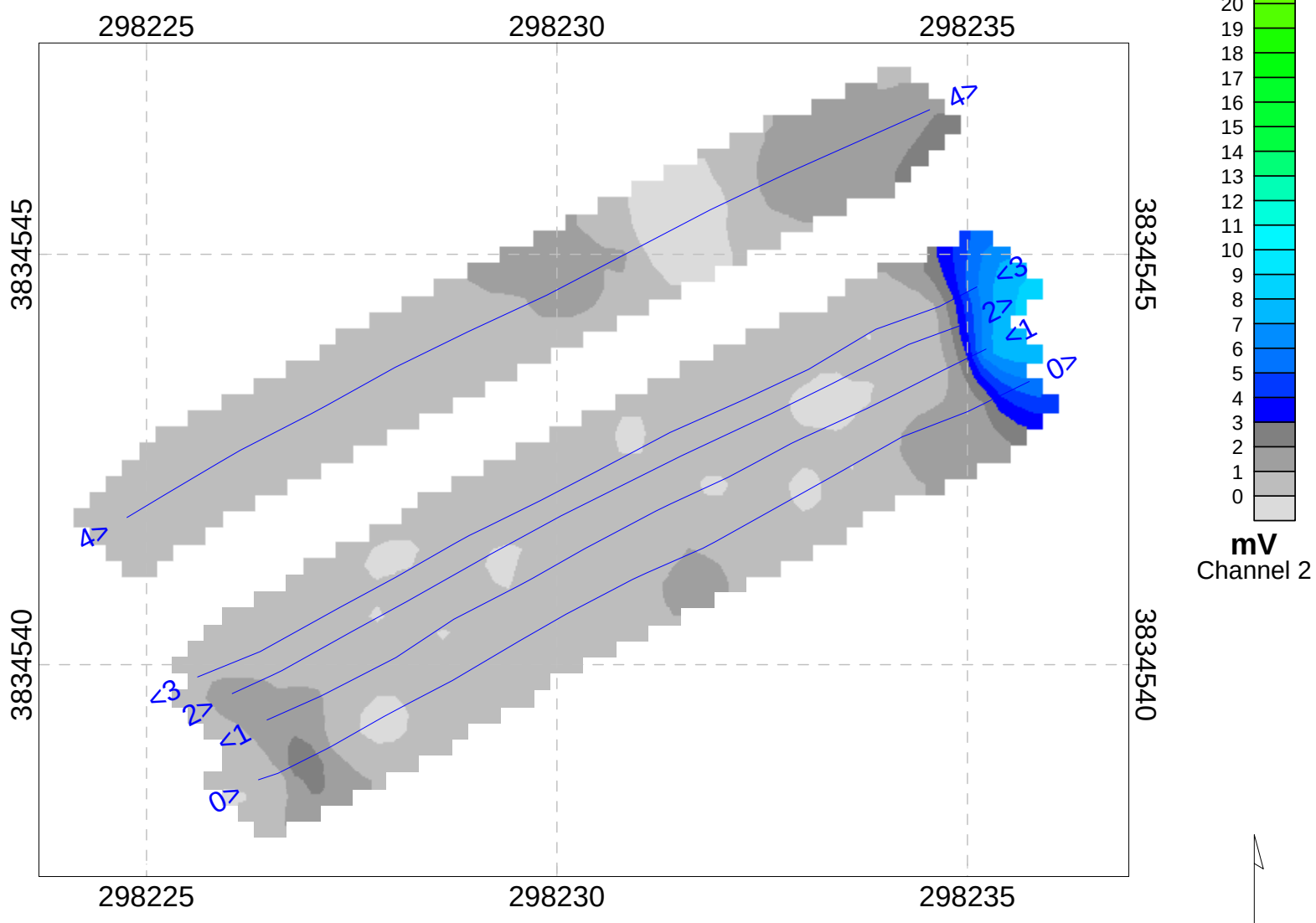
Date of Survey: 04/06/2010
Date of Map Creation: 04/07/2010

Map Approver: J. Guillard

0409IVS1 - New Area (April 09, 2010)
Seeded



0409IVSBG - New Area (April 09, 2010)
Background



Legend

- Survey Point
- Seed Location
  IVS Seed Depth 12.7cm / 5 inches
- Line Path

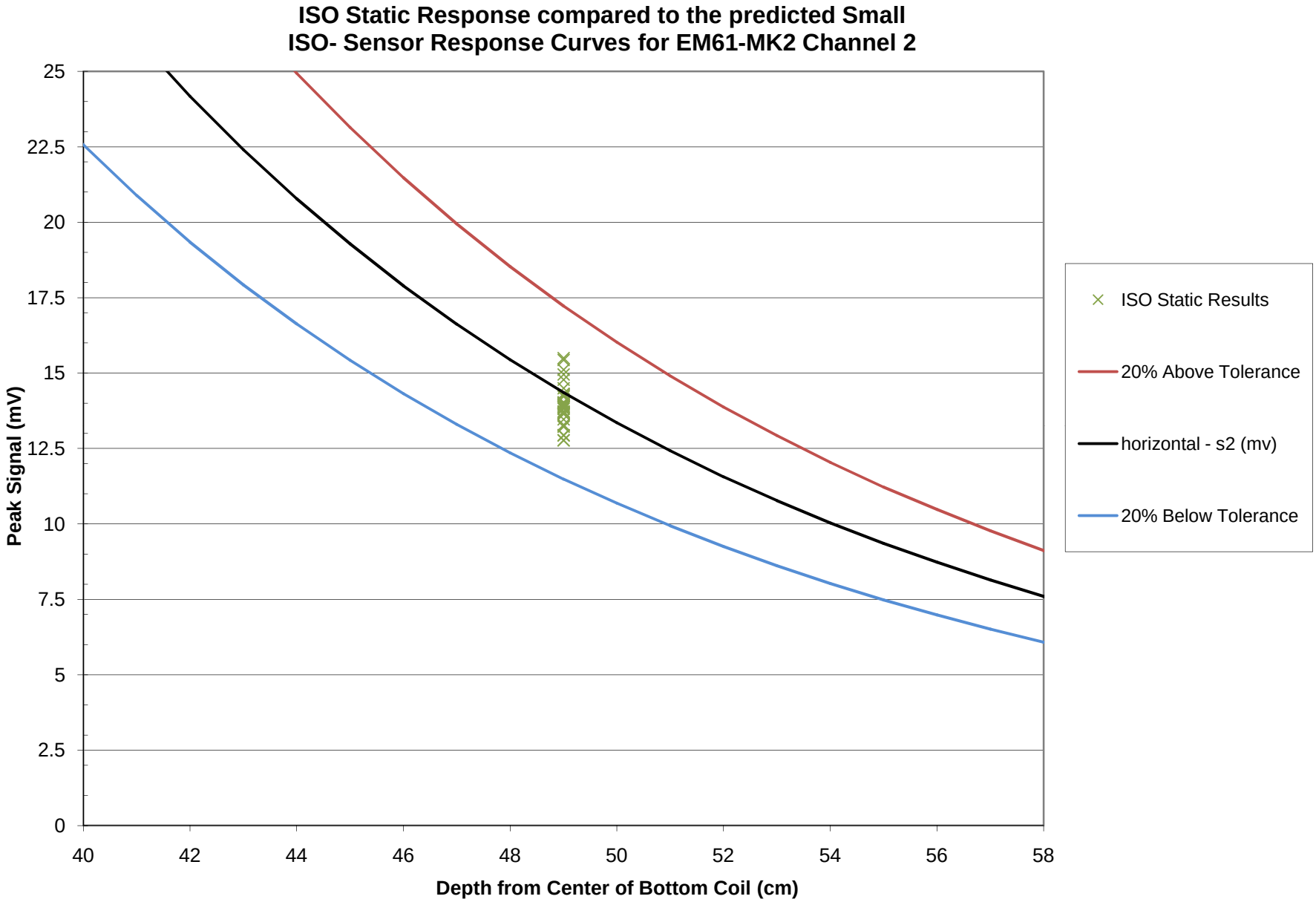
1 0 1 2
(meters)
NAD83 / UTM zone 18N

NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

Client: CH2M HILL
EM61 MK2 Bottom Coil 0409IVS (IVS Test - 5 Lines) Background vs. Seeded Off Base Surface Danger Zone Camp Lejeune, North Carolina
Date of Survey: 04/09/2010 Date of Map Creation: 04/12/2010
Map Approver: J. Guillard

Appendix B

Example QC Test Results



* ISO Static item set at 49cm.

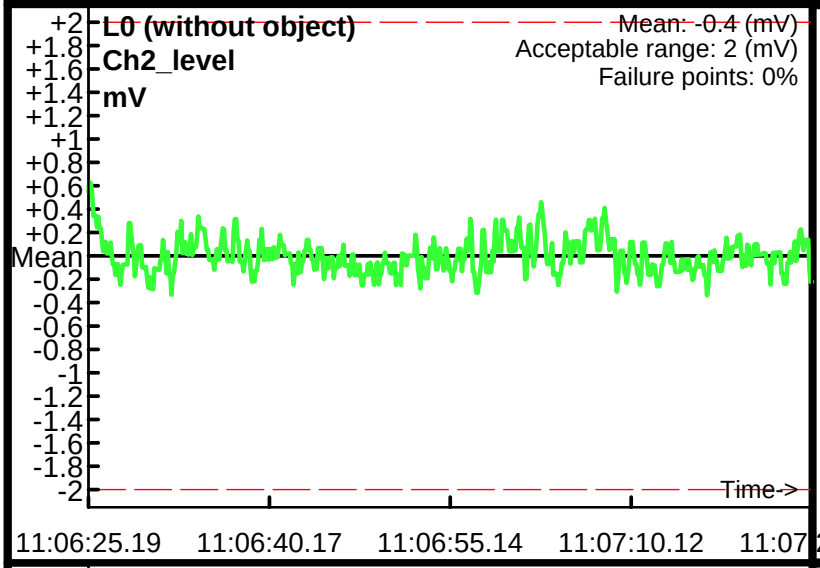
Static Calibration Test

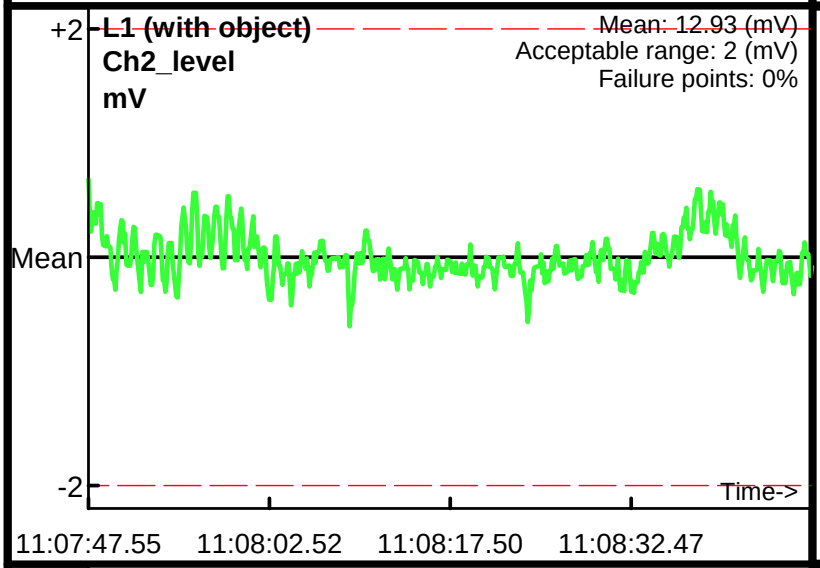
Mean Response Values
Ch2_level Without Object: -0.79
Ch2_level Signal Strength With Object: 13.72

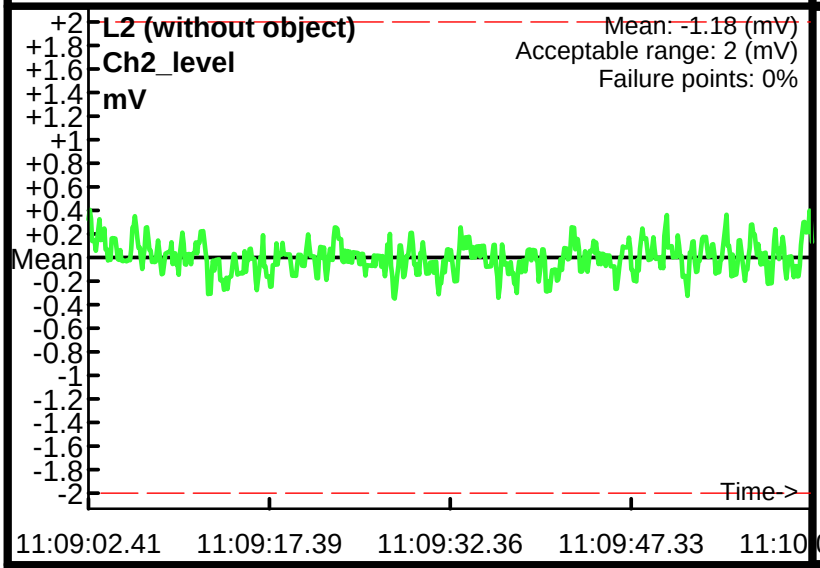
Project: Off Base SDZ, Camp Lejeune
Equipment: EM-61 Mark II
Grid/Location: Localized QC Area

Outside range
Acceptable limits

QC2 test
Operator: GeoA
Date: 4/13/2010







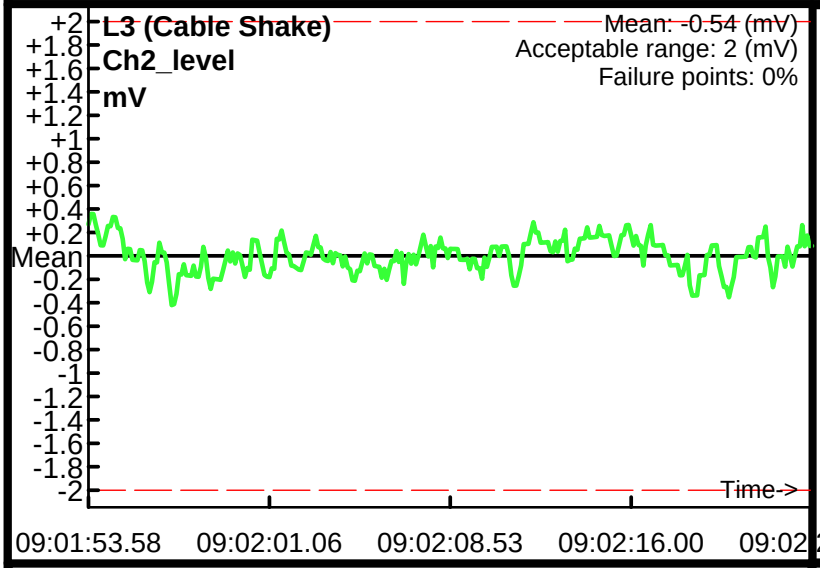
Database: Q:\Virginia Office\CH2M HILL\Camp Lejeune\Off-base Surface Danger Zone\Data\Geosoft\QC\041310\0413QC2.gdb
Line Name: L0 L1 L2

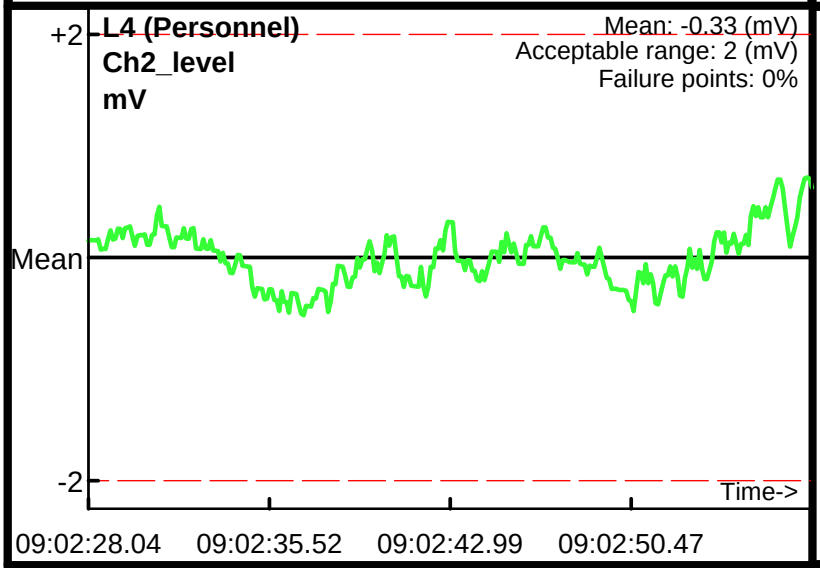
Cable Shake & Personnel Test

Project: Off Base SDZ, Camp Lejeune
Equipment: EM-61 Mark II
Grid/Location: Localized QC Area

Outside range
Acceptable limits

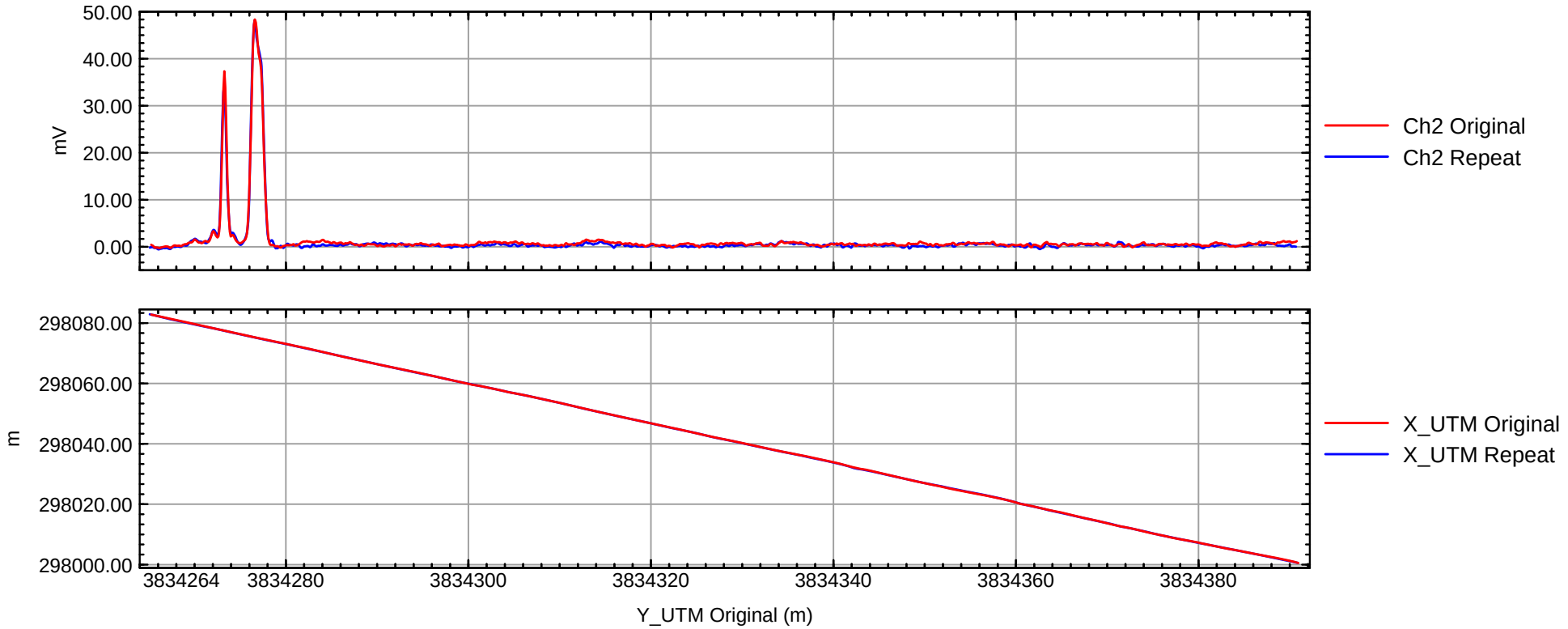
QC1 test
Operator: GeoA
Date: 4/12/2010





Database: .\0412QC1.gdb
Line Name: L3 L4 L4

Off Base Surface Danger Zone - Camp Lejeune, North Carolina
A1A1F3 Repeat Line 30 - EM61 MK2 Bottom Coil



Database: A1A1F3_Repeat.gdb Line/Group: L30

Date: 04/12/2010

Appendix F
Bear Island Intrusive Investigation Report

Bristol
ENVIRONMENTAL
REMEDIATION SERVICES, LLC

1072 Hwy 210, Ste C
Sneads Ferry, NC 28460
(910) 327 – 9204 Phone
(910) 327 – 9205 Fax

LETTER OF TRANSMITTAL

Date: 12/1/10

To: Program Manager Training Systems
Training Systems Division
12350 Research Parkway
Orlando FL 32826-3276

Copy to: John Lynch, Contracting Officer
Oscar Solano, Technical Project Manager
Jim McEwan, Project Officer

Job Number: 411028
Job Name: Environmental Remediation Effort
Marine Corps Base Camp Lejeune, NC

The following items are being sent to you:

No.	Copies	Description
1	Email	Certificate of Clearance: Bear Island, includes Final Surveillance

Please Note:

The following CDRL's do not apply to ERE: Bear Island:

- A004: Test/Inspection Report
- E001: Operation and Maintenance Manual
- A008: Reports of Destruction of UXO

Remarks:

CONTRACT: M67854-10-C-8131

Thank you.

Signature Hettie Ross

Hettie Ross

Title Office Manager/Project Assistant

DATA ITEM TRANSMITTAL/ACCEPTANCE/REJECTION FORM
CONTRACT: M67854-10-C-8131

TITLE: **Action Item Log – Certificate of Clearance and Final Surveillance Report: Bear Island**
Block 14 Distribution: John E. Lynch PMTRASYS 12350 Research Pkwy Orlando FL 32826-3276
Other: Oscar Solano (Oscar.solano@usmc.mil); James McEwan (James.mcewan@L-3com.com); John Feairheller (john.feairheller@L-3com.com); Janet Fondriest (Janet.fondriest@usmc.mil); Jim Schleining (james.schleining@usmc.mil); Joe Wade (joseph.p.wade@L-3com.com)

Doc. Ref. No.: DI-MGMT-80227 Date: 1 December 2010

From: Bristol Environmental Remediation Services, LLC 1072 NC Hwy 210, Suite C. Sneads Ferry, NC 28460

To: MARCORSYSCOM/PMTRASYS, 12350 Research Parkway, Orlando FL 32826-3276; John E. Lynch, Contracting Officer; Oscar Solano, Technical Project Manager; Jim Schleining, CLNC RDD On-Site Representative; Joe Wade, Project Engineer

The above detailed CDRL item is forwarded for review and acceptance / rejection. The Government review period is 5 days.

Signature: 

Typed Name/Title: Wendell Morgan Project Manager

FIRST ENDORSEMENT: Date Received: _____

( ) Accepted.
( ) Accepted. Attached comments must be incorporated into the next scheduled submission. (This block is for use with periodically submitted items only.)
( ) Rejected, comments attached. Change pages ( ) are ( ) not sufficient for correction. Contractor is allowed ( ) 30 days or ( ) ___ days to resubmit.

Signature: _____
Typed Name/Title: _____
Code: _____ Date: _____

VIA: _____ Date:_____

VIA: PD_____ Date:_____

SECOND ENDORSEMENT:

( ) Accepted.
( ) Accepted conditionally. Attached comments must be incorporated in the next scheduled submission.
( ) Rejected, comments attached. Resubmit no later than_____.

Signature: _____
Typed Name/Title: _____ Date: _____

CC w/Encl.:

CC w/o Encl.:

CONTRACTOR: Bristol Environmental Remediation Services, LLC

CONTRACT NUMBER: M67854-10-C-8131

PROJECT: Environmental Remediation Effort (ERE)
TRANSMITTAL NUMBER: 2
ITEM : Certificate of Clearance and Surveillance Report Bear Island
SPECIFICATION SECTION: DI-MGMT-80227
PARAGRAPH NUMBER:

X APPROVED AS SUBMITTED

_____ APPROVED WITH CORRECTIONS AS NOTED

SIGNATURE: 

TITLE: Project Manager
DATE: 12/1/2010

Bristol
ENVIRONMENTAL
REMEDIATION SERVICES, LLC

111 W. 16th Avenue, Third Floor
Anchorage, Alaska 99501-5109
907-563-0013 Phone
907-563-6713 Fax

November 24, 2010

PM TRASYS
Program Manager, Training Systems
12350 Research Parkway
Orlando FL 32826-3275

IAW contract M67854-10-C-8131, this letter certifies the Unexploded Ordnance (UXO) Removal Work Area A, Area B, Area C, and Area D, Figure 1, on Bear Island, Hammocks Beach State Park, North Carolina. Work was conducted by Bristol Environmental Remediation Services from October 30, 2010 thru November 19, 2010 and complete on November 22, 2010. During the UXO Removal Work, a surface clearance was conducted over the work area, 198 acres, followed by intrusive investigation and removal of 170 terrestrial and 13 water anomalies. Detailed results of the investigation and removal are provided in the daily production and QC reports previously submitted. Recovered anomalies and metal debris were removed from the work area. During the UXO Removal Work, no UXO or Munitions and Explosives of Concern were found.



Figure 1
Hammocks Beach State Park, Bear Island NC

Respectfully,



Wendell Morgan
Senior Project Manager
Bristol Environmental Remediation Services, LLC
1072 Hwy 210, Suite C
Sneads Ferry, NC 28460-9605
Phone : (910) 327-9204
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FAX : (910) 327-9205
wmorgan@bristol-companies.com
http://www.bristol-companies.com/

QUALITY CONTROL SURVEILLANCE REPORT	Report Number:
Project Name: Environmental Remediation Effort Marine Corps Base Camp Lejeune	Contract No: M67854-10-C-8131
Client: U.S. Marine Corps, Camp Lejeune	Project Manager: Wendell Morgan

1 - Activity

☐ Mobilization ☐ Under Water UXO Clearance ☐ Scrap Processing ☐ Range Cleanup Reports

☐ Surface Clearance ☐ Demolition ☐ Scrap Inspection / Certification

☐ Subsurface Clearance ☐ Demilitarization ☐ Demobilization ☒ Other: QC

2 - Phase

☐ Preparatory ☐ Initial ☐ Follow up

3 - References

kEnvironmental Remediation Effort Marine Corps Base Camp Lejeune: Work Plan, Site Specific Health and Safety Plan. Work Plan Table 6-1 Definable Features of Work/QC Action.

4 - Observed Condition/Activities:

(11192010) **This surveillance documents the QC process conducted at Bear Island with respect to Surface and Subsurface clearance.** The purpose of the surveillance is to certify that work completed is in accordance with contract specifications, scope of work and guidance outlined in the Work Plan. The area of Bear Island consisted of 170 terrestrial targets and 13 aquatic targets. Work commenced on 11012010 and completion occurred on 11192010. 100% of targets were sampled out to 10 meters from stakes placed by survey team to mark anomalies. UXOQCS Kerry Fryer and the undersigned conducted a search of the sample areas. During the search no items were discovered. **No UXO/MEC discovered during the QC process. Therefore, I recommend completion of clearance operations conducted on Bear Island. Walkthrough conducted with Mr. William Schultz, range control on 11172010 and Paul Donnelly, park superintendant on 11182010, site accepted by both parties.**

5 - Results of Surveillance

☒ Acceptable	☐ Unacceptable	Deficiency #: NCR #:

Conducted By: K. Fryer, UXOQCS	Signature:	Date:

6 – Project Manager Review

☒ Concur ☐ Non-Concur	Signature:	Date

7 - Distribution

☐ PM ☐ Site Superintendent ☐ SUXOSS ☐ QC Manager ☐ Safety ☐ Other:

Appendix G
Groundwater, Surface Water, and Pore Water Sampling Data Sheets

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 4/28/10
Weather: Sunny

Project Number: 387933.FI.FS
Well ID: B1-GW01-10A
CH2M HILL Personnel: TD A TEAM
D Lubell

Total Depth: 7.5 FT.(~~BTOC~~)
Depth to water: (-) 6.0 FT.(BTOC)
Water Column: 1.5 FT.
(x) 0.163 GAL/FT.
Well Volume: .24 GAL.
Total Purge Vol.: 2.5 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell 7619
Hanna Turbidity Meter 9016

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		**± 1 °C**	**± 10%**	**± 10%**	**± 0.1**	**± 10 mV**	**± 10% or <10**			
1540	6.0	15.54	0.360	6.84	7.94	62.9	25.1	0.17	500	
1545	6.0	15.6	0.370	6.46	7.82	56.1	4.22	0.18	500	
1550	5.94	15.64	0.380	6.18	7.76	55.9	2.04	0.18	500	
1555	5.95	15.63	0.386	6.07	7.72	57.1	1.38	0.19	500	

Total Volume Purged: 2.5

Comments:
1530 - Pump Started @ 500mL/min
1555 - Sample time

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/28/10
Weather: Sunny 40

Project Number: 387933.FI.FS
Well ID: BI-GW02-10A
CH2M HILL Personnel: A-TEAM
D. Lubell

Total Depth: 11.63 FT.(BTOC)
Depth to water: (-) 10.65 FT.(BTOC)
Water Column: .98 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.163 GAL.
Total Purge Vol.: 3.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell 7619
Hanna Turbidity Meter 05016

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		**± 1 °C**	**± 10%**	**± 10%**	**± 0.1**	**± 10 mV**	**± 10% or <10**			
0945	10.65	15.20	0.357	9.45	6.80	167.1	66.4	0.17	500	
0950	"	15.76	0.342	8.15	7.50	143	3.79	0.16	"	
0955	"	15.84	0.335	7.70	7.70	129.9	1.45	0.16	"	
1000	"	15.90	0.327	7.56	7.87	120.0	6.46	0.16	"	
1005	"	15.84	0.326	7.44	7.90	113.9	2.73	0.16	"	

Total Volume Purged: 3.0

Comments:
0942 - PUMP STARTED

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	BEAR ISLAND, NC	Well ID:	BI-GW03-10A / BI-GW03D-10A
Event:	CTO-80 OFF-BASE SDZ	CH2M HILL Personnel:	D.L > T&M
Date:	7/28/10		Dave Lubell
Weather:	40s sunny windy		

Total Depth: 9.28 FT.(BTOC)
Depth to water: (-) 8.08 FT.(BTOC)
Water Column: 1.20 FT.
(x) 0.163 GAL/FT.
Well Volume: .20 GAL.
Total Purge Vol.: 1.3 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell 7619
Hanna Turbidity Meter 05016

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		**± 1 °C**	**± 10%**	**± 10%**	**± 0.1**	**± 10 mV**	**± 10% or <10**			
1110	—						22.9	—	500	DRY
1115	8.52	15.51	0.259	7.12	7.99	69.0	20.4	0.13	200	recharge rate markedly
1120	8.52	15.41	0.265	6.91	7.96	68.0	3.73	0.13	200	Clear
1125	8.52	15.40	0.265	6.59	7.94	65.8	1.34	0.13	200	Clear
1130		15.42	0.264	6.65	7.92	64.9	0.82	0.13	200	

Total Volume Purged: 1.3

Comments:

1105 - Pump on 450 mL/min
Dry @ 1110 Rate lowered

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 01/28/2010
Weather: Mostly Sunny, highs ~ 60°F

Project Number: 387933.FI.FS
Well ID: BI-GW04-10A
CH2M HILL Personnel: A-team
D. Lubeck

Total Depth: 6.92 FT.(BTOC) Bgs
Depth to water: (-) 5.21 FT.(BTOC) Bgs
Water Column: 1.71 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.28 GAL.
Total Purge Vol.: 2.2 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell 7619
Hanna Turbidity Meter 9016

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1240	5.21	13.40	0.141	8.24	8.35	43.0	80.1	0.07	400	Clear
1245	"	13.32	0.140	8.17	8.39	38.3	27.3	0.07	250	Clear
1250	"	13.45	0.140	8.12	8.40	38.5	35.5	0.07	250	Clear
1255	"	13.31	0.138	8.31	8.44	41.7	16.7	0.07	250	Clear
1300	"	13.46	0.142	8.24	8.39	38.5	29.7	0.07	250	Clear
1306	"	13.44	0.141	8.21	8.39	36.7	5.42	0.07	250	"
1310	"	13.35	0.141	8.03	8.39	36.8	3.80	0.07	250	"

Total Volume Purged: 2.2

Comments:
1230 - pump started @ 500mL/min - 400
Sample time: 1315

Signature(s): Ron McCord

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/29/10
Weather: 50° Sunny

Project Number: 387933.FI.FS
Well ID: BI-GW05-10A
CH2M HILL Personnel: D. Brown/CLT
D. Hackett/CLT
G. Little/CLT

Total Depth: 8.51 FT.(BTOC)
Depth to water: (-) 7.45 FT.(BTOC)
Water Column: 1.06 FT.
(x) 0.163 GAL/FT.
Well Volume: .17 GAL.
Total Purge Vol.: 1.25 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell s/n 19916
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
0935	7.55	13.9	.340	7.65	7.85	122.1	98.2	.16	200	clear, no odor
0940	7.59	15.1	.336	7.25	7.97	116.4	19.2	.16	200	↓
0945	7.57	15.1	.332	7.00	7.99	113.6	4.21	.16	200	
0950	7.57	15.1	.330	7.02	8.00	111.7	2.02	.16	200	
0955	7.57	15.1	.332	7.02	8.00	111.3	1.46	.16	200	
1000										

Total Volume Purged: 1.25

Comments: Started Purging @ 0930
Sampled @ 0955

Signature(s): Dan Zn

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/29/10
Weather: 50° Sunny

Project Number: 387933.FI.FS
Well ID: BI GW06
CH2M HILL Personnel: D. Brown/CLT
G. Little/CLT
D. Hackett/CLT SAV 19916

Total Depth: 5.00 FT.(BTOC)
Depth to water: (-) 4.00 FT.(BTOC)
Water Column: 1.00 FT.
(x) 0.163 GAL/FT.
Well Volume: .163 GAL.
Total Purge Vol.: 2.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1045	4.13	14.4	.548	7.31	8.21	115.2	135	.27	200	clear, no odor
1050	4.15	14.5	.552	7.28	8.20	100.3	27.1	.27	200	clear, no odor
1055	4.17	14.5	.550	7.27	8.19	99.7	5.40	.27	200	
1100	4.19	14.5	.553	7.21	8.19	98.3	4.47	.27	200	

Total Volume Purged: 2.0

Comments: Started Purging @ 1040
Sampled @ 1100

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 4/29/10
Weather: 30's Sunny

Project Number: 387933.FI.FS
~~Well~~ Sample ID: BI-GW07-10A
CH2M HILL Personnel: DL (Co-Team)

Total Depth: 8.13 FT.(BTOC)
Depth to water: (-) 6.43 FT.(BTOC)
Water Column: 1.6 FT.
(x) 0.163 GAL/FT.
Well Volume: .26 GAL.
Total Purge Vol.: 3.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell 6054
Hanna Turbidity Meter 08970

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
0940	6.50	15.35	0.260	7.84	7.74	138.2	22.6	0.12	500	
0945	6.50	16.20	0.221	7.87	8.05	117.3	8.50	0.10	500	
0950	"	16.37	0.219	7.85	8.25	116.1	3.90	0.10	500	
0955	"	16.48	0.219	7.74	8.29	111.3	2.60	0.10	500	

Total Volume Purged: 3.0

Comments:

0932 - Pump on rate = 500mL/min
SAMPLE time 0955

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1-29-10
Weather: clear 40's

Project Number: 387933.FI.FS
Well ID: BI-GW08-10A
CH2M HILL Personnel: D Hockett, G Little, R Fields

Total Depth: 6.75 FT.(BTOC)
Depth to water: (-) 5.53 FT.(~~BTOC~~) BGS
Water Column: 1.22 FT.
(x) 0.163 GAL/FT.
Well Volume: .20 GAL.
Total Purge Vol.: 2.5 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell, Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

start pump 1155

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1200	6.39	13.74	0.288	~~7.86~~	~~7.86~~ 8.00	-35.5	211	0.18	300	Clear, no odor
1205	6.64	13.86	.292	7.56	7.96	-28.2	28.0	"		
1210	6.34	13.88	.296	7.36	7.94	-18.5	7.60	"		
1215	6.15	13.94	.299	7.29	"	-13.9	1.18	"		
1220	6.15	13.92	"	7.34	"	-10.9	0.77	"		

Total Volume Purged: 2.5

Comments: 1220 - collected BI-GW08-10A

Signature(s): Gordon Little

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1-31-10
Weather: 35°F Clear

Project Number: 387933.FI.FS
Well ID: BI-GW09
CH2M HILL Personnel: G.Little
D.Bishop
Chris

Total Depth: 3.94 FT.(BTOC)
Depth to water: (-) 2.75 FT.(BTOC)
Water Column: 1.19 FT.
(x) 0.163 GAL/FT.
Well Volume: .19 GAL.
Total Purge Vol.: 1.5 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1200	3.29	12.68	0.200	9.02	8.52	111.1	24.0	0.09		
1205	3.20	12.85	.195	8.53	8.58	107.4	9.50	"		
1210	3.32	12.86	.194	8.27	8.55	106.4	1.80	"		
1215	3.33	12.91	.193	8.19	~~8.19~~ 8.57	103.6	1.40	"		

Total Volume Purged: 1.5

Comments: Started pumping 1157
1215 - Collected BI-GW09-10A

Signature(s): Heather Powell

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/31/10
Weather: 30° sunny

Project Number: 387933.FI.FS
Well ID: BI-GW10 BI-GW10-10A
CH2M HILL Personnel: D. Braun/CLT
D. Hocker/CLT
G. Little/CLT

Measuring Device(s): YSI 556 + Flow Thru Cell (SN 06054)
Hanna Turbidity Meter

Total Depth: 3.24 FT.(BTOC)
Depth to water: (-) 1.93 FT.(BTOC)
Water Column: 1.31 FT.
(x) 0.163 GAL/FT.
Well Volume: .21 GAL.
Total Purge Vol.: 2.0 GAL.

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1055	2.23	11.2	.308	9.88	8.57	109.7	380	.16	300	Clear, no odor
1100	2.23	11.0	.297	9.73	8.57	108.3	14.0	.16	300	
1105	2.24	11.1	.285	8.87	8.60	106.9	5.40	.16	300	
1110	2.29	11.3	.291	8.71	8.59	105.3	2.60	.16	300	
1115	2.24	11.2	.287	8.73	8.59	104.7	1.90	.16	300	
1120	2.23	11.2	.289	8.72	8.59	105.1	1.70	.16	300	

Total Volume Purged: 2.0

Comments: Started Purging @ 1050
Collected Sample @ 1120

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/31/10
Weather: 25° Sunny

Project Number: 387933.FI.FS
Well ID: BI-GW11 BI-GW11-10A
CH2M HILL Personnel: D. Brown / CLT
D. Hackett / CLT
G. Little / CLT

Measuring Device(s): YSI 556 + Flow Thru Cell (S/N 06054)
Hanna Turbidity Meter

Total Depth: 7.30 FT.(BTOC)
Depth to water: (-) 6.09 FT.(BTOC)
Water Column: 1.21 FT.
(x) 0.163 GAL/FT.
Well Volume: .2 GAL.
Total Purge Vol.: 1.3 GAL.

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1020	6.15	13.5	.291	9.10	8.21	135.3	33.0	.14	200	clear, no odor
1025	6.17	13.7	.291	8.51	8.20	131.7	17.3	.14	200	
1030	6.18	13.7	.287	8.50	8.20	130.9	5.80	.14	200	
1035	6.20	13.7	.290	8.50	8.19	131.3	2.90	.14	200	

Total Volume Purged: 1.3

Comments: Started purging @ 1015
Sample collected @ 1035

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/31/10
Weather: 25° sunny

Project Number: 387933.FI.FS
Well ID: BI-GW12-10A
CH2M HILL Personnel: D. Brown/CLT
G. Little/CLT
D. Hockett/CLT

Total Depth: 2.85 FT.(BTOC)
Depth to water: (-) 1.28 FT.(BTOC)
Water Column: 1.57 FT.
(x) 0.163 GAL/FT.
Well Volume: .26 GAL.
Total Purge Vol.: 1.5 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell S/N 06054
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
0930	1.57	5.77	.357	8.12	7.84	168.5	250	.17	200	clear, no odor
0935	1.45	8.60	.330	5.65	7.75	151.2	17.0	.17	200	
0940	1.48	8.92	.331	5.44	7.86	145.1	3.80	.16	200	
0945	1.49	8.91	.332	5.47	7.87	146.3	2.95	.16	200	
0950	1.51	8.90	.331	5.46	7.87	146.1	3.01	.16	200	

Total Volume Purged: 1.50

Comments: Started purging @ 0925
Sample collected @ 0950

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/31/10
Weather: Sunny 20's

Project Number: 387933.FI.FS
Well ID: ~~BI-GW03~~ BI-GW13-10A
CH2M HILL Personnel: / DL TS JD RM KR

Total Depth: 4.70 FT.(BTOC)
Depth to water: (-) 2.67 FT.(BTOC)
Water Column: 2.03 FT.
(x) 0.163 GAL/FT.
Well Volume: .33 GAL.
Total Purge Vol.: 1.5 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell 7619
Hanna Turbidity Meter 9012

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1220	2.67						145			cloudy
1225	"	11.38	0.149	11.77	8.35	97.5	48.1	0.07	400	
1230	"	10.76	0.147	11.48	8.30	76.5	30.1	0.07	250	
1235	"	10.87	0.147	11.43	8.26	75.8	21.7	0.07	200	
1240	"	10.71	0.147	11.51	8.25	76.0	19.4	0.07	200	
1245	"	10.75	0.146	11.55	8.30	71.8	13.0	0.07	200	

Total Volume Purged: 1.5

Comments:

1215 - Pump on @ 400mL/min
(1) ~~initial Turbs~~

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1-27-10
Weather: clear, 60's

Project Number: 387933.FI.FS
Well ID: BI-GW14-104
CH2M HILL Personnel: D Hackett
R. Fields
G. Little

Total Depth: 7.71 FT.(BTOC) BGS
Depth to water: (-) 6.31 FT.(BTOC) BGS
Water Column: 1.39 FT.
(x) 0.163 GAL/FT.
Well Volume: .23 GAL.
Total Purge Vol.: 2.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell 06054
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

Start pumping 10:30

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1033	6.46	10.69	.121	4.97	6.95	146.7	391	0.06	350	
1038	6.47	11.73	.116	5.24	6.61	165.7	51.8	0.05	350	Stained tannin
1043	6.48	11.77	.117	3.42	6.43	169.3	31.3	0.06	350	
1048	6.48	11.77	.118	3.07	6.35	173.5	20.3	0.06	350	
1053	6.49	11.81	.118	2.73	6.32	175.0	15.4	0.06	350	

Total Volume Purged: 2.0

Comments: Sampled 10:55 TAL metals
Perchlorate
Explosives Residues
PETN+NG

Signature(s): David Hackett

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: ~~1/30~~ 1/31/10
Weather:

Project Number: 387933.FI.FS
Well ID: BI-GW15-10A / MS/SD
CH2M HILL Personnel: TS KR RM DL JD

Total Depth: 9.23 FT.(BTOC)
Depth to water: (-) 8.00 FT.(BTOC)
Water Column: 1.23 FT.
(x) 0.163 GAL/FT.
Well Volume: .20 GAL.
Total Purge Vol.: .41 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell 7619
Hanna Turbidity Meter 9012

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1345	8.0	14.08	0.052	~~5.19~~	9.60	66.9	345	0.02	250	
1350	8.0	14.24	0.050	13.87	9.90	58.1	170	0.02	250	
1355	"	14.28	0.049	13.81	9.96	55.7	~~12.2~~ 14.2	0.02	250	
1400	"	13.81	0.050	12.72	9.86	96.9	78.4	0.02	250	
1410	"	14.13	0.050	13.13	9.96	74.1	~~74.1~~ 58.9	0.02	250	
1415	"	14.14	0.049	12.99	10.01	67.5	58.9	0.02	250	
1425	"	13.83	0.050	12.70	10.09	56.2	46.5	0.02	200	
1430	"	13.84	0.050	12.57	10.07	53.5	26.9	0.02	200	

Total Volume Purged: .41

Comments:

1337 - Pump on @ 250 mL/min, turbidity @ 14:10 = 58.4 NTUs

1430 - Sample

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1-31-10
Weather: 35°F Clear, Windy

Project Number: 387933.FI.FS
Well ID: BI-GW16-10A
CH2M HILL Personnel: D. Brown, D. Hockett, R. Fields

Measuring Device(s): YSI 556 + Flow Thru Cell; Hanna Turbidity Meter

Total Depth: 6.00 FT.(BTOC)
Depth to water: (-) 4.27 FT.(BTOC)
Water Column: 1.73 FT.
(x) 0.163 GAL/FT.
Well Volume: .28 GAL.
Total Purge Vol.: 3.0 GAL.

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1318	4.43	12.53	0.064	14.15	8.73	105.9	750	0.03		
1323	4.45	"	.060	9.10	8.49	109.3	~ 400	"		
1328	4.47	12.34	.060	8.84	8.32	108.3	190	"		
1333	4.50	12.41	.061	8.68	8.19	109.8	140	"		
1338	4.55	12.57	.062	8.97	8.14	116.5	110	"		
1343	4.40	12.21	.062	9.26	8.13	115.2	110	"		
1348	"	11.93	.063	9.30	8.10	115.7	95	"		
1353	4.40	12.14	"	9.23	8.07	116.5	80	"		
1358	"	12.07	"	9.26	"	113.2	65	"		
1403		12.23	.064	9.35	8.05	113.5	60	"		
1415		11.71	.063	9.33	8.10	111.1	45	"		
1420							40			

Total Volume Purged: 6C 3.0

Comments: 1310 - Started pumping.
1420 - Collected BI-GW16-10A + BI-GW16-10ASD + BI-GW16-10AMS

Signature(s): Landon Lowe

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/26/10
Weather: 48° Sunny

Project Number: 387933.FI.FS Sample ID
Well ID: BI-GW17 BI-GW17-10A
CH2M HILL Personnel: D. Hackett / CLT
D. Brown / CLT

Total Depth: 9.80 FT.(BTOC)
Depth to water: (-) 8.41 FT.(BTOC)
Water Column: 1.39 FT.
(x) 0.163 GAL/FT.
Well Volume: .23 GAL.
Total Purge Vol.: 3.5 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
0915	8.59	9.83	.223	9.41	7.02	196.7	800	.10	300	tan, no odor
0920	8.60	13.3	.202	6.81	6.86	199.7	500	.12	300	
0925	8.61	13.5	.188	5.96	6.13	191.2	260	.09	300	
0930	8.59	13.6	.185	6.21	6.09	189.7	130	.09	300	
0935	8.58	13.6	.183	6.16	6.61	186.3	95.0	.09	300	
0940	8.59	13.6	.182	6.13	6.58	187.1	90.0	.09	300	
0945	8.59	13.7	.181	6.14	6.60	176.0	70.0	.09	300	
0950	8.58	13.8	.181	6.09	6.57	175.3	75.0	.09	300	
0955	8.58	13.9	.181	6.11	6.61	171.2	55.0	.09	300	
1000	8.58	13.8	.181	6.09	6.60	170.9	45.0	.09	300	
1005	8.57	13.8	.179	6.10	6.61	169.3	40.0	.09	300	
1010	8.57	13.8	.180	6.09	6.60	166.7	33.0	.09	300	
1015	8.57	13.8	.183	6.10	6.59	167.3	28.0	.09	300	

Total Volume Purged: 3.5

Comments: Started Purging @ 0910

Signature(s): Brown

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 2/1/10
Weather: 50° sunny

Project Number: 387933.FI.FS
Well ID: BI-GW20 BI-GW20-10A
CH2M HILL Personnel: D. Brown / CLT
G. Little / CLT
D. Hackett / CLT S/n 13916

Total Depth: 11.25 FT.(BTOC)
Depth to water: (-) 10.08 FT.(BTOC)
Water Column: 1.17 FT.
(x) 0.163 GAL/FT.
Well Volume: .19 GAL.
Total Purge Vol.: 3.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
0955	10.15	13.8	.116	5.28	6.69	152.5	532	.05	300	Dark Black, no odor
1000	10.53	14.3	.110	5.00	6.91	146.1	213	.05	300	Dark brown, no odor
1005	10.55	14.8	.108	4.99	6.98	141.2	90.4	.05	300	light brown, no odor
1010	10.56	15.1	.108	4.89	6.97	134.2	60.5	.05	300	light brown, no odor
1015	10.55	15.1	.108	4.90	6.97	132.3	58.0	.05	300	Clear, no odor
1020	10.55	15.1	.109	4.88	6.96	129.3	50.9	.05	300	
1025	10.55	15.1	.109	4.89	6.96	128.5	48.3	.05	300	
1030	10.53	15.1	.109	4.89	6.96	127.3	45.3	.05	300	
1035	10.54	15.1	.108	4.89	6.96	128.5	38.4	.05	300	

Total Volume Purged: 3.0

Comments: Started Purging @ 0950 Sampled @ 1035
Soil PH = 6.9
Soil moisture 5%

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	BEAR ISLAND, NC	Well ID:	BI-GW21
Event:	CTO-80 OFF-BASE SDZ	CH2M HILL Personnel:	G. Hibbs
Date:	2/1/10		R. Fields
Weather:	55° Sunny		D. Bishop

Total Depth:	2008 ~~19.45~~	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 18.98	FT.(BTOC)	Hanna Turbidity Meter
Water Column:	1.1	FT.	
	(x) 0.163	GAL/FT.	
Well Volume:	.18	GAL.	
Total Purge Vol.:	1.5	GAL.	

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1135	18.85	15.21	0.310	7.24	7.16	131.0	114	0.18		
1140	18.85	16.18	.321	6.99	7.19	129.1	22.8	.19		
1145	"	16.42	.322	6.85	7.18	127.3	3.12	"		
1150	"	16.52	"	6.68	"	125.2	1.38	"		

Total Volume Purged:

Comments: 1130 - started pumping
1150 - Collected BI-GW21-10A

Signature(s): Gordon Hibbs

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/28/10
Weather: 50° Sunny

Project Number: 387933.FI.FS
Well ID: BI-GW22-10A
CH2M HILL Personnel: D. Brown/CLT
D. Hockett/CLT
G. Little/CLT

Measuring Device(s): YSI 556 + Flow Thru Cell S/N 1396
Hanna Turbidity Meter

Total Depth: 16.50 FT.(BTOC)
Depth to water: (-) 14.91 FT.(BTOC)
Water Column: 1.59 FT.
(x) 0.163 GAL/FT.
Well Volume: .26 GAL.
Total Purge Vol.: 1.75 GAL.

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		±1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1005	14.99	9.5	.001	11.03	6.88	200.1	426	.12	200	clear, no odor
1010	15.01	16.4	.169	5.59	7.05	169.7	371	.10	200	
1015	15.03	16.6	.199	5.43	~~5.43~~ OB 7.06	165.5	49.7	.09	200	
1020	15.05	16.6	.200	5.35	7.05	165.8	26.6	.09	200	
1025	15.11	16.8	.200	5.21	7.04	163.4	22.0	.09	200	
1030	15.12	16.9	.200	5.22	7.04	162.3	9.39	.10	200	
1035	15.13	16.9	.201	5.24	7.04	161.8	8.75	.09	200	

Total Volume Purged: 1.25

Comments: Started Purging @ 1000
Sampled @ 1035

Signature(s): [signature]

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/28/10
Weather: 50° sunny

Project Number: 387933.FI.FS
Well ID: BI-GW23-1cA
CH2M HILL Personnel: D. Hackett / CLT
D. Brown / CLT
G. Little / CLT SM/13916

Total Depth: 12.07 FT.(BTOC)
Depth to water: (-) 10.95 FT.(BTOC)
Water Column: 1.12 FT.
(x) 0.163 GAL/FT.
Well Volume: .18 GAL.
Total Purge Vol.: 2.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1110	11.04	15.9	.124	5.61	7.52	148.1	32.1	.13	200	Clear, no odor
1115	11.06	15.5	.123	3.45	7.43	140.3	16.8	.06	200	
1120	11.08	15.8	.123	3.13	7.42	136.2	10.7	.07	200	
1125	11.10	16.1	.124	3.17	7.41	132.3	26.4	.07	200	
1130	11.10	16.1	.125	3.18	7.40	133.3	20.1	.07	200	
1135	11.10	16.1	.125	3.16	7.41	133.1	14.7	.07	200	
1140										

Total Volume Purged: 2.0

Comments: started Purging @ 1105
Sampled @ 1135

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/28/10
Weather: 60° SUNNY

Project Number: 387933.FI.FS
Well ID: BI-GW24 BI-GW24-10A
CH2M HILL Personnel: D. Brown / CLT
D. Hockett / CLT R. Fields / KNV
G. Little / CLT
S/A

Total Depth: 6.60 FT.(BTOC)
Depth to water: (-) 5.75 FT.(BTOC)
Water Column: .85 FT.
(x) 0.163 GAL/FT.
Well Volume: .14 GAL.
Total Purge Vol.: 1.25 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1200	5.75	12.9	.340	9.81	7.76	133.6	62.3	.16		Clear, no odor
1205	6.15	13.10	.359	7.43	7.84	125.3	47.1	.17		
1210	5.98	13.12	.363	6.90	7.81	117.4	2.01	.17		
1215	5.99	13.05	.353	6.77	7.82	107.7	1.59	.17		

Total Volume Purged: 1.25

Comments: Started purging @ 1155
sampled 12:20

Signature(s): Ben Hockett

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/28/10
Weather:

Project Number: 387933.FI.FS
Well ID: BI-GW25-10A
CH2M HILL Personnel: A TRAM
D. Lubell

Total Depth: 5.9 FT.(BTOC) ~~BTOC~~ Bgs
Depth to water: (-) 4.2 FT.(BTOC) Bgs
Water Column: 1.7 FT.
(x) 0.163 GAL/FT.
Well Volume: .28 GAL.
Total Purge Vol.: 3.6 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell # 7619
Hanna Turbidity Meter # 9016

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1035	4.25	13.71	0.191	8.64	8.11	92.2	10	0.09	500	
1040	"	13.06	0.190	8.69	8.11	86.8	3.88	0.09	500	
1045	"	15.67	0.188	8.46	8.12	79.7	4.77	0.09	500	
1050	"	13.71	0.186	8.48	8.14	75.4	3.77	0.09	500	

Total Volume Purged: 2.0

Comments:
1024 Pump ON, 500mL/min

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/29/10
Weather: Sunny 50's - 60's

Project Number: 387933.FI.FS
Well ID: BI-GW26-10A
CH2M HILL Personnel: A TEAM
D. Lubell

Total Depth: 3.55 FT.(BTOC)
Depth to water: (-) 1.91 FT.(BTOC)
Water Column: 1.64 FT.
(x) 0.163 GAL/FT.
Well Volume: .27 GAL.
Total Purge Vol.: 3.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell 7619
Hanna Turbidity Meter 9016

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1350	2.0	10.98	0.270	2.11	7.86	44	27.1	0.13	500	clear
1355	2.0	10.84	0.270	1.95	7.85	42.5	6.96	0.13	500	"
1400	2.0	10.88	0.267	1.72	7.85	40.3	3.47	0.13	400	"
1405	2.0	10.81	0.269	1.89	7.83	~~40~~ 38.0	2.33	0.13	400	"
1410	"	10.82	0.269	1.87	7.81	37.3	1.68	0.13	400	"

Total Volume Purged: 3.0

Comments:
1345 - Pump on @ 500 mL/min

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/26/10
Weather: Sunny 50-60

Project Number: 387933.FI.FS
Well ID: BI-GW27-10A
CH2M HILL Personnel: A-TEAM
D. Lubell

Total Depth: 6.38 FT.(~~BTOC~~) BGS
Depth to water: (-) 4.48 FT.(~~BTOC~~) BGS
Water Column: 1.9 FT.
(x) 0.163 GAL/FT.
Well Volume: .31 GAL.
Total Purge Vol.: 3.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell 7619
Hanna Turbidity Meter 9016

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1435	4.6						34.5		500	
1440	4.6	13.52	0.216	9.00	8.05	82.2	24.5	0.10	500	clear
1445	4.6	13.50	0.209	8.80	8.04	74.0	11.6	0.10	500	"
1450	4.6	13.42	0.208	8.88	8.03	68.3	6.73	0.10	500	"
1455	4.6	13.50	0.206	8.87	8.01	63.6	2.75	0.10	500	"

Total Volume Purged: 3.0

Comments:

1430 - Pump on
SAMPLE COLLECTED @ 1455

Signature(s): [signature]
Toby L. Stewart/BTR

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1-29-10
Weather: 10°F clear + windy

Project Number: 387933.FI.FS
Well ID: BI-GW28
CH2M HILL Personnel: G. Little/CLT, D. MacKett/CLT
C. Renkens/HGA

Total Depth: 2.8 FT.(BTOC)
Depth to water: (-) 1.7 FT.(BTOC)
Water Column: 1.1 FT.
(x) 0.163 GAL/FT.
Well Volume: .18 GAL.
Total Purge Vol.: 2.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1103	2.20	11.16	0.234	1.86	7.23	-174.9	154	0.15		
1108	2.26	10.86	.235	0.98	7.19	-169.9	21.9	"		
1113	2.05	11.10	.240	.49	7.16	-188.1	6.32	.16		
1118	2.18	11.12	.241	"	7.18	-189.2	4.70	"		
1123	2.15	11.12	.242	.55	7.17	-162.0	3.54	"		

Total Volume Purged:

Comments: 1123 - Collected BI-GW28-10A
1128 - collected BI-GW28D-10A

Signature(s): Gordon Little

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/29/10
Weather: 30's-40's Sunny

Project Number: 387933.FI.FS
~~Well ID:~~ BI-GW29-10A
CH2M HILL Personnel: A Team

Measuring Device(s): YSI 556 + Flow Thru Cell 6054
Hanna Turbidity Meter 08970

Total Depth: 5.35 FT.(~~BTOC~~) bgs
Depth to water: (-) 3.74 FT.(~~BTOC~~) bgs
Water Column: 1.61 FT.
(x) 0.163 GAL/FT.
Well Volume: .26 GAL.
Total Purge Vol.: 2.5 GAL.

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1019	3.74	14.10	0.338	8.99	8.22	116.1	22.0	0.16	500 mL/min	clear
1024	"	14.27	0.338	8.21	8.29	111.1	3.10	0.16	"	"
1029	"	14.33	0.341	8.05	8.25	113.6	1.60	0.16	"	"
1034		14.39	0.340	8.02	8.27	112.1	1.10	0.16	"	"

Total Volume Purged: 2.5

Comments:

1012 - Pump on ; sample @ 1035

Signature(s): Ben McLeod

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	BEAR ISLAND, NC	Sample ~~Well~~ ID:	BI-GW30-10A
Event:	CTO-80 OFF-BASE SDZ	CH2M HILL Personnel:	A TEAM
Date:	11/29/10		D. Lubell
Weather:	Sunny 30-40's		

Total Depth:	6.39	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell 6054
Depth to water:	(-) 4.22	FT.(BTOC)	Hanna Turbidity Meter 8970
Water Column:	2.17	FT.	
	(x) 0.163	GAL/FT.	
Well Volume:	.35	GAL.	
Total Purge Vol.:	3.0	GAL.	

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		**± 1 °C**	**± 10%**	**± 10%**	**± 0.1**	**± 10 mV**	**± 10% or <10**			
1150	4.22						110		500	brownish
1155	4.22	7.80	0.402	1.95	7.98	132.3	~~55.0~~ 40.0	0.19	500	yellow
1205	"	7.49	0.405	1.59	8.10	124.1	36.0	0.20	500	yellow
1210	"	7.71	0.405	1.21	8.09	124.5	25.0	0.20	350	slowed pump
1215	"	7.69	0.403	1.11	8.07	125.1	24.0	0.20	350	yellow
1220	"	7.67	0.402	1.10	8.02	127.2	20.0	0.19	350	yellow

Total Volume Purged: 3.0

Comments:

1145 - Pump on @ 500mL/min 1220 - Sample time

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 4/21/10
Weather: 20's sunny

Project Number: 387933.FI.FS
Well ID: BI-GW31-10A
CH2M HILL Personnel: D.L. T.S. KR JD R.M

Total Depth: 6.82 FT.(~~BTOC~~) bgs
Depth to water: (-) 3.65 FT.(~~BTOC~~) bgs
Water Column: 3.17 FT.
(x) 0.163 GAL/FT.
Well Volume: .52 GAL.
Total Purge Vol.: 1.9 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell 7619
Hanna Turbidity Meter 9012

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
0935	3.65	8.02	0.322	5.86	7.43	153.7	145	0.15	300	light brown
0940	3.65	8.24	0.322	5.10	7.53	147.0	99.5	0.15	300	"
0945	3.65	8.39	0.319	4.65	7.63	140.9	54.3	0.15	300	"
0950	3.65	8.50	0.318	4.62	7.65	138.1	42.9	0.15	300	"
0955	3.65	8.50	0.318	4.41	7.67	134.0	39.4	0.15	300	v. light brown
1000	3.65	8.47	0.317	4.29	7.68	130.5	26.6	0.15	300	"
1005	3.65	8.43	0.316	4.22	7.71	126.0	21.6	0.15	300	"
1010	3.65	8.48	0.316	4.11	7.73	122.7	19.5	0.15	300	"

Total Volume Purged: 1.9

Comments:

0922 - Pump on 300mL/min

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	BEAR ISLAND, NC	Well ID:	BI-GW32-10A
Event:	CTO-80 OFF-BASE SDZ	CH2M HILL Personnel:	Ron McComb/KNV, Kristen Riggers/RDU, Toby Stewart/BTR
Date:	1/31/10		
Weather:	Sunny 20°		

Total Depth:	5.25	FT.(BTOC)	
Depth to water:	(-) 2.54	FT.(BTOC)	
Water Column:	2.71	FT.	
	(x) 0.163	GAL/FT.	
Well Volume:	.44	GAL.	
Total Purge Vol.:	1.8	GAL.	

Measuring Device(s): YSI 556 + Flow Thru Cell; Hanna Turbidity Meter

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1038	2.54	8.94	0.357	7.40	7.46	118.3	583	0.17	350	tannish yellow
1043	2.54	8.73	0.352	6.14	7.47	114.1	56.8	0.17	350	yellow/tannish
1048	2.54	8.91	0.350	4.61	~~7.44~~ 7.46	111.6	15.7	0.17	350	clear tannish yellow
1053	2.54	9.25	0.349	5.90	7.50	109.0	15.4	0.17	350	" " "
1058	2.54	9.21	0.347	5.63	7.49	108.0	12.6	0.17	350	" " "

Total Volume Purged: 1.8

Comments:

1030 - Pump on, 350mL/min flowrate
pH @ 10:48 is 7.49, sample BI-GW32-10A @ 11:00

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 11/3/10
Weather: Sunny 20's

Project Number: 387933.FI.FS
Well ID: BI-GW33-10A
CH2M HILL Personnel: DL TS KR RM JD

Total Depth: 9.45 FT.(BTOC)
Depth to water: (-) 8.20 FT.(BTOC)
Water Column: 1.25 FT.
(x) 0.163 GAL/FT.
Well Volume: .20 GAL.
Total Purge Vol.: .4 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1130	8.20	14.20	0.183	12.53	8.37	82.6	84.4	0.09	300	sl. cloudy
1135	8.20	14.46	0.181	12.70	8.50	77.7	17.7	0.09	300	
1140	"	14.49	0.182	12.75	8.50	78.0	10.9	0.09	300	
1145	"	14.59	0.183	12.73	~~8.50~~ 8.50	76.9	5.58	0.09	300	

Total Volume Purged: .4

Comments:

1122 - Pump on @ 300 mL/min
Sample time = 1145

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/27/10
Weather: 50's sunny

Project Number: 387933.FI.FS
Well ID: BI-GW34
CH2M HILL Personnel: J. Diner

Total Depth: 8.27 FT.(BTOC)
Depth to water: (-) 4.64 FT.(BTOC)
Water Column: 2.63 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.592 GAL.
Total Purge Vol.: 4.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1040	4.64	11.49	0.071	6.96	6.49	143.3	780	0.03	500	tan
1046	4.64	11.74	0.071	5.88	6.43	142.0	160	0.03	"	tan
1051	"	11.88	0.072	5.03	6.25	145.2	108	0.03	"	"
1056	"	11.78	0.071	5.01	6.21	145.2	78.3	0.03	400	"
1101	4.67	11.70	0.070	5.03	6.20	143.9	61.3	0.03	300	"
1107	"	11.65	0.070	4.83	6.21	142.3	57.9	0.03	"	"
1111	"	11.61	0.070	4.83	6.21	141.2	57.6	0.03	~250	v. light tan
1116	"	11.58	0.071	4.76	6.22	139.2	52.5	0.03	"	"
1121	"	11.67	0.072	4.74	6.23	136.8	47.5	0.03	"	"
1126	"	11.68	0.073	4.60	6.26	133.8	39.0	0.03	"	"
1130	"	11.71	0.073	4.61	6.26	131.2	32.3	0.03	"	clear

Total Volume Purged: 4.0

Comments:

Signature(s): Jenny Diner

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	BEAR ISLAND, NC	Sampling Well ID:	BI-GW35-10A
Event:	CTO-80 OFF-BASE SDZ	CH2M HILL Personnel:	K.B., D.L., T.S., R.M., D.M.
Date:	1/26/10		
Weather:	Sunny, 50's		

Total Depth:	4.62	FT.(BTOC)	
Depth to water:	(-) 2.56	FT.(BTOC)	
Water Column:	2.06	FT.	
	(x) 0.163	GAL/FT.	
Well Volume:	.69	GAL.	
Total Purge Vol.:	1.3	GAL.	

Measuring Device(s): YSI 556 + Flow Thru Cell; Hanna Turbidity Meter

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1530	2.7	12.29	0.148	~~5.87~~	6.92	111.1	330	0.07	400	
1535		12.22	0.143	5.18	6.70	114.0	56.7	0.07	400	
1538		11.88	0.137	5.10	6.61	118.0	30.9	0.06		
1541		11.92	0.136	5.11	6.58	118.6	22.1	0.06		
1545		11.93	0.135	5.16	6.56	118.7	21.8	0.06		
1550		12.04	0.134	4.93	6.53	118.8	17.1	0.06		

Total Volume Purged: 1.3

Comments: Purge RATE = 400mL/min
Sample time 1555

SAMPLE ID: BI-GW35-10A @ 1555
BI-GW35D-10A @ 1600
TAL METALS, PERCHLORATE, EXPLOSIVES, NITRO PETN

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	BEAR ISLAND, NC	Shaw Well ID:	BI-GW36-10A
Event:	CTO-80 OFF-BASE SDZ	CH2M HILL Personnel:	D. Lubmy, T. Stewart, R. McCrab, K. Rogers
Date:	11/26/10		
Weather:	Sunny 50s		

Total Depth:	6.6	FT.(BTOC) bgs	
Depth to water:	(-) 4.0	FT.(BTOC)	
Water Column:	2.6	FT.	
	(x) 0.163	GAL/FT.	
Well Volume:	.42	GAL.	
Total Purge Vol.:	1.5	GAL.	

Measuring Device(s): YSI 556 + Flow Thru Cell; Hanna Turbidity Meter

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
0930	4.0	11.49	0.063	*	7.56	158.0	216	0.03	375	
0940	4.0	11.76	0.056	—	7.48	140.2	100	0.03	375	
0945	4.2	12.08	0.050	—	7.52	133.1	63.3	0.02	375	
0950	4.2	12.18	0.054	—	7.44	131.3	55.8	0.02	375	
0955	4.2	11.82	0.053	—	7.35	136.3	32.9	0.02	375	
1000	4.2	11.74	0.053	—	7.43	129.9	27.3	0.02	375	
1005	4.2	12.15	0.053	—	7.42	116.5	23.	0.02	375	
1010	—	—	—	—	—	—	20.9	—		

Total Volume Purged: 1.5

Comments:

0925 - PUMP STALLED

RATE = 375 mL/min

* DO NOT READING, probe fouled

SAMPLE ID: BI-GW36-10A @ 1010

ANALYSES: TAL METALS, PERCHLORATE, NITRO, EXPLOSIVES, PETN

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/26/10
Weather:

Project Number: 387933.FI.FS
Well ID: BI-GW38-10A
CH2M HILL Personnel: D. Lubell/RDM

Total Depth: 18.82 FT.(BTOC) ~~BGS~~
Depth to water: (-) 16.18 FT.(BTOC) ~~BGS~~
Water Column: 2.64 FT.
(x) 0.163 GAL/FT.
Well Volume: .43 GAL.
Total Purge Vol.: 1.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1353		18.53	0.456	7.59	7.28	106.3	>1000	0.23		TURBID
1400		17.69	0.459	5.90	7.20	109.2	>1000	0.22		CLEARING
1403		17.56	0.443	6.43	7.26	105.3	110	0.22		CLEARING
1406		17.71	0.450	5.99	7.21	105.6	44.5	0.22	~350	CLEAR
1410		17.69	0.447	6.69	7.19	105.2	27.5	0.17	~350	CLEAR
1416		17.65	0.444	6.84	7.17	106.4	21.7	0.21	"	"
1422		17.66	0.440	6.50	7.17	107.9	17.4	0.21	"	"

Total Volume Purged: 1.0

Comments:

SAMPLE ID: BI-GW38-10A @ 1425
ANALYSES: PETN, NITRO, EXPLOSIVES, TAL METALS, PERCHLORATE

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1-26-10
Weather: 57°F clear & windy

Project Number: 387933.FI.FS
Well ID: BI-GW39
CH2M HILL Personnel: G. Litty (CLT), Randy Fie (DS/KHX)

Total Depth: 5.00 FT.(BTOC)
Depth to water: (-) 3.78 FT.(BTOC) BGS
Water Column: 1.22 FT.
(x) 0.163 GAL/FT.
Well Volume: .20 GAL.
Total Purge Vol.: 2.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1425	3.78									
1430	4.44									
1435	4.20	14.42	0.132	6.23	5.72	170.6	190	0.03	0.1 L/min	
1440	4.11	14.09	.130	3.70	6.32	145.4	95	.03		
1445	4.10	14.07	.129	2.80	6.25	139.0	60.0	"		
1450	4.23	14.02	.128	2.37	6.23	112.9	45	"		
1455	4.10	13.99	.127	2.18	6.22	102.9	34	"		
1500	4.05	14.04	.127	1.94	6.21	99.6	30	"	↓	

Total Volume Purged: 2.0

Comments: Collected sample 1500 for GRO 8330, PETN, TAL metals + perchlorate.

Signature(s): Gordon Litty

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 2/1/10
Weather: 50° Sunny

Project Number: 387933.FI.FS
Well ID: BI-GW40
CH2M HILL Personnel: D. Brown / CLT
D. Hockett / CLT
G. Little / CLT 5/9 13916

Total Depth: 11.77 FT.(BTOC)
Depth to water: (-) 9.64 FT.(BTOC)
Water Column: 2.13 FT.
(x) 0.163 GAL/FT.
Well Volume: .35 GAL.
Total Purge Vol.: 1.5 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1350	9.75	14.2	.269	8.55	7.71	47.1	319	.13	300	Brown, no odor
1355	9.89	14.5	.219	8.32	7.70	13.4	83.2	.13	300	
1400	9.85	14.7	.223	7.08	7.23	7.3	54.0	.13	300	
1405	9.91	14.8	.225	7.10	7.24	8.9	33.1	.13	300	
1410	9.95	14.8	.225	7.09	7.23	8.1	19.1	.13	300	
1415	9.86	14.8	.225	7.09	7.23	8.3	7.3	.13	300	

Total Volume Purged: 1.5

Comments: Started purging @ 1345
Sampled well @ 1415

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 2/1/10
Weather: 50° Sunny

Project Number: 387933.FI.FS
Well ID: BI-6W41
CH2M HILL Personnel: D. Brown / CLT
G. Little / CLT
D. Hockett / CLT 13916

Total Depth: 5.00 FT.(BTOC)
Depth to water: (-) 4.32 FT.(BTOC)
Water Column: .68 FT.
(x) 0.163 GAL/FT.
Well Volume: .11 GAL.
Total Purge Vol.: 1.5 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1235	4.52	10.7	.258	4.81	6.61	93.3	194	.12	300	
1240	4.89	10.7	.259	3.15	6.56	87.1	51.1	.12	300	
1245	4.91	10.6	.260	3.12	6.57	88.3	35.4	.12	300	
1250	4.95	10.6	.261	3.10	6.56	87.7	24.1	.12	300	
1255	4.92	10.6	.260	3.10	6.57	87.8	9.8	.12	300	
1300										

Total Volume Purged: 1.5

Comments: Started Purging @ 1230
Soil Testing pH = 6.9
% Moisture = 5
Collected Sample @ 1255
Sample has tanning Stain

Signature(s): D. Brown

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	BEAR ISLAND, NC	Well ID:	BI-GW42-10A
Event:	CTO-80 OFF-BASE SDZ	CH2M HILL Personnel:	D. Brown / CLT
Date:	1/28/10		G. Little / CLT
Weather:	50° Sunny		D. Hockett / CLT S/A 139/6

Total Depth:	11.02	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 10.05	FT.(BTOC)	Hanna Turbidity Meter
Water Column:	.97	FT.	
	(x) 0.163	GAL/FT.	
Well Volume:	.16 ~~.97~~ DB	GAL.	
Total Purge Vol.:	2.0	GAL.	
Purge Device:	Geopump peristaltic pump		

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1305	10.13	10.5	.230	7.84	7.95	118.3	371	.10	200	Clear, no odor
1310	10.86	10.6	.233	7.06	8.00	105.1	184	.11	200	
1315	10.80	10.3	.230	8.13	7.88	97.6	41.9	.11	200	
1320	10.79	10.2	.230	8.21	7.85	95.1	30.8	.11	200	
1325	10.82	10.1	.230	8.63	7.85	87.0	21.7	.11	200	
1330	10.85	10.1	.230	8.60	7.86	87.7	19.4	.11	200	
1335	10.86	10.1	.230	8.59	7.85	85.1	19.0	.11	200	
1340	10.86	10.1	.230	8.58	7.86	84.9	13.7	.11	200	
1345	10.86	10.1	.231	8.58	7.86	85.7	9.8	.11	200	

Total Volume Purged: 2.0

Comments: Started Purging @ 1300
Sampled at 1345

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1-28-10
Weather: clear, slight wind, 60's

Project Number: 387933.FI.FS
Well ID: BI-GW43-10A
CH2M HILL Personnel: D. Mockett / CLT, Gordon Little / CLT, D. Brown / CLT, Ro. Field s / KNX

Total Depth: 9.10 FT.(~~BTOC~~) BGS
Depth to water: (-) 7.75 FT.(~~BTOC~~) BGS
Water Column: 1.35 FT.
(x) 0.163 GAL/FT.
Well Volume: .22 GAL.
Total Purge Vol.: 1.75 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Start pump at 2 PM

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1405	7.82	15.14	.121	8.16	8.11	69.8	200	0.07	250	
1410	7.85	15.11	.119	7.80	7.83	67.5	36.9	0.07	250	
1415	7.85	15.12	.120	7.43	8.09	66.5	19.9	0.07	250	
1420	7.81	15.07	.120	7.35	8.08	67.4	6.65	0.07	250	
1425	7.84	15.13	.121	7.27	8.08	68.0		0.07	250	

Total Volume Purged: 1.75 gallons

Comments: Sampled 1430

Signature(s): Daniel Mockett

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/29/16
Weather: Sunny 30's - 40's

Project Number: 387933.FI.FS
Well ID: BI-GW44-10A
CH2M HILL Personnel: A Tegan
D. Lubell

Total Depth: 6.17 FT.(~~BTOC~~) LAS
Depth to water: (-) 3.85 FT.(~~BTOC~~)
Water Column: 2.32 FT.
(x) 0.163 GAL/FT.
Well Volume: .38 GAL.
Total Purge Vol.: 3.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell 60154
Hanna Turbidity Meter 058770

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		**± 1 °C**	**± 10%**	**± 10%**	**± 0.1**	**± 10 mV**	**± 10% or <10**			
1100	3.85	11.55	0.157	12.31	8.79	108	700	0.07	475	
1105	"	11.26	0.146	9.25	8.60	104.6	40.0	0.07	475	
1110	"	11.58	0.144	8.66	8.52	107.8	17.0	0.07	475	
1115	"	11.59	0.144	8.62	8.54	101.2	20.0	0.07	475	
1120	"	11.53	0.144	8.47	8.50	107.7	13.0	0.07	475	
~~1125~~										

Total Volume Purged: 3.0

Comments:

1055 - Pump on @ 500mL/min
~~INITIAL TIME~~
1120 - Sample time

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/27/10
Weather:

Project Number: 387933.FI.FS
Well ID: BI-GW45-10A
CH2M HILL Personnel: DLudvil, J Diner, R McComb, K Rogers, T Stewart

Total Depth: 4.31' FT.(BTOC)
Depth to water: (-) 2.46 FT.(BTOC)
Water Column: 1.85 FT.
(x) 0.163 GAL/FT.
Well Volume: .30 GAL.
Total Purge Vol.: 2.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
0924	2.58	10.10	0.087	11.13	6.44	174.2	102	0.04	450	TURBID
0928	2.58	10.19	0.076	8.65	6.20	169.1	56.8	0.04	450	CLEAR
0932	2.65	10.30	0.075	8.01	6.13	169.3	32.7	0.03	450	CLEAR
0935	2.65	10.35	0.072	7.74	6.07	168.4	18.6	0.03	225	CLEAR
0939	2.65	10.38	0.071	7.61	6.07	166.7	16.4	0.03	225	CLEAR
0942	2.65	10.34	0.070	7.31	6.06	165.0	14.3	0.03	225	CLEAR

Total Volume Purged: 2.0

Comments:
SAMPLE ID: BI-GW45-10A @ 0945
ANALYSES DISSOLVED METALS, TAL METALS, NITRO, EXPLOSIVES, PETN, PERCHLORATE

Signature(s):

CH2MHILL

sample

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	BEAR ISLAND, NC	Well ID:	BI-GW46 BI-GW46-10A
Event:	CTO-80 OFF-BASE SDZ	CH2M HILL Personnel:	D. Brown / CLT
Date:	1/27/10		D. Hackett / CLT
Weather:	46° Sunny		G. Little / CLT

Measuring Device(s): YSI 556 + Flow Thru Cell S/N 6054
Hanna Turbidity Meter

Total Depth:	3.41	FT.(BTOC)
Depth to water:	(-) 1.92	FT.(BTOC)
Water Column:	1.49	FT.
	(x) 0.163	GAL/FT.
Well Volume:	.24	GAL.
Total Purge Vol.:	2.0	GAL.

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
0930	2.00	9.04	.191	8.31	7.9	131.8	388	.09	200	
0935	2.04	9.37	.168	8.35	8.03	132.5	96.2	.09	200	
0940	2.07	9.57	.189	8.41	8.10	127.7	22.8	.08	200	
0945	2.08	9.68	.188	8.49	8.13	129.7	17.8	.08	200	
0950	2.08	9.73	.187	8.45	8.15	128.3	11.7	.08	200	
0955	2.09	9.74	.186	8.43	8.14	129.3	8.52	.09	200	

Total Volume Purged: 2.0

Comments: Started Purging @ 0925
Sampled @ 0955

Signature(s): Dan Zn

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 2/01/10
Weather: Sunny 30's

Project Number: 387933.FI.FS
Well ID: BI-GW47-10A
CH2M HILL Personnel: TS KR RM DL JD

Total Depth: 7.48 FT.(BTOC)
Depth to water: (-) 4.85 FT.(BTOC)
Water Column: 2.63 FT.
(x) 0.163 GAL/FT.
Well Volume: .43 GAL.
Total Purge Vol.: 2.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1040	4.85	10.91	0.084	7.43	7.40	-88.0	269	0.04	300	cloudy
1045	"	11.38	0.083	7.33	7.80	-111.1	203	0.04	"	cloudy, pump rate sl.
1050	"	11.59	0.082	7.33	7.95	-112.9	90.2	0.04	250	cloudy
1055	"	11.62	0.083	7.01	7.99	-112.5	75.4	0.04	200	cloudy
1100	"	11.56	0.083	7.05	8.04	-106.1	47.4	0.04	"	sl. cloudy
1105	"	11.59	0.083	7.05	8.12	-104.6	38.1	0.04	"	sl. cloudy
1110	"	11.64	0.083	6.95	8.16	-103.8	26.2	0.04	"	clearing
1115	"	11.66	0.083	6.98	8.19	-103.7	21.6	0.04	"	clear

Total Volume Purged: 2.0

Comments:

1029 = START Pump @ 300 mL/min TURBIDITY = 863 @ 1035

1115 - Sample time

Signature(s): KR

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 7/1/10
Weather: 80° SUNNY

Project Number: 387933.FI.FS
Well ID: BI-GW48-10A
CH2M HILL Personnel: TS KR, RM C.R. DL JD

Total Depth: 12.25 FT.(BTOC)
Depth to water: (-) 10.40 FT.(BTOC)
Water Column: 1.8 FT.
(x) 0.163 GAL/FT.
Well Volume: .29 GAL.
Total Purge Vol.: 3.5 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1200	10.40	14.93	0.135	7.61	8.28	-90.3	174	0.06	400	
1205	"	14.98	0.135	7.71	8.35	-91.4	141	0.06	"	
1210	"	15.06	0.135	7.60	8.35	-89.0	95.1	0.06	"	
1215	"	14.99	0.136	7.30	8.38	-87.0	105	0.06	"	
1220	"	15.02	0.135	7.52	8.34	-82.6	86.6	0.06	300	
1225	"	15.04	0.135	7.56	8.37	-81.3	76.5	0.06	"	
1230	"	15.05	0.135	7.58	8.35	-77.9	78.8	0.06	"	
1235	"	14.97	0.135	7.26	8.36	-74.4	75.9	0.06	200	
1240	"	14.84	0.134	7.10	8.32	-69.7	73.7	0.06	"	
1245	"	14.85	0.133	7.20	8.33	-67.0	71.4	0.06	"	
1250	"	adjusted flowrate and tubing intake height						0		
1300	"	14.91	0.133	7.28	8.31	-61.7	60.0	0.06	100	
1305	"	15.07	0.134	7.30	8.32	-58.0	46.4	0.06	"	
1310	"	15.11	0.134	7.42	8.38	-58.2	43.8	0.06	"	
1315	"	15.22	0.135	7.54	8.36	-55.4	43.9	0.06	"	

Total Volume Purged: 3.5

Comments:

1315 - sample time

V42 1145 - Pump ON 400 mL/min, 1154 - Turbidity = 340 NTU

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/28/10
Weather: 55° sunny

Project Number: 387933.FI.FS
Well ID: BI-GW49
CH2M HILL Personnel: D. Brown / CLT
G. Little / CLT
D. Hackett / CLT

Total Depth: 6.4 FT.(BTOC)
Depth to water: (-) 5.4 FT.(BTOC)
Water Column: 1.0 FT.
(x) 0.163 GAL/FT.
Well Volume: .163 GAL.
Total Purge Vol.: 1.3 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

start pump 1445

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1450	5.08	13.99	.176	8.70	8.05	85.3	902	0.11	250	
1455	5.13	14.05	.182	7.94	7.96	84.2	101	0.11	250	
1500	5.13	13.99	.186	7.97	7.94	81.7	26.9	0.11	250	
1505	5.05	13.84	.187	8.03	7.92	79.8	11.2	0.11	250	

Total Volume Purged: 1.3

Comments:
Sample 1510 BI-GW49-10A
Duplicate 1515 BI-GW49D-10A

Signature(s): Daniel Hackett

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 1/27/10
Weather:

Project Number: 387933.FI.FS
Well ID: BI-GW50
CH2M HILL Personnel: J. Diner

Total Depth: 5.16 FT.(BTOC)
Depth to water: (-) 3.12 FT.(BTOC)
Water Column: 2.04 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.333 GAL.
Total Purge Vol.: 2.5 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		500	
1200	~~3.12~~	NM						>	~~400~~	
1215	3.35	11.76	0.158	NM	6.55	117.1	62.8	0.08	500	
1225	3.38	11.45	0.155	9.09	6.53	110.7	44.2	0.07	500	
1230	"	11.54	0.156	9.06	6.53	108.1	33.4	0.07	500	
1235	"	11.58	0.154	8.46	6.52	106.2	25.1	0.07	500	
1240	"	11.48	0.154	8.30	6.51	105.5	23.6	0.07	500	

Total Volume Purged: 2.5

Comments: NM - not measured

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	BEAR ISLAND, NC	Well ID:	BI-GW51
Event:	CTO-80 OFF-BASE SDZ	CH2M HILL Personnel:	D. Brown / CLT
Date:	1/27/10		D. Hackett / CLT
Weather:	50° Sunny		G. Little / CLT
		Measuring Device(s):	YSI 556 + Flow Thru Cell s/n 06054
			Hanna Turbidity Meter

Total Depth:	3.51	FT.(BTOC)
Depth to water:	(-) 2.27	FT.(BTOC)
Water Column:	1.24	FT.
	(x) 0.163	GAL/FT.
Well Volume:	.20	GAL.
Total Purge Vol.:	0.75	GAL.
Purge Device:	Geopump peristaltic pump	

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1225	2.44	10.37	.106	9.71	6.83	189.5	127	.05	200	clear/no odor
1230	2.42	9.72	.104	9.72	6.78	191.2	32	.05	200	
1235	2.42	9.63	.104	9.68	6.79	190.8	14.9	.05	200	
1240										
1245										

Total Volume Purged: .75

Comments: Started purging at 1220

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	BEAR ISLAND, NC	Well ID:	BI-GW52-10A
Event:	CTO-80 OFF-BASE SDZ	CH2M HILL Personnel:	A TERRY, D. LINDELL
Date:	1/27/10		
Weather:	SUNNY 50s		

Total Depth:	6.15	FT.(~~BTOC~~) bgs	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 4.68	FT.(~~BTOC~~) bgs	Hanna Turbidity Meter
Water Column:	1.47	FT.	
	(x) 0.163	GAL/FT.	
Well Volume:	.24	GAL.	
Total Purge Vol.:	1.5	GAL.	
Purge Device:	Geopump peristaltic pump		

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
~~1345~~	4.68	14.0	0.253	8.81	7.45	93.1	835	0.12	400	~~Clear~~ Cloudy
1355	"	13.91	0.251	8.19	7.68	79.4	11	0.12	400	Clear
1358	"	13.92	0.251	8.5	7.72	74.0	7.82	0.12	400	Clear
1401	"	13.87	0.252	8.11	7.75	70.8	5.8	0.12	400	Clear
~~1405~~										

Total Volume Purged: 1.5

Comments:

1345 Pump Started

SAMPLE time = 1405

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	BEAR ISLAND, NC	Well ID:	BI-[redacted]GWS3
Event:	CTO-80 OFF-BASE SDZ	CH2M HILL Personnel:	D. Brown/CLT
Date:	1/27/10		G. Little/ CLT
Weather:	45° sunny		D. Hackett/CLT 06054

Total Depth:	7.11	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 5.68	FT.(BTOC)	Hanna Turbidity Meter
Water Column:	1.43	FT.	
	(x) 0.163	GAL/FT.	
Well Volume:	.23	GAL.	
Total Purge Vol.:	1.2	GAL.	

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1335	5.95	14.8	.272	8.61	7.60	153.5	125	.13	200	Clear/No odor
1340	5.97	14.4	.276	8.39	7.81	145.9	40.8	.13	200	
1345	5.88	14.5	.281	8.31	7.40	140.7	19.6	.13	200	
1350	5.84	14.6	.282	8.33	7.90	136.8	12.4	.13	200	
1352	5.84	14.6	.282	8.35	7.98	138.5	13.2	.13	200	
1355	5.84	14.5	.280	8.30	7.96	133.8	9.44	.13	200	

Total Volume Purged: 1.2

Comments: started purging @ 1330
Daniel Hackett told D. Brown to sample @ 1355

Signature(s): Dan M

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	BEAR ISLAND, NC	Well ID:	BI-GW54-10A
Event:	CTO-80 OFF-BASE SDZ	CH2M HILL Personnel:	A TEAM (D Lutz M)
Date:	1/27/10		
Weather:	Sunny 50		

Total Depth:	5.35	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 3.5	FT.(BTOC)	Hanna Turbidity Meter
Water Column:	1.85	FT.	
	(x) 0.163	GAL/FT.	
Well Volume:	.30	GAL.	
Total Purge Vol.:	3.0	GAL.	

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1435	3.64						299		333	
1440	"	12.46	0.077	8.59	8.43	62.2	142	0.04	333	
1445	"	12.39	0.075	8.70	8.50	60.2	87.3	0.03	333	
1450	"	12.36	0.078	8.60	8.60	50.4	70.4	0.04	"	
1455	"	12.40	0.077	8.53	8.61	49.7	45.1	0.04	"	
1500	"	12.35	0.077	8.49	8.63	46.5	37.2	0.04	"	
1505	"	12.54	0.075	8.50	8.69	42.4	31.9	0.04	"	
1510	"	12.42	0.075	8.80	8.71	42.9	26.7	0.03	"	
1515	"	12.36	0.077	8.54	8.71	40.6	23.1	0.04	"	

Total Volume Purged: 3.0

Comments:

1428 - Start pump @ 333 mL/min

Signature(s): Ryan McLeod

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 2/1/10
Weather: 50's Sunny

Project Number: 387933.FI.FS
Well ID: BI-GW55-10A
CH2M HILL Personnel: K. Rogers

Total Depth: 8.70 FT.(~~BTOC~~) bgs
Depth to water: (-) 5.40 FT.(~~BTOC~~) bgs
Water Column: 3.30 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.54 GAL.
Total Purge Vol.: 2.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		**± 1 °C**	**± 10%**	**± 10%**	**± 0.1**	**± 10 mV**	**± 10% or <10**			
1450	5.40	12.20	0.111	10.28	8.30	15.6	28.2	0.05	400	
1455	"	12.06	0.111	8.96	7.81	20.7	18.6	0.05	400	
1500	"	12.04	0.112	8.47	7.52	25.9	14.2	0.05	400	
1505	"	11.84	0.112	8.81	7.32	26.3	7.20	0.05	400	
1510	"	11.78	0.112	8.84	7.26	26.7	5.02	0.05	400	

Total Volume Purged: 2.0

Comments:

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	BEAR ISLAND, NC	Well ID:	BI- GW56
Event:	CTO-80 OFF-BASE SDZ	CH2M HILL Personnel:	D Hockett
Date:	1-25-2010		D Brown
Weather:	clear 60's		

Total Depth:	9.0	FT.(BTOC)	
Depth to water:	(-) 7.7	FT.(BTOC)	
Water Column:	0.3	FT.	
	(x) 0.163	GAL/FT.	
Well Volume:	.05	GAL.	
Total Purge Vol.:	.5	GAL.	

Measuring Device(s): YSI 556 + Flow Thru Cell; Hanna Turbidity Meter

Purge Device: Geopump peristaltic pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

pump start 1502

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
1503	8.15	8.10	.206 mS	4.12	6.82	-23.0	>1000	.14	300	Pumped dry after .5 gal
1512	8.12	7.19	~~.315~~ .207	4.12	7.00	-113.8	59	.15	300	
1517	7.54	7.54	.208	3.07	6.97	-113	38.2	.15	300	

Total Volume Purged: .5 gal

Comments: sampled 1520

MS/MSD sample

sampled for Explosives Perchlorate TAL Metals dissolved metals PETN/NG

Signature(s): Daniel Hockett

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 2/1/10
Weather: 50's sunny

Project Number: 387933.FI.FS
Well ID: BI-GW57-10A
CH2M HILL Personnel: J. Diner
D. Lobell

Total Depth: 7.45 FT.(~~BTOC~~) bgs
Depth to water: (-) 5.00 FT.(~~BTOC~~) bgs
Water Column: 2.45 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.40 GAL.
Total Purge Vol.: 3.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		**± 1 °C**	**± 10%**	**± 10%**	**± 0.1**	**± 10 mV**	**± 10% or <10**			
1350	5.00	NM	→	→	→	→	211	NM	NM	
1355	5.15	14.63	0.079	7.70	7.67	157.0	231	0.04	~350	SL. TURBID
1400	5.13	14.71	0.060	7.29	7.24	148.4	109	0.03	~350	CLEARING
1404	5.14	14.89	0.058	7.16	7.17	137.1	71.3	0.03	~350	CLEARING
1408	5.14	14.71	0.056	7.16	7.15	123.4	46.0	0.03	~350	CLEARING
1412	5.14	14.53	0.053	7.33	7.10	120.2	33.7	0.02	~350	CLEAR
1416	5.14	14.94	0.052	7.35	7.11	110.5	21.8	0.02	~350	"
1420	5.14	15.15	0.052	7.23	7.11	107.2	19.5	0.02	~350	"
1424	5.14	14.99	0.052	7.39	7.11	104.8	16.3	0.02	~350	"

Total Volume Purged: 3.0 gal

Comments: Sample BI-GW57-10A collected @ 1430 and BI-GW57D-10A collected @ 1435.
Final turbidity at time of metal sample collection: 7.68

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: BEAR ISLAND, NC
Event: CTO-80 OFF-BASE SDZ
Date: 2/01/10
Weather: Mostly sunny

Project Number: 387933.FI.FS
Well ID: BI-GW59-10A
CH2M HILL Personnel: Ron McComb/RNV, KRISTEN ROGERS/RDU, Toby Stewart/BTR

Total Depth: 2.55 FT.(BTOC)
Depth to water: (-) 0.76 FT.(BTOC)
Water Column: 1.79 FT.
(x) 0.163 GAL/FT.
Well Volume: .29 GAL.
Total Purge Vol.: 2.0 GAL.

Purge Device: Geopump peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell 6054
Hanna Turbidity Meter 9008

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Salinity ppt	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10			
0940	0.76						74.6			Clear yellow/brown
0948	0.76	8.43	0.361	1.99	6.16	18.4	28.3	0.17	300	" " "
~~945~~	~~2.18~~					~~22.0~~	~~22.0~~			
953	0.76	8.65	0.342	1.53	6.14	-21.3	22.0	0.16	300	" " "
958	0.76	8.71	0.339	1.01	6.14	-34.2	14.3	0.16	300	" " "
1003	0.76	8.74	0.338	0.92	6.14	-42.1	10.1	0.16	300	" " "
1008	0.76	8.77	0.337	0.87	6.15	-47.4	7.85	0.16	300	
* 1010	Sample collected, 2-1 liter Ambers, 1-250 mL poly, 1-500 mL poly									

Total Volume Purged: 2.6

Comments: pump started @ 0935, ~300 mL/min flow rate, purged suspended solids prior to collecting first YSI measurement

Signature(s):

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3-23-10
Weather: 45°F clear & windy

Project Number: 387933.FI.FS
Well ID: ICW-GW01
CH2M HILL Personnel: G. Little
R. Fields
D. Hackett

Total Depth: 9.15 FT.(BTOC)
Depth to water: (-) 7.65 FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Purge Device: Peristaltic Pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		**± 1 °C**	**± 10%**	**± 10%**	**± 0.1**	**± 10 mV**	**± 10% or <10**		Salinity
0940	8.00	13.35	0.213	3.87	8.46	-98.1	>1000		0.13
0945	8.00	13.73	.212	2.18	8.31	-83.9	43.4		"
0950		13.66	.211	2.03	8.27	-72.5	11.8		"
0955		13.70	.210	1.62	8.24	-67.2	7.30		"

Total Volume Purged: 2.5 gals

Comments: 0937 started pumping
0955 collected ICW-GW01-10A for metals (6010), explosives (8330), PETN + nitro + perchlorate.

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	Off-Base SDZ	Well ID:	ICW-GW02
Event:	CTO-080 SDZ	CH2M HILL Personnel:	G. Little
Date:	3-23-10		R. Fields
Weather:	50°F clear & windy		D. Hackett

Total Depth:	4.77	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 2.49	FT.(BTOC)	Hanna Turbidity Meter
Water Column:		FT.	
	(x) 0.163	GAL/FT.	
Well Volume:		GAL.	
Total Purge Vol.:		GAL.	
Purge Device:	Peristaltic Pump		

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		**± 1 °C**	**± 10%**	**± 10%**	**± 0.1**	**± 10 mV**	**± 10% or <10**		Sal
0930		12.30	.198	1.41	8.45	-93.8	80.2		.12
0940		12.46	.179	1.25	8.42	-112.2	7.36		.11
0945		12.38	"	1.00	8.39	-116.1	4.48		"
6x 1050		12.35	.184	0.95	8.33	-118.9	3.93		"

Total Volume Purged: 3.25 gals

Comments: 1023 Started pumping.
1050 Collected ICW-GW02-10A for metals (6010), explosives (8330), PETN + Nitro, + perchlorate.

Signature(s): Jordan Little

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	Off-Base SDZ	Well ID:	ICW - GW03
Event:	CTO-080 SDZ	CH2M HILL Personnel:	G. Little / CLT
Date:	3-23-10		D. Hockett / CLT
Weather:	45°F clear + windy		R. Fields / KNX

Total Depth:	3.8	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 0.97	FT.(BTOC)	Hanna Turbidity Meter
Water Column:		FT.	
	(x) 0.163	GAL/FT.	
Well Volume:		GAL.	
Total Purge Vol.:		GAL.	

Purge Device: Peristaltic Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		Sal
0855		12.05	0.267	1.33	7.81	-75.7	242		
0900		12.51	.265	1.87	7.95	-114.2	34.2		
0905		12.45	.346	1.35	8.10	-129.0	14.1		
0910		12.58	.348	1.14	8.16	-137.6	9.5		0.17
0915		12.51	.350	1.04	8.21	-141.9	5.30		

Total Volume Purged: 3 gal

Comments: 0850 Started pumping.
0915 Collected ICW-GW03-10A for metals (6010), explosives (8330), PETN + nitro & perchlorate.
0920 Collected ICW-GW03D-10A for same as above.

Signature(s): Heather Little

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	Off-Base SDZ	Well ID:	ICW-GW04
Event:	CTO-080 SDZ	CH2M HILL Personnel:	G. Little
Date:	3-22-10		R. Fields
Weather:	60°F, clear		

Total Depth:	4.4	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 0.38	FT.(BTOC)	Hanna Turbidity Meter
Water Column:		FT.	
	(x) 0.163	GAL/FT.	
Well Volume:		GAL.	
Total Purge Vol.:		GAL.	

Purge Device: Peristaltic Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
(2)	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		Sg 1
1200	0.45	12.75	5.257	1.28	6.78	198.3	>1000	400	2.84
1208	"	12.61	5.531	1.10	6.95	159.0	731	"	3.00
1213		"	5.338	0.96	7.01	103.3	288	"	2.90
1218	0.72	12.54	5.247	1.18	7.05	61.6	181	"	2.85
1223	"	12.42	6.137	1.50	"	23.2	138	"	3.36
1228		12.52	6.235	1.30	6.98	3.6	91.2	"	3.42
1233	"	12.44	6.271	0.87	7.05	-11.2	64.0	"	3.44
1238	0.75	12.49	6.306	0.80	7.06	-21.7	45.8	"	3.46
1243	"	12.38	6.368	0.89	7.07	-28.7	39.2	"	3.50
1248	"	12.34	6.082	0.59	7.08	-35.0	28.2	"	3.33
1253	"	12.44	6.314	0.57	7.07	-39.9	23.5	"	3.47
1300	"	"	6.252	0.58	7.09	-41.9	24.2	"	3.42

Total Volume Purged: 6 gals

Comments: 1157 - Started pumping
1300 - Collected ICW-GW04 for metals (6010), explosives (8330), PETN + Nitro, & perchlorate.

Signature(s): Gordon Little

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	Off-Base SDZ	Well ID:	ICW-GW05
Event:	CTO-080 SDZ	CH2M HILL Personnel:	G. Little
Date:	3-22-10		R. Fieldr
Weather:	65°F + clear		

Total Depth:	4.6	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 2.15	FT.(BTOC)	Hanna Turbidity Meter
Water Column:		FT.	
	(x) 0.163	GAL/FT.	
Well Volume:		GAL.	
Total Purge Vol.:		GAL.	

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

Purge Device: Peristaltic Pump

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		Sal
1325	2.36	13.07	0.808	3.96	7.54	-31.5	685	400	0.40
1330	3.48	12.85	.703	7.81	7.32	-21.2	323	"	0.35
1332	well dry. Turned pump off.								
1339	Restarted pump								
1340		12.88	.706	4.03	7.21	-17.7	109	250	0.35
1344	well dry								
1351	2.35	Restarted pump							
1352		13.23	.698	3.51	7.17	-18.4	11.3	200	0.34
1357		12.97	.708	3.21	"	-18.8	4.39	"	"

Total Volume Purged: 1.25 gals

Comments: 1320 - Started pump
1400 - Collected ICW-GW05 for metals (6010), explosives (8330), PETN + Nitro, + perchlorate.
- collected ICW-GW05-10A-MS
- " ICW-GW05-10A-SD

Signature(s): Gordon Little

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	Off-Base SDZ	Well ID:	ICW-GW06
Event:	CTO-080 SDZ	CH2M HILL Personnel:	G. Little
Date:	3-22-10		R. Fields
Weather:	65°F & clear		

Total Depth:	4.1	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 1.65	FT.(BTOC)	Hanna Turbidity Meter
Water Column:		FT.	
	(x) 0.163	GAL/FT.	
Well Volume:		GAL.	
Total Purge Vol.:		GAL.	

Purge Device: Peristaltic Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		Sal
1500	1.83	13.18	0.741	9.24	7.40	18.2	71000	400	0.36
1505	"	13.02	"	1.66	7.25	9.8	349	"	"
1510	2.05	12.96	.745	1.06	7.20	0.4	66.0	"	.37
1515	"	12.94	.744	0.92	7.19	-6.8	28.9	"	"
1520	"	12.91	"	.86	7.17	-11.3	19.8	"	"

Total Volume Purged: 3

Comments: 1455 - Started pump.
1520 - Collected ICW-GW06 for metals (6010), explosives (8330), PETN + Nitro, & perchlorate.

Signature(s): Gordon Little

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	Off-Base SDZ	Well ID:	ICW- GW07
Event:	CTO-080 SDZ	CH2M HILL Personnel:	G. Little
Date:	3-22-10		R. Fields
Weather:	65°F + clear		

Total Depth:	4.7	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 1.90	FT.(BTOC)	Hanna Turbidity Meter
Water Column:		FT.	
	(x) 0.163	GAL/FT.	
Well Volume:		GAL.	
Total Purge Vol.:		GAL.	

Purge Device: Peristaltic Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		Sal
1545	2.05	12.68	0.383	2.22	7.34	-10.4	833	400	0.19
1550	"	12.54	"	8.45	~~8.45~~	-10.7	294	"	"
1555	"	12.61	.385	2.28	7.24	-13.5	205	"	"
1600	"	12.59	.387	1.68	7.21	-16.2	150	"	"
1605	2.11	12.54	.394	2.29	7.22	-22.1	88.6	"	"
1610	"	12.56	.397	0.90	7.19	-26.5	58.9	"	"
1615	"	12.54	.389	0.72	7.18	-30.2	42.1	"	"
1620	"	12.56	.390	0.68	7.16	-34.3	36.0	"	"

Total Volume Purged: 4.25 gals

Comments: 1539 - started pumping
1620 - collected ICW- GW07 for metals (6010), explosives (8330), PETN + Nitro, + perchlorate.

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	Off-Base SDZ	Well ID:	ICW-GW08
Event:	CTO-080 SDZ	CH2M HILL Personnel:	G. Little
Date:	3-23-10		R. Fields
Weather:	55°F clear, slight wind		

Total Depth: ~~7.85~~ 4.07 FT.(~~BTOC~~) bgs
Depth to water: (-) 2.85 FT.(~~BTOC~~) "
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Purge Device: Peristaltic Pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
(2)	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		Sal
1300		13.41	1.614	1.86	7.81	-121.4	>1000		1.06
1305		13.16	1.793	1.93	7.48	-129.6	259		1.21
1310		13.39	1.940	3.73	7.47	-131.7	22.2		1.30 well developing pulling grout water
1315		13.46	1.998	2.50	7.39	-136.8	27.9		1.34
1320		13.19	2.023	2.08	7.33	-136.7	16.8		1.36

Total Volume Purged: 2 gals

Comments: 1255 Started pumping. Water smells of hydrogen sulfide.
1320 Collected ICW-GW08-10A for metals (6010), explosives (8330), PETN + Nitro + perchlorate.

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3-23-10
Weather: 60°F Clear

Project Number: 387933.FI.FS
Well ID: ICW-GW09
CH2M HILL Personnel: G. Little
R. Fields

Total Depth: 3.65 FT.(~~BTOC~~) bgs
Depth to water: (-) 1.12 FT.(~~BTOC~~) bgs
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Purge Device: Peristaltic Pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		Sal
1403		13.50	16.13	1.97	7.62	-104.1	558		12.34
1408		13.14	15.29	0.89	7.33	-108.4	258		11.76
1413		12.86	14.68	0.75	7.11	-100.8	150		11.37
1418	1.60	12.87	14.52	0.41	6.95	-100.5	128		11.26
1423		12.83	14.49	0.28	6.82	-96.5	83.6		11.23
1428		13.00	14.28	0.19	6.78	-95.3	60.7		11.06
1433		13.06	14.48	0.22	6.80	-96.1	50.5		11.17
1438		13.13	14.52	0.30	6.90	-90.3	44.9		11.18
1443		13.07	14.51	0.25	6.97	-87.2	39.2		11.19
1448		13.04	14.52	0.17	7.03	-89.1	34.9		11.20
1453		13.01	14.51	0.30	7.10	-92.7	32.9		11.19

Total Volume Purged: 4 + 1.5 gal = 5.5 gals.

Comments: 1355 - Started pumping
1453 Collected ICW-GW09-10A for metals (6010), explosives (8330), PETN + Nitro + perchlorate.

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	**Project Number:**	387933.FI.FS
Location:	Off-Base SDZ	**Well ID:**	ICW-GW10
Event:	CTO-080 SDZ	**CH2M HILL Personnel:**	G. Little
Date:	3-23-10		R. Fields
Weather:	60°F Clear, Windy		

Total Depth:	4.4	FT.(BTOC)	**Measuring Device(s):** YSI 556 + Flow Thru Cell
Depth to water:	(-) 2.39	FT.(BTOC)	Hanna Turbidity Meter
Water Column:		FT.	
	(x) 0.163	GAL/FT.	
Well Volume:		GAL.	
Total Purge Vol.:		GAL.	
Purge Device:	Peristaltic Pump		

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
GL Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		Sal
1520		13.95	0.822	4.40	8.18	-55.4	>1000		0.49
1525		13.64	0.642	7.75	7.61	-93.8	926		.40
1530		13.54	.614	1.36	7.59	-103.4	402		.39
1535		13.53	"	1.18	7.54	-109.5	168		"
1540		13.52	.613	0.90	7.52	-112.9	26.2		"
1545		13.51	"	0.89	7.50	-113.5	9.02		"

Total Volume Purged: 2.5 gals

Comments: 1515 Started pumping.
1545 Collected ICW-GW10-10A for metals (6010), explosives (8330), PETN + Nitro + perchlorate.

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3/23/10
Weather: Sunny - 70's

Project Number: 387933.FI.FS 11
Well ID: ICW - ~~GW07~~ GL ICW-GW11
CH2M HILL Personnel: J. Diner C. Rinkema
R. Melomb
D. Lubell

Total Depth: 3.70 FT.(~~BTOC~~) bgs
Depth to water: (-) 1.90 FT.(~~BTOC~~) bgs
Water Column: 1.80 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.293 GAL.
Total Purge Vol.: 4.0 GAL.

Purge Device: Peristaltic Pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		Salinity
1440	1.90	NM →					→	500	cloudy green
1450	2.25	12.80	0.625	1.72	6.99	149.0	90.8	500	0.31
1500	2.05	12.91	0.620	1.20	7.06	129.5	70.6	400	0.30
1510	~~2.30~~ 1.98	12.90	0.620	0.96	7.08	112.7	30.2	400	0.30
1520	2.02	12.87	0.618	0.79	7.10	93.7	18.1	400	0.30
1525	2.04	12.79	0.617	0.75	7.11	78.0	13.3	400	0.30
1530	2.05	12.76	0.616	0.73	7.11	66.5	9.76	400	0.30

Total Volume Purged:

Comments: NM. not measured

Signature(s): Jenny Diner

WELL DEVELOPMENT DATA

	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
...on:	Off-Base SDZ	Well ID:	IDW-GW12
Event:	CTO-080 SDZ	CH2M HILL Personnel:	G. Little
Date:	3-24-10		R. Fields
Weather:	70°F clear & mild		

Total Depth:	4.4	FT.(~~BTOC~~) bgs	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 1.80	FT.(~~BTOC~~)	Hanna Turbidity Meter
Water Column:		FT.	
	(x) 0.163	GAL/FT.	
Well Volume:		GAL.	
Total Purge Vol.:		GAL.	
Purge Device:	Peristaltic Pump		

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
(2)	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10	<	Sal
1530	3.10	14.41	8.864	7.58	6.65	109.2	>1000	500	5.14
1535	3.35	13.58	8.966	1.55	7.02	90.6	686	"	5.02
1540	3.50	12.89	9.175	1.37	7.19	70.6	196	"	5.16
1545	3.22	12.73	9.616	1.52	7.20	58.1	137	"	5.44
1550	3.20	12.81	9.517	1.61	7.21	52.6	114	"	5.36
1555	2.78	12.71	9.603	1.24	7.23	47.2	101	~~400~~ 350	5.50
1600	2.65	12.77	9.733	1.10	7.19	45.3	90.5	350	5.48
1605	2.53	12.90	9.129	0.85	7.23	39.7	107	"	5.08
1610	2.68	12.77	8.781	0.89	7.27	34.3	173	"	4.87
1615	2.48	12.80	6.988	0.77	7.35	30.8	177	350	3.90
1620	2.11	13.22	8.231	0.75	7.36	33.6	112	"	4.64
1625	2.24	13.33	7.830	0.69	7.33	30.8	168	"	4.34
1630	2.32	13.17	7.621	0.64	7.34	29.0	191	"	4.22
1633	2.31	12.92	7.527	0.66	7.34	28.5	194	"	4.17
1635	—	12.87	7.585	0.69	"	—	178	—	—

Total Volume Purged: 8 gals.

Comments: 1528 - Started purging
1635 Collected IDW-GW12-10A for metals (6010), explosives (8330), PETN + Nitrate, & perchlorate

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3-25-10
Weather: 50°F & clear

Project Number: 387933.FI.FS
Well ID: ICW- GW13
CH2M HILL Personnel: G. Little
R. Fields

Total Depth: 3.9 FT.(BTOC)
Depth to water: (-) 2.89 FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Purge Device: Peristaltic Pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		

Aborted Location.
Moved ICW-GW13 ~60 80' East

Total Volume Purged:

Comments: 0900 - Started purging
0903 - well dry - Turned pump off. Recharge = 0.1'/min

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3-25-10
Weather: 55°F & clear

Project Number: 387933.FI.FS
Well ID: ICW-GW13
CH2M HILL Personnel: G. Little
R. Fields

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Total Depth: 4.8 FT.(~~BTOC~~) BgS
Depth to water: (-) 1.50 FT.(~~BTOC~~)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Purge Device: Peristaltic Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
(2)	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		±1 °C	±10%	±10%	±0.1	±10 mV	±10% or <10		Sal
1000	2.8	13.56	25.47	4.86	6.47	129.2	1000	500	14.43
1005	2.8	12.92	25.43	2.58	6.99	71.1	103	"	14.98
1010	"	12.87	24.15	1.19	7.07	-4.1	111	"	14.67
1015	"	13.08	23.87	1.12	7.13	-31.8	80.2	"	14.45
1020	"	13.10	23.65	1.02	7.15	-48.3	46.3	"	14.36
1025	"	13.02	23.63	0.98	7.17	-62.9	23.4	"	14.33
1030	"	13.07	23.58	0.85	7.18	-76.2	9.69	"	14.32
1035	"	13.19	23.49	0.77	7.20	-88.8	5.45	"	14.26
1039	"	13.18	23.56	0.76	7.21	-99.5	2.96	"	14.31
1042	"	13.20	26.86	0.84	7.22	-107.4	2.04	"	14.39

87.9

Total Volume Purged: 4 + 1 = 5

Comments: 0955 started purging
1045 Collected ICW-GW13-10A for metals (6010), explosives (8330), PETN + Nitro, & perchlorate.

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3-25-10
Weather: 55°F clear & windy

Project Number: 387933.FI.FS
Well ID: ICW-GW14
CH2M HILL Personnel: G. Little
R. Fields

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Total Depth: 4.5 FT.(BTOC)
Depth to water: (-) 0.80 FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Purge Device: Peristaltic Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
(2)	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		±1 °C	±10%	±10%	±0.1	±10 mV	±10% or <10		SAI
1105	0.84	13.98	19.67	2.67	7.51	-82.9	650	500	11.57
1110	0.86	13.44	19.10	1.23	7.40	-76.6	72	"	11.39
1115	"	13.76	19.11	0.94	7.38	-75.6	33.0	"	"
1120	"	13.38	19.17	0.91	7.35	-74.8	24.7	"	11.43
1125	"	13.44	19.22	0.81	7.32	-74.0	4.90	"	11.47

1.03.

Total Volume Purged: 4 gals.

Comments: 1100 - Started purging
1125 - Collected ICW-GW14-10A for metals (6010), explosives (8330), PETN + Nitro, & perchlorate

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3-25-10
Weather: 60°F

Project Number: 387933.FI.FS
Well ID: ICW-GW15
CH2M HILL Personnel: G. Little
R. Fields

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Total Depth: 4.8 FT.(BTOC)
Depth to water: (-) 1.60 FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Purge Device: Peristaltic Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		±1 °C	±10%	±10%	±0.1	±10 mV	±10% or <10		Sal
1215	2.67	17.68	5.606	2.33	7.29	-49.4	>1000	450	2.97 tan. Sulfide Smell
1220	2.73	13.12	5.400	1.41	7.26	-59.9	340	"	2.96
1225	"	13.03	5.259	1.35	7.36	-73.3	114	"	2.84
1230	"	12.99	5.163	1.17	7.30	-80.5	90.2	"	2.79
1235	"	13.03	5.177	1.24	7.29	-86.4	71.0	"	2.81
1240	"	12.93	5.247	1.15	7.27	-93.7	50.4	"	2.84
1245	2.60	13.00	5.155	1.02	7.26	-99.1	50.2	"	2.77
1250	"	12.94	5.043	0.88	7.28	-105.0	56	"	2.71
1255	"	12.98	"	0.80	7.27	-107.9	48.0	"	2.73 S:062
1300	2.55	13.01	5.101	0.72	"	-111.8	39.4	"	2.76
1305	"	13.04	5.048	0.64	7.29	-117.7	36.3	"	2.73
1310	"	13.03	5.023	0.63	7.29	-121.9	34.2	"	2.71

Total Volume Purged: 5 + 2 = 7 gal

Comments:
1205 started pumping. well dry @ 1206. Stopped pumping & let recharge.
1208 Restarted pumping. Tubing ~~and GL~~ was clogged.
1310 Collected ICW-GW15-10A
" ICW-GW15-10A-MS
" ICW-GW15-10A-SD

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3-25-10
Weather: 70°F, clear + slight wind

Project Number: 387933.FI.FS
Well ID: ICW - GW16
CH2M HILL Personnel: G. Little
R. Fields

Total Depth: 4.25 FT.(~~BTOC~~) bgs
Depth to water: (-) 0.85 FT.(~~BTOC~~)
Water Column: 3.40 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.6 GAL.
Total Purge Vol.: GAL.

Purge Device: Peristaltic Pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
(2)	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		±1 °C	±10%	±10%	±0.1	±10 mV	±10% or <10		Sal
1404		15.24	13.54	0.76	7.11	-119.7	110		7.55
1424	3.05	15.76	13.23	0.65	7.15	-197.6	106	150	8.39
1429	3.78	16.10	14.62	0.61	7.10	-241.8	50.4	"	8.46
1533	1.55	After recharge							
1536		14.54	16.79	—	7.13	-305.5	8.02	150	9.55
1536	4.11	14:47	12.64	2.34	7.34	-303.9	~~27.0~~ 30.8	"	6.94
1552	3.52								
1633	1.65						49.0		

Total Volume Purged:

Comments:
1345 - started pumping
1350 - well dry. Turned pump off to recharge
1404 - Restarted
1405 - well dry - stopped pumping - 3/4 gal
1424 - Restarted at lowest setting. ~1' of water column
1430 - Well Dry.
1533 - Restarted pumping
1542 - Stopped pumping - well dry
1633 - Restarted pump. Turb @ 49.0. Will pull pipe + go deeper w/ hole on Friday.
No sample collected.

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	Off-Base SDZ	Well ID:	ICW-GW16
Event:	CTO-080 SDZ	CH2M HILL Personnel:	G. Little
Date:	3-26-10		R. Fields
Weather:	55° F, clear, slight wind		

Total Depth:	5.0	FT.(BTOC)	
Depth to water:	(-) 0.85	FT.(BTOC)	
Water Column:	4.15	FT.	
	(x) 0.163	GAL/FT.	
Well Volume:		GAL.	
Total Purge Vol.:	0.7	GAL.	

Measuring Device(s): YSI 556 + Flow Thru Cell; Hanna Turbidity Meter

Purge Device: Peristaltic Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
(2)	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		±1 °C	±10%	±10%	±0.1	±10 mV	±10% or <10		Sal
0940	1.7	14.86	11.91	3.87	7.04	-288.6	59.2	250	6.66
0943	2.18	14.54	11.01	3.20	7.20	-278.8	32.4	"	6.28
0946	3.08	14.43	10.36	3.22	7.26	-272.4	31.2	"	5.81
0949	3.60	14.46	9.600	2.65	7.30	-236.1	26.7	"	5.37
0952	4.03	14.53	9.346	2.49	7.32	-216.5	23.7	200	5.26
0955	4.55	14.38	9.334	2.49	7.35	-203.2	25.3	"	5.28
0958	5.0	14.19	9.524	2.55	7.40	-216.4	21.9	"	5.63

Total Volume Purged: 1.5 gal

Comments:
0848 - Started well development
0858 - Well dry after ~~1.4~~ 1.5 gal.
0940 - Restarted pump.
1000 - Collected ICW-GW16 for metals (6010), explosives (8330), PETN + Nitro + perchlorate.

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3-25-10
Weather: 75° F clear & light wind

Project Number: 387933.FI.FS
Well ID: ICW-GW17
CH2M HILL Personnel: G. Little
R. Fields

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Total Depth: 4.76 FT.(BTOC)
Depth to water: (-) 0.95 FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Purge Device: Peristaltic Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
(2)	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		±1 °C	±10%	±10%	±0.1	±10 mV	±10% or <10		Sal
1450	2.15	17.96	10.42	2.73	7.48	-211.3	506	400	5.96
1455	1.87	17.69	10.65	2.76	7.49	-212.5	82.9	"	6.07
1500	"	17.66	10.61	1.17	7.44	-217.4	40.0	"	6.03
1505	1.80	17.60	10.55	1.00	7.42	-217.3	30.1	"	6.00
1508	1.84	17.58	10.51	0.90	7.43	-216.6	23.7	"	5.98
1511	"	17.59	10.48	0.82	7.40	-216.0	18.3	"	5.95
1515	"	17.53	10.46	0.81	"	-215.3	15.8	"	5.94

1.02
.91

Total Volume Purged: 3 gals

Comments: 1440 - Started pump
1515 - Collected ICW-GW17-10A for metals (6010), explorives (8330), PETN + Nitro, & perchlorate.

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3/25/10
Weather: Partly

Project Number: 387933.FI.FS
Well ID: ICW-GW18
CH2M HILL Personnel: J. Diner
R. McComb

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Total Depth: 4.10 FT.(BTOC)
Depth to water: (-) 1.05 FT.(BTOC)
Water Column: 3.05 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.50 GAL.
Total Purge Vol.: GAL.

Purge Device: Peristaltic Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		±1 °C	±10%	±10%	±0.1	±10 mV	±10% or <10		
1537	1.05	NM							
~~1545~~	3.00	13.86	12.56	1.91	6.98	-91.3	>1000	~250	7.32
1550							83.0		
1600	2.90	13.75	13.45	1.33	6.56	-79.7	83.0	~250	7.81
1605	2.70	13.98	13.59	0.97	6.51	-79.5	48.4	~250	7.88
1610	2.90	13.83	13.77	0.87	6.49	-80.4	~~23.0~~	~250	7.99
		~~13.66~~	~~13.88~~				13.3		~~8.06~~
1615	2.50	13.62	13.90	0.87	6.50	-81.6	9.20	~250	8.07
1620	2.36	13.34	13.84	0.84	6.52	-85.2	3.87	~250	8.05

Total Volume Purged: 2.25 gal

Comments:
- NM - not measured
- inconsistent purge rate due to dying battery

Explosives/PETN/Nitro by 8330/8332
TAL Metals by 6010B
Perchlorate by 6850

Signature(s):

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3-26-10
Weather: 65°F clear

Project Number: 387933.FI.FS
Well ID: ICW-GW19
CH2M HILL Personnel: G. Little
R. Fields

Total Depth: 4.6 FT.(~~BTOC~~) bgs
Depth to water: (-) 0.67 FT.(~~BTOC~~)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Purge Device: Peristaltic Pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		±1 °C	±10%	±10%	±0.1	±10 mV	±10% or <10		
1055	1.87	17.11	6.9865	3.44	8.29	-248.0	407	6407300	Sal 2.78 Mild Hyd. Sulfide
1100	1.77	12.98	5.079	2.03	8.09	-255.7	77.0	360	2.72
1103	"	12.96	4.865	1.19	7.88	-262.7	39.2	"	2.62
1106	"	12.90	4.864	0.95	7.78	-260.3	23.0	"	2.63
1109	1.83	12.77	4.930	0.74	7.69	-273.3	15.3	"	2.67
1112	"	12.72	5.017	0.57	7.67	-275.8	12.4	"	2.72
1115	"	"	5.117	0.49	7.61	-274.1	10.0	"	2.77
1118	"	12.70	5.155	0.48	7.58	-271.4	3.93	"	2.80

Total Volume Purged: 2.75 gal

Comments: 1050 - started pumping
1120 - Collected ICW-GW19 for metals (6010), explosives (8330), PETN + Nitro, + perchlorate.

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3/26/10
Weather: 60's, clear

Project Number: 387933.FI.FS
Well ID: ICW-GW20
CH2M HILL Personnel: J. Diner
R. Mccomb

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Total Depth: 4.0 FT.(BTOC)
Depth to water: (-) 0.2 FT.(BTOC)
Water Column: 3.8 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.65 GAL.
Total Purge Vol.: 4 GAL.

Purge Device: Peristaltic Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
(2)	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		SALINITY
10:50	0.20	NM →		1.45			→	~300	NM
1100	0.40	14.07	1.595	~~0.87~~	7.45	-235.0	253	~300	0.81
1110	0.40	13.64	1.545	1.68	7.29	-228.7	32.8	~300	0.78
1115	0.40	13.60	1.546	1.26	7.26	-221.7	25.4	~300	0.78
1120	0.40	13.55	1.545	1.15	7.24	-217.6	20.7	~300	0.78
1125	0.40	13.58	1.531	1.13	7.22	-214.2	19.9	~300	0.78
1130	NM →							→	
1135	0.30	14.05	1.533	1.15	7.19	-232.3	11.3	~300	0.78
1140	0.30	13.76	1.521	1.11	7.24	-220.1	7.84	~300	0.77
1145	0.30	13.87	1.503	1.04	7.21	-214.4	7.66	~300	0.76

Total Volume Purged: 4 gallons

Comments: NM- not measured
1130 - battery dead, replaced @ 1132

Explosives/RDX/Nitro by 8330/8332
Perchlorate by 6850
TAL Metals by 6010B + Dissolved Metals

Signature(s): J. Diner

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3/26/10
Weather: upper 50s clear, breezy

Project Number: 387933.FI.FS
Well ID: JCW-GW21
CH2M HILL Personnel: R McCord
J Diner

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Total Depth: 4.5 ~~0.2~~ FT.(~~BTOC~~) bgs
Depth to water: (-) 0.2 FT.(~~BTOC~~) bgs
Water Column: 4.3 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.7 GAL.
Total Purge Vol.: ~4.5 GAL.

Purge Device: Peristaltic Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		SALINITY
0950	1.4'	13.71	25.68	4.22 ↓	6.31	-284.7	513	~400	15.85 v dark grey
0955	1.6'	13.80	27.13	2.74	6.60	-329.5	103	~400	16.72
1000	1.6'	13.56	27.78	3.15	6.69	-314.2	65.6	~400	17.02
1005	1.6	13.49	27.86	2.73	6.64	-330.5	39.1	~400	17.23
1010	1.75	13.44	28.83	1.87	6.64	-333.6	22.8	~400	17.93
1015	1.75	13.33	29.85	1.63	6.65	-333.0	11.8	~400	18.52
1020	1.75	13.32	30.55	1.63	6.66	-340.1	5.09	~400	19.02
1025	1.78	13.38	30.69	1.68	6.65	-334.0	4.02	~400	19.09
				EID Purging					

Total Volume Purged: ~4.5 gallons

Comments: Sample collected @ 1025 for
JCW-GW21-10A
- Metals 6010B 500mL poly (HNO3)
- Perchlorate 6850 250mL poly
- Explosives 8330 1 Liter amber
- PETN/Nitro 8332 1 Liter amber

Signature(s): Ron McCord

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3/25/10
Weather: perfect

Project Number: 387933.FI.FS
Well ID: ICW-GW22
CH2M HILL Personnel: J. Diner
R. McComb

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Total Depth: 4.90 FT.(BTOC)
Depth to water: (-) 0.60 FT.(BTOC)
Water Column: 4.30 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.70 GAL.
Total Purge Vol.: 3.25 GAL.

Purge Device: Peristaltic Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		±1 °C	±10%	±10%	±0.1	±10 mV	±10% or <10		Salinity
1440	0.60	NM					→	300	NM
1455	1.20	14.15	1.422	3.07	6.57	-129.4	45.4	300	0.72
1500	1.20	13.98	1.397	1.85	6.53	-131.0	11.8	300	0.71
1505	1.20	13.85	1.384	1.18	6.55	-141.2	6.38	300	0.70
1510	1.20	13.66	1.380	1.08	6.58	-141.0	5.31	300	0.70
1515	1.20	13.65	1.377	0.82	6.58	-142.6	8.03	300	0.69

Total Volume Purged: 3.25

Comments: NM-not measured

Explosives/PETN/Nitro by 8330/8332
TAL Metals by 6010B
Perchlorate by 6850

Signature(s):

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	**Project Number:**	387933.FI.FS
Location:	Off-Base SDZ	**Well ID:**	SI-GW01
Event:	CTO-080 SDZ	**CH2M HILL Personnel:**	J Diner C Rencamo
Date:	3/24/10		D Lubell
Weather:	70s, clear, breezy		R McLeod

Total Depth:	5.5	FT.(~~BTOC~~) Ground	**Measuring Device(s):** YSI 556 + Flow Thru Cell
Depth to water:	(-) 2.9	FT.(~~BTOC~~) Ground	Hanna Turbidity Meter
Water Column:	2.6	FT.	
	(x) 0.163	GAL/FT.	
Well Volume:	0.4	GAL.	
Total Purge Vol.:		GAL.	
Purge Device:	Peristaltic Pump		

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments (Salinity)
Stabilization Criteria		**± 1 °C**	**± 10%**	**± 10%**	**± 0.1**	**± 10 mV**	**± 10% or <10**		
~~1230~~	4.33	13.92	9.428	4.56	5.71	141	95.4	~500	brown/orange (tannin)
1235	3.85	14.14	9.410	4.80	5.84	124.X	23.7	"	5.30
1240	3.8	13.94	9.283	1.57	5.87	111.8	18.4	~400	5.22
1245	3.83	13.89	8.990	1.59	5.92	101.9	16.5	~400	5.00
1250	3.9	13.85	8.370	1.21	5.97	93.8	16.7	~400	4.66
1255	4.02	13.74	8.328	1.14	5.98	86.2	15.8	~400	4.66
1300	3.8	13.93	8.326	1.15	6.01	80.9	15.0	~400	4.63
1305	3.8	13.97	8.210	1.07	6.00	78.4	15.2	~400	4.56

Total Volume Purged: 4.5 gallons

Comments: Emptied 1st bucket 3.5 gallons

1306 Collect sample SI-GW01-10A
SI-GW01D-10A

2 liters
1 - 250 ml + Dup + Dissolved (Peristaltic Pump)
1 - 500 (~~1 liter~~ 500 ml)

Signature(s): Ron McLeod

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	Off-Base SDZ	Well ID:	SI-GW02
Event:	CTO-080 SDZ	CH2M HILL Personnel:	G. Little
Date:	3-24-10		R. Fields
Weather:	65°F clear & windy		

Total Depth:	4.7	FT.(~~BTOC~~) bgs	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 2.45	FT.(~~BTOC~~)	Hanna Turbidity Meter
Water Column:		FT.	
	(x) 0.163	GAL/FT.	
Well Volume:		GAL.	
Total Purge Vol.:		GAL.	
Purge Device:	Peristaltic Pump		

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
(2)	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		Sal
1220	2.55	15.43	0.503	1.82	7.84	-142.8	71000	480	0.30
1225	2.50	15.42	.539	0.98	7.98	-186.4	861	"	.32
1230	"	15.33	.513	0.67	7.92	-217.4	138	"	.31
1235	"	14.89	.490	0.62	7.83	-234.2	66.8	"	.29
1240	"	15.07	.484	.60	7.38	-234.0	36.7	"	"
1245	"	15.15	.476	~~0.54~~ 0.54	7.36	-240.4	18.4	"	.28
1257	~~"~~ GW								

Total Volume Purged: 2 gals.

Comments: 1215-Started pumping
1300-Collected SI-GW02-10A for metals (6010), explosives (8330), PETN + Nitro, + perchlorate.
1250 Battery died.

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	Off-Base SDZ	Well ID:	SI- GW03
Event:	CTO-080 SDZ	CH2M HILL Personnel:	G. Little
Date:	3-24-10		R. Fields
Weather:	65°F clear, slight wind		

Total Depth:	6.1	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 4.04	FT.(BTOC)	Hanna Turbidity Meter
Water Column:		FT.	
	(x) 0.163	GAL/FT.	
Well Volume:		GAL.	
Total Purge Vol.:		GAL.	
Purge Device:	Peristaltic Pump		

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
(2)	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		Sal
1105		16.03	1.067	2.81	7.88	-225.6	71000	400	0.60
1110	4.10	16.06	0.978	1.49	7.61	-227.0	703	"	0.59
1120	"	15.58	0.905	0.61	7.29	-251.1	72.6	"	—
1130	4.18	15.72	.901	0.47	7.12	-257.7	33.2	"	0.55
1135	"	15.62	.899	.42	7.09	-268.7	20.0	"	0.55
1140	"	15.46	.894	.43	7.02	-265.8	16.2	"	"

Total Volume Purged: 4 gals

Comments: 1160 Started pumping.
1140 Collected SI & GW03 -10A for metals (6010), explosives (8330), PETN + Nitro, & perchlorate.

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Project Number: GL 387933.FI.FS
Location: Off-Base SDZ
Well ID: SI-GW05-4
Event: CTO-080 SDZ
CH2M HILL Personnel: G. Little
R. Fields
Date: 3-24-10
Weather: 60°F clear

Total Depth: 4.8 FT.(~~BTOC~~) bgs
Depth to water: (-) 2.32 FT.(~~BTOC~~)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Purge Device: Peristaltic pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
(2)	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		**± 1 °C**	**± 10%**	**± 10%**	**± 0.1**	**± 10 mV**	**± 10% or <10**		Sal 2.12
1000	2.74	14.22	2.619	0.88	7.45	+255.6	> 1000	6 x 400	strong Hydrogen Sulfide smell
1005	"	13.93	3.763	0.56	7.05	-277.4	61.6	"	2.60
1010	2.77	13.90	4.057	0.50	6.97	-305.4	25.6	"	2.80
1015	"	13.85	4.180	0.45	6.94	-321.5	14.4	"	2.88
1020	"	13.89	4.255	0.44	6.93	-335.8	9.03	"	2.94
1030	"	13.95	4.310	0.40	6.89	-350.1	6.46	"	2.97

Total Volume Purged: 5 gals

Comments: 0955 Started pumping
→ Collected SI-GW05-10A for metals (6010), explosives (8330), PETN + Nitric + perchlorate.
1030

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	Off-Base SDZ	Well ID:	SI - GW05
Event:	CTO-080 SDZ	CH2M HILL Personnel:	G. Little
Date:	3-24-10		A. Fields
Weather:	50°F clear, light wind		

Total Depth:	4.8	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 2.91	FT.(BTOC)	Hanna Turbidity Meter
Water Column:		FT.	
	(x) 0.163	GAL/FT.	
Well Volume:		GAL.	
Total Purge Vol.:		GAL.	
Purge Device:	Peristaltic Pump		

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
(2)	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		Sal
0905		13.08	2.571	2.28	6.27	-192.4	71000	.4	1.59
0910		13.05	1.899	1.27	6.80	-236.8	169	"	1.26
0915		13.00	1.794	0.99	7.00	-251.7	14.7	"	1.20
0920		13.01	1.985	0.86	7.08	-267.7	6.24	"	1.33
0925		"	1.733	0.75	7.18	-272.8	3.61	"	1.16
0930		"	1.792	0.74	7.20	-276.1	2.43	"	1.21

Total Volume Purged: 4 gals

Comments: 0900 Started pumping
0930 Collected SI-GW05-10A for metals (6010), explosives (8330), PETN + Nitro + perchlorate.

Signature(s): Gordon Little

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	Off-Base SDZ	Well ID:	SI - GW06
Event:	CTO-080 SDZ	CH2M HILL Personnel:	G. Little
Date:	3-24-10		R. Fields
Weather:	70°F clear, light wind		

Total Depth:	4.4	FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-) 2.95	FT.(BTOC)	Hanna Turbidity Meter
Water Column:		FT.	
	(x) 0.163	GAL/FT.	
Well Volume:		GAL.	
Total Purge Vol.:		GAL.	
Purge Device:	Peristaltic Pump		

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Color / Odor / Comments
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		Sal
1410		15.44	3.771	4.23	6.74	40.6	7/000	~ 500	2.00
1415	3.32	13.99	3.259	1.92	7.18	11.1	146	"	1.72
1420	3.40	"	3.325	1.25	7.20	-4.5	21.9	"	1.76
1425	3.44	14.03	3.417	1.05	7.26	-22.2	16.4	"	1.80
1430	3.47	13.86	3.477	1.04	7.28	-30.9	9.30	"	1.84
1435	3.50	13.89	3.524	0.97	7.33	-41.9	5.69	"	1.87

Total Volume Purged: 3.75 gals

Comments: 1405 - Started pumping
1435 - Collected SI-GW06-10A for metals (6010), explosives (8330), PETN + Nitro, + perchlorate.

Signature(s): Gordon Little

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-7-10
Weather: 75°F + clear, light wind

Project Number: 387933.FI.FS
Well ID: SDZ-WN01
CH2M HILL Personnel:

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: ____ GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Purge Device: peri pump

DTW out | DTW in

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		

No WN sample collected. Collected SW

Total Volume Purged:

Comments: Low tide.
1045 - set well. Waited 20 ± 5 min., no water. Will collect SW instead.
1105 Collected SDZ-SW08-10B

Signature(s): Gordon Little

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-7-10
Weather: 80°F clear + windy

Project Number: 387933.FI.FS
Well ID: SDZ-WN02
CH2M HILL Personnel:

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: ____ GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell; Hanna Turbidity Meter

Purge Device: peri pump

DTW out | DTW in

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1145		5.12	1.04	1.465	4.54	7.14	-131.6	240		0.73

Total Volume Purged:

Comments: 1145 - started purging - well dry after ~2 min.
1200 - Collected SDZ-WN02-10B for expl (8330/8332), perchlorate (6850), total diss metals

Signature(s): Landon Lutz

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-6-10
Weather: 85° F & clear

Project Number: 387933.FI.FS
Well ID: SDZ-WN03
CH2M HILL Personnel:

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: ____ GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Purge Device: Peri pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

DTW out | DTW in

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1135	3.71 / 4.49	26.76	28.88	4.75	7.69	-44.0	150		17.78

Total Volume Purged: 0.25 L

Comments: 1130 - Collected SDZ-WN03-10B for expl (8330/8332), perch (6850), total & diss. metals.

Signature(s): Gordon Ladd

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-6-10
Weather: 80°F + clear

Project Number: 387933.FI.FS
Well ID: SDZ-WN 04
CH2M HILL Personnel:

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: ____ GAL.

Purge Device: Peri pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

DTW out | DTW in

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
	2.98								
	5.48								

Sample Collected via

Total Volume Purged:

Comments: 1045 ~~started purging~~ set well. Dry after 10 min. Will return later
1610 - checked WL; 5.48. 0.32' of wate column. Pulled pipe.

Signature(s): Gordon Sills

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Project Number: 387933.FI.FS
Location: Off-Base SDZ
Well ID: SDZ-MW05
Event: CTO-080 SDZ
CH2M HILL Personnel:
Date: 5-5-10
Weather: 75°F ~~overcast~~ 76° partly cloudy/sunny

Total Depth: FT.(BTOC)
Depth to water: (-) FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Purge Device: Peri Pump

DTW out | DTW in

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
	3.08 / —								

No sample Collected

Total Volume Purged:

Comments: ~ 1' water
water depth 1' well dry. Will leave + return
5-6-10 - Returned to find well had been broken + laying in marsh grass.

Signature(s): Gordon Lott

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTC-080 SDZ
Date: 5-3-10
Weather: 60°F cloudy + windy

Project Number: 387933.FI.FS
Well ID: SDZ-WN06
CH2M HILL Personnel: Little, Hackett, McCombs, Diner,

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: ____ GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Purge Device: PeriPump

DTW O | DTW I

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)		Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria			± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1115	3.45	5.52								
1118	"	5.00								
1125		4.40								
1130		3.95								
1140		3.85								
1143		4.50	22.19	51.23	~~73.68~~ 1.85	7.49	-143.5	37		33.63
1145		6.25	2.247	50.98	1.29	7.45	-102.7	24		32.53
1150										

Total Volume Purged: 500 ml 1"

Comments: DTW-O - outside of PVC
DTW-I - inside 1"
1140 - Started pumping 1"
Surface Water ~ 1'

Signature(s): Heather Little

1150 - Collected SDZ-WN06-10B for explosives (8330), perchlorate, TAL metals, + dissolved metals.

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-3-10
Weather: 75°F, partly cloudy + windy

Project Number: 387933.FI.FS
Well ID: SDZ-WN07
CH2M HILL Personnel:

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: ____ GAL.

Purge Device: Peri. pump.

DTW out | DTW in

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)		Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria			± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1505	2.28	4.10	23.04	54.06	1.77	7.39	-177.4	65.0	120 ml/min	35.76
1511			23.09	54.01	0.6	7.25	-221.7	24.0	"	35.73
1515	2.70	3.70	23.22	54.14	0.46	7.24	-232.8	19.0	"	35.84

Total Volume Purged: 1.5 L

Comments: 1505 - started pumping
1515 - Collected SDZ-WN07-10B for expl. (8330)

Signature(s): Landon Lill

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-3-10
Weather: 75°F, partly cloudy + windy

Project Number: 387933.FI.FS
Well ID: SDZ-6L ~~SD08~~ WN
CH2M HILL Personnel:

Total Depth: FT.(BTOC)
Depth to water: (-) FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Purge Device: Peripump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		

No sample collected

Total Volume Purged:

Comments: No re-charge in well. Left well & will return.
5-4-10 – 1340 – WL – 3.46
1350 – well dried after slow purge. Pulled pipes. NO sample WN

Signature(s): Gordon Pitts

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-6-10 & 5-7-10
Weather: 90°F, clear & windy

Project Number: 387933.FI.FS
Well ID: SDZ-WN10
CH2M HILL Personnel:

Total Depth: FT.(BTOC)
Depth to water: (-) FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Purge Device: Peri pump

DTW out | DTW in

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1430	3.33	23.30	49.10	0.66	7.32	-162.3	28.0		31.94
5-7 1450	3.46 / 3.65								

Total Volume Purged:

Comments: 1430 - Started purging. Well dry after ~ 2 minutes. Purged ½ L. Will return.
5-7-10 1445 - Returned. WLe 3.65.
1445 - Collected SDZ-WN10-10B for explosives (8330/8332), perchlorate (6850), total + diss metals.

Signature(s): Landon Lutt

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5/10/10
Weather: 70's Sunny

Project Number: 387933.FI.FS
Well ID: SDZ-MW11-0B
CH2M HILL Personnel: J. Dink, C. Rawlins, C. LeBlanc, R. McComb

Measuring Device(s): YSI 556 + Flow Thru Cell; Hanna Turbidity Meter

Total Depth: 5.82 FT.(BTOC)
Depth to water: (-) 3.62 FT.(BTOC)
Water Column: 2.20 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.359 GAL.
Total Purge Vol.: ~~2.4~~ GAL. 10 L
Purge Device: Peri Pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or < 10		
0825	3.62	13.64	15.05	1.59	7.32	-85.4	50.0	~300	33.89
Dry @		0830							
0855	5.30	13.25	53.43	4.32	7.30	-123.5	11.0	~100	35.22
0840	5.30	19.20	46.84	0.68	8.17	-73.4	5.80	~100	30.51
0845	5.30	19.53	46.97	0.46	8.23	-131.4	2.40	~100	30.59
0850	5.31	19.62	47.00	0.63	8.36	-163.2	1.60	~100	30.62
0855	5.31	19.60	47.05	0.62	8.36	-175.9	1.54	~100	30.66
0900	5.32	19.60	47.06	0.62	8.37	-176.7	1.50	~100	30.65

Total Volume Purged: ~~0.4~~ 10 L

Comments: 0835- change YSI meters b/c DO is whacko, (>100% in pore water)

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 8/1/16
Weather: 70's sunny

Project Number: 387933.FI.FS
Well ID: SDZ MW-21B
CH2M HILL Personnel: D. Dunn, C. Pentecost, S. LeBlanc, K. McCombs

Total Depth: 5.62 FT.(BTOC)
Depth to water: (-) 3.28 FT.(BTOC)
Water Column: ~~2.34~~ FT. 2.34
(x) 0.163 GAL/FT.
Well Volume: ~~0.375~~ GAL. 0.69
Total Purge Vol.: 12 ~~GAL.~~ L
Purge Device: Peristaltic Pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
0945	3.36	19.36	42.10	0.56	7.62	-11.2	350	~300	30.69
0950	4.73	19.61	47.43	0.22	7.57	-7.9	20.0	~300	30.94
0955	5.90	19.16	46.98	0.21	7.57	-5.7	19.0	~300	30.60
1000	5.62	19.35	47.20	0.20	7.55	-6.7	8.3	~300	30.77
1005	5.62	19.52	47.89	0.33	7.56	-3.8	8.0	~300	30.31
1010	5.62	19.55	48.00	0.13	7.55	-10.5	9.1	~300	31.79

Total Volume Purged: 12 L

Comments:

Signature(s):

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5/19/10
Weather: [illegible]

Project Number: 387933.FI.FS
Well ID: [illegible]
CH2M HILL Personnel: [illegible]

Total Depth: [illegible] FT.(BTOC)
Depth to water: (-) [illegible] FT.(BTOC)
Water Column: [illegible] FT.
(x) 0.163 GAL/FT.
Well Volume: [illegible] GAL. 0.06
Total Purge Vol.: 12 L GAL.

Purge Device: Peristaltic Pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1130	[illegible]	20.68	49.59	0.58	[illegible]	-119.5	[illegible]	[illegible]	[illegible]
1135	[illegible]	20.68	49.62	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1140	[illegible]	20.58	49.59	0.85	[illegible]	-115.3	[illegible]	[illegible]	[illegible]

Total Volume Purged: 12 L

Comments:

Signature(s): [illegible]

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5/16/12
Weather: 70's / clear with Smoke E/E

Project Number: 387933.FI.FS
Well ID: SDZ - MW-14
CH2M HILL Personnel: C. Lebsack
J. Dunn
R. McCosh

Total Depth: 5.86 FT.(BTOC)
Depth to water: (-) 3.32 FT.(BTOC)
Water Column: 2.48 FT.
(x) 0.163 GAL/FT.
Well Volume: 0.40 GAL.
Total Purge Vol.: 40L ~~GAL~~.

Purge Device: (Peri.) Geo Pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1300	4.75								
1320	4.75	21.40	45.46	0.60	7.82	-128.3	13.0	~250	30.00
1335	4.80	21.45	46.49	0.71	7.66	-163.6	11.0	~250	30.27
1340	4.81	21.46	46.64	0.50	7.73	-171.5	24.5	~250	30.24
1345	4.81	21.455	46.41	0.46	7.72	-179.9	22.5	~250	30.26

Total Volume Purged: 10L

Comments: Pump-tubing started YSI, eventually clean out tubing & clamp

Signature(s): Chad D Fetterman

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 3/13/14
Weather: Cold, windy

Project Number: 387933.FI.FS
Well ID: SDZ-MW15-11B
CH2M HILL Personnel: J. Dyer, C. Perkins, R. McComb, C. Le Blanc

Total Depth: [illegible] FT.(BTOC)
Depth to water: (-) 4.88 FT.(BTOC)
Water Column: [illegible] FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Purge Device: Peri pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1420	4.88	22.43	49.99	3.35*	7.93	-4.3	3.15	~100	32.12
1425	5.82	22.1	49.58	4.18*	7.95	-3.2	4.50	~100	32.18
1430	5.52	21.86	49.66	4.67*	8.04	-13.2	3.14	~100	32.23

Total Volume Purged:

Comments: *slow recharge rate causing erratic DO readings
1425 - turbidimeter fails, well run dry. Time to collect sample. Measured @ 1420 @ 1425 (during sampling)

Signature(s): [signature]

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-8-10
Weather: 89°F clear & windy

Project Number: 387933.FI.FS
Well ID: SDZ-WN16
CH2M HILL Personnel:

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: 22 ~~GAL.~~ liters

Purge Device: Peri pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

DTW out / DTW in

FIELD PARAMETERS

Time	Depth to Water (ft bgs)		Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria			± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
~~1305~~	3.82	4.05	24.05	52.18	0.40	7.08	-105.6	8.1		
~~1310~~			24.29	51.84	4.3	7.04	-108.0	2.30		
1420	3.82	3.90	24.37	51.77	0.36	7.04	-115.2	1.40		34.05
1427	"	"	24.29	51.79	0.45	7.03	-109.4	1.70		34.07
1432	"	"	24.40	51.76	0.48	7.04	-109.0	1.10		34.05
1437	"	"	24.34	51.77	0.49	7.05	109.9	1.30		34.04

Total Volume Purged:

Comments: 1355 - started pumping
Sample time @ 1440 Collected SDZ-WN16-10B for 8330/8332 Explosives/PETN-WG, Perchlorate (6850), TAL Metals (6010B) & Dissolved TAL Metals (6010B).

Signature(s): Gordon Little

CH2MHILL

WELL DEVELOPMENT DATA

Client:	NAVFAC Mid-Atlantic	Project Number:	387933.FI.FS
Location:	Off-Base SDZ	Well ID:	SDZ-WN17
Event:	CTO-080 SDZ	CH2M HILL Personnel:	
Date:	5-5-10		
Weather:	85°F clear		

Total Depth:			FT.(BTOC)	Measuring Device(s): YSI 556 + Flow Thru Cell
Depth to water:	(-)		FT.(BTOC)	Hanna Turbidity Meter
Water Column:			FT.	
	(x)	0.163	GAL/FT.	
Well Volume:			GAL.	
Total Purge Vol.:			GAL.	

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

Purge Device: Peri pump

DTW out / DTW in

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1500	2.90 / 5.03	20.31	53.37	0.37	8.01	-217.2	19.0		35.29
1505		20.48	57.05	0.23	7.90	-249.2	9.0		35.06
1510		20.29	57.09	0.23	7.84	-275.5	11.0		35.08

Total Volume Purged: 4 L

Comments: 1500 – Started purging
1515 – Collected SDZ-WN17-10B for expl. (8330/8332), perch (6850), total & diss. metals.

Signature(s): Gordon Pitts

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-8-10
Weather: 80°F clear & windy

Project Number: 387933.FI.FS
Well ID: SDZ-WN18
CH2M HILL Personnel:

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: ____ GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell; Hanna Turbidity Meter

Purge Device: Peri pump

DTW out / DTW in

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)		Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria			± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1010	3.18	3.18	20.99	49.42	0.77	7.12	73.6	35.0		32.36
1016			20.79	48.82	0.45	6.99	-78.5	23.0		31.93
1021		3.56	20.86	48.59	0.34	6.92	-79.7	16.0		31.76
1026			20.88	48.48	0.29	6.88	-81.8	10.0		31.70

Total Volume Purged: 12 L

Comments: 1008 Started purging
1030 Collected SDZ-WN18-10B - for expl. (8330/8332), perchlorate (6850), total & diss metals

Signature(s): Gordon Litt

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Project Number: 387933.FI.FS
Location: Off-Base SDZ
Well ID: SDZ - WN19
Event: CTO-080 SDZ
CH2M HILL Personnel:
Date: 5-8-10
Weather: 75°F clear & windy

Total Depth: FT.(BTOC)
Depth to water: (-) FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Purge Device: Peri Pump

DTW out | DTW in

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)		Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria			± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
0908	3.46	5.70	22.22	57.97	0.51	6.84	-103.8	45.0		35.74
0916			22.21	57.16	0.21	6.84	-133.4	14.0		35.85
0921			"	54.01	0.028	"	-134.5	6.80		35.76
0926		4.18	22.25	53.85	0.26	6.85	-139.2	4.70		35.63

Total Volume Purged: 10 L

Comments: 0908 Started purging
0930 collected SDZ-WN19-10B for expl. (8330/8332), perchlorate (6850), TAL total & diss metals.
0935 Collected SDZ-WN19D-10B

Signature(s): Gordon Little

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-8-10
Weather: 85°F, clear & windy

Project Number: 387933.FI.FS
Well ID: SDZ-WN20
CH2M HILL Personnel:

Total Depth: FT.(BTOC)
Depth to water: (-) FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell; Hanna Turbidity Meter

Purge Device: Peri pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

DTW out | DTW in

FIELD PARAMETERS

Time	Depth to Water (ft bgs)		Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria			± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
	2.10	2.28	~~22.76~~	~~51.98~~	~~7.33~~	~~7.56~~	~~0.2~~	GL		~~34.24~~
1117			21.72	5.79	0.85	7.27	-25.8	7.50		34.11
1126			21.96	51.62	0.90	7.22	-40.6	4.30		33.97
1132		2.15	22.02	51.59	1.23	7.22	-41.0	4.70		33.97
1138			22.20	51.69	1.60	7.23	-36.6	6.10		34.03
1143			22.44	51.74	2.44	7.25	-29.6			34.05
1200			22.41	51.75	2.10	7.24	-29.9	3.10		34.07
1205			22.42	51.73	2.14	7.24	-29.6			34.06
1210			23.39	51.76	2.27	7.25	-28.5	3.40		34.08

Total Volume Purged: 14+14 = 28L

Comments:
1110 Started purging
~~1135~~ Adjusted boat due to high DO.
1145 Adjusted boat due to high DO.
1215 Collected SDZ-SD20-10B
1220 Collected SDZ-SD200-10B
> for expl. (8330/8332), perchlorate (6850), total + diss metals.

Signature(s): Gordon Little

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-8-10
Weather: 85°F clear & windy

Project Number: 387933.FI.FS
Well ID: SDZ-WN21
CH2M HILL Personnel:

Total Depth: FT.(BTOC)
Depth to water: (-) FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Purge Device: Peri pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

DTW out | DTW in

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1300	3.12 / 3.58	22.63	51.92	1.61	7.31	-91.3	3.5		34.19
1305		22.67	51.74	1.90	7.30	-98.7	1.4		34.06
1310		22.67	51.71	2.06	7.30	-104.1	1.0		34.05
1315		22.73	51.72	2.01	7.29	-102.0	0.9		34.05

Total Volume Purged: 17L

Comments: 1255 started purging
1315 Collected SDZ-WN21-10B for expl. (8330/8332), perchlorate (6850), total & diss metals.

Signature(s): Brandon Little

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-5-10
Weather: 85° F + clear, windy

Project Number: GC 387933.FI.FS
Well ID: SDZ-SW WN22
CH2M HILL Personnel:

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: ____ GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

Purge Device: Peri pump

PTW out / DTW in

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1345	2.80 / 3.20	19.98	52.88	0.82	7.94	-19.4	4.00		34.93
1350		20.09	52.66	0.80	7.89	-27.7	4.70		34.77
1355		20.11	52.67	0.87	7.88	-29.6	7.10		34.77

Total Volume Purged: 10 L

Comments: 1340 - Started purging
1400 - Collected SDZ-WN22-10B, SDZ-WN22-10B-MS + SDZ-WN22-10B-SD for expl. (8330/8332), perch (6850) total + diss metals.

Signature(s): Landon Lill

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-5-10
Weather: 80°F clear, windy

Project Number: 387933.FI.FS
Well ID: SDZ-SD WN23 (6L)
CH2M HILL Personnel:

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: ____ GAL.

Purge Device: Peri pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

DTW out | DTW in

FIELD PARAMETERS

Time	Depth to Water (ft bgs)		Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria			± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1218	3.22	3.36	20.60	52.97	1.11	7.98	-98.7	8.80		34.98
1225			20.27	52.18	0.35	7.85	-111.5	4.30		34.92
1230			20.28	52.12	0.27	7.81	-112.5	3.40		34.36
1235			20.30	52.08	0.26	7.80	-115.6	2.80		34.33

Total Volume Purged: 9 L

Comments: 1216 – Started pumping 6L SDZ-SD WN23-10B, SDZ-WN23-10B-MS & SDZ-WN23-10B-SD for expl. (8330), perch. (6850), total & diss. metals.
1235 – Collected

Signature(s): Gordon Litt

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-4-10
Weather: 75°F Rain

Project Number: 387933.FI.FS
Well ID: SDZ-WN24
CH2M HILL Personnel:

Total Depth: FT.(BTOC)
Depth to water: (-) FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Purge Device: Peri pump

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

DTW out | DTW in

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
	~~1.5~~								
	2.49								
0915	2.61	19.76	51.17	.45	7.44	-126.2	13.0		33.67
0919	"	19.91	51.13	.58	7.42	-120.0	9.4		33.64
0925	2.53	19.90	51.12	.51	7.42	-127.2	8.40		33.63

Total Volume Purged: 2.5 gal

Comments: 0930 - Collected SDZ-WN24-10B for exp. (8330), perch (6850), total + diss metals
Tide - rising

Signature(s): Gordon Lutz

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-4-10
Weather: 75°F + Rain

Project Number: GL 387933.FI.FS
Well ID: SDZ-SD WN25
CH2M HILL Personnel:

Total Depth: FT.(BTOC)
Depth to water: (-) FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Purge Device: Peri pump

DTW out / DTW in

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
0835	3.97 / 3.95	20.53	50.85	.92	7.40	-98.6	20.0		33.43
0838	— / —	20.46	50.85	0.5	7.40	-120.7	3.70		"
0845	" / 4.11	"	50.80	0.42	7.23	-127.4	2.0		33.40

Total Volume Purged: 4 L

Comments: 0830 – started pumping
0845 – Collected SDZ-WN25-10B for expl. (8330), perch (6850), + total + diss metals.

Signature(s): Gordon Lutly

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-4-10
Weather: 75° Cloudy/rain

Project Number: 387933.FI.FS
Well ID: SDZ-WN26
CH2M HILL Personnel:

Total Depth: FT.(BTOC)
Depth to water: (-) FT.(BTOC)
Water Column: FT.
(x) 0.163 GAL/FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Purge Device: Peri pump

DTW out / DTW in

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1427	3.62 / 5.27	20.98	51.69	1.71	7.64	-16.7	37.9 ~~20~~ 60		34.04
1443									

Total Volume Purged: 0.25 L

Comments:
1423 - started pumping
1425 - well Dry. Let recharge, collected WQ parameters
1430 - Collected SDZ-WN26-10B for expl. (8330), perchlorate (6850), total & Diss metals.

Signature(s): Landon Lutz

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-4-10
Weather: 75°F Overcast / rain

Project Number: 387933.FI.FS
Well ID: SDZ-WN27
CH2M HILL Personnel:

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: ____ GAL.

Purge Device: Peri pump

DTW out 10.49 DTW in

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1020	3.90	4.28	21.12	53.07	~~24.00~~	7.83	-121.3	2.30		35.03
1023		4.06	21.15	53.05	0.5	7.83	-118.2	"		35.06
1030		4.06	21.16	53.04	0.5	"	-120.2	1.9		35.09

Total Volume Purged: 7 L

Comments: 1017 : started pumping
1030 - Collected SDZ-WN27-10B for exp(8330), perch(6850) total & diss TAL metals

Signature(s): Landon Lill

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-5-10
Weather: 80°F + clear

Project Number: 387933.FI.FS
Well ID: SDZ-WN28
CH2M HILL Personnel:

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: ____ GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell; Hanna Turbidity Meter

Purge Device: Peri pump

DTW out | DTW in

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
1114	4.00 4.00	20.14	52.81	0.91	7.83	-65.9	10.0		34.86
1117	4.15	20.02	52.19	0.51	7.77	-80.7	5.40		34.42
1122		20.01	52.18	0.50	7.76	-88.9	4.70		34.41
1128		20.20	52.12	0.51	7.76	-88.9	2.90		34.36

Total Volume Purged: 7.5 L

Comments:
1110 Started purging
1130 Collected SDZ-WN28-10B
1135 Collected SDZ-WN28D-10B for expl.(8330), perch (6850), total + diss metals.

Signature(s): Gordon Little

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Location: Off-Base SDZ
Event: CTO-080 SDZ
Date: 5-4-10
Weather: 75°F overcast/Rain

Project Number: 387933.FI.FS
Well ID: SDZ-WN89
CH2M HILL Personnel:

Measuring Device(s): YSI 556 + Flow Thru Cell; Hanna Turbidity Meter

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: ____ GAL.

Purge Device: Peri pump

DTW out | DTW in

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

FIELD PARAMETERS

Time	Depth to Water (ft bgs)		Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria			±1 °C	±10%	±10%	±0.1	±10 mV	±10% or <10		
1107	3.80	4.30	21.16	45.47	2.41	7.27	-81.3	71000		29.47
1112		4.33	20.93	44.46	1.06	7.10	-97.0	280		28.76
1117		4.27	20.76	43.79	0.37	7.02	-112.3	70.0		28.29
1122		4.21	20.64	43.65	0.27	6.99	-118.9	24.0		28.19
								14.00		

Total Volume Purged: 10 L

Comments: 1105 Started pumping
1130 Collected SDZ-WN29-10B for exp. (8330), perchl. (6850), total + dissolved metals.

Signature(s): Gordon Lund

CH2MHILL

WELL DEVELOPMENT DATA

Client: NAVFAC Mid-Atlantic
Project Number: 387933.FI.FS
Location: Off-Base SDZ
Well ID: SDZ-WN30
Event: CTO-080 SDZ
CH2M HILL Personnel:
Date: 5-5-10 / 5-6-10
Weather: 70°F & overcast 70°F & clear

Total Depth: ____ FT.(BTOC)
Depth to water: (-) ____ FT.(BTOC)
Water Column: ____ FT.
(x) 0.163 GAL/FT.
Well Volume: ____ GAL.
Total Purge Vol.: ____ GAL.

Measuring Device(s): YSI 556 + Flow Thru Cell
Hanna Turbidity Meter

Purge Device: Peri pump

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

PTW out | DTW in

FIELD PARAMETERS

Time	Depth to Water (ft bgs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Flow Rate (mL/min)	Salinity
Stabilization Criteria		± 1 °C	± 10%	± 10%	± 0.1	± 10 mV	± 10% or <10		
0910	3.33 Dry								
5-6-10 0842		19.99	49.62	1.25	6.43	39.2			32.50

Total Volume Purged:

Comments:
5-5-10 ~~Started pumping @ L~~
0910 - Well dry
- 0925 - ~2" water - Leave pipe in ground, will return later.
5-6-10 0842 - WL = 7.00. Started purging, collected 1 WGP, collected 0.75 L.
0900 - Collected SDZ-WN30-10B for cypl. (8330/8332), perch (6850) total & diss. metals.

Signature(s): Gordon Lidell

Appendix H
Waste Manifest

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
NC8 170 022 580	1	(800) 839-3975	032999 08867

GENERATOR

5. Generator's Name and Mailing Address
MCB CAMP LEJEUNE
ATTN: I&E/EMD/ECB/RCRS
BOX 20004
CAMP LEJEUNE, NC 28542
Generator's Phone: (910) 451-9807

Generator's Site Address (if different than mailing address)
SITE 89 UXO-02
CAMP LEJEUNE, NC 28542

6. Transporter 1 Company Name
~~EQ INDUSTRIAL SERVICES~~ ENVIRITE OF PA, INC.
U.S. EPA ID Number
~~MID 999 269 871~~ PAD 10 154 045

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EQ FLORIDA, INC
2002 NORTH ORIENT ROAD
TAMPA, FL 33619
Facility's Phone: (813) 623-5302
U.S. EPA ID Number
FLD 981 932 494

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	NON HAZARDOUS NON REGULATED LIQUID WASTE (IDW WATER)	001	DM	300 ~~055~~	P	NONE
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
1 APPROVAL#: MCBCL 002 / IDW WATER(WASH WATER)

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name	Signature	Month	Day	Year
JAY A. MYERS, II		7	26	10

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name	Signature	Month	Day	Year
JAMES E. MILLER, JR		07	26	10
Transporter 2 Printed/Typed Name	Signature	Month	Day	Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)	Month	Day	Year

LW

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name	Signature	Month	Day	Year

169-BLC-I 6 Rev. 8/06

COPY

EQ The Environmental Quality Company 1-800-592-5489 www.eqonline.com
www.eqonline.com 1-800-592-5489 EQ The Environmental Quality Company

ENVIRITE OF PENNSYLVANIA, INC.
Technology For The Environment

BILL OF LADING

CARRIER

Envirite of Pennsylvania, Inc.
730 Vogelsong Road
York, PA 17404
(717) 846-1900
(717) 854-6757 Fax

Central Dispatch Number
(800) 501-5659

EPA ID: PAD010154045

ICC: MC 311577

Bol No.: Nº 65167 Y
Load No.:
Stream No.: MCBCL 002
Date: 1/26/10

TO CONSIGNEE EQ FLORIDA, INC
STREET 2002 N. ORIENT RD
DESTINATION TAMPA, FL. 33619

FROM SHIPPER MCB CAMP LEJUNE
STREET 502
ORIGIN CAMP LEJUNE STATE NC ZIP 28542

No Shipping Units	HM	Kind of Packages, Description of Articles (IF HAZARDOUS MATERIALS - PROPER SHIPPING NAME)	HAZARD CLASS	I.D. Number	PACKING GROUP	WEIGHT (subject to correction)
1. Drm		NAPHTHA # 03 2994	-	-	-	300 ~~550~~ est
2.						
3.						

IF PRODUCT TEMPERATURE IS OVER 110°F, CALL DISPATCH

DRIVER: JIM MILLER
TRUCK #: 8016
TRAILER #: 3004Y
BOX # SPOTTED
BOX # REMOVED

Miles | Pump Used Y N | Liner Used Y N

Finish	P/U Date 1/26/10	Del. Date	Gross Wt.
Start	P/U Time	Del. Time	Tare Wt.
TOTAL	In Out	In Out	Net Wt.

Special Instruction & Explain Delay at Shippers

Special Instruction & Explain Delay at Consignee

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.
I have inspected the trailer and certify it acceptable for loading and verify that the times and explanation listed above are correct.

I have inspected the trailer and certify it completely empty and verify that the times and explanation listed above are correct.

Shipper Signature X
Loading Date 1/26/10
Driver Signature X

Consignee Signature X
Unloading Date
Driver Signature X

CARRIER - **ENVIRITE OF PENNSYLVANIA, INC.** - YORK, PA 17404

CARRIER - **ENVIRITE OF PENNSYLVANIA, INC.** - YORK, PA 17404

WHITE - Consignee CANARY - Corporate PINK - Transporter GOLDENROD - Shipper

Appendix I
Analytical Data

CTO-80
Surface Danger Zone
Validated Groundwater Raw Analytical Results
January - March 2010

Station ID	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54	BIBG-GW55/SO55	BIBG-GW56/SO56	BIBG-GW57/SO57		BI-GW01/SO01	BI-GW02/SO02	BI-GW03/SO03		BI-GW04/GW04	BI-GW05/SO05
Sample ID	BI-GW50-10A	BI-GW51-10A	BI-GW52-10A	BI-GW53-10A	BI-GW54-10A	BI-GW55-10A	BI-GW56-10A	BI-GW57-10A	BI-GW57D-10A	BI-GW01-10A	BI-GW02-10A	BI-GW03-10A	BI-GW03D-10A	BI-GW04-10A	BI-GW05-10A
Sample Date	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	02/01/10	01/25/10	02/01/10	02/01/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10
Chemical Name															
Semivolatile Organic Compounds (µg/l)															
2,4-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Nitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Explosives (µg/l)															
1,3,5-Trinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,3-Dinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2,4,6-Trinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-Amino-4,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Amino-2,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
HMX	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Nitroglycerin	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
Perchlorate	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.08 J	0.2 U	0.2 U	0.03 J	0.2 U	0.17 J
PETN	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
RDX	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Tetryl	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total Metals (µg/l)															
Aluminum	545	200 U	196 J	200 U	346	200 U	200 U	206	239	200 UJ	320 J	200 UJ	200 UJ	200 U	200 UJ
Antimony	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	3 J	10 U	10 U	10 U	10 U	10 U	14	10 U	10 U	10 U	10 U	10 U	10 U	10 U	3 J
Barium	1.8 J	0.53 J	200 U	0.78 J	0.72 J	200 U	1.2 J	200 U	200 U	0.37 J	1.9 J	200 U	200 U	200 U	200 U
Beryllium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	18,400	9,900	45,700	46,700	11,100	13,200	39,100	6,100	6,200	58,100	53,400	48,600	48,600	25,700	43,400
Chromium	5.6 J	2.5 J	1.9 J	5.8 J	2.9 J	2.3 J	1.9 J	2.7 J	3 J	2.3 J	10.1	2 J	1.6 J	1.4 J	3 J
Cobalt	5 U	5 U	5 U	5 U	5 U	5 U	1.9 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Copper	5 U	5 U	5 U	5 U	1.8 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	1,450	283	204	191	697	353	8,940	492	502	100 UJ	609 J	100 UJ	100 UJ	107 J	100 UJ
Lead	3 U	3 U	3.9 J	3 U	3 U	3 U	3 U	3 U	3 U	3.1 J	3 U	3 U	3 U	3 U	3 U
Magnesium	5,000 U	5,000 U	5,110	5,910	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	16,800	9,740	6,790	6,770	5,000 U	11,300
Manganese	10.5	3.2 J	2.7 J	8.9 J	7.8 J	5.3 J	466	6.1 J	6 J	0.68 J	7.2 J	10 U	10 U	1.3 J	0.44 J
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.22	0.2 U	0.17 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	40 U	40 U	40 U	426	40 U	40 U	40 U	40 U	40 U	40 U	1.7 J	40 U	40 U	40 U	40 U
Potassium	362 J	512 J	518 J	645 J	226 J	219 J	700 J	282 J	289 J	1,620 J	1,220 J	757 J	756 J	366 J	1,430 J
Selenium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	3.9 J
Silver	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	9,640	10,500	9,020	11,900	5,000 U	6,270	13,000	5,000 U	5,000 U	17,300	12,600	5,000 U	5,000 U	5,000 U	18,400
Thallium	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	2.9 J	0.88 J	1.5 J	1 J	2.8 J	1.5 J	1.4 J	1.9 J	2 J	1.8 J	2.4 J	1.3 J	1.2 J	1.4 J	2.2 J
Zinc	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)															
Aluminum, Dissolved	NA	NA	NA	NA	NA	NA	200 U	NA	NA	NA	NA	200 U	200 U	NA	NA
Antimony, Dissolved	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	10 U	10 U	NA	NA
Arsenic, Dissolved	NA	NA	NA	NA	NA	NA	10.9	NA	NA	NA	NA	10 U	10 U	NA	NA
Barium, Dissolved	NA	NA	NA	NA	NA	NA	200 U	NA	NA	NA	NA	200 U	200 U	NA	NA
Beryllium, Dissolved	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	5 U	5 U	NA	NA
Cadmium, Dissolved	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	5 U	5 U	NA	NA
Calcium, Dissolved	NA	NA	NA	NA	NA	NA	39,300	NA	NA	NA	NA	50,600	49,800	NA	NA
Chromium, Dissolved	NA	NA	NA	NA	NA	NA	2.2 J	NA	NA	NA	NA	2.7 J	10 U	NA	NA
Cobalt, Dissolved	NA	NA	NA	NA	NA	NA	1.6 J	NA	NA	NA	NA	5 U	5 U	NA	NA
Copper, Dissolved	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	5 U	5 U	NA	NA
Iron, Dissolved	NA	NA	NA	NA	NA	NA	8,930	NA	NA	NA	NA	100 U	100 U	NA	NA
Lead, Dissolved	NA	NA	NA	NA	NA	NA	3.5	NA	NA	NA	NA	3.3 J	3.3 J	NA	NA
Magnesium, Dissolved	NA	NA	NA	NA	NA	NA	5,000 U	NA	NA	NA	NA	6,990	6,840	NA	NA

CTO-80
Surface Danger Zone
Validated Groundwater Raw Analytical Results
January - March 2010

Station ID	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54	BIBG-GW55/SO55	BIBG-GW56/SO56	BIBG-GW57/SO57		BI-GW01/SO01	BI-GW02/SO02	BI-GW03/SO03		BI-GW04/GW04	BI-GW05/SO05
Sample ID	BI-GW50-10A	BI-GW51-10A	BI-GW52-10A	BI-GW53-10A	BI-GW54-10A	BI-GW55-10A	BI-GW56-10A	BI-GW57-10A	BI-GW57D-10A	BI-GW01-10A	BI-GW02-10A	BI-GW03-10A	BI-GW03D-10A	BI-GW04-10A	BI-GW05-10A
Sample Date	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	02/01/10	01/25/10	02/01/10	02/01/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10
Chemical Name															
Manganese, Dissolved	NA	NA	NA	NA	NA	NA	475	NA	NA	NA	NA	10 U	10 U	NA	NA
Mercury, Dissolved	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	0.2 U	0.2 U	NA	NA
Nickel, Dissolved	NA	NA	NA	NA	NA	NA	40 U	NA	NA	NA	NA	40 U	40 U	NA	NA
Potassium, Dissolved	NA	NA	NA	NA	NA	NA	584 J	NA	NA	NA	NA	773 J	752 J	NA	NA
Selenium, Dissolved	NA	NA	NA	NA	NA	NA	5 UJ	NA	NA	NA	NA	5 UJ	5 UJ	NA	NA
Silver, Dissolved	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	5 U	5 U	NA	NA
Sodium, Dissolved	NA	NA	NA	NA	NA	NA	12,600	NA	NA	NA	NA	5,000 U	5,000 U	NA	NA
Thallium, Dissolved	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	10 U	10 U	NA	NA
Vanadium, Dissolved	NA	NA	NA	NA	NA	NA	1.5 J	NA	NA	NA	NA	1.5 J	20 U	NA	NA
Zinc, Dissolved	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA	20 U	20 U	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

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Station ID	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08	BI-GW09/SO09	BI-GW10/SO10	BI-GW11/SO11	BI-GW12/SO12	BI-GW13/SO13	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17	BI-GW20/SO20	BI-GW21/SO21	BI-GW22/SO22		BI-GW23/SO23
Sample ID	BI-GW06-10A	BI-GW07-10A	BI-GW08-10A	BI-GW09-10A	BI-GW10-10A	BI-GW11-10A	BI-GW12-10A	BI-GW13-10A	BI-GW14-10A	BI-GW15-10A	BI-GW16-10A	BI-GW17-10A	BI-GW20-10A	BI-GW21-10A	BI-GW22-10A	BI-GW22D-10A	BI-GW23-10A
Sample Date	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/28/10
Chemical Name																	
Semivolatile Organic Compounds (µg/l)																	
2,4-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Nitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Explosives (µg/l)																	
1,3,5-Trinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,3-Dinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2,4,6-Trinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-Amino-4,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Amino-2,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
HMX	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Nitroglycerin	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
Perchlorate	0.07 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 J	0.2 U	0.2 U	0.08 J	0.13 J	0.2 U	0.21	0.2 U	0.04 J	0.04 J
PETN	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
RDX	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Tetryl	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total Metals (µg/l)																	
Aluminum	200 UJ	53.1 J	200 UJ	712	36.4 J	200 U	200 U	250	602	933 J	901	482	1,060	200 U	200 UJ	200 U	623 J
Antimony	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	10 U	10 U	10 U	10 U	10 U	10 U	10 U	6.2 J	3.7 J	10 U	8.6 J	4.4 J	12	10 U	10 U	10 U	10 U
Barium	200 U	200 U	0.7 J	200 U	200 U	200 U	200 U	200 U	1.2 J	200 U	200 U	1.5 J	200 U	200 U	0.54 J	0.89 J	3.1 J
Beryllium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	42,400	33,700	55,800	60,100	45,800	52,500	55,200	38,000	10,600	10,200	10,700	13,000	14,600	70,900	42,100	43,300	26,300
Chromium	2 J	2.9 J	4.4 J	14	1.7 J	0.99 J	10 U	2.2 J	9.6 J	5.5 J	6.5 J	10.3	13.1	10 U	1.8 J	2.7 J	8.8 J
Cobalt	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Copper	5 U	5 U	5 U	5 U	5 U	1.6 J	5 U	5 U	5 U	5 U	5 U	2.2 J	5 U	5 U	5 U	5 U	5 U
Iron	100 UJ	100 U	582 J	1,880	100 U	100 U	100 U	364	770	1,060 J	1,480	1,250	3,140	47.6 J	196 J	422 J	1,550 J
Lead	3 U	3 U	3 U	3.7	3 U	3 U	3 U	4.6	5.1 J	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	14,500	5,500 J	7,800	5,600 J	8,870 J	5,670 J	8,800 J	5,000 UJ	6,200	5,000 U	5,000 UJ	5,000 U	5,000 U	5,500	5,000 U	5,000 U	5,000 U
Manganese	10 U	0.62 J	3.8 J	20	0.44 J	0.69 J	0.61 J	9.2 J	9 J	6.8 J	9.4 J	12.5	8.7 J	0.69 J	1.2 J	3 J	8.9 J
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	3.9 J	40 U	40 U	2.4 J	40 U	40 U	40 U	40 U	40 U
Potassium	1,920 J	624 J	1,040 J	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	104 J	244 J	265 J	378 J	101 J	274 J	127 J	141 J	130 J
Selenium	5 U	5 UJ	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	4.4 J	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U
Silver	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	63,000	13,500	26,900	9,640	14,800	19,500	18,800	5,000 U	12,000	5,000 U	5,000 U	29,900	11,700	10,500	5,000 U	5,000 U	6,130
Thallium	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	1.7 J	1.7 J	2.2 J	4.6 J	0.98 J	0.89 J	0.72 J	3 J	2.7 J	4.4 J	4.5 J	3.5 J	5.1 J	2 J	2.2 J	2.4 J	3.9 J
Zinc	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)																	
Aluminum, Dissolved	NA	NA	NA	NA	NA	200 U	NA	NA	NA	NA	NA	NA	292	NA	NA	NA	NA
Antimony, Dissolved	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA
Arsenic, Dissolved	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	7.9 J	NA	NA	NA	NA
Barium, Dissolved	NA	NA	NA	NA	NA	200 U	NA	NA	NA	NA	NA	NA	2.8 J	NA	NA	NA	NA
Beryllium, Dissolved	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA
Cadmium, Dissolved	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA
Calcium, Dissolved	NA	NA	NA	NA	NA	47,700	NA	NA	NA	NA	NA	NA	12,800	NA	NA	NA	NA
Chromium, Dissolved	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA
Cobalt, Dissolved	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA
Copper, Dissolved	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA
Iron, Dissolved	NA	NA	NA	NA	NA	100 U	NA	NA	NA	NA	NA	NA	573	NA	NA	NA	NA
Lead, Dissolved	NA	NA	NA	NA	NA	3 U	NA	NA	NA	NA	NA	NA	3.1	NA	NA	NA	NA
Magnesium, Dissolved	NA	NA	NA	NA	NA	5,360	NA	NA	NA	NA	NA	NA	5,000 U	NA	NA	NA	NA

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Station ID	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08	BI-GW09/SO09	BI-GW10/SO10	BI-GW11/SO11	BI-GW12/SO12	BI-GW13/SO13	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17	BI-GW20/SO20	BI-GW21/SO21	BI-GW22/SO22		BI-GW23/SO23
Sample ID	BI-GW06-10A	BI-GW07-10A	BI-GW08-10A	BI-GW09-10A	BI-GW10-10A	BI-GW11-10A	BI-GW12-10A	BI-GW13-10A	BI-GW14-10A	BI-GW15-10A	BI-GW16-10A	BI-GW17-10A	BI-GW20-10A	BI-GW21-10A	BI-GW22-10A	BI-GW22D-10A	BI-GW23-10A
Sample Date	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/28/10
Chemical Name																	
Manganese, Dissolved	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	3.3 J	NA	NA	NA	NA
Mercury, Dissolved	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA
Nickel, Dissolved	NA	NA	NA	NA	NA	40 U	NA	NA	NA	NA	NA	NA	40 U	NA	NA	NA	NA
Potassium, Dissolved	NA	NA	NA	NA	NA	581 J	NA	NA	NA	NA	NA	NA	77.5 J	NA	NA	NA	NA
Selenium, Dissolved	NA	NA	NA	NA	NA	5 UJ	NA	NA	NA	NA	NA	NA	5 UJ	NA	NA	NA	NA
Silver, Dissolved	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA
Sodium, Dissolved	NA	NA	NA	NA	NA	17,300	NA	NA	NA	NA	NA	NA	11,800	NA	NA	NA	NA
Thallium, Dissolved	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA
Vanadium, Dissolved	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA
Zinc, Dissolved	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

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Station ID	BI-GW24/SO24	BI-GW25/SO25	BI-GW26/SO26	BI-GW27/SO27	BI-GW28/SO28		BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31	BI-GW32/SO32	BI-GW33/SO33	BI-GW34/SO34	BI-GW35/SO35		BI-GW36/SO36	BI-GW38/SO38	BI-GW39/SO39
Sample ID	BI-GW24-10A	BI-GW25-10A	BI-GW26-10A	BI-GW27-10A	BI-GW28-10A	BI-GW28D-10A	BI-GW29-10A	BI-GW30-10A	BI-GW31-10A	BI-GW32-10A	BI-GW33-10A	BI-GW34-10A	BI-GW35-10A	BI-GW35D-10A	BI-GW36-10A	BI-GW38-10A	BI-GW39-10A
Sample Date	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/27/10	01/26/10	01/26/10	01/26/10	01/26/10	01/26/10
Chemical Name																	
Semivolatile Organic Compounds (µg/l)																	
2,4-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Nitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Explosives (µg/l)																	
1,3,5-Trinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,3-Dinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2,4,6-Trinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-Amino-4,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Amino-2,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
HMX	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Nitroglycerin	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
Perchlorate	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.04 J	0.2 U	0.2 U	0.03 J	0.19 J	0.07 J
PETN	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
RDX	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Tetryl	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total Metals (µg/l)																	
Aluminum	200 UJ	200 UJ	200 UJ	200 UJ	119 J	130 J	200 UJ	580	422	363	41.4 J	746	286	204	485	259	657
Antimony	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	10 U	10 U	10 U	10 U	19.4	18.7	10 U	9 J	13.8	13.8	10 U	3.3 J	10 U	10 U	10 U	4 J	5.9 J
Barium	200 U	200 U	200 U	200 U	0.62 J	0.34 J	200 U	1 J	200 U	200 U	200 U	2.5 J	1.3 J	1.2 J	1.2 J	1.3 J	2.3 J
Beryllium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	58,300	38,200	54,400	42,700	64,000	67,200	57,000	55,600	54,000	63,900	36,200	8,810	18,800	18,600	9,140	52,800	17,400
Chromium	1.4 J	1.9 J	1.6 J	1.4 J	6 J	7.6 J	10 U	9 J	7.5 J	12.1	2.2 J	8.4 J	5.2 J	4.9 J	4.5 J	3.3 J	9.3 J
Cobalt	5 U	5 U	5 U	5 U	0.9 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Copper	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5.9	1.6 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	100 UJ	100 UJ	100 UJ	100 UJ	8,180	8,490	100 UJ	627	742	480	100 U	2,100	806	537	1,080	590	1,300
Lead	3 U	3 U	3 U	3 U	3 U	4.2	3 U	4.2	3 U	3 U	3 U	3.3 J	3 U	3 U	3 U	3 U	3 U
Magnesium	5,160	5,000 U	5,770	5,000 U	5,000 UJ	5,000 UJ	6,530	9,290 J	7,710 J	9,220 J	5,000 UJ	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U
Manganese	0.46 J	1.2 J	16.8	0.74 J	416	427	0.56 J	57.4	12.5	19.3	1.2 J	11	13.6	9.8 J	9.7 J	3.2 J	20.3
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.1 J	0.1 J	0.2 U	0.2 U	0.2 U
Nickel	40 U	40 U	40 U	40 U	2.3 J	1.7 J	40 U	3 J	2.1 J	5.9 J	40 U	40 U	2.3 J	2.2 J	40 U	40 U	2.2 J
Potassium	438 J	311 J	832 J	255 J	1,610 J	1,570 J	651 J	1,900 J	1,300 J	541 J	345 J	139 J	396 J	392 J	167 J	197 J	248 J
Selenium	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 U	5.2 J	5 U	5 U	5 U	5 U
Silver	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	18,400	5,000 U	7,230	5,000 U	19,200	18,300	9,070	33,600	32,300	32,700	12,400	5,000 U	5,090	5,210	5,000 U	43,300	21,600
Thallium	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	1.1 J	1.3 J	1.2 J	1 J	10.4 J	10.3 J	0.97 J	12.5 J	6.9 J	7.6 J	1.3 J	4.7 J	3.7 J	3.4 J	2.6 J	2.4 J	4.8 J
Zinc	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)																	
Aluminum, Dissolved	NA	NA	NA	NA	NA	NA	NA	224	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	NA	NA	NA	NA	NA	NA	NA	7.7 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	NA	NA	NA	NA	NA	NA	NA	200 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	NA	NA	NA	NA	NA	NA	NA	51,600	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	NA	NA	NA	NA	NA	NA	NA	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	NA	NA	NA	NA	NA	NA	NA	3.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	NA	NA	NA	NA	NA	NA	NA	8,700	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Station ID	BI-GW24/SO24	BI-GW25/SO25	BI-GW26/SO26	BI-GW27/SO27	BI-GW28/SO28		BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31	BI-GW32/SO32	BI-GW33/SO33	BI-GW34/SO34	BI-GW35/SO35		BI-GW36/SO36	BI-GW38/SO38	BI-GW39/SO39
Sample ID	BI-GW24-10A	BI-GW25-10A	BI-GW26-10A	BI-GW27-10A	BI-GW28-10A	BI-GW28D-10A	BI-GW29-10A	BI-GW30-10A	BI-GW31-10A	BI-GW32-10A	BI-GW33-10A	BI-GW34-10A	BI-GW35-10A	BI-GW35D-10A	BI-GW36-10A	BI-GW38-10A	BI-GW39-10A
Sample Date	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/27/10	01/26/10	01/26/10	01/26/10	01/26/10	01/26/10
Chemical Name																	
Manganese, Dissolved	NA	NA	NA	NA	NA	NA	NA	47.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury, Dissolved	NA	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	NA	NA	NA	NA	NA	NA	NA	3 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	NA	NA	NA	NA	NA	NA	NA	1,750 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	NA	NA	NA	NA	NA	NA	NA	5 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver, Dissolved	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	NA	NA	NA	NA	NA	NA	NA	30,100	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	NA	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	NA	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

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Station ID	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42	BI-GW43/SO43	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46	BI-GW47/SO47	BI-GW48/SO48	BI-GW49/SO49		BI-GW59/SO59	ICWBG-GW20/SO20		ICWBG-GW21/SO21
Sample ID	BI-GW40-10A	BI-GW41-10A	BI-GW42-10A	BI-GW43-10A	BI-GW44-10A	BI-GW45-10A	BI-GW46-10A	BI-GW47-10A	BI-GW48-10A	BI-GW49-10A	BI-GW49D-10A	BI-GW59-10A	ICW-GW20-10A	ICW-GW20D-10A	ICW-GW21-10A
Sample Date	02/01/10	02/01/10	01/28/10	01/28/10	01/29/10	01/27/10	01/27/10	02/01/10	02/01/10	01/28/10	01/28/10	02/01/10	03/26/10	03/26/10	03/26/10
Chemical Name															
Semivolatile Organic Compounds (µg/l)															
2,4-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.5 U	2.5 U	2.5 UJ
2,6-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.5 U	2.5 U	2.5 UJ
Nitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ
Explosives (µg/l)															
1,3,5-Trinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ
1,3-Dinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ
2,4,6-Trinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ
2-Amino-4,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
2-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
3-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
4-Amino-2,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
4-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
HMX	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ
Nitroglycerin	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 UJ
Perchlorate	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.03 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
PETN	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ
RDX	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	4 U	4 U	2.5 UJ
Tetryl	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
Total Metals (µg/l)															
Aluminum	452	200 U	226 J	200 UJ	186 J	168 J	200 U	291	1,180	54.9 J	56.7 J	1,570	129 J+	116 J+	63.2 J
Antimony	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	7.9 J	10 U	8.4 J	10 U	10 U	10 U	10 U	10 U	5.8 J	10 U	10 U	28.1	16	13.9	5.8 J
Barium	200 U	200 U	0.74 J	200 U	200 U	0.39 J	200 U	200 U	200 U	200 U	200 U	200 U	1.5 J	1.4 J	13.1 J
Beryllium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	46,900	6,030	42,100	31,100	31,600	9,980	42,500	16,700	21,700	41,500	41,800	31,700	89,700	87,000	453,000
Chromium	4.2 J	2.6 J	4.5 J	1.4 J	1.8 J	2.1 J	1.3 J	2.7 J	9.9 J	10 U	0.95 J	41	4.8 J	4.9 J	4.2 J
Cobalt	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	13.4	5 U	5 U	5 U
Copper	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.2 J	5 U	1.9 J	5 U
Iron	850	481	431 J	100 UJ	250	471	71.3 J	851	2,350	29.7 J	34.1 J	60,300	3,730	3,600	488
Lead	3 U	3 U	3 U	3 U	3 U	3 U	3.5 J	3 U	3 U	3 U	3 U	5.2	3 U	3 U	3 U
Magnesium	7,380	5,000 U	5,000 U	5,000 U	5,000 UJ	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	7,900	30,000	29,100	326,000
Manganese	2.9 J	5.9 J	24.9	1.4 J	4.5 J	6.9 J	1.4 J	9.4 J	14	0.69 J	0.84 J	292	55	53.4	41.6
Mercury	0.38	0.23	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	40 U	40 U	1 J	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	2.2 J	2.5 J	40 U
Potassium	794 J	279 J	406 J	127 J	55.1 J	40.7 J	184 J	120 J	292 J	179 J	184 J	1,040 J	7,690 J	7,530 J	316,000 J
Selenium	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	4.2 J-	5 R	5 U
Silver	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	6,420	5,000 U	11,800	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	11,500	11,900	12,500	12,300	199,000 J	197,000 J	5,540,000 J
Thallium	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	23.4
Vanadium	3.2 J	1.8 J	4.7 J	0.95 J	2.4 J	0.97 J	0.92 J	3.4 J	7.2 J	1.6 J	1.7 J	17.4 J	11.9 J	11.6 J	2.7 J
Zinc	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)															
Aluminum, Dissolved	NA	388	NA	NA	NA	200 U	NA	NA	NA	NA	NA	NA	200 U	200 U	NA
Antimony, Dissolved	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	10 U	10 U	NA
Arsenic, Dissolved	NA	38	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	14.3	13.9	NA
Barium, Dissolved	NA	2.7 J	NA	NA	NA	200 U	NA	NA	NA	NA	NA	NA	1.1 J	1.2 J	NA
Beryllium, Dissolved	NA	5 U	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	5 U	NA
Cadmium, Dissolved	NA	5 U	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	5 U	NA
Calcium, Dissolved	NA	40,000	NA	NA	NA	10,000	NA	NA	NA	NA	NA	NA	82,900	82,600	NA
Chromium, Dissolved	NA	11.3	NA	NA	NA	1.1 J	NA	NA	NA	NA	NA	NA	3.8 J	4.4 J	NA
Cobalt, Dissolved	NA	1.9 J	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	5 U	NA
Copper, Dissolved	NA	5 U	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	5 U	NA
Iron, Dissolved	NA	9,640	NA	NA	NA	100 U	NA	NA	NA	NA	NA	NA	3,320	3,310	NA
Lead, Dissolved	NA	4.4	NA	NA	NA	3 U	NA	NA	NA	NA	NA	NA	3 U	2.1 J	NA
Magnesium, Dissolved	NA	5,000 U	NA	NA	NA	5,000 U	NA	NA	NA	NA	NA	NA	28,200	28,100	NA

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Station ID	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42	BI-GW43/SO43	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46	BI-GW47/SO47	BI-GW48/SO48	BI-GW49/SO49		BI-GW59/SO59	ICWBG-GW20/SO20		ICWBG-GW21/SO21
Sample ID	BI-GW40-10A	BI-GW41-10A	BI-GW42-10A	BI-GW43-10A	BI-GW44-10A	BI-GW45-10A	BI-GW46-10A	BI-GW47-10A	BI-GW48-10A	BI-GW49-10A	BI-GW49D-10A	BI-GW59-10A	ICW-GW20-10A	ICW-GW20D-10A	ICW-GW21-10A
Sample Date	02/01/10	02/01/10	01/28/10	01/28/10	01/29/10	01/27/10	01/27/10	02/01/10	02/01/10	01/28/10	01/28/10	02/01/10	03/26/10	03/26/10	03/26/10
Chemical Name															
Manganese, Dissolved	NA	715	NA	NA	NA	2 J	NA	NA	NA	NA	NA	NA	49.3	49.1	NA
Mercury, Dissolved	NA	0.2 U	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	0.2 U	0.2 U	NA
Nickel, Dissolved	NA	4.2 J	NA	NA	NA	40 U	NA	NA	NA	NA	NA	NA	2 J	2 J	NA
Potassium, Dissolved	NA	2,730 J	NA	NA	NA	28 J	NA	NA	NA	NA	NA	NA	7,310 J	7,210 J	NA
Selenium, Dissolved	NA	5 UJ	NA	NA	NA	5 UJ	NA	NA	NA	NA	NA	NA	5 U	5 U	NA
Silver, Dissolved	NA	5 U	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	5 U	NA
Sodium, Dissolved	NA	14,700	NA	NA	NA	5,000 U	NA	NA	NA	NA	NA	NA	191,000	191,000	NA
Thallium, Dissolved	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	10 U	10 U	NA
Vanadium, Dissolved	NA	20 U	NA	NA	NA	1 J	NA	NA	NA	NA	NA	NA	10.2 J	10.1 J	NA
Zinc, Dissolved	NA	20 U	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA	2.3 J	2.4 J	NA

Notes:

Shading indicates detections

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

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µg/l - Micrograms per liter

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Station ID	ICWBG-GW22/SO22	ICW-GW01/SO01	ICW-GW02/SO02	ICW-GW03/SO03		ICW-GW04/SO04	ICW-GW05/SO05	ICW-GW06/SO06	ICW-GW07/SO07	ICW-GW08/SO08	ICW-GW09/SO09	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW12/SO12	ICW-GW13/SO13
Sample ID	ICW-GW22-10A	ICW-GW01-10A	ICW-GW02-10A	ICW-GW03-10A	ICW-GW03D-10A	ICW-GW04-10A	ICW-GW05-10A	ICW-GW06-10A	ICW-GW07-10A	ICW-GW08-10A	ICW-GW09-10A	ICW-GW10-10A	ICW-GW11-10A	ICW-GW12-10A	ICW-GW13-10A
Sample Date	03/25/10	03/23/10	03/23/10	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10	03/22/10	03/23/10	03/23/10	03/23/10	03/23/10	03/24/10	03/25/10
Chemical Name															
Semivolatile Organic Compounds (µg/l)															
2,4-Dinitrotoluene	2.5 U	5 U	5 U	5 U	5 U	2.5 U	2.5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.5 U	2.5 UJ
2,6-Dinitrotoluene	2.5 U	5 U	5 U	5 U	5 U	2.5 U	2.5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.5 U	2.5 UJ
Nitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ
Explosives (µg/l)															
1,3,5-Trinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ
1,3-Dinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ
2,4,6-Trinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ
2-Amino-4,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
2-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
3-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
4-Amino-2,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
4-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
HMX	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ
Nitroglycerin	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 UJ
Perchlorate	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
PETN	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ
RDX	4 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	4 UJ
Tetryl	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
Total Metals (µg/l)															
Aluminum	200 U	200 U	200 U	2,120	200 U	1,320	200 U	604	1,570	200 U	2,050	253	200 U	7,040	200 U
Antimony	10 U	19,800	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	3 J	10 U	10 U	10 U	10 U	12.7	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Barium	1.2 J	200 U	200 U	200 U	12.1 J	8.7 J	1.1 J	3.9 J	12.8 J	2.1 J	15.2 J	6 J	1 J	12.9 J	7.7 J
Beryllium	5 U	5 U	5 U	985	214	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	5 U	5 U	5 U	27	5 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.41 J	5 U
Calcium	116,000	5,000 U	37,200	30,800	169,000	86,700	79,200	69,800	52,800	83,400	212,000	61,000	74,600	151,000	334,000
Chromium	2.3 J	10 U	2.1 J	68.5	15.2	18.8	1 J	2.4 J	5.7 J	3.8 J	11.2	2.5 J	2.2 J	27.2	10 U
Cobalt	5 U	5 U	5 U	39.8	23	2.8 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.5 J	5 U
Copper	5 U	5 U	6.6	5 U	27.2	6.9	5 U	5 U	6.7	5.7	5 U	5.5	5 U	18.1	5 U
Iron	874	100 U	71.2 J	5,780	542	8,920	1,000	649	3,850	256	4,320	573	1,260	7,390	135
Lead	3 U	11,800	2.5 J	3 U	3 U	2.3 J	3 U	3 U	3.2	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	35,400	5,000 U	7,040	5,000 U	25,100	102,000	28,400	29,000	10,900	41,300	362,000	21,800	22,500	150,000	594,000
Manganese	31.4	10 U	1.4 J	33.9	8.9 J	26.5	33	16.7	19.2	16.7	40.1	23.6	18.7	39.7	3.5 J
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.13 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	5 U	5 U	1.3 J	453	45.1	7.2	5 U	5 U	5 U	5 U	1.1 J	5 U	5 U	6	5 U
Potassium	8,560 J	5,000 U	1,180 J	310,000 J	40,000 J	58,300 J	8,820 J	6,990 J	2,150 J	14,800 J	170,000 J	11,200 J	3,090 J	88,400 J	235,000 J
Selenium	7 J-	5 U	5 U	5 U	5 U	5.8	5 U	4.6 J	5 U	3.8 J	5 U	5	5 U	5 J	5 R
Silver	5 U	5 U	1.5 J	13.7	1 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	130,000 J	240,000	5,000 U	5,000 U	68,900	979,000	25,900	46,600	26,400	427,000	2,910,000	91,500	40,600	1,400,000	3,900,000 J
Thallium	10 U	5,440	10 U	345	10 U	10 U	10 U	10 U	10 U	10 U	10.8	10 U	10 U	10 U	13.2
Vanadium	4.8 J	20 U	3.7 J	20 U	20 U	64.5	1.5 J	6.1 J	11.2 J	9.9 J	18.2 J	3.4 J	5.7 J	27.7	1.1 J
Zinc	20 U	20 U	20 U	441	20.9	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)															
Aluminum, Dissolved	NA	NA	NA	200 U	200 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	NA	NA	NA	200 U	200 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	NA	NA	NA	40,200	41,500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	NA	NA	NA	100 U	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	NA	NA	NA	3 U	2.7 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	NA	NA	NA	10,600	10,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

CTO-80
Surface Danger Zone
Validated Groundwater Raw Analytical Results
January - March 2010

Station ID	ICWBG-GW22/SO22	ICW-GW01/SO01	ICW-GW02/SO02	ICW-GW03/SO03		ICW-GW04/SO04	ICW-GW05/SO05	ICW-GW06/SO06	ICW-GW07/SO07	ICW-GW08/SO08	ICW-GW09/SO09	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW12/SO12	ICW-GW13/SO13
Sample ID	ICW-GW22-10A	ICW-GW01-10A	ICW-GW02-10A	ICW-GW03-10A	ICW-GW03D-10A	ICW-GW04-10A	ICW-GW05-10A	ICW-GW06-10A	ICW-GW07-10A	ICW-GW08-10A	ICW-GW09-10A	ICW-GW10-10A	ICW-GW11-10A	ICW-GW12-10A	ICW-GW13-10A
Sample Date	03/25/10	03/23/10	03/23/10	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10	03/22/10	03/23/10	03/23/10	03/23/10	03/23/10	03/24/10	03/25/10
Chemical Name															
Manganese, Dissolved	NA	NA	NA	1.1 J	1.4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury, Dissolved	NA	NA	NA	0.44	0.39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	NA	NA	NA	2,150 J	2,040 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver, Dissolved	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	NA	NA	NA	9,210	9,310	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	NA	NA	NA	20 U	0.85 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	NA	NA	NA	1.5 J	1.4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Raw Analytical Results
January - March 2010

Station ID	ICW-GW14/SO14	ICW-GW15/SO15	ICW-GW16/SO16	ICW-GW17/SO17	ICW-GW18/SO18	ICW-GW19/SO19	SI-GW01/SO01		SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID	ICW-GW14-10A	ICW-GW15-10A	ICW-GW16-10A	ICW-GW17-10A	ICW-GW18-10A	ICW-GW19-10A	SI-GW01-10A	SI-GW01D-10A	SI-GW02-10A	SI-GW03-10A	SI-GW04-10A	SI-GW05-10A	SI-GW06-10A
Sample Date	03/25/10	03/25/10	03/26/10	03/25/10	03/25/10	03/26/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name													
Semivolatile Organic Compounds (µg/l)													
2,4-Dinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ	2.5 UJ	2.5 U
2,6-Dinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ	2.5 UJ	2.5 U
Nitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ	2.5 UJ	2.5 U
Explosives (µg/l)													
1,3,5-Trinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ	2.5 UJ	2.5 U
1,3-Dinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ	2.5 UJ	2.5 U
2,4,6-Trinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ	2.5 UJ	2.5 U
2-Amino-4,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 U
2-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 U
3-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 U
4-Amino-2,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 U
4-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 U
HMX	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ	2.5 UJ	2.5 U
Nitroglycerin	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 UJ	16 U	16 U
Perchlorate	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
PETN	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U
RDX	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	2.5 U	2.5 U	4 UJ	4 UJ	2.5 U
Tetryl	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 U
Total Metals (µg/l)													
Aluminum	648 J+	1,780 J+	476 J+	237 J+	617 J+	204 J+	3,370 J+	3,880 J+	200 U	200 U	43.7 J+	4,090 J+	200 U
Antimony	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	510	10 U
Arsenic	3.2 J	10 U	17.2	4.6 J	5 J	10 U	20.5	21.9	10 U	10 U	10 U	43	10 U
Barium	5.3 J	5.4 J	4.7 J	5.9 J	6.3 J	3.6 J	200 U	18.6 J	3.8 J	1.7 J	2.2 J	1,970	2.5 J
Beryllium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	8.4	5 U	5 U	48.8	5 U
Cadmium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.46 J	5 U	5 U	46	5 U
Calcium	184,000	188,000	255,000	280,000	333,000	175,000	54,600	53,600	76,400	49,500	95,800	186,000	129,000
Chromium	2.2 J	7.9 J	8.3 J	2.6 J	5.4 J	5.7 J	25.5	30.9	5.2 J	4.7 J	1.2 J	197	2 J
Cobalt	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.83 J	5 U	5 U	487	5 U
Copper	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5.5	29.2	11.6	5 U	246	19.5
Iron	1,010	1,400	4,970	374	3,060	776	1,910	2,300	841	546	121	2,390	85 J
Lead	3 U	3 U	3 U	3 U	3 U	3 U	3.3	4.2	3 U	3 U	3 U	19.8	3 U
Magnesium	420,000	86,900	216,000	216,000	265,000	95,400	139,000	137,000	18,100	31,300	89,900	87,000	74,900
Manganese	24.9	31.4	48.1	49.1	103	26.3	33.4	32.9	25.1	32.2	9.5 J	518	24.5
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	1.4 J	3 J	2.7 J	2.2 J	1.1 J	2.2 J	1.6 J	1.6 J	5 U	5 U	5 U	471	5 U
Potassium	231,000 J	28,400 J	93,300 J	72,400 J	98,100 J	34,600 J	63,600 J	63,000 J	14,200 J	23,700 J	41,000 J	28,600 J	33,900 J
Selenium	5 R	5 R	5 R	5 R	5 R	3.8 J-	5 R	5 R	5 U	5.5	5 R	5 R	5 U
Silver	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.2 J	5 U	5 U	46.2	5 U
Sodium	3,490,000 J	749,000 J	1,770,000 J	1,630,000 J	2,130,000 J	746,000 J	1,240,000 J	1,220,000 J	122,000	178,000	716,000 J	365,000 J	592,000
Thallium	9.5 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	57.1	10 U
Vanadium	5.3 J	16 J	15.2 J	4.3 J	6.6 J	12.7 J	20 U	16.2 J	20 U	13.8 J	20 U	521	20 U
Zinc	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	476	20 U
Dissolved Metals (µg/l)													
Aluminum, Dissolved	NA	NA	NA	NA	NA	NA	2,640	2,690	NA	NA	NA	NA	NA
Antimony, Dissolved	NA	NA	NA	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA
Arsenic, Dissolved	NA	NA	NA	NA	NA	NA	19.3	21.9	NA	NA	NA	NA	NA
Barium, Dissolved	NA	NA	NA	NA	NA	NA	16.6 J	16.5 J	NA	NA	NA	NA	NA
Beryllium, Dissolved	NA	NA	NA	NA	NA	NA	5 U	0.45 J	NA	NA	NA	NA	NA
Cadmium, Dissolved	NA	NA	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Calcium, Dissolved	NA	NA	NA	NA	NA	NA	53,300	52,800	NA	NA	NA	NA	NA
Chromium, Dissolved	NA	NA	NA	NA	NA	NA	28.5	27.4	NA	NA	NA	NA	NA
Cobalt, Dissolved	NA	NA	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Copper, Dissolved	NA	NA	NA	NA	NA	NA	4.1 J	5 U	NA	NA	NA	NA	NA
Iron, Dissolved	NA	NA	NA	NA	NA	NA	1,400	1,350	NA	NA	NA	NA	NA
Lead, Dissolved	NA	NA	NA	NA	NA	NA	3.1	2 J	NA	NA	NA	NA	NA
Magnesium, Dissolved	NA	NA	NA	NA	NA	NA	139,000	140,000	NA	NA	NA	NA	NA

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Surface Danger Zone
Validated Groundwater Raw Analytical Results
January - March 2010

Station ID	ICW-GW14/SO14	ICW-GW15/SO15	ICW-GW16/SO16	ICW-GW17/SO17	ICW-GW18/SO18	ICW-GW19/SO19	SI-GW01/SO01		SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID	ICW-GW14-10A	ICW-GW15-10A	ICW-GW16-10A	ICW-GW17-10A	ICW-GW18-10A	ICW-GW19-10A	SI-GW01-10A	SI-GW01D-10A	SI-GW02-10A	SI-GW03-10A	SI-GW04-10A	SI-GW05-10A	SI-GW06-10A
Sample Date	03/25/10	03/25/10	03/26/10	03/25/10	03/25/10	03/26/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name													
Manganese, Dissolved	NA	NA	NA	NA	NA	NA	30.8	30.7	NA	NA	NA	NA	NA
Mercury, Dissolved	NA	NA	NA	NA	NA	NA	0.6	0.2 U	NA	NA	NA	NA	NA
Nickel, Dissolved	NA	NA	NA	NA	NA	NA	1.9 J	1 J	NA	NA	NA	NA	NA
Potassium, Dissolved	NA	NA	NA	NA	NA	NA	57,200 J	58,300 J	NA	NA	NA	NA	NA
Selenium, Dissolved	NA	NA	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Silver, Dissolved	NA	NA	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Sodium, Dissolved	NA	NA	NA	NA	NA	NA	1,100,000	1,140,000	NA	NA	NA	NA	NA
Thallium, Dissolved	NA	NA	NA	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA
Vanadium, Dissolved	NA	NA	NA	NA	NA	NA	13.9 J	14.1 J	NA	NA	NA	NA	NA
Zinc, Dissolved	NA	NA	NA	NA	NA	NA	7.3 J	5.4 J	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Detected Analytical Results
January - March 2010

Station ID	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54	BIBG-GW55/SO55	BIBG-GW56/SO56	BIBG-GW57/SO57		BI-GW01/SO01	BI-GW02/SO02	BI-GW03/SO03		BI-GW04/GW04	BI-GW05/SO05	BI-GW06/SO06
Sample ID	BI-GW50-10A	BI-GW51-10A	BI-GW52-10A	BI-GW53-10A	BI-GW54-10A	BI-GW55-10A	BI-GW56-10A	BI-GW57-10A	BI-GW57D-10A	BI-GW01-10A	BI-GW02-10A	BI-GW03-10A	BI-GW03D-10A	BI-GW04-10A	BI-GW05-10A	BI-GW06-10A
Sample Date	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	02/01/10	01/25/10	02/01/10	02/01/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10
Chemical Name																
Semivolatile Organic Compounds (µg/l)																
No Detections	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives (µg/l)																
Perchlorate	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.08 J	0.2 U	0.2 U	0.03 J	0.2 U	0.17 J	0.07 J
Total Metals (µg/l)																
Aluminum	545	200 U	196 J	200 U	346	200 U	200 U	206	239	200 UJ	320 J	200 UJ	200 UJ	200 U	200 UJ	200 UJ
Antimony	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	3 J	10 U	10 U	10 U	10 U	10 U	14	10 U	10 U	10 U	10 U	10 U	10 U	10 U	3 J	10 U
Barium	1.8 J	0.53 J	200 U	0.78 J	0.72 J	200 U	1.2 J	200 U	200 U	0.37 J	1.9 J	200 U	200 U	200 U	200 U	200 U
Beryllium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	18,400	9,900	45,700	46,700	11,100	13,200	39,100	6,100	6,200	58,100	53,400	48,600	48,600	25,700	43,400	42,400
Chromium	5.6 J	2.5 J	1.9 J	5.8 J	2.9 J	2.3 J	1.9 J	2.7 J	3 J	2.3 J	10.1	2 J	1.6 J	1.4 J	3 J	2 J
Cobalt	5 U	5 U	5 U	5 U	5 U	5 U	1.9 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Copper	5 U	5 U	5 U	5 U	1.8 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	1,450	283	204	191	697	353	8,940	492	502	100 UJ	609 J	100 UJ	100 UJ	107 J	100 UJ	100 UJ
Lead	3 U	3 U	3.9 J	3 U	3 U	3 U	3 U	3 U	3 U	3.1 J	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	5,000 U	5,000 U	5,110	5,910	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	16,800	9,740	6,790	6,770	5,000 U	11,300	14,500
Manganese	10.5	3.2 J	2.7 J	8.9 J	7.8 J	5.3 J	466	6.1 J	6 J	0.68 J	7.2 J	10 U	10 U	1.3 J	0.44 J	10 U
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.22	0.2 U	0.17 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	40 U	40 U	40 U	426	40 U	40 U	40 U	40 U	40 U	40 U	1.7 J	40 U	40 U	40 U	40 U	40 U
Potassium	362 J	512 J	518 J	645 J	226 J	219 J	700 J	282 J	289 J	1,620 J	1,220 J	757 J	756 J	366 J	1,430 J	1,920 J
Selenium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	3.9 J	5 U
Silver	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	9,640	10,500	9,020	11,900	5,000 U	6,270	13,000	5,000 U	5,000 U	17,300	12,600	5,000 U	5,000 U	5,000 U	18,400	63,000
Thallium	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	2.9 J	0.88 J	1.5 J	1 J	2.8 J	1.5 J	1.4 J	1.9 J	2 J	1.8 J	2.4 J	1.3 J	1.2 J	1.4 J	2.2 J	1.7 J
Zinc	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)																
Aluminum, Dissolved	NA	NA	NA	NA	NA	NA	200 U	NA	NA	NA	NA	200 U	200 U	NA	NA	NA
Arsenic, Dissolved	NA	NA	NA	NA	NA	NA	10.9	NA	NA	NA	NA	10 U	10 U	NA	NA	NA
Barium, Dissolved	NA	NA	NA	NA	NA	NA	200 U	NA	NA	NA	NA	200 U	200 U	NA	NA	NA
Beryllium, Dissolved	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	5 U	5 U	NA	NA	NA
Calcium, Dissolved	NA	NA	NA	NA	NA	NA	39,300	NA	NA	NA	NA	50,600	49,800	NA	NA	NA
Chromium, Dissolved	NA	NA	NA	NA	NA	NA	2.2 J	NA	NA	NA	NA	2.7 J	10 U	NA	NA	NA
Cobalt, Dissolved	NA	NA	NA	NA	NA	NA	1.6 J	NA	NA	NA	NA	5 U	5 U	NA	NA	NA
Copper, Dissolved	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	5 U	5 U	NA	NA	NA
Iron, Dissolved	NA	NA	NA	NA	NA	NA	8,930	NA	NA	NA	NA	100 U	100 U	NA	NA	NA
Lead, Dissolved	NA	NA	NA	NA	NA	NA	3.5	NA	NA	NA	NA	3.3 J	3.3 J	NA	NA	NA
Magnesium, Dissolved	NA	NA	NA	NA	NA	NA	5,000 U	NA	NA	NA	NA	6,990	6,840	NA	NA	NA
Manganese, Dissolved	NA	NA	NA	NA	NA	NA	475	NA	NA	NA	NA	10 U	10 U	NA	NA	NA
Mercury, Dissolved	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	0.2 U	0.2 U	NA	NA	NA
Nickel, Dissolved	NA	NA	NA	NA	NA	NA	40 U	NA	NA	NA	NA	40 U	40 U	NA	NA	NA
Potassium, Dissolved	NA	NA	NA	NA	NA	NA	584 J	NA	NA	NA	NA	773 J	752 J	NA	NA	NA
Sodium, Dissolved	NA	NA	NA	NA	NA	NA	12,600	NA	NA	NA	NA	5,000 U	5,000 U	NA	NA	NA
Vanadium, Dissolved	NA	NA	NA	NA	NA	NA	1.5 J	NA	NA	NA	NA	1.5 J	20 U	NA	NA	NA
Zinc, Dissolved	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA	20 U	20 U	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

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µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Detected Analytical Results
January - March 2010

Station ID	BI-GW07/SO07	BI-GW08/SO08	BI-GW09/SO09	BI-GW10/SO10	BI-GW11/SO11	BI-GW12/SO12	BI-GW13/SO13	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17	BI-GW20/SO20	BI-GW21/SO21	BI-GW22/SO22		BI-GW23/SO23	BI-GW24/SO24	BI-GW25/SO25
Sample ID	BI-GW07-10A	BI-GW08-10A	BI-GW09-10A	BI-GW10-10A	BI-GW11-10A	BI-GW12-10A	BI-GW13-10A	BI-GW14-10A	BI-GW15-10A	BI-GW16-10A	BI-GW17-10A	BI-GW20-10A	BI-GW21-10A	BI-GW22-10A	BI-GW22D-10A	BI-GW23-10A	BI-GW24-10A	BI-GW25-10A
Sample Date	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10
Chemical Name																		
Semivolatile Organic Compounds (µg/l)																		
No Detections	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives (µg/l)																		
Perchlorate	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 J	0.2 U	0.2 U	0.08 J	0.13 J	0.2 U	0.21	0.2 U	0.04 J	0.04 J	0.2 U	0.2 U
Total Metals (µg/l)																		
Aluminum	53.1 J	200 UJ	712	36.4 J	200 U	200 U	250	602	933 J	901	482	1,060	200 U	200 UJ	200 U	623 J	200 UJ	200 UJ
Antimony	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	10 U	10 U	10 U	10 U	10 U	10 U	6.2 J	3.7 J	10 U	8.6 J	4.4 J	12	10 U	10 U	10 U	10 U	10 U	10 U
Barium	200 U	0.7 J	200 U	200 U	200 U	200 U	200 U	1.2 J	200 U	200 U	1.5 J	200 U	200 U	0.54 J	0.89 J	3.1 J	200 U	200 U
Beryllium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	33,700	55,800	60,100	45,800	52,500	55,200	38,000	10,600	10,200	10,700	13,000	14,600	70,900	42,100	43,300	26,300	58,300	38,200
Chromium	2.9 J	4.4 J	14	1.7 J	0.99 J	10 U	2.2 J	9.6 J	5.5 J	6.5 J	10.3	13.1	10 U	1.8 J	2.7 J	8.8 J	1.4 J	1.9 J
Cobalt	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Copper	5 U	5 U	5 U	5 U	1.6 J	5 U	5 U	5 U	5 U	5 U	2.2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	100 U	582 J	1,880	100 U	100 U	100 U	364	770	1,060 J	1,480	1,250	3,140	47.6 J	196 J	422 J	1,550 J	100 UJ	100 UJ
Lead	3 U	3 U	3.7	3 U	3 U	3 U	4.6	5.1 J	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	5,500 J	7,800	5,600 J	8,870 J	5,670 J	8,800 J	5,000 UJ	6,200	5,000 U	5,000 UJ	5,000 U	5,000 U	5,500	5,000 U	5,000 U	5,000 U	5,160	5,000 U
Manganese	0.62 J	3.8 J	20	0.44 J	0.69 J	0.61 J	9.2 J	9 J	6.8 J	9.4 J	12.5	8.7 J	0.69 J	1.2 J	3 J	8.9 J	0.46 J	1.2 J
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	40 U	40 U	40 U	40 U	40 U	40 U	40 U	3.9 J	40 U	40 U	2.4 J	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Potassium	624 J	1,040 J	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	104 J	244 J	265 J	378 J	101 J	274 J	127 J	141 J	130 J	438 J	311 J
Selenium	5 UJ	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	4.4 J	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	13,500	26,900	9,640	14,800	19,500	18,800	5,000 U	12,000	5,000 U	5,000 U	29,900	11,700	10,500	5,000 U	5,000 U	6,130	18,400	5,000 U
Thallium	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	1.7 J	2.2 J	4.6 J	0.98 J	0.89 J	0.72 J	3 J	2.7 J	4.4 J	4.5 J	3.5 J	5.1 J	2 J	2.2 J	2.4 J	3.9 J	1.1 J	1.3 J
Zinc	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)																		
Aluminum, Dissolved	NA	NA	NA	NA	200 U	NA	NA	NA	NA	NA	NA	292	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	7.9 J	NA	NA	NA	NA	NA	NA
Barium, Dissolved	NA	NA	NA	NA	200 U	NA	NA	NA	NA	NA	NA	2.8 J	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	NA	NA	NA	NA	47,700	NA	NA	NA	NA	NA	NA	12,800	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA
Copper, Dissolved	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA
Iron, Dissolved	NA	NA	NA	NA	100 U	NA	NA	NA	NA	NA	NA	573	NA	NA	NA	NA	NA	NA
Lead, Dissolved	NA	NA	NA	NA	3 U	NA	NA	NA	NA	NA	NA	3.1	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	NA	NA	NA	NA	5,360	NA	NA	NA	NA	NA	NA	5,000 U	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	3.3 J	NA	NA	NA	NA	NA	NA
Mercury, Dissolved	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	NA	NA	NA	NA	40 U	NA	NA	NA	NA	NA	NA	40 U	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	NA	NA	NA	NA	581 J	NA	NA	NA	NA	NA	NA	77.5 J	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	NA	NA	NA	NA	17,300	NA	NA	NA	NA	NA	NA	11,800	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	NA	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	NA	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA

Notes:

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µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Detected Analytical Results
January - March 2010

Station ID	BI-GW26/SO26	BI-GW27/SO27	BI-GW28/SO28		BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31	BI-GW32/SO32	BI-GW33/SO33	BI-GW34/SO34	BI-GW35/SO35		BI-GW36/SO36	BI-GW38/SO38	BI-GW39/SO39	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42
Sample ID	BI-GW26-10A	BI-GW27-10A	BI-GW28-10A	BI-GW28D-10A	BI-GW29-10A	BI-GW30-10A	BI-GW31-10A	BI-GW32-10A	BI-GW33-10A	BI-GW34-10A	BI-GW35-10A	BI-GW35D-10A	BI-GW36-10A	BI-GW38-10A	BI-GW39-10A	BI-GW40-10A	BI-GW41-10A	BI-GW42-10A
Sample Date	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/27/10	01/26/10	01/26/10	01/26/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10
Chemical Name																		
Semivolatile Organic Compounds (µg/l)																		
No Detections	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives (µg/l)																		
Perchlorate	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.04 J	0.2 U	0.2 U	0.03 J	0.19 J	0.07 J	0.2 U	0.2 U	0.2 U
Total Metals (µg/l)																		
Aluminum	200 UJ	200 UJ	119 J	130 J	200 UJ	580	422	363	41.4 J	746	286	204	485	259	657	452	200 U	226 J
Antimony	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	10 U	10 U	19.4	18.7	10 U	9 J	13.8	13.8	10 U	3.3 J	10 U	10 U	10 U	4 J	5.9 J	7.9 J	10 U	8.4 J
Barium	200 U	200 U	0.62 J	0.34 J	200 U	1 J	200 U	200 U	200 U	2.5 J	1.3 J	1.2 J	1.2 J	1.3 J	2.3 J	200 U	200 U	0.74 J
Beryllium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	54,400	42,700	64,000	67,200	57,000	55,600	54,000	63,900	36,200	8,810	18,800	18,600	9,140	52,800	17,400	46,900	6,030	42,100
Chromium	1.6 J	1.4 J	6 J	7.6 J	10 U	9 J	7.5 J	12.1	2.2 J	8.4 J	5.2 J	4.9 J	4.5 J	3.3 J	9.3 J	4.2 J	2.6 J	4.5 J
Cobalt	5 U	5 U	0.9 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Copper	5 U	5 U	5 U	5 U	5 U	5 U	5.9	1.6 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	100 UJ	100 UJ	8,180	8,490	100 UJ	627	742	480	100 U	2,100	806	537	1,080	590	1,300	850	481	431 J
Lead	3 U	3 U	3 U	4.2	3 U	4.2	3 U	3 U	3 U	3.3 J	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	5,770	5,000 U	5,000 UJ	5,000 UJ	6,530	9,290 J	7,710 J	9,220 J	5,000 UJ	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	7,380	5,000 U	5,000 U
Manganese	16.8	0.74 J	416	427	0.56 J	57.4	12.5	19.3	1.2 J	11	13.6	9.8 J	9.7 J	3.2 J	20.3	2.9 J	5.9 J	24.9
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.1 J	0.1 J	0.2 U	0.2 U	0.2 U	0.38	0.23	0.2 U
Nickel	40 U	40 U	2.3 J	1.7 J	40 U	3 J	2.1 J	5.9 J	40 U	40 U	2.3 J	2.2 J	40 U	40 U	2.2 J	40 U	40 U	1 J
Potassium	832 J	255 J	1,610 J	1,570 J	651 J	1,900 J	1,300 J	541 J	345 J	139 J	396 J	392 J	167 J	197 J	248 J	794 J	279 J	406 J
Selenium	5 U	5 U	5 UJ	5 UJ	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 U	5.2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	7,230	5,000 U	19,200	18,300	9,070	33,600	32,300	32,700	12,400	5,000 U	5,090	5,210	5,000 U	43,300	21,600	6,420	5,000 U	11,800
Thallium	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	1.2 J	1 J	10.4 J	10.3 J	0.97 J	12.5 J	6.9 J	7.6 J	1.3 J	4.7 J	3.7 J	3.4 J	2.6 J	2.4 J	4.8 J	3.2 J	1.8 J	4.7 J
Zinc	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)																		
Aluminum, Dissolved	NA	NA	NA	NA	NA	224	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	388	NA
Arsenic, Dissolved	NA	NA	NA	NA	NA	7.7 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	38	NA
Barium, Dissolved	NA	NA	NA	NA	NA	200 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.7 J	NA
Beryllium, Dissolved	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 U	NA
Calcium, Dissolved	NA	NA	NA	NA	NA	51,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	40,000	NA
Chromium, Dissolved	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	11.3	NA
Cobalt, Dissolved	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9 J	NA
Copper, Dissolved	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 U	NA
Iron, Dissolved	NA	NA	NA	NA	NA	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9,640	NA
Lead, Dissolved	NA	NA	NA	NA	NA	3.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.4	NA
Magnesium, Dissolved	NA	NA	NA	NA	NA	8,700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,000 U	NA
Manganese, Dissolved	NA	NA	NA	NA	NA	47.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	715	NA
Mercury, Dissolved	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	NA
Nickel, Dissolved	NA	NA	NA	NA	NA	3 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.2 J	NA
Potassium, Dissolved	NA	NA	NA	NA	NA	1,750 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,730 J	NA
Sodium, Dissolved	NA	NA	NA	NA	NA	30,100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	14,700	NA
Vanadium, Dissolved	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	NA
Zinc, Dissolved	NA	NA	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	NA

Notes:

Shading indicates detections

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µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Detected Analytical Results
January - March 2010

Station ID	BI-GW43/SO43	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46	BI-GW47/SO47	BI-GW48/SO48	BI-GW49/SO49		BI-GW59/SO59	ICWBG-GW20/SO20		ICWBG-GW21/SO21	ICWBG-GW22/SO22	ICW-GW01/SO01	ICW-GW02/SO02
Sample ID	BI-GW43-10A	BI-GW44-10A	BI-GW45-10A	BI-GW46-10A	BI-GW47-10A	BI-GW48-10A	BI-GW49-10A	BI-GW49D-10A	BI-GW59-10A	ICW-GW20-10A	ICW-GW20D-10A	ICW-GW21-10A	ICW-GW22-10A	ICW-GW01-10A	ICW-GW02-10A
Sample Date	01/28/10	01/29/10	01/27/10	01/27/10	02/01/10	02/01/10	01/28/10	01/28/10	02/01/10	03/26/10	03/26/10	03/26/10	03/25/10	03/23/10	03/23/10
Chemical Name															
Semivolatile Organic Compounds (µg/l)															
No Detections	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives (µg/l)															
Perchlorate	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.03 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/l)															
Aluminum	200 UJ	186 J	168 J	200 U	291	1,180	54.9 J	56.7 J	1,570	129 J+	116 J+	63.2 J	200 U	200 U	200 U
Antimony	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	19,800	10 U
Arsenic	10 U	10 U	10 U	10 U	10 U	5.8 J	10 U	10 U	28.1	16	13.9	5.8 J	3 J	10 U	10 U
Barium	200 U	200 U	0.39 J	200 U	200 U	200 U	200 U	200 U	200 U	1.5 J	1.4 J	13.1 J	1.2 J	200 U	200 U
Beryllium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	31,100	31,600	9,980	42,500	16,700	21,700	41,500	41,800	31,700	89,700	87,000	453,000	116,000	5,000 U	37,200
Chromium	1.4 J	1.8 J	2.1 J	1.3 J	2.7 J	9.9 J	10 U	0.95 J	41	4.8 J	4.9 J	4.2 J	2.3 J	10 U	2.1 J
Cobalt	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	13.4	5 U	5 U	5 U	5 U	5 U	5 U
Copper	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.2 J	5 U	1.9 J	5 U	5 U	5 U	6.6
Iron	100 UJ	250	471	71.3 J	851	2,350	29.7 J	34.1 J	60,300	3,730	3,600	488	874	100 U	71.2 J
Lead	3 U	3 U	3 U	3.5 J	3 U	3 U	3 U	3 U	5.2	3 U	3 U	3 U	3 U	11,800	2.5 J
Magnesium	5,000 U	5,000 UJ	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	7,900	30,000	29,100	326,000	35,400	5,000 U	7,040
Manganese	1.4 J	4.5 J	6.9 J	1.4 J	9.4 J	14	0.69 J	0.84 J	292	55	53.4	41.6	31.4	10 U	1.4 J
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	2.2 J	2.5 J	40 U	5 U	5 U	1.3 J
Potassium	127 J	55.1 J	40.7 J	184 J	120 J	292 J	179 J	184 J	1,040 J	7,690 J	7,530 J	316,000 J	8,560 J	5,000 U	1,180 J
Selenium	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	4.2 J-	5 R	5 U	7 J-	5 U	5 U
Silver	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.5 J
Sodium	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	11,500	11,900	12,500	12,300	199,000 J	197,000 J	5,540,000 J	130,000 J	240,000	5,000 U
Thallium	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	23.4	10 U	5,440	10 U
Vanadium	0.95 J	2.4 J	0.97 J	0.92 J	3.4 J	7.2 J	1.6 J	1.7 J	17.4 J	11.9 J	11.6 J	2.7 J	4.8 J	20 U	3.7 J
Zinc	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)															
Aluminum, Dissolved	NA	NA	200 U	NA	NA	NA	NA	NA	NA	200 U	200 U	NA	NA	NA	NA
Arsenic, Dissolved	NA	NA	10 U	NA	NA	NA	NA	NA	NA	14.3	13.9	NA	NA	NA	NA
Barium, Dissolved	NA	NA	200 U	NA	NA	NA	NA	NA	NA	1.1 J	1.2 J	NA	NA	NA	NA
Beryllium, Dissolved	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA
Calcium, Dissolved	NA	NA	10,000	NA	NA	NA	NA	NA	NA	82,900	82,600	NA	NA	NA	NA
Chromium, Dissolved	NA	NA	1.1 J	NA	NA	NA	NA	NA	NA	3.8 J	4.4 J	NA	NA	NA	NA
Cobalt, Dissolved	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA
Copper, Dissolved	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA
Iron, Dissolved	NA	NA	100 U	NA	NA	NA	NA	NA	NA	3,320	3,310	NA	NA	NA	NA
Lead, Dissolved	NA	NA	3 U	NA	NA	NA	NA	NA	NA	3 U	2.1 J	NA	NA	NA	NA
Magnesium, Dissolved	NA	NA	5,000 U	NA	NA	NA	NA	NA	NA	28,200	28,100	NA	NA	NA	NA
Manganese, Dissolved	NA	NA	2 J	NA	NA	NA	NA	NA	NA	49.3	49.1	NA	NA	NA	NA
Mercury, Dissolved	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	0.2 U	0.2 U	NA	NA	NA	NA
Nickel, Dissolved	NA	NA	40 U	NA	NA	NA	NA	NA	NA	2 J	2 J	NA	NA	NA	NA
Potassium, Dissolved	NA	NA	28 J	NA	NA	NA	NA	NA	NA	7,310 J	7,210 J	NA	NA	NA	NA
Sodium, Dissolved	NA	NA	5,000 U	NA	NA	NA	NA	NA	NA	191,000	191,000	NA	NA	NA	NA
Vanadium, Dissolved	NA	NA	1 J	NA	NA	NA	NA	NA	NA	10.2 J	10.1 J	NA	NA	NA	NA
Zinc, Dissolved	NA	NA	20 U	NA	NA	NA	NA	NA	NA	2.3 J	2.4 J	NA	NA	NA	NA

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CTO-80
Surface Danger Zone
Validated Groundwater Detected Analytical Results
January - March 2010

Station ID	ICW-GW03/SO03		ICW-GW04/SO04	ICW-GW05/SO05	ICW-GW06/SO06	ICW-GW07/SO07	ICW-GW08/SO08	ICW-GW09/SO09	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW12/SO12	ICW-GW13/SO13	ICW-GW14/SO14	ICW-GW15/SO15	ICW-GW16/SO16	ICW-GW17/SO17
Sample ID	ICW-GW03-10A	ICW-GW03D-10A	ICW-GW04-10A	ICW-GW05-10A	ICW-GW06-10A	ICW-GW07-10A	ICW-GW08-10A	ICW-GW09-10A	ICW-GW10-10A	ICW-GW11-10A	ICW-GW12-10A	ICW-GW13-10A	ICW-GW14-10A	ICW-GW15-10A	ICW-GW16-10A	ICW-GW17-10A
Sample Date	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10	03/22/10	03/23/10	03/23/10	03/23/10	03/23/10	03/24/10	03/25/10	03/25/10	03/25/10	03/26/10	03/25/10
Chemical Name																
Semivolatile Organic Compounds (µg/l)																
No Detections	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives (µg/l)																
Perchlorate	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/l)																
Aluminum	2,120	200 U	1,320	200 U	604	1,570	200 U	2,050	253	200 U	7,040	200 U	648 J+	1,780 J+	476 J+	237 J+
Antimony	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	10 U	10 U	12.7	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	3.2 J	10 U	17.2	4.6 J
Barium	200 U	12.1 J	8.7 J	1.1 J	3.9 J	12.8 J	2.1 J	15.2 J	6 J	1 J	12.9 J	7.7 J	5.3 J	5.4 J	4.7 J	5.9 J
Beryllium	985	214	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	27	5 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.41 J	5 U	5 U	5 U	5 U	5 U
Calcium	30,800	169,000	86,700	79,200	69,800	52,800	83,400	212,000	61,000	74,600	151,000	334,000	184,000	188,000	255,000	280,000
Chromium	68.5	15.2	18.8	1 J	2.4 J	5.7 J	3.8 J	11.2	2.5 J	2.2 J	27.2	10 U	2.2 J	7.9 J	8.3 J	2.6 J
Cobalt	39.8	23	2.8 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.5 J	5 U	5 U	5 U	5 U	5 U
Copper	5 U	27.2	6.9	5 U	5 U	6.7	5.7	5 U	5.5	5 U	18.1	5 U	5 U	5 U	5 U	5 U
Iron	5,780	542	8,920	1,000	649	3,850	256	4,320	573	1,260	7,390	135	1,010	1,400	4,970	374
Lead	3 U	3 U	2.3 J	3 U	3 U	3.2	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	5,000 U	25,100	102,000	28,400	29,000	10,900	41,300	362,000	21,800	22,500	150,000	594,000	420,000	86,900	216,000	216,000
Manganese	33.9	8.9 J	26.5	33	16.7	19.2	16.7	40.1	23.6	18.7	39.7	3.5 J	24.9	31.4	48.1	49.1
Mercury	0.2 U	0.2 U	0.13 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	453	45.1	7.2	5 U	5 U	5 U	5 U	1.1 J	5 U	5 U	6	5 U	1.4 J	3 J	2.7 J	2.2 J
Potassium	310,000 J	40,000 J	58,300 J	8,820 J	6,990 J	2,150 J	14,800 J	170,000 J	11,200 J	3,090 J	88,400 J	235,000 J	231,000 J	28,400 J	93,300 J	72,400 J
Selenium	5 U	5 U	5.8	5 U	4.6 J	5 U	3.8 J	5 U	5	5 U	5 J	5 R	5 R	5 R	5 R	5 R
Silver	13.7	1 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	5,000 U	68,900	979,000	25,900	46,600	26,400	427,000	2,910,000	91,500	40,600	1,400,000	3,900,000 J	3,490,000 J	749,000 J	1,770,000 J	1,630,000 J
Thallium	345	10 U	10 U	10 U	10 U	10 U	10 U	10.8	10 U	10 U	10 U	13.2	9.5 J	10 U	10 U	10 U
Vanadium	20 U	20 U	64.5	1.5 J	6.1 J	11.2 J	9.9 J	18.2 J	3.4 J	5.7 J	27.7	1.1 J	5.3 J	16 J	15.2 J	4.3 J
Zinc	441	20.9	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)																
Aluminum, Dissolved	200 U	200 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	200 U	200 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	40,200	41,500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	100 U	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	3 U	2.7 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	10,600	10,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	1.1 J	1.4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury, Dissolved	0.44	0.39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	2,150 J	2,040 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	9,210	9,310	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	20 U	0.85 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	1.5 J	1.4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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CTO-80
Surface Danger Zone
Validated Groundwater Detected Analytical Results
January - March 2010

Station ID	ICW-GW18/SO18	ICW-GW19/SO19	SI-GW01/SO01		SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID	ICW-GW18-10A	ICW-GW19-10A	SI-GW01-10A	SI-GW01D-10A	SI-GW02-10A	SI-GW03-10A	SI-GW04-10A	SI-GW05-10A	SI-GW06-10A
Sample Date	03/25/10	03/26/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name									
Semivolatile Organic Compounds (µg/l)									
No Detections	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives (µg/l)									
Perchlorate	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/l)									
Aluminum	617 J+	204 J+	3,370 J+	3,880 J+	200 U	200 U	43.7 J+	4,090 J+	200 U
Antimony	10 U	10 U	10 U	10 U	10 U	10 U	10 U	510	10 U
Arsenic	5 J	10 U	20.5	21.9	10 U	10 U	10 U	43	10 U
Barium	6.3 J	3.6 J	200 U	18.6 J	3.8 J	1.7 J	2.2 J	1,970	2.5 J
Beryllium	5 U	5 U	5 U	5 U	8.4	5 U	5 U	48.8	5 U
Cadmium	5 U	5 U	5 U	5 U	0.46 J	5 U	5 U	46	5 U
Calcium	333,000	175,000	54,600	53,600	76,400	49,500	95,800	186,000	129,000
Chromium	5.4 J	5.7 J	25.5	30.9	5.2 J	4.7 J	1.2 J	197	2 J
Cobalt	5 U	5 U	5 U	5 U	0.83 J	5 U	5 U	487	5 U
Copper	5 U	5 U	5 U	5.5	29.2	11.6	5 U	246	19.5
Iron	3,060	776	1,910	2,300	841	546	121	2,390	85 J
Lead	3 U	3 U	3.3	4.2	3 U	3 U	3 U	19.8	3 U
Magnesium	265,000	95,400	139,000	137,000	18,100	31,300	89,900	87,000	74,900
Manganese	103	26.3	33.4	32.9	25.1	32.2	9.5 J	518	24.5
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	1.1 J	2.2 J	1.6 J	1.6 J	5 U	5 U	5 U	471	5 U
Potassium	98,100 J	34,600 J	63,600 J	63,000 J	14,200 J	23,700 J	41,000 J	28,600 J	33,900 J
Selenium	5 R	3.8 J-	5 R	5 R	5 U	5.5	5 R	5 R	5 U
Silver	5 U	5 U	5 U	5 U	1.2 J	5 U	5 U	46.2	5 U
Sodium	2,130,000 J	746,000 J	1,240,000 J	1,220,000 J	122,000	178,000	716,000 J	365,000 J	592,000
Thallium	10 U	10 U	10 U	10 U	10 U	10 U	10 U	57.1	10 U
Vanadium	6.6 J	12.7 J	20 U	16.2 J	20 U	13.8 J	20 U	521	20 U
Zinc	20 U	20 U	20 U	20 U	20 U	20 U	20 U	476	20 U
Dissolved Metals (µg/l)									
Aluminum, Dissolved	NA	NA	2,640	2,690	NA	NA	NA	NA	NA
Arsenic, Dissolved	NA	NA	19.3	21.9	NA	NA	NA	NA	NA
Barium, Dissolved	NA	NA	16.6 J	16.5 J	NA	NA	NA	NA	NA
Beryllium, Dissolved	NA	NA	5 U	0.45 J	NA	NA	NA	NA	NA
Calcium, Dissolved	NA	NA	53,300	52,800	NA	NA	NA	NA	NA
Chromium, Dissolved	NA	NA	28.5	27.4	NA	NA	NA	NA	NA
Cobalt, Dissolved	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Copper, Dissolved	NA	NA	4.1 J	5 U	NA	NA	NA	NA	NA
Iron, Dissolved	NA	NA	1,400	1,350	NA	NA	NA	NA	NA
Lead, Dissolved	NA	NA	3.1	2 J	NA	NA	NA	NA	NA
Magnesium, Dissolved	NA	NA	139,000	140,000	NA	NA	NA	NA	NA
Manganese, Dissolved	NA	NA	30.8	30.7	NA	NA	NA	NA	NA
Mercury, Dissolved	NA	NA	0.6	0.2 U	NA	NA	NA	NA	NA
Nickel, Dissolved	NA	NA	1.9 J	1 J	NA	NA	NA	NA	NA
Potassium, Dissolved	NA	NA	57,200 J	58,300 J	NA	NA	NA	NA	NA
Sodium, Dissolved	NA	NA	1,100,000	1,140,000	NA	NA	NA	NA	NA
Vanadium, Dissolved	NA	NA	13.9 J	14.1 J	NA	NA	NA	NA	NA
Zinc, Dissolved	NA	NA	7.3 J	5.4 J	NA	NA	NA	NA	NA

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µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54	BIBG-GW55/SO55	BIBG-GW56/SO56	BIBG-GW57/SO57	
Sample ID				BI-GW50-10A	BI-GW51-10A	BI-GW52-10A	BI-GW53-10A	BI-GW54-10A	BI-GW55-10A	BI-GW56-10A	BI-GW57-10A	BI-GW57D-10A
Sample Date				01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	02/01/10	01/25/10	02/01/10	02/01/10
Chemical Name												
Semivolatile Organic Compounds (µg/l)												
No Detections												
Explosives (µg/l)												
Perchlorate	--	--	2.6	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/l)												
Aluminum	360	--	3,700	545	200 U	196 J	200 U	346	200 U	200 U	206	239
Antimony	--	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.06	10	0.045	**3 J**	10 U	10 U	10 U	10 U	10 U	**14**	10 U	10 U
Barium	58.4	700	730	1.8 J	0.53 J	200 U	0.78 J	0.72 J	200 U	1.2 J	200 U	200 U
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	154,400	--	--	18,400	9,900	45,700	46,700	11,100	13,200	39,100	6,100	6,200
Chromium	6.7	10	0.043	**5.6 J**	**2.5 J**	**1.9 J**	**5.8 J**	**2.9 J**	**2.3 J**	**1.9 J**	**2.7 J**	**3 J**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	5 U	5 U	5 U	**1.9 J**	5 U	5 U
Copper	4.88	1,000	150	5 U	5 U	5 U	5 U	1.8 J	5 U	5 U	5 U	5 U
Iron	3,220	300	2,600	1,450	283	204	191	697	353	**8,940**	492	502
Lead	3.44	15	15	3 U	3 U	3.9 J	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	75,800	--	--	5,000 U	5,000 U	5,110	5,910	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U
Manganese	116	50	88	10.5	3.2 J	2.7 J	8.9 J	7.8 J	5.3 J	**466**	6.1 J	6 J
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.22	0.2 U	0.17 J	0.2 U
Nickel	107.4	100	73	40 U	40 U	40 U	**426**	40 U	40 U	40 U	40 U	40 U
Potassium	61,000	--	--	362 J	512 J	518 J	645 J	226 J	219 J	700 J	282 J	289 J
Selenium	6.12	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	--	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	1,078,000	--	--	9,640	10,500	9,020	11,900	5,000 U	6,270	13,000	5,000 U	5,000 U
Thallium	13.34	2	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	6.06	--	18	2.9 J	0.88 J	1.5 J	1 J	2.8 J	1.5 J	1.4 J	1.9 J	2 J
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)												
Aluminum, Dissolved	360	--	3,700	NA	NA	NA	NA	NA	NA	200 U	NA	NA
Arsenic, Dissolved	13.06	10	0.045	NA	NA	NA	NA	NA	NA	**10.9**	NA	NA
Barium, Dissolved	58.4	700	730	NA	NA	NA	NA	NA	NA	200 U	NA	NA
Beryllium, Dissolved	--	4	7.3	NA	NA	NA	NA	NA	NA	5 U	NA	NA
Calcium, Dissolved	154,400	--	--	NA	NA	NA	NA	NA	NA	39,300	NA	NA
Chromium, Dissolved	6.7	10	0.043	NA	NA	NA	NA	NA	NA	**2.2 J**	NA	NA
Cobalt, Dissolved	4.9	--	1.1	NA	NA	NA	NA	NA	NA	**1.6 J**	NA	NA
Copper, Dissolved	4.88	1,000	150	NA	NA	NA	NA	NA	NA	5 U	NA	NA
Iron, Dissolved	3,220	300	2,600	NA	NA	NA	NA	NA	NA	**8,930**	NA	NA
Lead, Dissolved	3.44	15	15	NA	NA	NA	NA	NA	NA	3.5	NA	NA
Magnesium, Dissolved	75,800	--	--	NA	NA	NA	NA	NA	NA	5,000 U	NA	NA
Manganese, Dissolved	116	50	88	NA	NA	NA	NA	NA	NA	**475**	NA	NA
Mercury, Dissolved	0.234	1	1.1	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA
Nickel, Dissolved	107.4	100	73	NA	NA	NA	NA	NA	NA	40 U	NA	NA
Potassium, Dissolved	61,000	--	--	NA	NA	NA	NA	NA	NA	584 J	NA	NA
Sodium, Dissolved	1,078,000	--	--	NA	NA	NA	NA	NA	NA	12,600	NA	NA

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	**Camp Lejeune Background GW 2X Mean**	**NC2LGW (January, 2010) ***	**Adjusted Tap Water RSLs (May 2010)**	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54	BIBG-GW55/SO55	BIBG-GW56/SO56	BIBG-GW57/SO57	
Sample ID				BI-GW50-10A	BI-GW51-10A	BI-GW52-10A	BI-GW53-10A	BI-GW54-10A	BI-GW55-10A	BI-GW56-10A	BI-GW57-10A	BI-GW57D-10A
Sample Date				01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	02/01/10	01/25/10	02/01/10	02/01/10
Chemical Name												
Vanadium, Dissolved	6.06	--	18	NA	NA	NA	NA	NA	NA	1.5 J	NA	NA
Zinc, Dissolved	--	1,000	1,100	NA	NA	NA	NA	NA	NA	20 U	NA	NA

Notes:

Bold box indicates exceedance of NC2LGW or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

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

* - The MCL-Groundwater value is reported in place of the NC2LGW where the MCL value is more conservative.

Shading indicates exceedance of two times the mean base background concentration for Groundwater

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BI-GW01/SO01	BI-GW02/SO02	BI-GW03/SO03		BI-GW04/GW04	BI-GW05/SO05	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08	BI-GW09/SO09	BI-GW10/SO10
Sample ID				BI-GW01-10A	BI-GW02-10A	BI-GW03-10A	BI-GW03D-10A	BI-GW04-10A	BI-GW05-10A	BI-GW06-10A	BI-GW07-10A	BI-GW08-10A	BI-GW09-10A	BI-GW10-10A
Sample Date				01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10
Chemical Name														
Semivolatile Organic Compounds (µg/l)														
No Detections														
Explosives (µg/l)														
Perchlorate	--	--	2.6	0.08 J	0.2 U	0.2 U	0.03 J	0.2 U	0.17 J	0.07 J	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/l)														
Aluminum	360	--	3,700	200 UJ	320 J	200 UJ	200 UJ	200 U	200 UJ	200 UJ	53.1 J	200 UJ	712	36.4 J
Antimony	--	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.06	10	0.045	10 U	10 U	10 U	10 U	10 U	**3 J**	10 U	10 U	10 U	10 U	10 U
Barium	58.4	700	730	0.37 J	1.9 J	200 U	200 U	200 U	200 U	200 U	200 U	0.7 J	200 U	200 U
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	154,400	--	--	58,100	53,400	48,600	48,600	25,700	43,400	42,400	33,700	55,800	60,100	45,800
Chromium	6.7	10	0.043	**2.3 J**	**10.1**	**2 J**	**1.6 J**	**1.4 J**	**3 J**	**2 J**	**2.9 J**	**4.4 J**	**14**	**1.7 J**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Copper	4.88	1,000	150	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	3,220	300	2,600	100 UJ	609 J	100 UJ	100 UJ	107 J	100 UJ	100 UJ	100 U	582 J	1,880	100 U
Lead	3.44	15	15	3.1 J	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3.7	3 U
Magnesium	75,800	--	--	16,800	9,740	6,790	6,770	5,000 U	11,300	14,500	5,500 J	7,800	5,600 J	8,870 J
Manganese	116	50	88	0.68 J	7.2 J	10 U	10 U	1.3 J	0.44 J	10 U	0.62 J	3.8 J	20	0.44 J
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	107.4	100	73	40 U	1.7 J	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Potassium	61,000	--	--	1,620 J	1,220 J	757 J	756 J	366 J	1,430 J	1,920 J	624 J	1,040 J	5,000 U	5,000 U
Selenium	6.12	20	18	5 U	5 U	5 U	5 U	5 U	3.9 J	5 U	5 UJ	5 U	5 UJ	5 UJ
Silver	--	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	1,078,000	--	--	17,300	12,600	5,000 U	5,000 U	5,000 U	18,400	63,000	13,500	26,900	9,640	14,800
Thallium	13.34	2	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	6.06	--	18	1.8 J	2.4 J	1.3 J	1.2 J	1.4 J	2.2 J	1.7 J	1.7 J	2.2 J	4.6 J	0.98 J
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)														
Aluminum, Dissolved	360	--	3,700	NA	NA	200 U	200 U	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	13.06	10	0.045	NA	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	58.4	700	730	NA	NA	200 U	200 U	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	7.3	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	154,400	--	--	NA	NA	50,600	49,800	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	6.7	10	0.043	NA	NA	**2.7 J**	10 U	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	4.9	--	1.1	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	4.88	1,000	150	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	3,220	300	2,600	NA	NA	100 U	100 U	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	3.44	15	15	NA	NA	3.3 J	3.3 J	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	75,800	--	--	NA	NA	6,990	6,840	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	116	50	88	NA	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Mercury, Dissolved	0.234	1	1.1	NA	NA	0.2 U	0.2 U	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	107.4	100	73	NA	NA	40 U	40 U	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	61,000	--	--	NA	NA	773 J	752 J	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	1,078,000	--	--	NA	NA	5,000 U	5,000 U	NA	NA	NA	NA	NA	NA	NA

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BI-GW01/SO01	BI-GW02/SO02	BI-GW03/SO03		BI-GW04/GW04	BI-GW05/SO05	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08	BI-GW09/SO09	BI-GW10/SO10
Sample ID				BI-GW01-10A	BI-GW02-10A	BI-GW03-10A	BI-GW03D-10A	BI-GW04-10A	BI-GW05-10A	BI-GW06-10A	BI-GW07-10A	BI-GW08-10A	BI-GW09-10A	BI-GW10-10A
Sample Date				01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10
Chemical Name														
Vanadium, Dissolved	6.06	--	18	NA	NA	1.5 J	20 U	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	1,000	1,100	NA	NA	20 U	20 U	NA	NA	NA	NA	NA	NA	NA

Notes:

Bold box indicates exceedance of NC2LGW or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

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

* - The MCL-Groundwater value is reported in place of the NC2LGW where the MCL value is more conservative.

Shading indicates exceedance of two times the mean base background concentration for Groundwater

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BI-GW11/SO11	BI-GW12/SO12	BI-GW13/SO13	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17	BI-GW20/SO20	BI-GW21/SO21	BI-GW22/SO22	
Sample ID				BI-GW11-10A	BI-GW12-10A	BI-GW13-10A	BI-GW14-10A	BI-GW15-10A	BI-GW16-10A	BI-GW17-10A	BI-GW20-10A	BI-GW21-10A	BI-GW22-10A	BI-GW22D-10A
Sample Date				01/31/10	01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10
Chemical Name														
Semivolatile Organic Compounds (µg/l)														
No Detections														
Explosives (µg/l)														
Perchlorate	--	--	2.6	0.2 U	0.2 U	0.05 J	0.2 U	0.2 U	0.08 J	0.13 J	0.2 U	0.21	0.2 U	0.04 J
Total Metals (µg/l)														
Aluminum	360	--	3,700	200 U	200 U	250	602	933 J	901	482	1,060	200 U	200 UJ	200 U
Antimony	--	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.06	10	0.045	10 U	10 U	**6.2 J**	**3.7 J**	10 U	**8.6 J**	**4.4 J**	**12**	10 U	10 U	10 U
Barium	58.4	700	730	200 U	200 U	200 U	1.2 J	200 U	200 U	1.5 J	200 U	200 U	0.54 J	0.89 J
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	154,400	--	--	52,500	55,200	38,000	10,600	10,200	10,700	13,000	14,600	70,900	42,100	43,300
Chromium	6.7	10	0.043	**0.99 J**	10 U	**2.2 J**	**9.6 J**	**5.5 J**	**6.5 J**	**10.3**	**13.1**	10 U	**1.8 J**	**2.7 J**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Copper	4.88	1,000	150	1.6 J	5 U	5 U	5 U	5 U	5 U	2.2 J	5 U	5 U	5 U	5 U
Iron	3,220	300	2,600	100 U	100 U	364	770	1,060 J	1,480	1,250	**3,140**	47.6 J	196 J	422 J
Lead	3.44	15	15	3 U	3 U	4.6	5.1 J	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	75,800	--	--	5,670 J	8,800 J	5,000 UJ	6,200	5,000 U	5,000 UJ	5,000 U	5,000 U	5,500	5,000 U	5,000 U
Manganese	116	50	88	0.69 J	0.61 J	9.2 J	9 J	6.8 J	9.4 J	12.5	8.7 J	0.69 J	1.2 J	3 J
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	107.4	100	73	40 U	40 U	40 U	3.9 J	40 U	40 U	2.4 J	40 U	40 U	40 U	40 U
Potassium	61,000	--	--	5,000 U	5,000 U	5,000 U	104 J	244 J	265 J	378 J	101 J	274 J	127 J	141 J
Selenium	6.12	20	18	5 UJ	5 UJ	5 UJ	4.4 J	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U
Silver	--	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	1,078,000	--	--	19,500	18,800	5,000 U	12,000	5,000 U	5,000 U	29,900	11,700	10,500	5,000 U	5,000 U
Thallium	13.34	2	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	6.06	--	18	0.89 J	0.72 J	3 J	2.7 J	4.4 J	4.5 J	3.5 J	5.1 J	2 J	2.2 J	2.4 J
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)														
Aluminum, Dissolved	360	--	3,700	200 U	NA	NA	NA	NA	NA	NA	292	NA	NA	NA
Arsenic, Dissolved	13.06	10	0.045	10 U	NA	NA	NA	NA	NA	NA	**7.9 J**	NA	NA	NA
Barium, Dissolved	58.4	700	730	200 U	NA	NA	NA	NA	NA	NA	2.8 J	NA	NA	NA
Beryllium, Dissolved	--	4	7.3	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA
Calcium, Dissolved	154,400	--	--	47,700	NA	NA	NA	NA	NA	NA	12,800	NA	NA	NA
Chromium, Dissolved	6.7	10	0.043	10 U	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA
Cobalt, Dissolved	4.9	--	1.1	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA
Copper, Dissolved	4.88	1,000	150	5 U	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA
Iron, Dissolved	3,220	300	2,600	100 U	NA	NA	NA	NA	NA	NA	573	NA	NA	NA
Lead, Dissolved	3.44	15	15	3 U	NA	NA	NA	NA	NA	NA	3.1	NA	NA	NA
Magnesium, Dissolved	75,800	--	--	5,360	NA	NA	NA	NA	NA	NA	5,000 U	NA	NA	NA
Manganese, Dissolved	116	50	88	10 U	NA	NA	NA	NA	NA	NA	3.3 J	NA	NA	NA
Mercury, Dissolved	0.234	1	1.1	0.2 U	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA
Nickel, Dissolved	107.4	100	73	40 U	NA	NA	NA	NA	NA	NA	40 U	NA	NA	NA
Potassium, Dissolved	61,000	--	--	581 J	NA	NA	NA	NA	NA	NA	77.5 J	NA	NA	NA
Sodium, Dissolved	1,078,000	--	--	17,300	NA	NA	NA	NA	NA	NA	11,800	NA	NA	NA

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BI-GW11/SO11	BI-GW12/SO12	BI-GW13/SO13	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17	BI-GW20/SO20	BI-GW21/SO21	BI-GW22/SO22	
Sample ID				BI-GW11-10A	BI-GW12-10A	BI-GW13-10A	BI-GW14-10A	BI-GW15-10A	BI-GW16-10A	BI-GW17-10A	BI-GW20-10A	BI-GW21-10A	BI-GW22-10A	BI-GW22D-10A
Sample Date				01/31/10	01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10
Chemical Name														
Vanadium, Dissolved	6.06	--	18	20 U	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA
Zinc, Dissolved	--	1,000	1,100	20 U	NA	NA	NA	NA	NA	NA	20 U	NA	NA	NA

Notes:

Bold box indicates exceedance of NC2LGW or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

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

* - The MCL-Groundwater value is reported in place of the NC2LGW where the MCL value is more conservative.

Shading indicates exceedance of two times the mean base background concentration for Groundwater

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BI-GW23/SO23	BI-GW24/SO24	BI-GW25/SO25	BI-GW26/SO26	BI-GW27/SO27	BI-GW28/SO28		BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31	BI-GW32/SO32
Sample ID				BI-GW23-10A	BI-GW24-10A	BI-GW25-10A	BI-GW26-10A	BI-GW27-10A	BI-GW28-10A	BI-GW28D-10A	BI-GW29-10A	BI-GW30-10A	BI-GW31-10A	BI-GW32-10A
Sample Date				01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10
Chemical Name														
Semivolatile Organic Compounds (µg/l)														
No Detections														
Explosives (µg/l)														
Perchlorate	--	--	2.6	0.04 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/l)														
Aluminum	360	--	3,700	623 J	200 UJ	200 UJ	200 UJ	200 UJ	119 J	130 J	200 UJ	580	422	363
Antimony	--	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.06	10	0.045	10 U	10 U	10 U	10 U	10 U	**19.4**	**18.7**	10 U	**9 J**	**13.8**	**13.8**
Barium	58.4	700	730	3.1 J	200 U	200 U	200 U	200 U	0.62 J	0.34 J	200 U	1 J	200 U	200 U
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	154,400	--	--	26,300	58,300	38,200	54,400	42,700	64,000	67,200	57,000	55,600	54,000	63,900
Chromium	6.7	10	0.043	**8.8 J**	**1.4 J**	**1.9 J**	**1.6 J**	**1.4 J**	**6 J**	**7.6 J**	10 U	**9 J**	**7.5 J**	**12.1**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	5 U	5 U	0.9 J	5 U	5 U	5 U	5 U	5 U
Copper	4.88	1,000	150	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5.9	1.6 J
Iron	3,220	300	2,600	1,550 J	100 UJ	100 UJ	100 UJ	100 UJ	**8,180**	**8,490**	100 UJ	627	742	480
Lead	3.44	15	15	3 U	3 U	3 U	3 U	3 U	3 U	4.2	3 U	4.2	3 U	3 U
Magnesium	75,800	--	--	5,000 U	5,160	5,000 U	5,770	5,000 U	5,000 UJ	5,000 UJ	6,530	9,290 J	7,710 J	9,220 J
Manganese	116	50	88	8.9 J	0.46 J	1.2 J	16.8	0.74 J	**416**	**427**	0.56 J	57.4	12.5	19.3
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	107.4	100	73	40 U	40 U	40 U	40 U	40 U	2.3 J	1.7 J	40 U	3 J	2.1 J	5.9 J
Potassium	61,000	--	--	130 J	438 J	311 J	832 J	255 J	1,610 J	1,570 J	651 J	1,900 J	1,300 J	541 J
Selenium	6.12	20	18	5 U	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 U	5 UJ	5 UJ	5 UJ
Silver	--	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	1,078,000	--	--	6,130	18,400	5,000 U	7,230	5,000 U	19,200	18,300	9,070	33,600	32,300	32,700
Thallium	13.34	2	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	6.06	--	18	3.9 J	1.1 J	1.3 J	1.2 J	1 J	10.4 J	10.3 J	0.97 J	12.5 J	6.9 J	7.6 J
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)														
Aluminum, Dissolved	360	--	3,700	NA	NA	NA	NA	NA	NA	NA	NA	224	NA	NA
Arsenic, Dissolved	13.06	10	0.045	NA	NA	NA	NA	NA	NA	NA	NA	**7.7 J**	NA	NA
Barium, Dissolved	58.4	700	730	NA	NA	NA	NA	NA	NA	NA	NA	200 U	NA	NA
Beryllium, Dissolved	--	4	7.3	NA	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA
Calcium, Dissolved	154,400	--	--	NA	NA	NA	NA	NA	NA	NA	NA	51,600	NA	NA
Chromium, Dissolved	6.7	10	0.043	NA	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA
Cobalt, Dissolved	4.9	--	1.1	NA	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA
Copper, Dissolved	4.88	1,000	150	NA	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA
Iron, Dissolved	3,220	300	2,600	NA	NA	NA	NA	NA	NA	NA	NA	100 U	NA	NA
Lead, Dissolved	3.44	15	15	NA	NA	NA	NA	NA	NA	NA	NA	3.1 J	NA	NA
Magnesium, Dissolved	75,800	--	--	NA	NA	NA	NA	NA	NA	NA	NA	8,700	NA	NA
Manganese, Dissolved	116	50	88	NA	NA	NA	NA	NA	NA	NA	NA	47.9	NA	NA
Mercury, Dissolved	0.234	1	1.1	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA
Nickel, Dissolved	107.4	100	73	NA	NA	NA	NA	NA	NA	NA	NA	3 J	NA	NA
Potassium, Dissolved	61,000	--	--	NA	NA	NA	NA	NA	NA	NA	NA	1,750 J	NA	NA
Sodium, Dissolved	1,078,000	--	--	NA	NA	NA	NA	NA	NA	NA	NA	30,100	NA	NA

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BI-GW23/SO23	BI-GW24/SO24	BI-GW25/SO25	BI-GW26/SO26	BI-GW27/SO27	BI-GW28/SO28		BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31	BI-GW32/SO32
Sample ID				BI-GW23-10A	BI-GW24-10A	BI-GW25-10A	BI-GW26-10A	BI-GW27-10A	BI-GW28-10A	BI-GW28D-10A	BI-GW29-10A	BI-GW30-10A	BI-GW31-10A	BI-GW32-10A
Sample Date				01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10
Chemical Name														
Vanadium, Dissolved	6.06	--	18	NA	NA	NA	NA	NA	NA	NA	NA	20 U	NA	NA
Zinc, Dissolved	--	1,000	1,100	NA	NA	NA	NA	NA	NA	NA	NA	20 U	NA	NA

Notes:

Bold box indicates exceedance of NC2LGW or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

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

* - The MCL-Groundwater value is reported in place of the NC2LGW where the MCL value is more conservative.

Shading indicates exceedance of two times the mean base background concentration for Groundwater

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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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BI-GW33/SO33	BI-GW34/SO34	BI-GW35/SO35		BI-GW36/SO36	BI-GW38/SO38	BI-GW39/SO39	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42	BI-GW43/SO43
Sample ID				BI-GW33-10A	BI-GW34-10A	BI-GW35-10A	BI-GW35D-10A	BI-GW36-10A	BI-GW38-10A	BI-GW39-10A	BI-GW40-10A	BI-GW41-10A	BI-GW42-10A	BI-GW43-10A
Sample Date				01/31/10	01/27/10	01/26/10	01/26/10	01/26/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10
Chemical Name														
Semivolatile Organic Compounds (µg/l)														
No Detections														
Explosives (µg/l)														
Perchlorate	--	--	2.6	0.2 U	0.04 J	0.2 U	0.2 U	0.03 J	0.19 J	0.07 J	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/l)														
Aluminum	360	--	3,700	41.4 J	746	286	204	485	259	657	452	200 U	226 J	200 UJ
Antimony	--	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.06	10	0.045	10 U	**3.3 J**	10 U	10 U	10 U	**4 J**	**5.9 J**	**7.9 J**	10 U	**8.4 J**	10 U
Barium	58.4	700	730	200 U	2.5 J	1.3 J	1.2 J	1.2 J	1.3 J	2.3 J	200 U	200 U	0.74 J	200 U
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	154,400	--	--	36,200	8,810	18,800	18,600	9,140	52,800	17,400	46,900	6,030	42,100	31,100
Chromium	6.7	10	0.043	**2.2 J**	**8.4 J**	**5.2 J**	**4.9 J**	**4.5 J**	**3.3 J**	**9.3 J**	**4.2 J**	**2.6 J**	**4.5 J**	**1.4 J**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Copper	4.88	1,000	150	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	3,220	300	2,600	100 U	2,100	806	537	1,080	590	1,300	850	481	431 J	100 UJ
Lead	3.44	15	15	3 U	3.3 J	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	75,800	--	--	5,000 UJ	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	7,380	5,000 U	5,000 U	5,000 U
Manganese	116	50	88	1.2 J	11	13.6	9.8 J	9.7 J	3.2 J	20.3	2.9 J	5.9 J	24.9	1.4 J
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.1 J	0.1 J	0.2 U	0.2 U	0.2 U	0.38	0.23	0.2 U	0.2 U
Nickel	107.4	100	73	40 U	40 U	2.3 J	2.2 J	40 U	40 U	2.2 J	40 U	40 U	1 J	40 U
Potassium	61,000	--	--	345 J	139 J	396 J	392 J	167 J	197 J	248 J	794 J	279 J	406 J	127 J
Selenium	6.12	20	18	5 UJ	5 U	5.2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	--	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	1,078,000	--	--	12,400	5,000 U	5,090	5,210	5,000 U	43,300	21,600	6,420	5,000 U	11,800	5,000 U
Thallium	13.34	2	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	6.06	--	18	1.3 J	4.7 J	3.7 J	3.4 J	2.6 J	2.4 J	4.8 J	3.2 J	1.8 J	4.7 J	0.95 J
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)														
Aluminum, Dissolved	360	--	3,700	NA	NA	NA	NA	NA	NA	NA	NA	388	NA	NA
Arsenic, Dissolved	13.06	10	0.045	NA	NA	NA	NA	NA	NA	NA	NA	**38**	NA	NA
Barium, Dissolved	58.4	700	730	NA	NA	NA	NA	NA	NA	NA	NA	2.7 J	NA	NA
Beryllium, Dissolved	--	4	7.3	NA	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA
Calcium, Dissolved	154,400	--	--	NA	NA	NA	NA	NA	NA	NA	NA	40,000	NA	NA
Chromium, Dissolved	6.7	10	0.043	NA	NA	NA	NA	NA	NA	NA	NA	**11.3**	NA	NA
Cobalt, Dissolved	4.9	--	1.1	NA	NA	NA	NA	NA	NA	NA	NA	**1.9 J**	NA	NA
Copper, Dissolved	4.88	1,000	150	NA	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA
Iron, Dissolved	3,220	300	2,600	NA	NA	NA	NA	NA	NA	NA	NA	**9,640**	NA	NA
Lead, Dissolved	3.44	15	15	NA	NA	NA	NA	NA	NA	NA	NA	4.4	NA	NA
Magnesium, Dissolved	75,800	--	--	NA	NA	NA	NA	NA	NA	NA	NA	5,000 U	NA	NA
Manganese, Dissolved	116	50	88	NA	NA	NA	NA	NA	NA	NA	NA	**715**	NA	NA
Mercury, Dissolved	0.234	1	1.1	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA
Nickel, Dissolved	107.4	100	73	NA	NA	NA	NA	NA	NA	NA	NA	4.2 J	NA	NA
Potassium, Dissolved	61,000	--	--	NA	NA	NA	NA	NA	NA	NA	NA	2,730 J	NA	NA
Sodium, Dissolved	1,078,000	--	--	NA	NA	NA	NA	NA	NA	NA	NA	14,700	NA	NA

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BI-GW33/SO33	BI-GW34/SO34	BI-GW35/SO35		BI-GW36/SO36	BI-GW38/SO38	BI-GW39/SO39	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42	BI-GW43/SO43
Sample ID				BI-GW33-10A	BI-GW34-10A	BI-GW35-10A	BI-GW35D-10A	BI-GW36-10A	BI-GW38-10A	BI-GW39-10A	BI-GW40-10A	BI-GW41-10A	BI-GW42-10A	BI-GW43-10A
Sample Date				01/31/10	01/27/10	01/26/10	01/26/10	01/26/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10
Chemical Name														
Vanadium, Dissolved	6.06	--	18	NA	NA	NA	NA	NA	NA	NA	NA	20 U	NA	NA
Zinc, Dissolved	--	1,000	1,100	NA	NA	NA	NA	NA	NA	NA	NA	20 U	NA	NA

Notes:

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Bold text indicates exceedance of Adjusted Tap Water RSLs

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* - The MCL-Groundwater value is reported in place of the NC2LGW where the MCL value is more conservative.

Shading indicates exceedance of two times the mean base background concentration for Groundwater

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46	BI-GW47/SO47	BI-GW48/SO48	BI-GW49/SO49		BI-GW59/SO59	ICWBG-GW20/SO20	
Sample ID				BI-GW44-10A	BI-GW45-10A	BI-GW46-10A	BI-GW47-10A	BI-GW48-10A	BI-GW49-10A	BI-GW49D-10A	BI-GW59-10A	ICW-GW20-10A	ICW-GW20D-10A
Sample Date				01/29/10	01/27/10	01/27/10	02/01/10	02/01/10	01/28/10	01/28/10	02/01/10	03/26/10	03/26/10
Chemical Name													
Semivolatile Organic Compounds (µg/l)													
No Detections													
Explosives (µg/l)													
Perchlorate	--	--	2.6	0.2 U	0.2 U	0.2 U	0.2 U	0.03 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/l)													
Aluminum	360	--	3,700	186 J	168 J	200 U	291	1,180	54.9 J	56.7 J	1,570	129 J+	116 J+
Antimony	--	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.06	10	0.045	10 U	10 U	10 U	10 U	**5.8 J**	10 U	10 U	**28.1**	**16**	**13.9**
Barium	58.4	700	730	200 U	0.39 J	200 U	200 U	200 U	200 U	200 U	200 U	1.5 J	1.4 J
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	154,400	--	--	31,600	9,980	42,500	16,700	21,700	41,500	41,800	31,700	89,700	87,000
Chromium	6.7	10	0.043	**1.8 J**	**2.1 J**	**1.3 J**	**2.7 J**	**9.9 J**	10 U	**0.95 J**	**41**	**4.8 J**	**4.9 J**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**13.4**	5 U	5 U
Copper	4.88	1,000	150	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.2 J	5 U	1.9 J
Iron	3,220	300	2,600	250	471	71.3 J	851	2,350	29.7 J	34.1 J	**60,300**	**3,730**	**3,600**
Lead	3.44	15	15	3 U	3 U	3.5 J	3 U	3 U	3 U	3 U	5.2	3 U	3 U
Magnesium	75,800	--	--	5,000 UJ	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	7,900	30,000	29,100
Manganese	116	50	88	4.5 J	6.9 J	1.4 J	9.4 J	14	0.69 J	0.84 J	**292**	55	53.4
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	107.4	100	73	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	2.2 J	2.5 J
Potassium	61,000	--	--	55.1 J	40.7 J	184 J	120 J	292 J	179 J	184 J	1,040 J	7,690 J	7,530 J
Selenium	6.12	20	18	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	4.2 J-	5 R
Silver	--	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	1,078,000	--	--	5,000 U	5,000 U	5,000 U	5,000 U	11,500	11,900	12,500	12,300	199,000 J	197,000 J
Thallium	13.34	2	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	6.06	--	18	2.4 J	0.97 J	0.92 J	3.4 J	7.2 J	1.6 J	1.7 J	17.4 J	11.9 J	11.6 J
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)													
Aluminum, Dissolved	360	--	3,700	NA	200 U	NA	NA	NA	NA	NA	NA	200 U	200 U
Arsenic, Dissolved	13.06	10	0.045	NA	10 U	NA	NA	NA	NA	NA	NA	**14.3**	**13.9**
Barium, Dissolved	58.4	700	730	NA	200 U	NA	NA	NA	NA	NA	NA	1.1 J	1.2 J
Beryllium, Dissolved	--	4	7.3	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	5 U
Calcium, Dissolved	154,400	--	--	NA	10,000	NA	NA	NA	NA	NA	NA	82,900	82,600
Chromium, Dissolved	6.7	10	0.043	NA	**1.1 J**	NA	NA	NA	NA	NA	NA	**3.8 J**	**4.4 J**
Cobalt, Dissolved	4.9	--	1.1	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	5 U
Copper, Dissolved	4.88	1,000	150	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	5 U
Iron, Dissolved	3,220	300	2,600	NA	100 U	NA	NA	NA	NA	NA	NA	**3,320**	**3,310**
Lead, Dissolved	3.44	15	15	NA	3 U	NA	NA	NA	NA	NA	NA	3 U	2.1 J
Magnesium, Dissolved	75,800	--	--	NA	5,000 U	NA	NA	NA	NA	NA	NA	28,200	28,100
Manganese, Dissolved	116	50	88	NA	2 J	NA	NA	NA	NA	NA	NA	49.3	49.1
Mercury, Dissolved	0.234	1	1.1	NA	0.2 U	NA	NA	NA	NA	NA	NA	0.2 U	0.2 U
Nickel, Dissolved	107.4	100	73	NA	40 U	NA	NA	NA	NA	NA	NA	2 J	2 J
Potassium, Dissolved	61,000	--	--	NA	28 J	NA	NA	NA	NA	NA	NA	7,310 J	7,210 J
Sodium, Dissolved	1,078,000	--	--	NA	5,000 U	NA	NA	NA	NA	NA	NA	191,000	191,000

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46	BI-GW47/SO47	BI-GW48/SO48	BI-GW49/SO49		BI-GW59/SO59	ICWBG-GW20/SO20	
Sample ID				BI-GW44-10A	BI-GW45-10A	BI-GW46-10A	BI-GW47-10A	BI-GW48-10A	BI-GW49-10A	BI-GW49D-10A	BI-GW59-10A	ICW-GW20-10A	ICW-GW20D-10A
Sample Date				01/29/10	01/27/10	01/27/10	02/01/10	02/01/10	01/28/10	01/28/10	02/01/10	03/26/10	03/26/10
Chemical Name													
Vanadium, Dissolved	6.06	--	18	NA	1 J	NA	NA	NA	NA	NA	NA	10.2 J	10.1 J
Zinc, Dissolved	--	1,000	1,100	NA	20 U	NA	NA	NA	NA	NA	NA	2.3 J	2.4 J

Notes:

Bold box indicates exceedance of NC2LGW or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

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

* - The MCL-Groundwater value is reported in place of the NC2LGW where the MCL value is more conservative.

Shading indicates exceedance of two times the mean base background concentration for Groundwater

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	ICWBG-GW21/SO21	ICWBG-GW22/SO22	ICW-GW01/SO01	ICW-GW02/SO02	ICW-GW03/SO03		ICW-GW04/SO04	ICW-GW05/SO05	ICW-GW06/SO06
Sample ID				ICW-GW21-10A	ICW-GW22-10A	ICW-GW01-10A	ICW-GW02-10A	ICW-GW03-10A	ICW-GW03D-10A	ICW-GW04-10A	ICW-GW05-10A	ICW-GW06-10A
Sample Date				03/26/10	03/25/10	03/23/10	03/23/10	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10
Chemical Name												
Semivolatile Organic Compounds (µg/l)												
No Detections												
Explosives (µg/l)												
Perchlorate	--	--	2.6	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/l)												
Aluminum	360	--	3,700	63.2 J	200 U	200 U	200 U	2,120	200 U	1,320	200 U	604
Antimony	--	6	1.5	10 U	10 U	**19,800**	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.06	10	0.045	**5.8 J**	**3 J**	10 U	10 U	10 U	10 U	**12.7**	10 U	10 U
Barium	58.4	700	730	13.1 J	1.2 J	200 U	200 U	200 U	12.1 J	8.7 J	1.1 J	3.9 J
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	**985**	**214**	5 U	5 U	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	5 U	**27**	**5 J**	5 U	5 U	5 U
Calcium	154,400	--	--	453,000	116,000	5,000 U	37,200	30,800	169,000	86,700	79,200	69,800
Chromium	6.7	10	0.043	**4.2 J**	**2.3 J**	10 U	**2.1 J**	**68.5**	**15.2**	**18.8**	**1 J**	**2.4 J**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	5 U	**39.8**	**23**	**2.8 J**	5 U	5 U
Copper	4.88	1,000	150	5 U	5 U	5 U	6.6	5 U	27.2	6.9	5 U	5 U
Iron	3,220	300	2,600	488	874	100 U	71.2 J	**5,780**	542	**8,920**	1,000	649
Lead	3.44	15	15	3 U	3 U	**11,800**	2.5 J	3 U	3 U	2.3 J	3 U	3 U
Magnesium	75,800	--	--	326,000	35,400	5,000 U	7,040	5,000 U	25,100	102,000	28,400	29,000
Manganese	116	50	88	41.6	31.4	10 U	1.4 J	33.9	8.9 J	26.5	33	16.7
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.13 J	0.2 U	0.2 U
Nickel	107.4	100	73	40 U	5 U	5 U	1.3 J	**453**	45.1	7.2	5 U	5 U
Potassium	61,000	--	--	316,000 J	8,560 J	5,000 U	1,180 J	310,000 J	40,000 J	58,300 J	8,820 J	6,990 J
Selenium	6.12	20	18	5 U	7 J-	5 U	5 U	5 U	5 U	5.8	5 U	4.6 J
Silver	--	20	18	5 U	5 U	5 U	1.5 J	13.7	1 J	5 U	5 U	5 U
Sodium	1,078,000	--	--	5,540,000 J	130,000 J	240,000	5,000 U	5,000 U	68,900	979,000	25,900	46,600
Thallium	13.34	2	--	23.4	10 U	5,440	10 U	345	10 U	10 U	10 U	10 U
Vanadium	6.06	--	18	2.7 J	4.8 J	20 U	3.7 J	20 U	20 U	**64.5**	1.5 J	6.1 J
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	441	20.9	20 U	20 U	20 U
Dissolved Metals (µg/l)												
Aluminum, Dissolved	360	--	3,700	NA	NA	NA	NA	200 U	200 U	NA	NA	NA
Arsenic, Dissolved	13.06	10	0.045	NA	NA	NA	NA	10 U	10 U	NA	NA	NA
Barium, Dissolved	58.4	700	730	NA	NA	NA	NA	200 U	200 U	NA	NA	NA
Beryllium, Dissolved	--	4	7.3	NA	NA	NA	NA	5 U	5 U	NA	NA	NA
Calcium, Dissolved	154,400	--	--	NA	NA	NA	NA	40,200	41,500	NA	NA	NA
Chromium, Dissolved	6.7	10	0.043	NA	NA	NA	NA	10 U	10 U	NA	NA	NA
Cobalt, Dissolved	4.9	--	1.1	NA	NA	NA	NA	5 U	5 U	NA	NA	NA
Copper, Dissolved	4.88	1,000	150	NA	NA	NA	NA	5 U	5 U	NA	NA	NA
Iron, Dissolved	3,220	300	2,600	NA	NA	NA	NA	100 U	100 U	NA	NA	NA
Lead, Dissolved	3.44	15	15	NA	NA	NA	NA	3 U	2.7 J	NA	NA	NA
Magnesium, Dissolved	75,800	--	--	NA	NA	NA	NA	10,600	10,600	NA	NA	NA
Manganese, Dissolved	116	50	88	NA	NA	NA	NA	1.1 J	1.4 J	NA	NA	NA
Mercury, Dissolved	0.234	1	1.1	NA	NA	NA	NA	0.44	0.39	NA	NA	NA
Nickel, Dissolved	107.4	100	73	NA	NA	NA	NA	5 U	5 U	NA	NA	NA
Potassium, Dissolved	61,000	--	--	NA	NA	NA	NA	2,150 J	2,040 J	NA	NA	NA
Sodium, Dissolved	1,078,000	--	--	NA	NA	NA	NA	9,210	9,310	NA	NA	NA

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	ICWBG-GW21/SO21	ICWBG-GW22/SO22	ICW-GW01/SO01	ICW-GW02/SO02	ICW-GW03/SO03		ICW-GW04/SO04	ICW-GW05/SO05	ICW-GW06/SO06
Sample ID				ICW-GW21-10A	ICW-GW22-10A	ICW-GW01-10A	ICW-GW02-10A	ICW-GW03-10A	ICW-GW03D-10A	ICW-GW04-10A	ICW-GW05-10A	ICW-GW06-10A
Sample Date				03/26/10	03/25/10	03/23/10	03/23/10	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10
Chemical Name												
Vanadium, Dissolved	6.06	--	18	NA	NA	NA	NA	20 U	0.85 J	NA	NA	NA
Zinc, Dissolved	--	1,000	1,100	NA	NA	NA	NA	1.5 J	1.4 J	NA	NA	NA

Notes:

Bold box indicates exceedance of NC2LGW or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

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

* - The MCL-Groundwater value is reported in place of the NC2LGW where the MCL value is more conservative.

Shading indicates exceedance of two times the mean base background concentration for Groundwater

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	ICW-GW07/SO07	ICW-GW08/SO08	ICW-GW09/SO09	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW12/SO12	ICW-GW13/SO13	ICW-GW14/SO14	ICW-GW15/SO15	ICW-GW16/SO16
Sample ID				ICW-GW07-10A	ICW-GW08-10A	ICW-GW09-10A	ICW-GW10-10A	ICW-GW11-10A	ICW-GW12-10A	ICW-GW13-10A	ICW-GW14-10A	ICW-GW15-10A	ICW-GW16-10A
Sample Date				03/22/10	03/23/10	03/23/10	03/23/10	03/23/10	03/24/10	03/25/10	03/25/10	03/25/10	03/26/10
Chemical Name													
Semivolatile Organic Compounds (µg/l)													
No Detections													
Explosives (µg/l)													
Perchlorate	--	--	2.6	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/l)													
Aluminum	360	--	3,700	1,570	200 U	2,050	253	200 U	**7,040**	200 U	648 J+	1,780 J+	476 J+
Antimony	--	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.06	10	0.045	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**3.2 J**	10 U	**17.2**
Barium	58.4	700	730	12.8 J	2.1 J	15.2 J	6 J	1 J	12.9 J	7.7 J	5.3 J	5.4 J	4.7 J
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	5 U	5 U	0.41 J	5 U	5 U	5 U	5 U
Calcium	154,400	--	--	52,800	83,400	212,000	61,000	74,600	151,000	334,000	184,000	188,000	255,000
Chromium	6.7	10	0.043	**5.7 J**	**3.8 J**	**11.2**	**2.5 J**	**2.2 J**	**27.2**	10 U	**2.2 J**	**7.9 J**	**8.3 J**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	5 U	5 U	**1.5 J**	5 U	5 U	5 U	5 U
Copper	4.88	1,000	150	6.7	5.7	5 U	5.5	5 U	18.1	5 U	5 U	5 U	5 U
Iron	3,220	300	2,600	**3,850**	256	**4,320**	573	1,260	**7,390**	135	1,010	1,400	**4,970**
Lead	3.44	15	15	3.2	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	75,800	--	--	10,900	41,300	362,000	21,800	22,500	150,000	594,000	420,000	86,900	216,000
Manganese	116	50	88	19.2	16.7	40.1	23.6	18.7	39.7	3.5 J	24.9	31.4	48.1
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	107.4	100	73	5 U	5 U	1.1 J	5 U	5 U	6	5 U	1.4 J	3 J	2.7 J
Potassium	61,000	--	--	2,150 J	14,800 J	170,000 J	11,200 J	3,090 J	88,400 J	235,000 J	231,000 J	28,400 J	93,300 J
Selenium	6.12	20	18	5 U	3.8 J	5 U	5	5 U	5 J	5 R	5 R	5 R	5 R
Silver	--	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	1,078,000	--	--	26,400	427,000	2,910,000	91,500	40,600	1,400,000	3,900,000 J	3,490,000 J	749,000 J	1,770,000 J
Thallium	13.34	2	--	10 U	10 U	10.8	10 U	10 U	10 U	13.2	9.5 J	10 U	10 U
Vanadium	6.06	--	18	11.2 J	9.9 J	**18.2 J**	3.4 J	5.7 J	**27.7**	1.1 J	5.3 J	16 J	15.2 J
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Dissolved Metals (µg/l)													
Aluminum, Dissolved	360	--	3,700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	13.06	10	0.045	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	58.4	700	730	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	7.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	154,400	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	6.7	10	0.043	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	4.9	--	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	4.88	1,000	150	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	3,220	300	2,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	3.44	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	75,800	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	116	50	88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury, Dissolved	0.234	1	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	107.4	100	73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	61,000	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	1,078,000	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	ICW-GW07/SO07	ICW-GW08/SO08	ICW-GW09/SO09	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW12/SO12	ICW-GW13/SO13	ICW-GW14/SO14	ICW-GW15/SO15	ICW-GW16/SO16
Sample ID				ICW-GW07-10A	ICW-GW08-10A	ICW-GW09-10A	ICW-GW10-10A	ICW-GW11-10A	ICW-GW12-10A	ICW-GW13-10A	ICW-GW14-10A	ICW-GW15-10A	ICW-GW16-10A
Sample Date				03/22/10	03/23/10	03/23/10	03/23/10	03/23/10	03/24/10	03/25/10	03/25/10	03/25/10	03/26/10
Chemical Name													
Vanadium, Dissolved	6.06	--	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	1,000	1,100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Bold box indicates exceedance of NC2LGW or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

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

* - The MCL-Groundwater value is reported in place of the NC2LGW where the MCL value is more conservative.

Shading indicates exceedance of two times the mean base background concentration for Groundwater

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	ICW-GW17/SO17	ICW-GW18/SO18	ICW-GW19/SO19	SI-GW01/SO01		SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID				ICW-GW17-10A	ICW-GW18-10A	ICW-GW19-10A	SI-GW01-10A	SI-GW01D-10A	SI-GW02-10A	SI-GW03-10A	SI-GW04-10A	SI-GW05-10A	SI-GW06-10A
Sample Date				03/25/10	03/25/10	03/26/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name													
Semivolatile Organic Compounds (µg/l)													
No Detections													
Explosives (µg/l)													
Perchlorate	--	--	2.6	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Metals (µg/l)													
Aluminum	360	--	3,700	237 J+	617 J+	204 J+	3,370 J+	**3,880 J+**	200 U	200 U	43.7 J+	**4,090 J+**	200 U
Antimony	--	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**510**	10 U
Arsenic	13.06	10	0.045	**4.6 J**	**5 J**	10 U	**20.5**	**21.9**	10 U	10 U	10 U	**43**	10 U
Barium	58.4	700	730	5.9 J	6.3 J	3.6 J	200 U	18.6 J	3.8 J	1.7 J	2.2 J	**1,970**	2.5 J
Beryllium	--	4	7.3	5 U	5 U	5 U	5 U	5 U	**8.4**	5 U	5 U	**48.8**	5 U
Cadmium	--	2	1.8	5 U	5 U	5 U	5 U	5 U	0.46 J	5 U	5 U	**46**	5 U
Calcium	154,400	--	--	280,000	333,000	175,000	54,600	53,600	76,400	49,500	95,800	186,000	129,000
Chromium	6.7	10	0.043	**2.6 J**	**5.4 J**	**5.7 J**	**25.5**	**30.9**	**5.2 J**	**4.7 J**	**1.2 J**	**197**	**2 J**
Cobalt	4.9	--	1.1	5 U	5 U	5 U	5 U	5 U	0.83 J	5 U	5 U	**487**	5 U
Copper	4.88	1,000	150	5 U	5 U	5 U	5 U	5.5	29.2	11.6	5 U	**246**	19.5
Iron	3,220	300	2,600	374	**3,060**	776	1,910	2,300	841	546	121	2,390	85 J
Lead	3.44	15	15	3 U	3 U	3 U	3.3	4.2	3 U	3 U	3 U	**19.8**	3 U
Magnesium	75,800	--	--	216,000	265,000	95,400	139,000	137,000	18,100	31,300	89,900	87,000	74,900
Manganese	116	50	88	49.1	**103**	26.3	33.4	32.9	25.1	32.2	9.5 J	**518**	24.5
Mercury	0.234	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	107.4	100	73	2.2 J	1.1 J	2.2 J	1.6 J	1.6 J	5 U	5 U	5 U	**471**	5 U
Potassium	61,000	--	--	72,400 J	98,100 J	34,600 J	63,600 J	63,000 J	14,200 J	23,700 J	41,000 J	28,600 J	33,900 J
Selenium	6.12	20	18	5 R	5 R	3.8 J-	5 R	5 R	5 U	5.5	5 R	5 R	5 U
Silver	--	20	18	5 U	5 U	5 U	5 U	5 U	1.2 J	5 U	5 U	**46.2**	5 U
Sodium	1,078,000	--	--	1,630,000 J	2,130,000 J	746,000 J	1,240,000 J	1,220,000 J	122,000	178,000	716,000 J	365,000 J	592,000
Thallium	13.34	2	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	57.1	10 U
Vanadium	6.06	--	18	4.3 J	6.6 J	12.7 J	20 U	16.2 J	20 U	13.8 J	20 U	**521**	20 U
Zinc	--	1,000	1,100	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	476	20 U
Dissolved Metals (µg/l)													
Aluminum, Dissolved	360	--	3,700	NA	NA	NA	2,640	2,690	NA	NA	NA	NA	NA
Arsenic, Dissolved	13.06	10	0.045	NA	NA	NA	**19.3**	**21.9**	NA	NA	NA	NA	NA
Barium, Dissolved	58.4	700	730	NA	NA	NA	16.6 J	16.5 J	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	7.3	NA	NA	NA	5 U	0.45 J	NA	NA	NA	NA	NA
Calcium, Dissolved	154,400	--	--	NA	NA	NA	53,300	52,800	NA	NA	NA	NA	NA
Chromium, Dissolved	6.7	10	0.043	NA	NA	NA	**28.5**	**27.4**	NA	NA	NA	NA	NA
Cobalt, Dissolved	4.9	--	1.1	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Copper, Dissolved	4.88	1,000	150	NA	NA	NA	4.1 J	5 U	NA	NA	NA	NA	NA
Iron, Dissolved	3,220	300	2,600	NA	NA	NA	1,400	1,350	NA	NA	NA	NA	NA
Lead, Dissolved	3.44	15	15	NA	NA	NA	3.1	2 J	NA	NA	NA	NA	NA
Magnesium, Dissolved	75,800	--	--	NA	NA	NA	139,000	140,000	NA	NA	NA	NA	NA
Manganese, Dissolved	116	50	88	NA	NA	NA	30.8	30.7	NA	NA	NA	NA	NA
Mercury, Dissolved	0.234	1	1.1	NA	NA	NA	0.6	0.2 U	NA	NA	NA	NA	NA
Nickel, Dissolved	107.4	100	73	NA	NA	NA	1.9 J	1 J	NA	NA	NA	NA	NA
Potassium, Dissolved	61,000	--	--	NA	NA	NA	57,200 J	58,300 J	NA	NA	NA	NA	NA
Sodium, Dissolved	1,078,000	--	--	NA	NA	NA	1,100,000	1,140,000	NA	NA	NA	NA	NA

CTO-80
Surface Danger Zone
Validated Groundwater Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background GW 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May 2010)	ICW-GW17/SO17	ICW-GW18/SO18	ICW-GW19/SO19	SI-GW01/SO01		SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID				ICW-GW17-10A	ICW-GW18-10A	ICW-GW19-10A	SI-GW01-10A	SI-GW01D-10A	SI-GW02-10A	SI-GW03-10A	SI-GW04-10A	SI-GW05-10A	SI-GW06-10A
Sample Date				03/25/10	03/25/10	03/26/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name													
Vanadium, Dissolved	6.06	--	18	NA	NA	NA	13.9 J	14.1 J	NA	NA	NA	NA	NA
Zinc, Dissolved	--	1,000	1,100	NA	NA	NA	7.3 J	5.4 J	NA	NA	NA	NA	NA

Notes:

Bold box indicates exceedance of NC2LGW or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

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

* - The MCL-Groundwater value is reported in place of the NC2LGW where the MCL value is more conservative.

Shading indicates exceedance of two times the mean base background concentration for Groundwater

NA - Not analyzed

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

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Subsurface Soil Raw Analytical Results
January - March 2010

Station ID	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54	BIBG-GW55/SO55		BIBG-GW56/SO56	BIBG-GW57/SO57	BI-GW01/SO01	BI-GW02/SO02		BI-GW03/SO03	BI-GW04/GW04	BI-GW05/SO05
Sample ID	BI-IS50-1-2-10A	BI-IS51-1-2-10A	BI-IS52-2-3-10A	BI-IS53-3-4-10A	BI-IS54-1-2-10A	BI-IS55-2-3-10A	BI-IS55D-2-3-10A	BI-IS56-6-7-10A	BI-IS57-3-4-10A	BI-IS01-4-5-10A	BI-IS02-8-9-10A	BI-IS02D-8-9-10A	BI-IS03-6-7-10A	BI-IS04-3-4-10A	BI-IS05-5-6-10A
Sample Date	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/25/10	01/31/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
2,4-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
2,6-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
Nitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Explosives (µg/kg)															
1,3,5-Trinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
1,3-Dinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2,4,6-Trinitrotoluene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2-Amino-4,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
2-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
3-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
4-Amino-2,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
4-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
HMX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	2.2 U	2.2 U	2.1 R	2.1 UJ	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 UJ	2.1 R	2.1 U	2.1 U	2.1 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Tetryl	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R
Total Metals (mg/kg)															
Aluminum	358	336	341	384	328	325	351	302	355	278	331	343	337	327	339 J
Antimony	1 U	1 U	1 U	1.1	0.32 J	0.96 U	0.37 J	0.37 J	1.1	0.82 J	1	1 U	0.83 J	0.92 J	1 U
Arsenic	1 U	1 U	0.64 J	1 J	0.46 J	0.44 J	0.5 J	0.48 J	1 U	0.79 J	1	0.77 J	0.93 J	0.82 J	0.89 J
Barium	2.4 J	20.5 UJ	2.4 J	20.8 UJ	2.3 J	1.7 J	2.1 J	1.5 J	20.6 UJ	1 J	19.8 UJ	20.4 UJ	1.1 J	1.1 J	1.8 J
Beryllium	0.51 U	0.51 U	0.5 U	0.52 U	0.54 U	0.48 U	0.5 U	0.53 U	0.52 U	0.5 U	0.5 U	0.51 U	0.5 U	0.52 U	0.51 U
Cadmium	0.51 U	0.51 U	0.5 U	0.52 U	0.54 U	0.48 U	0.5 U	0.53 U	0.52 U	0.5 U	0.5 U	0.51 U	0.5 U	0.52 U	0.51 U
Calcium	2,300	1,620	3,810	6,580	2,270	1,890	2,120	1,720	1,770	10,200	8,060	7,110	6,430	4,640	7,310
Chromium	4.9	4.3	5.1	5.8	4.6	4.1	4.7	4	4.3	3.6	4.4	4.6	4.8	4.4	5.3
Cobalt	0.14 J	0.51 U	0.14 J	0.52 U	0.14 J	0.13 J	0.14 J	0.14 J	0.52 U	0.5 U	0.5 U	0.51 U	0.5 U	0.52 U	0.09 J
Copper	0.16 J	0.51 U	0.16 J	0.52 U	0.54 U	0.48 U	0.15 J	0.17 J	0.52 U	0.5 U	0.5 U	0.51 U	0.5 U	0.52 U	0.51 U
Iron	709	701	744	903	713	665	755	660	717	791	883	878	811	685	855
Lead	1.4 J	1.1 J	1.6 J	1.6 J	1.4 J	1.2 J	1.3 J	1.1 J	1 J	0.88 J	0.95 J	0.92 J	1.1 J	1 J	1.7 J
Magnesium	513 UJ	512 U	500 UJ	520 U	537 UJ	481 UJ	495 UJ	527 UJ	142 J	280 J	495 U	511 U	263 J	218 J	512 U
Manganese	4.8	5.2	6.1	7.7	5.5	4.9	5.8	4.7	5.3	5.3	6.4	6	6.4	5.2	6.7
Mercury	0.036 U	0.037 U	0.035 U	0.033 U	0.037 U	0.031 U	0.034 U	0.035 U	0.036 U	0.033 U	0.035 U	0.035 U	0.031 U	0.033 U	0.035 U
Nickel	0.21 J	0.33 J	0.3 J	0.49 J	0.24 J	0.21 J	0.24 J	0.27 J	0.32 J	0.29 J	0.32 J	0.42 J	0.33 J	0.3 J	0.36 J
Potassium	513 U	512 U	500 U	520 U	537 U	481 U	495 U	527 U	515 U	44.8 J	495 U	511 U	52.3 J	51.2 J	37.2 J
Selenium	0.51 U	0.51 UJ	0.5 U	0.52 UJ	0.54 U	0.48 U	0.5 U	0.53 U	0.52 UJ	0.5 U	0.5 UJ	0.51 UJ	0.5 U	0.52 U	0.51 U
Silver	0.51 U	0.51 U	0.5 U	0.52 U	0.54 U	0.48 U	0.5 U	0.53 U	0.52 U	0.5 U	0.5 U	0.51 U	0.5 U	0.52 U	0.51 U
Sodium	513 U	512 U	500 U	520 U	537 U	481 U	495 U	527 U	515 U	496 U	495 U	511 U	504 U	520 U	512 U
Thallium	1 U	1 U	1 U	1 U	1.1 U	0.96 U	0.99 U	1.1 U	1 U	0.99 U	0.99 U	1 U	1 U	1 U	1 U
Vanadium	2.1 U	1.3 J	2 U	2 J	2.1 U	1.9 U	2 U	2.1 U	1.5 J	1.5 J	1.6 J	1.5 J	1.7 J	1.6 J	1.8 J
Zinc	2.1	2.4	2.6	3.1	2.4	2.1	2.5	2.2	2.5	2.1	2.7	3.3	2.9	2.8	4.3

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

CTO-80
Surface Danger Zone
Validated Subsurface Soil Raw Analytical Results
January - March 2010

Station ID	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08	BI-GW09/SO09	BI-GW10/SO10	BI-GW11/SO11	BI-GW12/SO12	BI-GW13/SO13	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17	BI-GW19/SO19	BI-GW20/SO20	BI-GW21/SO21	
Sample ID	BI-IS06-2-3-10A	BI-IS07-4-5-10A	BI-IS08-3-4-10A	BI-IS09-1-2-10A	BI-IS10-1-2-10A	BI-IS11-3-4-10A	BI-IS12-1-2-10A	BI-IS13-0-1-10A	BI-IS14-4-5-10A	BI-IS15-6-7-10A	BI-IS16-3-4-10A	BI-IS17-6-7-10A	BI-IS19-14-15-10A	BI-IS20-8-9-10A	BI-IS21-17-18-10A	BI-IS21D-17-18-10A
Sample Date	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10	01/26/10	02/01/10	02/01/10	02/01/10
Chemical Name																
Semivolatile Organic Compounds (µg/kg)																
2,4-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U
2,6-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U
Nitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Explosives (µg/kg)																
1,3,5-Trinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
1,3-Dinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2,4,6-Trinitrotoluene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2-Amino-4,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U
2-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U
3-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U
4-Amino-2,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U
4-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U
HMX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.5 U	2.1 U	2.2 U	2.1 U	2.3 U	2.1 U	2.1 U	2.1 U	2.2 U	2.1 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Tetryl	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,250 R	1,250 R	1,200 R	1,200 R	1,200 R
Total Metals (mg/kg)																
Aluminum	302	298 J	347 J	271	355	353	373	379	333	300	268	330	250	138	384	373
Antimony	0.8 J	1 U	0.99 U	1 U	1.1	1.1 U	1.1 U	1	1.1 U	0.93 J	1.1 U	1 U	1 U	1.2	1 U	1.2
Arsenic	0.86 J	0.6 J	0.71 J	2.1	1.3	0.93 J	0.87 J	0.99 U	0.39 J	1.1 U	1.1 U	0.67 J	1 U	1 U	0.81 J	0.72 J
Barium	0.9 J	1.7 J	1.9 J	20 UJ	21.2 UJ	21.3 UJ	22.6 UJ	19.7 UJ	2.3 J	0.76 J	22.7 UJ	5.7 J	1.7 J	20.6 UJ	20.2 UJ	19.7 UJ
Beryllium	0.5 U	0.51 U	0.5 U	0.5 U	0.53 U	0.53 U	0.57 U	0.49 U	0.53 U	0.54 U	0.57 U	0.52 U	0.5 U	0.52 U	0.51 U	0.49 U
Cadmium	0.5 U	0.51 U	0.5 U	0.5 U	0.53 U	0.53 U	0.57 U	0.49 U	0.53 U	0.54 U	0.57 U	0.52 U	0.5 U	0.52 U	0.51 U	0.49 U
Calcium	5,940	9,750	5,050	30,500	6,990	7,010	4,780	1,710	1,940	3,060	2,040	2,950	1,350	515 U	2,500	2,270
Chromium	4	3.7	5.3	3.5	5.9	5	5.6	4.7	4.8	3.8	3.9	5.1	3.2	1.9	5.1	4.9
Cobalt	0.5 U	0.51 U	0.09 J	0.5 U	0.53 U	0.53 U	0.57 U	0.49 U	0.16 J	0.54 U	0.57 U	0.52 U	0.5 U	0.52 U	0.51 U	0.49 U
Copper	0.5 U	0.51 U	0.5 U	0.5 U	0.53 U	0.53 U	0.57 U	0.49 U	0.18 J	0.54 U	0.57 U	0.52 U	0.5 U	0.52 U	0.51 U	0.49 U
Iron	731	802	847	1,190	843	834	816	787	726	633	591	738	501	198	785	767
Lead	0.97 J	1.1 J	1.7 J	0.96 J	1.7 J	1.2 J	1.6 J	1.3 J	1.5 J	0.87 J	0.72 J	1.4 J	1.2 J	1.4	1.1	1.1
Magnesium	225 J	511 U	497 U	362 J	284 J	261 J	244 J	170 J	529 UJ	177 J	119 J	516 U	503 U	25.8 J	142 J	139 J
Manganese	5.1	5.2	6.6	8.8	7.4	7	6.6	5.7	5.5	3.9	3.7	6	4.2	2.4	5.6	5.3
Mercury	0.033 U	0.035 U	0.034 U	0.035 U	0.036 U	0.034 U	0.039 U	0.034 U	0.032 U	0.036 U	0.038 U	0.034 U	0.034 U	0.034 U	0.034 U	0.031 U
Nickel	0.23 J	0.25 J	0.33 J	0.3 J	0.4 J	0.38 J	0.44 J	0.36 J	0.26 J	0.26 J	0.38 J	4.1 U	4 U	4.1 U	0.36 J	0.4 J
Potassium	46 J	35.5 J	34.7 J	501 U	530 U	531 U	566 U	493 U	529 U	47.4 J	568 U	516 U	503 U	13.6 J	47.9 J	45.8 J
Selenium	0.5 U	0.51 U	0.5 U	0.5 UJ	0.53 UJ	0.53 UJ	0.57 UJ	0.49 UJ	0.53 U	0.54 U	0.57 UJ	0.52 UJ	0.5 UJ	0.52 U	0.51 U	0.49 U
Silver	0.5 U	0.51 U	0.5 U	0.5 U	0.53 U	0.53 U	0.57 U	0.49 U	0.53 U	0.54 U	0.57 U	0.52 U	0.5 U	0.52 U	0.51 U	0.49 U
Sodium	500 U	511 U	497 U	501 U	530 U	531 U	566 U	493 U	529 U	541 U	568 U	516 U	503 U	515 U	506 U	494 U
Thallium	1 U	1 U	0.99 U	1 U	1.1 U	1.1 U	1.1 U	0.99 U	1.1 U	1.1 U	1.1 U	1 U	1 U	1 U	1 U	0.99 U
Vanadium	1.5 J	2 U	2 U	2.4	2.1	1.8 J	2 J	1.6 J	2.1 U	1.3 J	1.3 J	2.1 U	2 U	2.1 U	2 U	2 U
Zinc	2.3	2	2.9	2	2.9	2.7	2.9	3.2	2.3	2.2 U	2.3 U	2.2 J	2 UJ	0.97 J	4.2 J	2.7 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

CTO-80
Surface Danger Zone
Validated Subsurface Soil Raw Analytical Results
January - March 2010

Station ID	BI-GW22/SO22	BI-GW23/SO23	BI-GW24/SO24	BI-GW25/SO25	BI-GW26/SO26	BI-GW27/SO27		BI-GW28/SO28	BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31	BI-GW32/SO32	BI-GW33/SO33	BI-GW34/SO34	BI-GW35/SO35
Sample ID	BI-IS22-12-13-10A	BI-IS23-10-11-10A	BI-IS24-3-4-10A	BI-IS25-2-3-10A	BI-IS26-0-0_5-10A	BI-IS27-1-2-10A	BI-IS27D-1-2-10A	BI-IS28-1-2-10A	BI-IS29-1-2-10A	BI-IS30-2-3-10A	BI-IS31-1-2-10A	BI-IS32-0-1-10A	BI-IS33-5-6-10A	BI-IS34-2-3-10A	BI-IS35-1-2-10A
Sample Date	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/27/10	01/26/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
2,4-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
2,6-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
Nitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Explosives (µg/kg)															
1,3,5-Trinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
1,3-Dinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2,4,6-Trinitrotoluene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2-Amino-4,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
2-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
3-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
4-Amino-2,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
4-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
HMX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	2.1 U	2.1 U	2.1 UJ	2.1 U	2.2 U	2.1 UJ	2.1 UJ	2.3 U	2.1 U	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.4 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Tetryl	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R
Total Metals (mg/kg)															
Aluminum	297	322	271	348	286	226	223	339 J	257 J	285 J	320 J	303 J	358 J	340	325
Antimony	1	1.1 U	1 U	1 J	0.81 J	1 U	1.1	1.1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	0.52 J
Arsenic	0.64 J	1.1 U	0.86 J	0.84 J	0.77 J	0.99 J	0.71 J	1.1 U	0.43 J	0.42 J	0.72 J	0.63 J	0.6 J	0.37 J	1.3 U
Barium	20.4 UJ	21.3 UJ	20 UJ	0.98 J	1.4 J	20.4 UJ	19.8 UJ	2 J	1.3 J	1.2 J	1.6 J	1.4 J	1.8 J	1.7 J	2.1 J
Beryllium	0.51 U	0.53 U	0.5 U	0.57 U	0.51 U	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.52 U	0.5 U	0.5 U	0.53 U	0.66 U
Cadmium	0.51 U	0.53 U	0.5 U	0.57 U	0.51 U	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.52 U	0.5 U	0.5 U	0.53 U	0.66 U
Calcium	2,550	2,520	6,920	5,680	3,690	6,810	5,920	1,980	4,010	4,980	4,500	5,670	3,440	1,480	1,680
Chromium	4.6	4.8	3.7	4.5	4	3.4	3.2	4.8	3.5	3.8	4.5	4.1	4.7	4.3	4.7
Cobalt	0.51 U	0.53 U	0.5 U	0.57 U	0.51 U	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.11 J	0.11 J	0.09 J	0.17 J	0.14 J
Copper	0.51 U	0.53 U	0.5 U	0.37 J	0.51 U	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.52 U	0.5 U	0.5 U	0.21 J	0.23 J
Iron	633	757	710	777	703	621	577	701	582	678	682	735	807	716	727
Lead	1.1 J	1.1 J	0.81 J	1.1 J	1.3 J	0.84 J	0.82 J	2.1 J	1.3 J	1.1 J	1.3 J	1.3 J	1.3 J	1.2 J	1.6 J
Magnesium	509 U	533 U	500 U	252 J	179 J	511 U	496 U	558 U	517 U	516 U	517 U	502 U	502 U	535 UJ	657 UJ
Manganese	5.2	4.6	4.9	5.3	5.1	4.4	4.1	3.9	3.7	4.7	5.1	4.9	6.1	5.2	5.1
Mercury	0.031 U	0.035 U	0.035 U	0.039 U	0.033 U	0.031 U	0.032 U	0.035 U	0.033 U	0.034 U	0.034 U	0.035 U	0.032 U	0.036 U	0.044 U
Nickel	0.3 J	4.3 U	0.23 J	0.36 J	0.27 J	0.32 J	0.22 J	0.16 J	0.2 J	0.19 J	0.27 J	0.26 J	0.3 J	0.27 J	0.3 J
Potassium	509 U	533 U	500 U	53.4 J	45.1 J	511 U	496 U	30.5 J	26.7 J	29.2 J	35.2 J	32.8 J	34.4 J	535 U	657 U
Selenium	0.51 UJ	0.53 UJ	0.5 UJ	0.57 U	0.51 U	0.51 UJ	0.5 UJ	0.56 U	0.52 U	0.52 U	0.52 U	0.5 U	0.5 U	0.53 U	0.66 U
Silver	0.51 U	0.53 U	0.5 U	0.57 U	0.51 U	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.52 U	0.5 U	0.5 U	0.53 U	0.66 U
Sodium	509 U	533 U	500 U	573 U	509 U	511 U	496 U	558 U	517 U	516 U	517 U	502 U	502 U	535 U	657 U
Thallium	1 U	1.1 U	1 U	1.1 U	1 U	1 U	0.99 U	1.1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	1.3 U
Vanadium	1.4 J	1.6 J	1.3 J	1.6 J	1.4 J	1.2 J	1.2 J	2.2 U	2.1 U	2.1 U	2.1 U	2 U	2 U	2.1 U	2.6 U
Zinc	2.5	2.2	2.2	2.9	2.9	2 U	2 U	2.5	2.1	2.2	2.8	2.2	2.7	2.1	2.6 U

Notes:

Shading indicates detections

NA - Not analyzed

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

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CTO-80
Surface Danger Zone
Validated Subsurface Soil Raw Analytical Results
January - March 2010

Station ID	BI-GW36/SO36		BI-GW38/SO38	BI-GW39/SO39	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42	BI-GW43/SO43	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46	BI-GW47/SO47	BI-GW48/SO48		BI-GW49/SO49	BI-GW59/SO59
Sample ID	BI-IS36-2-3-10A	BI-IS36D-2-3-10A	BI-IS38-14-15-10A	BI-IS39-1-2-10A	BI-IS40-7-8-10A	BI-IS41-3-4-10A	BI-IS42-7-8-10A	BI-IS43-5-6-10A	BI-IS44-1-2-10A	BI-IS45-0-1-10A	BI-IS46-0-1-10A	BI-IS47-3-4-10A	BI-IS48-8-9-10A	BI-IS48D-8-9-10A	BI-IS49-4-5-10A	BI-IS59-0-0_5-10A
Sample Date	01/25/10	01/25/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/29/10	01/27/10	01/27/10	02/01/10	02/01/10	02/01/10	01/28/10	02/01/10
Chemical Name																
Semivolatile Organic Compounds (µg/kg)																
2,4-Dinitrotoluene	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
2,6-Dinitrotoluene	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
Nitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Explosives (µg/kg)																
1,3,5-Trinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
1,3-Dinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2,4,6-Trinitrotoluene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2-Amino-4,6-dinitrotoluene	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
2-Nitrotoluene	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
3-Nitrotoluene	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
4-Amino-2,6-dinitrotoluene	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
4-Nitrotoluene	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
HMX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	2.2 U	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 UJ	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U	2.1 U	2.1 U	2.2 UJ	2.9 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Tetryl	1,250 R	1,250 R	1,250 R	1,250 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R
Total Metals (mg/kg)																
Aluminum	353	357	309	266	222	140	300	275	331 J	325	338	321	342	356	327	364
Antimony	1 U	1.1 U	1.1 U	1 U	1 U	1.1 U	1.1	0.84 J	1 U	1 U	1.2 U	1 U	1	1 U	1.2	1.2 U
Arsenic	0.75 J	0.76 J	0.54 J	0.48 J	1 U	1.1 U	1.2	1.4	0.38 J	0.32 J	1.2 U	1 U	0.7 J	0.9 J	0.91 J	1.2 U
Barium	2.5 J	2.7 J	2.2 J	2.6 J	20.3 UJ	21.2 UJ	19.5 UJ	1 J	1.5 J	1.5 J	2.2 J	20.3 UJ	20 UJ	20.8 UJ	21.3 UJ	23.8 UJ
Beryllium	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U	0.5 U	0.52 U	0.6 U	0.51 U	0.5 U	0.52 U	0.53 U	0.6 U
Cadmium	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U	0.5 U	0.52 U	0.6 U	0.51 U	0.5 U	0.52 U	0.53 U	0.6 U
Calcium	2,850	3,040	2,080	2,420	601	530 U	13,400	14,400	2,480	1,560	2,480	1,820	2,170	2,750	4,700	697
Chromium	5	5.2	4.5	4	3.4	2.4	4.2	3.9	4.4	4.3	5	4	5.2	5.6	4.7	3.9
Cobalt	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U	0.5 U	0.12 J	0.13 J	0.51 U	0.5 U	0.52 U	0.53 U	0.6 U
Copper	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U	0.5 U	0.19 J	0.18 J	0.28 J	0.27 J	0.28 J	0.53 U	0.6 U
Iron	793	807	660	615	504	252	904	916	765	706	785	673	693	746	792	604
Lead	1.4 J	1.6 J	1.1 J	0.92 J	1.2	1.4	0.82 J	1.1 J	1.3 J	1.2 J	1.6 J	0.92	1.5	1.6	1.2 J	2.6
Magnesium	523 U	532 U	532 U	520 U	66.1 J	27.4 J	487 U	276 J	501 U	515 UJ	602 UJ	150 J	152 J	159 J	534 U	96 J
Manganese	6	6.4	5.6	8.6	3.2	10.1	7	6.7	5.5	4.9	5.7	4.7	6.3	6.8	6	4.1
Mercury	0.034 U	0.036 U	0.035 U	0.035 U	0.035 U	0.034 U	0.031 U	0.035 U	0.031 U	0.035 U	0.038 U	0.036 U	0.034 U	0.035 U	0.036 U	0.042 U
Nickel	4.2 U	0.12 J	0.17 J	4.2 U	0.35 J	4.2 U	0.48 J	0.34 J	0.22 J	0.23 J	0.26 J	0.31 J	0.36 J	0.45 J	0.37 J	4.8 U
Potassium	523 U	532 U	532 U	520 U	508 U	530 U	487 U	41.6 J	32 J	515 U	602 U	506 U	47.1 J	50 J	534 U	596 U
Selenium	0.52 UJ	0.53 UJ	0.53 UJ	0.52 UJ	0.51 UJ	0.53 UJ	0.49 UJ	0.49 U	0.5 U	0.52 U	0.6 U	0.51 UJ	0.5 U	0.52 U	0.53 UJ	0.6 UJ
Silver	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U	0.5 U	0.52 U	0.6 U	0.51 U	0.5 U	0.52 U	0.53 U	0.6 U
Sodium	523 U	532 U	532 U	520 U	508 U	530 U	487 U	487 U	501 U	515 U	602 U	506 U	501 U	519 U	534 U	596 U
Thallium	1 U	1.1 U	1.1 U	1 U	1 U	1.1 U	0.97 U	0.97 U	1 U	1 U	1.2 U	1 U	1 U	1 U	1.1 U	1.2 U
Vanadium	2.1 U	2.1 U	2.1 U	2.1 U	1.2 J	1 J	1.7 J	1.9 J	2 U	2.1 U	2.4 U	1.4 J	2 U	2.1 U	1.6 J	1.4 J
Zinc	2.6 J	2.5 J	2.1 UJ	2.1 UJ	1.5 J	0.77 J	2.4	2.3	2.4	2.1 U	2.5	2.4	2.5	2.7	2.7	3.6

Notes:

Shading indicates detections

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mg/kg - Milligrams per kilogram

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Subsurface Soil Raw Analytical Results
January - March 2010

Station ID	BI-SO18	BI-SO37	ICW-GW01/SO01	ICW-GW02/SO02	ICW-GW05/SO05	ICW-GW07/SO07	ICW-GW08/SO08	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW13/SO13	ICW-GW15/SO15	SI-GW01/SO01	
Sample ID	BI-IS18-16-17-10A	BI-IS37-10-11-10A	ICW-IS01-6-7-10A	ICW-IS02-1-2-10A	ICW-IS05-1-1_5-10A	ICW-IS07-1-2-10A	ICW-IS08-1-2-10A	ICW-IS10-1-2-10A	ICW-IS11-1-2-10A	ICW-IS13-1-1_5-10A	ICW-IS15-1-2-10A	SI-IS01-1-1_5-10A	SI-IS01D-1-1_5-10A
Sample Date	01/26/10	01/26/10	03/23/10	03/23/10	03/22/10	03/22/10	03/23/10	03/23/10	03/23/10	03/25/10	03/25/10	03/24/10	03/24/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
2,4-Dinitrotoluene	1,250 U	1,250 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,6-Dinitrotoluene	1,250 U	1,250 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
Nitrobenzene	620 U	620 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Explosives (µg/kg)													
1,3,5-Trinitrobenzene	620 U	620 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
1,3-Dinitrobenzene	620 U	620 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,4,6-Trinitrotoluene	620 U	620 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Amino-4,6-dinitrotoluene	1,250 U	1,250 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Nitrotoluene	1,250 U	1,250 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
3-Nitrotoluene	1,250 U	1,250 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
4-Amino-2,6-dinitrotoluene	1,250 U	1,250 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
4-Nitrotoluene	1,250 U	1,250 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
HMX	620 U	620 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	2.1 U	2.1 UJ	2.4 U	2.3 U	2.3 U	2.3 U	2.3 U	2.2 U	2.3 U	2.5 U	2.6 U	2.2 U	2.2 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	620 U	620 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Tetryl	1,250 R	1,250 R	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 R	3,000 R	3,000 U	3,000 U
Total Metals (mg/kg)													
Aluminum	371	293	676	376	577	618	652	652	395	1,680	1,740	327	336
Antimony	0.99 U	0.97 U	1.1 U	1.1 U	1.2 U	1.1 U	1.2 U	1.1 U	1.1 U	1.2 U	1.1 U	1 U	1 U
Arsenic	0.53 J	0.41 J	1.1 U	0.37 J	1.2 U	1.1 U	1.2 U	0.49 J	1.1 U	0.55 J	1.2	0.9 J	0.78 J
Barium	2.9 J	1.7 J	3 J	1.5 J	3.5 J	4.6 J	3.2 J	4.3 J	8.5 J	24.1 U	22.6 U	1.5 J	1.4 J
Beryllium	0.5 U	0.49 U	0.57 U	0.55 U	0.58 U	0.55 U	0.06 J	0.56 U	0.07 J	0.6 U	0.51 U	0.51 U	0.52 U
Cadmium	0.5 U	0.49 U	0.57 U	0.55 U	0.58 U	0.55 U	0.58 U	0.56 U	0.56 U	0.6 U	0.57 U	0.51 U	0.52 U
Calcium	1,780	3,180	13,000	17,800	3,970	1,690	20,800	3,370	3,660	35,300	8,740	690	804
Chromium	4.6	4.2	4.7	4.4	2.9	2.2	3.9	3.3	1.8	6.2	6.4	3.5	3.7
Cobalt	0.5 U	0.49 U	0.11 J	0.55 U	0.58 U	0.15 J	0.1 J	0.12 J	0.1 J	0.22 J	0.27 J	0.51 U	0.52 U
Copper	0.5 U	0.49 U	0.57 U	0.55 U	0.58 U	0.55 U	0.58 U	0.56 U	0.56 U	0.55 J	0.44 J	0.58	0.96
Iron	791	640	1,030 J	964 J	687 J	780 J	991 J	1,210 J	642 J	1,980	2,150	626 J	616 J
Lead	1.1 J	1.1 J	1.5	1.1	1.5	1.5	2.9	2	2.5	2	2	1.1	1.2
Magnesium	497 U	485 U	568 U	548 U	584 U	547 U	311 J	560 U	558 U	787	629	506 U	515 U
Manganese	6.4	4.8	8.4	7.4	5.5	3.5	7.4	7	4.9	13.5	12.5	2.3	2.4
Mercury	0.033 U	0.035 U	0.021 J	0.034 U	0.14	0.031 J	0.022 J	0.042	0.036 U	0.039 U	0.037 U	0.031 U	0.033 U
Nickel	4 U	0.14 J	4.5 U	4.4 U	0.32 J	4.4 U	4.6 U	4.5 U	4.5 U	0.76	0.77	4 U	4.1 U
Potassium	497 U	485 U	64.9 J	38.9 J	38.7 J	38.7 J	61.1 J	56 J	23.1 J	258 J	223 J	37.6 J	41.4 J
Selenium	0.5 UJ	0.49 UJ	0.57 R	0.55 R	0.58 R	0.55 R	0.58 R	0.56 R	0.56 R	0.6 UJ	0.57 UJ	0.51 R	0.52 R
Silver	0.5 U	0.49 U	0.57 U	0.55 U	0.58 U	0.55 U	0.58 U	0.56 U	0.56 U	0.6 U	0.57 U	0.51 U	0.52 U
Sodium	497 U	485 U	568 U	548 U	584 U	547 U	577 U	560 U	558 U	813	239 J	506 U	515 U
Thallium	0.99 U	0.97 U	1.1 U	1.1 U	1.2 U	1.1 U	1.2 U	1.1 U	1.1 U	1.2 U	1.1 U	1 U	1 U
Vanadium	2 U	1.9 U	2.4	1.7 J	1.8 J	1.7 J	2.2 J	2.3	1.5 J	5.4	6.5	1.1 J	1.1 J
Zinc	2.2 J	2.2 J	3	3	2.3 U	2.2 U	2.8	2.2 U	2.2 U	3.9	3.8	2.3	2.4

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

CTO-80
Surface Danger Zone
Validated Subsurface Soil Raw Analytical Results
January - March 2010

Station ID	SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID	SI-IS02-1-2-10A	SI-IS03-2-3-10A	SI-IS04-1-2-10A	SI-IS05-1-2-10A	SI-IS06-1-2-10A
Sample Date	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name					
Semivolatile Organic Compounds (µg/kg)					
2,4-Dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,6-Dinitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
Nitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Explosives (µg/kg)					
1,3,5-Trinitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
1,3-Dinitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,4,6-Trinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Amino-4,6-dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
3-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
4-Amino-2,6-dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
4-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
HMX	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	2.5 U	2.2 U	2.3 U	2.5 U	2.5 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Tetryl	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
Total Metals (mg/kg)					
Aluminum	322	261	271	304	496
Antimony	1.3 U	1 U	1.2 U	1.1 U	1.2 U
Arsenic	1.3 U	1.1	0.65 J	1.1 U	1.2 U
Barium	1.4 J	1.4 J	1.5 J	1.9 J	1.8 J
Beryllium	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Cadmium	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Calcium	3,520	16,500	17,500	5,420	14,900
Chromium	4.1	3.5	3.9	3.9	4.6
Cobalt	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Copper	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Iron	630 J	995 J	998 J	716 J	996 J
Lead	1.1	0.93	1.1	1.3	1.4
Magnesium	635 U	500 U	592 U	552 U	601 U
Manganese	3.8	6	6.5	4.9	5.1
Mercury	0.041 U	0.034 U	0.038 U	0.035 U	0.042 U
Nickel	5.1 U	4 U	4.7 U	4.4 U	4.8 U
Potassium	36.7 J	27.9 J	30.4 J	35.7 J	60 J
Selenium	0.63 R	0.5 R	0.59 R	0.55 R	0.6 R
Silver	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Sodium	171 J	500 U	592 U	165 J	601 U
Thallium	1.3 U	1 U	1.2 U	1.1 U	1.2 U
Vanadium	1.3 J	2 J	2 J	1.5 J	2.3 J
Zinc	2.5 U	2 U	2.4 U	3	2.8

Notes:

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NA - Not analyzed

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

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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

CTO-80
Surface Danger Zone
Validated Subsurface Soil Detected Analytical Results
January - March 2010

Station ID	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54	BIBG-GW55/SO55		BIBG-GW56/SO56	BIBG-GW57/SO57	BI-GW01/SO01	BI-GW02/SO02		BI-GW03/SO03	BI-GW04/GW04	BI-GW05/SO05
Sample ID	BI-IS50-1-2-10A	BI-IS51-1-2-10A	BI-IS52-2-3-10A	BI-IS53-3-4-10A	BI-IS54-1-2-10A	BI-IS55-2-3-10A	BI-IS55D-2-3-10A	BI-IS56-6-7-10A	BI-IS57-3-4-10A	BI-IS01-4-5-10A	BI-IS02-8-9-10A	BI-IS02D-8-9-10A	BI-IS03-6-7-10A	BI-IS04-3-4-10A	BI-IS05-5-6-10A
Sample Date	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/25/10	01/31/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	358	336	341	384	328	325	351	302	355	278	331	343	337	327	339 J
Antimony	1 U	1 U	1 U	1.1	0.32 J	0.96 U	0.37 J	0.37 J	1.1	0.82 J	1	1 U	0.83 J	0.92 J	1 U
Arsenic	1 U	1 U	0.64 J	1 J	0.46 J	0.44 J	0.5 J	0.48 J	1 U	0.79 J	1	0.77 J	0.93 J	0.82 J	0.89 J
Barium	2.4 J	20.5 UJ	2.4 J	20.8 UJ	2.3 J	1.7 J	2.1 J	1.5 J	20.6 UJ	1 J	19.8 UJ	20.4 UJ	1.1 J	1.1 J	1.8 J
Beryllium	0.51 U	0.51 U	0.5 U	0.52 U	0.54 U	0.48 U	0.5 U	0.53 U	0.52 U	0.5 U	0.5 U	0.51 U	0.5 U	0.52 U	0.51 U
Calcium	2,300	1,620	3,810	6,580	2,270	1,890	2,120	1,720	1,770	10,200	8,060	7,110	6,430	4,640	7,310
Chromium	4.9	4.3	5.1	5.8	4.6	4.1	4.7	4	4.3	3.6	4.4	4.6	4.8	4.4	5.3
Cobalt	0.14 J	0.51 U	0.14 J	0.52 U	0.14 J	0.13 J	0.14 J	0.14 J	0.52 U	0.5 U	0.5 U	0.51 U	0.5 U	0.52 U	0.09 J
Copper	0.16 J	0.51 U	0.16 J	0.52 U	0.54 U	0.48 U	0.15 J	0.17 J	0.52 U	0.5 U	0.5 U	0.51 U	0.5 U	0.52 U	0.51 U
Iron	709	701	744	903	713	665	755	660	717	791	883	878	811	685	855
Lead	1.4 J	1.1 J	1.6 J	1.6 J	1.4 J	1.2 J	1.3 J	1.1 J	1 J	0.88 J	0.95 J	0.92 J	1.1 J	1 J	1.7 J
Magnesium	513 UJ	512 U	500 UJ	520 U	537 UJ	481 UJ	495 UJ	527 UJ	142 J	280 J	495 U	511 U	263 J	218 J	512 U
Manganese	4.8	5.2	6.1	7.7	5.5	4.9	5.8	4.7	5.3	5.3	6.4	6	6.4	5.2	6.7
Mercury	0.036 U	0.037 U	0.035 U	0.033 U	0.037 U	0.031 U	0.034 U	0.035 U	0.036 U	0.033 U	0.035 U	0.035 U	0.031 U	0.033 U	0.035 U
Nickel	0.21 J	0.33 J	0.3 J	0.49 J	0.24 J	0.21 J	0.24 J	0.27 J	0.32 J	0.29 J	0.32 J	0.42 J	0.33 J	0.3 J	0.36 J
Potassium	513 U	512 U	500 U	520 U	537 U	481 U	495 U	527 U	515 U	44.8 J	495 U	511 U	52.3 J	51.2 J	37.2 J
Sodium	513 U	512 U	500 U	520 U	537 U	481 U	495 U	527 U	515 U	496 U	495 U	511 U	504 U	520 U	512 U
Vanadium	2.1 U	1.3 J	2 U	2 J	2.1 U	1.9 U	2 U	2.1 U	1.5 J	1.5 J	1.6 J	1.5 J	1.7 J	1.6 J	1.8 J
Zinc	2.1	2.4	2.6	3.1	2.4	2.1	2.5	2.2	2.5	2.1	2.7	3.3	2.9	2.8	4.3

Notes:

Shading indicates detections

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

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mg/kg - Milligrams per kilogram

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CTO-80
Surface Danger Zone
Validated Subsurface Soil Detected Analytical Results
January - March 2010

Station ID	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08	BI-GW09/SO09	BI-GW10/SO10	BI-GW11/SO11	BI-GW12/SO12	BI-GW13/SO13	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17	BI-GW19/SO19	BI-GW20/SO20	BI-GW21/SO21	
Sample ID	BI-IS06-2-3-10A	BI-IS07-4-5-10A	BI-IS08-3-4-10A	BI-IS09-1-2-10A	BI-IS10-1-2-10A	BI-IS11-3-4-10A	BI-IS12-1-2-10A	BI-IS13-0-1-10A	BI-IS14-4-5-10A	BI-IS15-6-7-10A	BI-IS16-3-4-10A	BI-IS17-6-7-10A	BI-IS19-14-15-10A	BI-IS20-8-9-10A	BI-IS21-17-18-10A	BI-IS21D-17-18-10A
Sample Date	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10	01/26/10	02/01/10	02/01/10	02/01/10
Chemical Name																
Semivolatile Organic Compounds (µg/kg)																
No Detections																
Explosives (µg/kg)																
No Detections																
Total Metals (mg/kg)																
Aluminum	302	298 J	347 J	271	355	353	373	379	333	300	268	330	250	138	384	373
Antimony	0.8 J	1 U	0.99 U	1 U	1.1	1.1 U	1.1 U	1	1.1 U	0.93 J	1.1 U	1 U	1 U	1.2	1 U	1.2
Arsenic	0.86 J	0.6 J	0.71 J	2.1	1.3	0.93 J	0.87 J	0.99 U	0.39 J	1.1 U	1.1 U	0.67 J	1 U	1 U	0.81 J	0.72 J
Barium	0.9 J	1.7 J	1.9 J	20 UJ	21.2 UJ	21.3 UJ	22.6 UJ	19.7 UJ	2.3 J	0.76 J	22.7 UJ	5.7 J	1.7 J	20.6 UJ	20.2 UJ	19.7 UJ
Beryllium	0.5 U	0.51 U	0.5 U	0.5 U	0.53 U	0.53 U	0.57 U	0.49 U	0.53 U	0.54 U	0.57 U	0.52 U	0.5 U	0.52 U	0.51 U	0.49 U
Calcium	5,940	9,750	5,050	30,500	6,990	7,010	4,780	1,710	1,940	3,060	2,040	2,950	1,350	515 U	2,500	2,270
Chromium	4	3.7	5.3	3.5	5.9	5	5.6	4.7	4.8	3.8	3.9	5.1	3.2	1.9	5.1	4.9
Cobalt	0.5 U	0.51 U	0.09 J	0.5 U	0.53 U	0.53 U	0.57 U	0.49 U	0.16 J	0.54 U	0.57 U	0.52 U	0.5 U	0.52 U	0.51 U	0.49 U
Copper	0.5 U	0.51 U	0.5 U	0.5 U	0.53 U	0.53 U	0.57 U	0.49 U	0.18 J	0.54 U	0.57 U	0.52 U	0.5 U	0.52 U	0.51 U	0.49 U
Iron	731	802	847	1,190	843	834	816	787	726	633	591	738	501	198	785	767
Lead	0.97 J	1.1 J	1.7 J	0.96 J	1.7 J	1.2 J	1.6 J	1.3 J	1.5 J	0.87 J	0.72 J	1.4 J	1.2 J	1.4	1.1	1.1
Magnesium	225 J	511 U	497 U	362 J	284 J	261 J	244 J	170 J	529 UJ	177 J	119 J	516 U	503 U	25.8 J	142 J	139 J
Manganese	5.1	5.2	6.6	8.8	7.4	7	6.6	5.7	5.5	3.9	3.7	6	4.2	2.4	5.6	5.3
Mercury	0.033 U	0.035 U	0.034 U	0.035 U	0.036 U	0.034 U	0.039 U	0.034 U	0.032 U	0.036 U	0.038 U	0.034 U	0.034 U	0.034 U	0.034 U	0.031 U
Nickel	0.23 J	0.25 J	0.33 J	0.3 J	0.4 J	0.38 J	0.44 J	0.36 J	0.26 J	0.26 J	0.38 J	4.1 U	4 U	4.1 U	0.36 J	0.4 J
Potassium	46 J	35.5 J	34.7 J	501 U	530 U	531 U	566 U	493 U	529 U	47.4 J	568 U	516 U	503 U	13.6 J	47.9 J	45.8 J
Sodium	500 U	511 U	497 U	501 U	530 U	531 U	566 U	493 U	529 U	541 U	568 U	516 U	503 U	515 U	506 U	494 U
Vanadium	1.5 J	2 U	2 U	2.4	2.1	1.8 J	2 J	1.6 J	2.1 U	1.3 J	1.3 J	2.1 U	2 U	2.1 U	2 U	2 U
Zinc	2.3	2	2.9	2	2.9	2.7	2.9	3.2	2.3	2.2 U	2.3 U	2.2 J	2 UJ	0.97 J	4.2 J	2.7 J

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CTO-80
Surface Danger Zone
Validated Subsurface Soil Detected Analytical Results
January - March 2010

Station ID	BI-GW22/SO22	BI-GW23/SO23	BI-GW24/SO24	BI-GW25/SO25	BI-GW26/SO26	BI-GW27/SO27		BI-GW28/SO28	BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31	BI-GW32/SO32	BI-GW33/SO33	BI-GW34/SO34	BI-GW35/SO35
Sample ID	BI-IS22-12-13-10A	BI-IS23-10-11-10A	BI-IS24-3-4-10A	BI-IS25-2-3-10A	BI-IS26-0-0_5-10A	BI-IS27-1-2-10A	BI-IS27D-1-2-10A	BI-IS28-1-2-10A	BI-IS29-1-2-10A	BI-IS30-2-3-10A	BI-IS31-1-2-10A	BI-IS32-0-1-10A	BI-IS33-5-6-10A	BI-IS34-2-3-10A	BI-IS35-1-2-10A
Sample Date	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/27/10	01/26/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	297	322	271	348	286	226	223	339 J	257 J	285 J	320 J	303 J	358 J	340	325
Antimony	1	1.1 U	1 U	1 J	0.81 J	1 U	1.1	1.1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	0.52 J
Arsenic	0.64 J	1.1 U	0.86 J	0.84 J	0.77 J	0.99 J	0.71 J	1.1 U	0.43 J	0.42 J	0.72 J	0.63 J	0.6 J	0.37 J	1.3 U
Barium	20.4 UJ	21.3 UJ	20 UJ	0.98 J	1.4 J	20.4 UJ	19.8 UJ	2 J	1.3 J	1.2 J	1.6 J	1.4 J	1.8 J	1.7 J	2.1 J
Beryllium	0.51 U	0.53 U	0.5 U	0.57 U	0.51 U	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.52 U	0.5 U	0.5 U	0.53 U	0.66 U
Calcium	2,550	2,520	6,920	5,680	3,690	6,810	5,920	1,980	4,010	4,980	4,500	5,670	3,440	1,480	1,680
Chromium	4.6	4.8	3.7	4.5	4	3.4	3.2	4.8	3.5	3.8	4.5	4.1	4.7	4.3	4.7
Cobalt	0.51 U	0.53 U	0.5 U	0.57 U	0.51 U	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.11 J	0.11 J	0.09 J	0.17 J	0.14 J
Copper	0.51 U	0.53 U	0.5 U	0.37 J	0.51 U	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.52 U	0.5 U	0.5 U	0.21 J	0.23 J
Iron	633	757	710	777	703	621	577	701	582	678	682	735	807	716	727
Lead	1.1 J	1.1 J	0.81 J	1.1 J	1.3 J	0.84 J	0.82 J	2.1 J	1.3 J	1.1 J	1.3 J	1.3 J	1.3 J	1.2 J	1.6 J
Magnesium	509 U	533 U	500 U	252 J	179 J	511 U	496 U	558 U	517 U	516 U	517 U	502 U	502 U	535 UJ	657 UJ
Manganese	5.2	4.6	4.9	5.3	5.1	4.4	4.1	3.9	3.7	4.7	5.1	4.9	6.1	5.2	5.1
Mercury	0.031 U	0.035 U	0.035 U	0.039 U	0.033 U	0.031 U	0.032 U	0.035 U	0.033 U	0.034 U	0.034 U	0.035 U	0.032 U	0.036 U	0.044 U
Nickel	0.3 J	4.3 U	0.23 J	0.36 J	0.27 J	0.32 J	0.22 J	0.16 J	0.2 J	0.19 J	0.27 J	0.26 J	0.3 J	0.27 J	0.3 J
Potassium	509 U	533 U	500 U	53.4 J	45.1 J	511 U	496 U	30.5 J	26.7 J	29.2 J	35.2 J	32.8 J	34.4 J	535 U	657 U
Sodium	509 U	533 U	500 U	573 U	509 U	511 U	496 U	558 U	517 U	516 U	517 U	502 U	502 U	535 U	657 U
Vanadium	1.4 J	1.6 J	1.3 J	1.6 J	1.4 J	1.2 J	1.2 J	2.2 U	2.1 U	2.1 U	2.1 U	2 U	2 U	2.1 U	2.6 U
Zinc	2.5	2.2	2.2	2.9	2.9	2 U	2 U	2.5	2.1	2.2	2.8	2.2	2.7	2.1	2.6 U

Notes:

Shading indicates detections

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

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Subsurface Soil Detected Analytical Results
January - March 2010

Station ID	BI-GW36/SO36		BI-GW38/SO38	BI-GW39/SO39	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42	BI-GW43/SO43	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46	BI-GW47/SO47	BI-GW48/SO48		BI-GW49/SO49	BI-GW59/SO59
Sample ID	BI-IS36-2-3-10A	BI-IS36D-2-3-10A	BI-IS38-14-15-10A	BI-IS39-1-2-10A	BI-IS40-7-8-10A	BI-IS41-3-4-10A	BI-IS42-7-8-10A	BI-IS43-5-6-10A	BI-IS44-1-2-10A	BI-IS45-0-1-10A	BI-IS46-0-1-10A	BI-IS47-3-4-10A	BI-IS48-8-9-10A	BI-IS48D-8-9-10A	BI-IS49-4-5-10A	BI-IS59-0-0_5-10A
Sample Date	01/25/10	01/25/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/29/10	01/27/10	01/27/10	02/01/10	02/01/10	02/01/10	01/28/10	02/01/10
Chemical Name																
Semivolatile Organic Compounds (µg/kg)																
No Detections																
Explosives (µg/kg)																
No Detections																
Total Metals (mg/kg)																
Aluminum	353	357	309	266	222	140	300	275	331 J	325	338	321	342	356	327	364
Antimony	1 U	1.1 U	1.1 U	1 U	1 U	1.1 U	1.1	0.84 J	1 U	1 U	1.2 U	1 U	1	1 U	1.2	1.2 U
Arsenic	0.75 J	0.76 J	0.54 J	0.48 J	1 U	1.1 U	1.2	1.4	0.38 J	0.32 J	1.2 U	1 U	0.7 J	0.9 J	0.91 J	1.2 U
Barium	2.5 J	2.7 J	2.2 J	2.6 J	20.3 UJ	21.2 UJ	19.5 UJ	1 J	1.5 J	1.5 J	2.2 J	20.3 UJ	20 UJ	20.8 UJ	21.3 UJ	23.8 UJ
Beryllium	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U	0.5 U	0.52 U	0.6 U	0.51 U	0.5 U	0.52 U	0.53 U	0.6 U
Calcium	2,850	3,040	2,080	2,420	601	530 U	13,400	14,400	2,480	1,560	2,480	1,820	2,170	2,750	4,700	697
Chromium	5	5.2	4.5	4	3.4	2.4	4.2	3.9	4.4	4.3	5	4	5.2	5.6	4.7	3.9
Cobalt	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U	0.5 U	0.12 J	0.13 J	0.51 U	0.5 U	0.52 U	0.53 U	0.6 U
Copper	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U	0.5 U	0.19 J	0.18 J	0.28 J	0.27 J	0.28 J	0.53 U	0.6 U
Iron	793	807	660	615	504	252	904	916	765	706	785	673	693	746	792	604
Lead	1.4 J	1.6 J	1.1 J	0.92 J	1.2	1.4	0.82 J	1.1 J	1.3 J	1.2 J	1.6 J	0.92	1.5	1.6	1.2 J	2.6
Magnesium	523 U	532 U	532 U	520 U	66.1 J	27.4 J	487 U	276 J	501 U	515 UJ	602 UJ	150 J	152 J	159 J	534 U	96 J
Manganese	6	6.4	5.6	8.6	3.2	10.1	7	6.7	5.5	4.9	5.7	4.7	6.3	6.8	6	4.1
Mercury	0.034 U	0.036 U	0.035 U	0.035 U	0.035 U	0.034 U	0.031 U	0.035 U	0.031 U	0.035 U	0.038 U	0.036 U	0.034 U	0.035 U	0.036 U	0.042 U
Nickel	4.2 U	0.12 J	0.17 J	4.2 U	0.35 J	4.2 U	0.48 J	0.34 J	0.22 J	0.23 J	0.26 J	0.31 J	0.36 J	0.45 J	0.37 J	4.8 U
Potassium	523 U	532 U	532 U	520 U	508 U	530 U	487 U	41.6 J	32 J	515 U	602 U	506 U	47.1 J	50 J	534 U	596 U
Sodium	523 U	532 U	532 U	520 U	508 U	530 U	487 U	487 U	501 U	515 U	602 U	506 U	501 U	519 U	534 U	596 U
Vanadium	2.1 U	2.1 U	2.1 U	2.1 U	1.2 J	1 J	1.7 J	1.9 J	2 U	2.1 U	2.4 U	1.4 J	2 U	2.1 U	1.6 J	1.4 J
Zinc	2.6 J	2.5 J	2.1 UJ	2.1 UJ	1.5 J	0.77 J	2.4	2.3	2.4	2.1 U	2.5	2.4	2.5	2.7	2.7	3.6

Notes:

Shading indicates detections

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

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Subsurface Soil Detected Analytical Results
January - March 2010

Station ID	BI-SO18	BI-SO37	ICW-GW01/SO01	ICW-GW02/SO02	ICW-GW05/SO05	ICW-GW07/SO07	ICW-GW08/SO08	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW13/SO13	ICW-GW15/SO15	SI-GW01/SO01	
Sample ID	BI-IS18-16-17-10A	BI-IS37-10-11-10A	ICW-IS01-6-7-10A	ICW-IS02-1-2-10A	ICW-IS05-1-1_5-10A	ICW-IS07-1-2-10A	ICW-IS08-1-2-10A	ICW-IS10-1-2-10A	ICW-IS11-1-2-10A	ICW-IS13-1-1_5-10A	ICW-IS15-1-2-10A	SI-IS01-1-1_5-10A	SI-IS01D-1-1_5-10A
Sample Date	01/26/10	01/26/10	03/23/10	03/23/10	03/22/10	03/22/10	03/23/10	03/23/10	03/23/10	03/25/10	03/25/10	03/24/10	03/24/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
No Detections													
Explosives (µg/kg)													
No Detections													
Total Metals (mg/kg)													
Aluminum	371	293	676	376	577	618	652	652	395	1,680	1,740	327	336
Antimony	0.99 U	0.97 U	1.1 U	1.1 U	1.2 U	1.1 U	1.2 U	1.1 U	1.1 U	1.2 U	1.1 U	1 U	1 U
Arsenic	0.53 J	0.41 J	1.1 U	0.37 J	1.2 U	1.1 U	1.2 U	0.49 J	1.1 U	0.55 J	1.2	0.9 J	0.78 J
Barium	2.9 J	1.7 J	3 J	1.5 J	3.5 J	4.6 J	3.2 J	4.3 J	8.5 J	24.1 U	22.6 U	1.5 J	1.4 J
Beryllium	0.5 U	0.49 U	0.57 U	0.55 U	0.58 U	0.55 U	0.06 J	0.56 U	0.07 J	0.6 U	0.51 U	0.51 U	0.52 U
Calcium	1,780	3,180	13,000	17,800	3,970	1,690	20,800	3,370	3,660	35,300	8,740	690	804
Chromium	4.6	4.2	4.7	4.4	2.9	2.2	3.9	3.3	1.8	6.2	6.4	3.5	3.7
Cobalt	0.5 U	0.49 U	0.11 J	0.55 U	0.58 U	0.15 J	0.1 J	0.12 J	0.1 J	0.22 J	0.27 J	0.51 U	0.52 U
Copper	0.5 U	0.49 U	0.57 U	0.55 U	0.58 U	0.55 U	0.58 U	0.56 U	0.56 U	0.55 J	0.44 J	0.58	0.96
Iron	791	640	1,030 J	964 J	687 J	780 J	991 J	1,210 J	642 J	1,980	2,150	626 J	616 J
Lead	1.1 J	1.1 J	1.5	1.1	1.5	1.5	2.9	2	2.5	2	2	1.1	1.2
Magnesium	497 U	485 U	568 U	548 U	584 U	547 U	311 J	560 U	558 U	787	629	506 U	515 U
Manganese	6.4	4.8	8.4	7.4	5.5	3.5	7.4	7	4.9	13.5	12.5	2.3	2.4
Mercury	0.033 U	0.035 U	0.021 J	0.034 U	0.14	0.031 J	0.022 J	0.042	0.036 U	0.039 U	0.037 U	0.031 U	0.033 U
Nickel	4 U	0.14 J	4.5 U	4.4 U	0.32 J	4.4 U	4.6 U	4.5 U	4.5 U	0.76	0.77	4 U	4.1 U
Potassium	497 U	485 U	64.9 J	38.9 J	38.7 J	38.7 J	61.1 J	56 J	23.1 J	258 J	223 J	37.6 J	41.4 J
Sodium	497 U	485 U	568 U	548 U	584 U	547 U	577 U	560 U	558 U	813	239 J	506 U	515 U
Vanadium	2 U	1.9 U	2.4	1.7 J	1.8 J	1.7 J	2.2 J	2.3	1.5 J	5.4	6.5	1.1 J	1.1 J
Zinc	2.2 J	2.2 J	3	3	2.3 U	2.2 U	2.8	2.2 U	2.2 U	3.9	3.8	2.3	2.4

Notes:

Shading indicates detections

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

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Subsurface Soil Detected Analytical Results
January - March 2010

Station ID	SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID	SI-IS02-1-2-10A	SI-IS03-2-3-10A	SI-IS04-1-2-10A	SI-IS05-1-2-10A	SI-IS06-1-2-10A
Sample Date	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name					
Semivolatile Organic Compounds (µg/kg)					
No Detections					
Explosives (µg/kg)					
No Detections					
Total Metals (mg/kg)					
Aluminum	322	261	271	304	496
Antimony	1.3 U	1 U	1.2 U	1.1 U	1.2 U
Arsenic	1.3 U	1.1	0.65 J	1.1 U	1.2 U
Barium	1.4 J	1.4 J	1.5 J	1.9 J	1.8 J
Beryllium	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Calcium	3,520	16,500	17,500	5,420	14,900
Chromium	4.1	3.5	3.9	3.9	4.6
Cobalt	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Copper	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Iron	630 J	995 J	998 J	716 J	996 J
Lead	1.1	0.93	1.1	1.3	1.4
Magnesium	635 U	500 U	592 U	552 U	601 U
Manganese	3.8	6	6.5	4.9	5.1
Mercury	0.041 U	0.034 U	0.038 U	0.035 U	0.042 U
Nickel	5.1 U	4 U	4.7 U	4.4 U	4.8 U
Potassium	36.7 J	27.9 J	30.4 J	35.7 J	60 J
Sodium	171 J	500 U	592 U	165 J	601 U
Vanadium	1.3 J	2 J	2 J	1.5 J	2.3 J
Zinc	2.5 U	2 U	2.4 U	3	2.8

Notes:

Shading indicates detections

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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

CTO-80
Surface Danger Zone
Validated Subsurface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SB 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54	BIBG-GW55/SO55		BIBG-GW56/SO56	BIBG-GW57/SO57	BI-GW01/SO01
Sample ID					BI-IS50-1-2-10A	BI-IS51-1-2-10A	BI-IS52-2-3-10A	BI-IS53-3-4-10A	BI-IS54-1-2-10A	BI-IS55-2-3-10A	BI-IS55D-2-3-10A	BI-IS56-6-7-10A	BI-IS57-3-4-10A	BI-IS01-4-5-10A
Sample Date					01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/25/10	01/31/10	01/28/10
Chemical Name														
Semivolatile Organic Compounds (µg/kg)														
No Detections														
Explosives (µg/kg)														
No Detections														
Total Metals (mg/kg)														
Aluminum	682	--	99,000	7,700	358	336	341	384	328	325	351	302	355	278
Antimony	1.218	--	41	3.1	1 U	1 U	1 U	1.1	0.32 J	0.96 U	0.37 J	0.37 J	1.1	0.82 J
Arsenic	1.13	5.8	1.6	0.39	1 U	1 U	0.64 J	1 J	0.46 J	0.44 J	0.5 J	0.48 J	1 U	0.79 J
Barium	10.32	580	19,000	1,500	2.4 J	20.5 UJ	2.4 J	20.8 UJ	2.3 J	1.7 J	2.1 J	1.5 J	20.6 UJ	1 J
Beryllium	--	--	200	16	0.51 U	0.51 U	0.5 U	0.52 U	0.54 U	0.48 U	0.5 U	0.53 U	0.52 U	0.5 U
Calcium	5,500	--	--	--	2,300	1,620	3,810	6,580	2,270	1,890	2,120	1,720	1,770	10,200
Chromium	9.28	3.8	5.6	0.29	4.9	4.3	5.1	**5.8**	4.6	4.1	4.7	4	4.3	3.6
Cobalt	0.366	--	30	2.3	0.14 J	0.51 U	0.14 J	0.52 U	0.14 J	0.13 J	0.14 J	0.14 J	0.52 U	0.5 U
Copper	0.444	700	4,100	310	0.16 J	0.51 U	0.16 J	0.52 U	0.54 U	0.48 U	0.15 J	0.17 J	0.52 U	0.5 U
Iron	1,454	150	72,000	5,500	709	701	744	903	713	665	755	660	717	791
Lead	2.6	270	800	400	1.4 J	1.1 J	1.6 J	1.6 J	1.4 J	1.2 J	1.3 J	1.1 J	1 J	0.88 J
Magnesium	484	--	--	--	513 UJ	512 U	500 UJ	520 U	537 UJ	481 UJ	495 UJ	527 UJ	142 J	280 J
Manganese	11.06	65	2,300	180	4.8	5.2	6.1	7.7	5.5	4.9	5.8	4.7	5.3	5.3
Mercury	--	1	31	2.3	0.036 U	0.037 U	0.035 U	0.033 U	0.037 U	0.031 U	0.034 U	0.035 U	0.036 U	0.033 U
Nickel	0.592	130	2,000	150	0.21 J	0.33 J	0.3 J	0.49 J	0.24 J	0.21 J	0.24 J	0.27 J	0.32 J	0.29 J
Potassium	--	--	--	--	513 U	512 U	500 U	520 U	537 U	481 U	495 U	527 U	515 U	44.8 J
Sodium	--	--	--	--	513 U	512 U	500 U	520 U	537 U	481 U	495 U	527 U	515 U	496 U
Vanadium	2.48	--	520	39	2.1 U	1.3 J	2 U	2 J	2.1 U	1.9 U	2 U	2.1 U	1.5 J	1.5 J
Zinc	4.86	1,200	31,000	2,300	2.1	2.4	2.6	3.1	2.4	2.1	2.5	2.2	2.5	2.1

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Shading indicates exceedance of two times the mean base background concentration for subsurface soil

Underline indicates exceedance of Adjusted Residential Soil RSLs

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

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

CTO-80
Surface Danger Zone
Validated Subsurface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SB 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW02/SO02		BI-GW03/SO03	BI-GW04/GW04	BI-GW05/SO05	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08	BI-GW09/SO09	BI-GW10/SO10	BI-GW11/SO11
Sample ID					BI-IS02-8-9-10A	BI-IS02D-8-9-10A	BI-IS03-6-7-10A	BI-IS04-3-4-10A	BI-IS05-5-6-10A	BI-IS06-2-3-10A	BI-IS07-4-5-10A	BI-IS08-3-4-10A	BI-IS09-1-2-10A	BI-IS10-1-2-10A	BI-IS11-3-4-10A
Sample Date					01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	682	--	99,000	7,700	331	343	337	327	339 J	302	298 J	347 J	271	355	353
Antimony	1.218	--	41	3.1	1	1 U	0.83 J	0.92 J	1 U	0.8 J	1 U	0.99 U	1 U	1.1	1.1 U
Arsenic	1.13	5.8	1.6	0.39	1	0.77 J	0.93 J	0.82 J	0.89 J	0.86 J	0.6 J	0.71 J	**2.1**	1.3	0.93 J
Barium	10.32	580	19,000	1,500	19.8 UJ	20.4 UJ	1.1 J	1.1 J	1.8 J	0.9 J	1.7 J	1.9 J	20 UJ	21.2 UJ	21.3 UJ
Beryllium	--	--	200	16	0.5 U	0.51 U	0.5 U	0.52 U	0.51 U	0.5 U	0.51 U	0.5 U	0.5 U	0.53 U	0.53 U
Calcium	5,500	--	--	--	8,060	7,110	6,430	4,640	7,310	5,940	9,750	5,050	30,500	6,990	7,010
Chromium	9.28	3.8	5.6	0.29	4.4	4.6	4.8	4.4	5.3	4	3.7	5.3	3.5	**5.9**	5
Cobalt	0.366	--	30	2.3	0.5 U	0.51 U	0.5 U	0.52 U	0.09 J	0.5 U	0.51 U	0.09 J	0.5 U	0.53 U	0.53 U
Copper	0.444	700	4,100	310	0.5 U	0.51 U	0.5 U	0.52 U	0.51 U	0.5 U	0.51 U	0.5 U	0.5 U	0.53 U	0.53 U
Iron	1,454	150	72,000	5,500	883	878	811	685	855	731	802	847	1,190	843	834
Lead	2.6	270	800	400	0.95 J	0.92 J	1.1 J	1 J	1.7 J	0.97 J	1.1 J	1.7 J	0.96 J	1.7 J	1.2 J
Magnesium	484	--	--	--	495 U	511 U	263 J	218 J	512 U	225 J	511 U	497 U	362 J	284 J	261 J
Manganese	11.06	65	2,300	180	6.4	6	6.4	5.2	6.7	5.1	5.2	6.6	8.8	7.4	7
Mercury	--	1	31	2.3	0.035 U	0.035 U	0.031 U	0.033 U	0.035 U	0.033 U	0.035 U	0.034 U	0.035 U	0.036 U	0.034 U
Nickel	0.592	130	2,000	150	0.32 J	0.42 J	0.33 J	0.3 J	0.36 J	0.23 J	0.25 J	0.33 J	0.3 J	0.4 J	0.38 J
Potassium	--	--	--	--	495 U	511 U	52.3 J	51.2 J	37.2 J	46 J	35.5 J	34.7 J	501 U	530 U	531 U
Sodium	--	--	--	--	495 U	511 U	504 U	520 U	512 U	500 U	511 U	497 U	501 U	530 U	531 U
Vanadium	2.48	--	520	39	1.6 J	1.5 J	1.7 J	1.6 J	1.8 J	1.5 J	2 U	2 U	2.4	2.1	1.8 J
Zinc	4.86	1,200	31,000	2,300	2.7	3.3	2.9	2.8	4.3	2.3	2	2.9	2	2.9	2.7

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Shading indicates exceedance of two times the mean base background concentration for subsurface soil

Underline indicates exceedance of Adjusted Residential Soil RSLs

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

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

CTO-80
Surface Danger Zone
Validated Subsurface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SB 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW12/SO12	BI-GW13/SO13	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17	BI-GW19/SO19	BI-GW20/SO20	BI-GW21/SO21		BI-GW22/SO22
Sample ID					BI-IS12-1-2-10A	BI-IS13-0-1-10A	BI-IS14-4-5-10A	BI-IS15-6-7-10A	BI-IS16-3-4-10A	BI-IS17-6-7-10A	BI-IS19-14-15-10A	BI-IS20-8-9-10A	BI-IS21-17-18-10A	BI-IS21D-17-18-10A	BI-IS22-12-13-10A
Sample Date					01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10	01/26/10	02/01/10	02/01/10	02/01/10	01/28/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	682	--	99,000	7,700	373	379	333	300	268	330	250	138	384	373	297
Antimony	1.218	--	41	3.1	1.1 U	1	1.1 U	0.93 J	1.1 U	1 U	1 U	1.2	1 U	1.2	1
Arsenic	1.13	5.8	1.6	0.39	0.87 J	0.99 U	0.39 J	1.1 U	1.1 U	0.67 J	1 U	1 U	0.81 J	0.72 J	0.64 J
Barium	10.32	580	19,000	1,500	22.6 UJ	19.7 UJ	2.3 J	0.76 J	22.7 UJ	5.7 J	1.7 J	20.6 UJ	20.2 UJ	19.7 UJ	20.4 UJ
Beryllium	--	--	200	16	0.57 U	0.49 U	0.53 U	0.54 U	0.57 U	0.52 U	0.5 U	0.52 U	0.51 U	0.49 U	0.51 U
Calcium	5,500	--	--	--	4,780	1,710	1,940	3,060	2,040	2,950	1,350	515 U	2,500	2,270	2,550
Chromium	9.28	3.8	5.6	0.29	5.6	4.7	4.8	3.8	3.9	5.1	3.2	1.9	5.1	4.9	4.6
Cobalt	0.366	--	30	2.3	0.57 U	0.49 U	0.16 J	0.54 U	0.57 U	0.52 U	0.5 U	0.52 U	0.51 U	0.49 U	0.51 U
Copper	0.444	700	4,100	310	0.57 U	0.49 U	0.18 J	0.54 U	0.57 U	0.52 U	0.5 U	0.52 U	0.51 U	0.49 U	0.51 U
Iron	1,454	150	72,000	5,500	816	787	726	633	591	738	501	198	785	767	633
Lead	2.6	270	800	400	1.6 J	1.3 J	1.5 J	0.87 J	0.72 J	1.4 J	1.2 J	1.4	1.1	1.1	1.1 J
Magnesium	484	--	--	--	244 J	170 J	529 UJ	177 J	119 J	516 U	503 U	25.8 J	142 J	139 J	509 U
Manganese	11.06	65	2,300	180	6.6	5.7	5.5	3.9	3.7	6	4.2	2.4	5.6	5.3	5.2
Mercury	--	1	31	2.3	0.039 U	0.034 U	0.032 U	0.036 U	0.038 U	0.034 U	0.034 U	0.034 U	0.034 U	0.031 U	0.031 U
Nickel	0.592	130	2,000	150	0.44 J	0.36 J	0.26 J	0.26 J	0.38 J	4.1 U	4 U	4.1 U	0.36 J	0.4 J	0.3 J
Potassium	--	--	--	--	566 U	493 U	529 U	47.4 J	568 U	516 U	503 U	13.6 J	47.9 J	45.8 J	509 U
Sodium	--	--	--	--	566 U	493 U	529 U	541 U	568 U	516 U	503 U	515 U	506 U	494 U	509 U
Vanadium	2.48	--	520	39	2 J	1.6 J	2.1 U	1.3 J	1.3 J	2.1 U	2 U	2.1 U	2 U	2 U	1.4 J
Zinc	4.86	1,200	31,000	2,300	2.9	3.2	2.3	2.2 U	2.3 U	2.2 J	2 UJ	0.97 J	4.2 J	2.7 J	2.5

Notes:

Bold box indicates exceedance of NC SSL

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Shading indicates exceedance of two times the mean base background concentration for subsurface soil

Underline indicates exceedance of Adjusted Residential Soil RSLs

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mg/kg - Milligrams per kilogram

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Subsurface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SB 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW23/SO23	BI-GW24/SO24	BI-GW25/SO25	BI-GW26/SO26	BI-GW27/SO27		BI-GW28/SO28	BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31	BI-GW32/SO32
Sample ID					BI-IS23-10-11-10A	BI-IS24-3-4-10A	BI-IS25-2-3-10A	BI-IS26-0-0_5-10A	BI-IS27-1-2-10A	BI-IS27D-1-2-10A	BI-IS28-1-2-10A	BI-IS29-1-2-10A	BI-IS30-2-3-10A	BI-IS31-1-2-10A	BI-IS32-0-1-10A
Sample Date					01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	682	--	99,000	7,700	322	271	348	286	226	223	339 J	257 J	285 J	320 J	303 J
Antimony	1.218	--	41	3.1	1.1 U	1 U	1 J	0.81 J	1 U	1.1	1.1 U	1 U	1 U	1 U	1 U
Arsenic	1.13	5.8	1.6	0.39	1.1 U	0.86 J	0.84 J	0.77 J	0.99 J	0.71 J	1.1 U	0.43 J	0.42 J	0.72 J	0.63 J
Barium	10.32	580	19,000	1,500	21.3 UJ	20 UJ	0.98 J	1.4 J	20.4 UJ	19.8 UJ	2 J	1.3 J	1.2 J	1.6 J	1.4 J
Beryllium	--	--	200	16	0.53 U	0.5 U	0.57 U	0.51 U	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.52 U	0.5 U
Calcium	5,500	--	--	--	2,520	6,920	5,680	3,690	6,810	5,920	1,980	4,010	4,980	4,500	5,670
Chromium	9.28	3.8	5.6	0.29	4.8	3.7	4.5	4	3.4	3.2	4.8	3.5	3.8	4.5	4.1
Cobalt	0.366	--	30	2.3	0.53 U	0.5 U	0.57 U	0.51 U	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.11 J	0.11 J
Copper	0.444	700	4,100	310	0.53 U	0.5 U	0.37 J	0.51 U	0.51 U	0.5 U	0.56 U	0.52 U	0.52 U	0.52 U	0.5 U
Iron	1,454	150	72,000	5,500	757	710	777	703	621	577	701	582	678	682	735
Lead	2.6	270	800	400	1.1 J	0.81 J	1.1 J	1.3 J	0.84 J	0.82 J	2.1 J	1.3 J	1.1 J	1.3 J	1.3 J
Magnesium	484	--	--	--	533 U	500 U	252 J	179 J	511 U	496 U	558 U	517 U	516 U	517 U	502 U
Manganese	11.06	65	2,300	180	4.6	4.9	5.3	5.1	4.4	4.1	3.9	3.7	4.7	5.1	4.9
Mercury	--	1	31	2.3	0.035 U	0.035 U	0.039 U	0.033 U	0.031 U	0.032 U	0.035 U	0.033 U	0.034 U	0.034 U	0.035 U
Nickel	0.592	130	2,000	150	4.3 U	0.23 J	0.36 J	0.27 J	0.32 J	0.22 J	0.16 J	0.2 J	0.19 J	0.27 J	0.26 J
Potassium	--	--	--	--	533 U	500 U	53.4 J	45.1 J	511 U	496 U	30.5 J	26.7 J	29.2 J	35.2 J	32.8 J
Sodium	--	--	--	--	533 U	500 U	573 U	509 U	511 U	496 U	558 U	517 U	516 U	517 U	502 U
Vanadium	2.48	--	520	39	1.6 J	1.3 J	1.6 J	1.4 J	1.2 J	1.2 J	2.2 U	2.1 U	2.1 U	2.1 U	2 U
Zinc	4.86	1,200	31,000	2,300	2.2	2.2	2.9	2.9	2 U	2 U	2.5	2.1	2.2	2.8	2.2

Notes:

Bold box indicates exceedance of NC SSL

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Shading indicates exceedance of two times the mean base background concentration for subsurface soil

Underline indicates exceedance of Adjusted Residential Soil RSLs

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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

CTO-80
Surface Danger Zone
Validated Subsurface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SB 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW33/SO33	BI-GW34/SO34	BI-GW35/SO35	BI-GW36/SO36		BI-GW38/SO38	BI-GW39/SO39	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42	BI-GW43/SO43
Sample ID					BI-IS33-5-6-10A	BI-IS34-2-3-10A	BI-IS35-1-2-10A	BI-IS36-2-3-10A	BI-IS36D-2-3-10A	BI-IS38-14-15-10A	BI-IS39-1-2-10A	BI-IS40-7-8-10A	BI-IS41-3-4-10A	BI-IS42-7-8-10A	BI-IS43-5-6-10A
Sample Date					01/31/10	01/27/10	01/26/10	01/25/10	01/25/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	682	--	99,000	7,700	358 J	340	325	353	357	309	266	222	140	300	275
Antimony	1.218	--	41	3.1	1 U	1.1 U	0.52 J	1 U	1.1 U	1.1 U	1 U	1 U	1.1 U	1.1	0.84 J
Arsenic	1.13	5.8	1.6	0.39	0.6 J	0.37 J	1.3 U	0.75 J	0.76 J	0.54 J	0.48 J	1 U	1.1 U	1.2	1.4
Barium	10.32	580	19,000	1,500	1.8 J	1.7 J	2.1 J	2.5 J	2.7 J	2.2 J	2.6 J	20.3 UJ	21.2 UJ	19.5 UJ	1 J
Beryllium	--	--	200	16	0.5 U	0.53 U	0.66 U	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U
Calcium	5,500	--	--	--	3,440	1,480	1,680	2,850	3,040	2,080	2,420	601	530 U	13,400	14,400
Chromium	9.28	3.8	5.6	0.29	4.7	4.3	4.7	5	5.2	4.5	4	3.4	2.4	4.2	3.9
Cobalt	0.366	--	30	2.3	0.09 J	0.17 J	0.14 J	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U
Copper	0.444	700	4,100	310	0.5 U	0.21 J	0.23 J	0.52 U	0.53 U	0.53 U	0.52 U	0.51 U	0.53 U	0.49 U	0.49 U
Iron	1,454	150	72,000	5,500	807	716	727	793	807	660	615	504	252	904	916
Lead	2.6	270	800	400	1.3 J	1.2 J	1.6 J	1.4 J	1.6 J	1.1 J	0.92 J	1.2	1.4	0.82 J	1.1 J
Magnesium	484	--	--	--	502 U	535 UJ	657 UJ	523 U	532 U	532 U	520 U	66.1 J	27.4 J	487 U	276 J
Manganese	11.06	65	2,300	180	6.1	5.2	5.1	6	6.4	5.6	8.6	3.2	10.1	7	6.7
Mercury	--	1	31	2.3	0.032 U	0.036 U	0.044 U	0.034 U	0.036 U	0.035 U	0.035 U	0.035 U	0.034 U	0.031 U	0.035 U
Nickel	0.592	130	2,000	150	0.3 J	0.27 J	0.3 J	4.2 U	0.12 J	0.17 J	4.2 U	0.35 J	4.2 U	0.48 J	0.34 J
Potassium	--	--	--	--	34.4 J	535 U	657 U	523 U	532 U	532 U	520 U	508 U	530 U	487 U	41.6 J
Sodium	--	--	--	--	502 U	535 U	657 U	523 U	532 U	532 U	520 U	508 U	530 U	487 U	487 U
Vanadium	2.48	--	520	39	2 U	2.1 U	2.6 U	2.1 U	2.1 U	2.1 U	2.1 U	1.2 J	1 J	1.7 J	1.9 J
Zinc	4.86	1,200	31,000	2,300	2.7	2.1	2.6 U	2.6 J	2.5 J	2.1 UJ	2.1 UJ	1.5 J	0.77 J	2.4	2.3

Notes:

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mg/kg - Milligrams per kilogram

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Subsurface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SB 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46	BI-GW47/SO47	BI-GW48/SO48		BI-GW49/SO49	BI-GW59/SO59	BI-SO18	BI-SO37	ICW-GW01/SO01
Sample ID					BI-IS44-1-2-10A	BI-IS45-0-1-10A	BI-IS46-0-1-10A	BI-IS47-3-4-10A	BI-IS48-8-9-10A	BI-IS48D-8-9-10A	BI-IS49-4-5-10A	BI-IS59-0-0_5-10A	BI-IS18-16-17-10A	BI-IS37-10-11-10A	ICW-IS01-6-7-10A
Sample Date					01/29/10	01/27/10	01/27/10	02/01/10	02/01/10	02/01/10	01/28/10	02/01/10	01/26/10	01/26/10	03/23/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	682	--	99,000	7,700	331 J	325	338	321	342	356	327	364	371	293	676
Antimony	1.218	--	41	3.1	1 U	1 U	1.2 U	1 U	1	1 U	1.2	1.2 U	0.99 U	0.97 U	1.1 U
Arsenic	1.13	5.8	1.6	0.39	0.38 J	0.32 J	1.2 U	1 U	0.7 J	0.9 J	0.91 J	1.2 U	0.53 J	0.41 J	1.1 U
Barium	10.32	580	19,000	1,500	1.5 J	1.5 J	2.2 J	20.3 UJ	20 UJ	20.8 UJ	21.3 UJ	23.8 UJ	2.9 J	1.7 J	3 J
Beryllium	--	--	200	16	0.5 U	0.52 U	0.6 U	0.51 U	0.5 U	0.52 U	0.53 U	0.6 U	0.5 U	0.49 U	0.57 U
Calcium	5,500	--	--	--	2,480	1,560	2,480	1,820	2,170	2,750	4,700	697	1,780	3,180	13,000
Chromium	9.28	3.8	5.6	0.29	4.4	4.3	5	4	5.2	5.6	4.7	3.9	4.6	4.2	4.7
Cobalt	0.366	--	30	2.3	0.5 U	0.12 J	0.13 J	0.51 U	0.5 U	0.52 U	0.53 U	0.6 U	0.5 U	0.49 U	0.11 J
Copper	0.444	700	4,100	310	0.5 U	0.19 J	0.18 J	0.28 J	0.27 J	0.28 J	0.53 U	0.6 U	0.5 U	0.49 U	0.57 U
Iron	1,454	150	72,000	5,500	765	706	785	673	693	746	792	604	791	640	1,030 J
Lead	2.6	270	800	400	1.3 J	1.2 J	1.6 J	0.92	1.5	1.6	1.2 J	2.6	1.1 J	1.1 J	1.5
Magnesium	484	--	--	--	501 U	515 UJ	602 UJ	150 J	152 J	159 J	534 U	96 J	497 U	485 U	568 U
Manganese	11.06	65	2,300	180	5.5	4.9	5.7	4.7	6.3	6.8	6	4.1	6.4	4.8	8.4
Mercury	--	1	31	2.3	0.031 U	0.035 U	0.038 U	0.036 U	0.034 U	0.035 U	0.036 U	0.042 U	0.033 U	0.035 U	0.021 J
Nickel	0.592	130	2,000	150	0.22 J	0.23 J	0.26 J	0.31 J	0.36 J	0.45 J	0.37 J	4.8 U	4 U	0.14 J	4.5 U
Potassium	--	--	--	--	32 J	515 U	602 U	506 U	47.1 J	50 J	534 U	596 U	497 U	485 U	64.9 J
Sodium	--	--	--	--	501 U	515 U	602 U	506 U	501 U	519 U	534 U	596 U	497 U	485 U	568 U
Vanadium	2.48	--	520	39	2 U	2.1 U	2.4 U	1.4 J	2 U	2.1 U	1.6 J	1.4 J	2 U	1.9 U	2.4
Zinc	4.86	1,200	31,000	2,300	2.4	2.1 U	2.5	2.4	2.5	2.7	2.7	3.6	2.2 J	2.2 J	3

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Shading indicates exceedance of two times the mean base background concentration for subsurface soil

Underline indicates exceedance of Adjusted Residential Soil RSLs

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

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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

CTO-80
Surface Danger Zone
Validated Subsurface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SB 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	ICW-GW02/SO02	ICW-GW05/SO05	ICW-GW07/SO07	ICW-GW08/SO08	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW13/SO13	ICW-GW15/SO15
Sample ID					ICW-IS02-1-2-10A	ICW-IS05-1-1_5-10A	ICW-IS07-1-2-10A	ICW-IS08-1-2-10A	ICW-IS10-1-2-10A	ICW-IS11-1-2-10A	ICW-IS13-1-1_5-10A	ICW-IS15-1-2-10A
Sample Date					03/23/10	03/22/10	03/22/10	03/23/10	03/23/10	03/23/10	03/25/10	03/25/10
Chemical Name												
Semivolatile Organic Compounds (µg/kg)												
No Detections												
Explosives (µg/kg)												
No Detections												
Total Metals (mg/kg)												
Aluminum	682	--	99,000	7,700	376	577	618	652	652	395	1,680	1,740
Antimony	1.218	--	41	3.1	1.1 U	1.2 U	1.1 U	1.2 U	1.1 U	1.1 U	1.2 U	1.1 U
Arsenic	1.13	5.8	1.6	0.39	0.37 J	1.2 U	1.1 U	1.2 U	0.49 J	1.1 U	0.55 J	1.2
Barium	10.32	580	19,000	1,500	1.5 J	3.5 J	4.6 J	3.2 J	4.3 J	8.5 J	24.1 U	22.6 U
Beryllium	--	--	200	16	0.55 U	0.58 U	0.55 U	0.06 J	0.56 U	0.07 J	0.6 U	0.51 U
Calcium	5,500	--	--	--	17,800	3,970	1,690	20,800	3,370	3,660	35,300	8,740
Chromium	9.28	3.8	5.6	0.29	4.4	2.9	2.2	3.9	3.3	1.8	**6.2**	**6.4**
Cobalt	0.366	--	30	2.3	0.55 U	0.58 U	0.15 J	0.1 J	0.12 J	0.1 J	0.22 J	0.27 J
Copper	0.444	700	4,100	310	0.55 U	0.58 U	0.55 U	0.58 U	0.56 U	0.56 U	0.55 J	0.44 J
Iron	1,454	150	72,000	5,500	964 J	687 J	780 J	991 J	1,210 J	642 J	1,980	2,150
Lead	2.6	270	800	400	1.1	1.5	1.5	2.9	2	2.5	2	2
Magnesium	484	--	--	--	548 U	584 U	547 U	311 J	560 U	558 U	787	629
Manganese	11.06	65	2,300	180	7.4	5.5	3.5	7.4	7	4.9	13.5	12.5
Mercury	--	1	31	2.3	0.034 U	0.14	0.031 J	0.022 J	0.042	0.036 U	0.039 U	0.037 U
Nickel	0.592	130	2,000	150	4.4 U	0.32 J	4.4 U	4.6 U	4.5 U	4.5 U	0.76	0.77
Potassium	--	--	--	--	38.9 J	38.7 J	38.7 J	61.1 J	56 J	23.1 J	258 J	223 J
Sodium	--	--	--	--	548 U	584 U	547 U	577 U	560 U	558 U	813	239 J
Vanadium	2.48	--	520	39	1.7 J	1.8 J	1.7 J	2.2 J	2.3	1.5 J	5.4	6.5
Zinc	4.86	1,200	31,000	2,300	3	2.3 U	2.2 U	2.8	2.2 U	2.2 U	3.9	3.8

Notes:

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Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Shading indicates exceedance of two times the mean base background concentration for subsurface soil

Underline indicates exceedance of Adjusted Residential Soil RSLs

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CTO-80
Surface Danger Zone
Validated Subsurface Soil Exceedance Results
January - March 2010

Station ID	**Camp Lejeune Background SB 2X Mean**	**NCSSLs (January, 2010)**	**Adjusted Industrial Soil RSLs (May 2010)**	**Adjusted Residential Soil RSLs (May 2010)**	SI-GW01/SO01		SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID					SI-IS01-1-1_5-10A	SI-IS01D-1-1_5-10A	SI-IS02-1-2-10A	SI-IS03-2-3-10A	SI-IS04-1-2-10A	SI-IS05-1-2-10A	SI-IS06-1-2-10A
Sample Date					03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name											
Semivolatile Organic Compounds (µg/kg)											
No Detections											
Explosives (µg/kg)											
No Detections											
Total Metals (mg/kg)											
Aluminum	682	--	99,000	7,700	327	336	322	261	271	304	496
Antimony	1.218	--	41	3.1	1 U	1 U	1.3 U	1 U	1.2 U	1.1 U	1.2 U
Arsenic	1.13	5.8	1.6	0.39	0.9 J	0.78 J	1.3 U	1.1	0.65 J	1.1 U	1.2 U
Barium	10.32	580	19,000	1,500	1.5 J	1.4 J	1.4 J	1.4 J	1.5 J	1.9 J	1.8 J
Beryllium	--	--	200	16	0.51 U	0.52 U	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Calcium	5,500	--	--	--	690	804	3,520	16,500	17,500	5,420	14,900
Chromium	9.28	3.8	5.6	0.29	3.5	3.7	4.1	3.5	3.9	3.9	4.6
Cobalt	0.366	--	30	2.3	0.51 U	0.52 U	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Copper	0.444	700	4,100	310	0.58	0.96	0.63 U	0.5 U	0.59 U	0.55 U	0.6 U
Iron	1,454	150	72,000	5,500	626 J	616 J	630 J	995 J	998 J	716 J	996 J
Lead	2.6	270	800	400	1.1	1.2	1.1	0.93	1.1	1.3	1.4
Magnesium	484	--	--	--	506 U	515 U	635 U	500 U	592 U	552 U	601 U
Manganese	11.06	65	2,300	180	2.3	2.4	3.8	6	6.5	4.9	5.1
Mercury	--	1	31	2.3	0.031 U	0.033 U	0.041 U	0.034 U	0.038 U	0.035 U	0.042 U
Nickel	0.592	130	2,000	150	4 U	4.1 U	5.1 U	4 U	4.7 U	4.4 U	4.8 U
Potassium	--	--	--	--	37.6 J	41.4 J	36.7 J	27.9 J	30.4 J	35.7 J	60 J
Sodium	--	--	--	--	506 U	515 U	171 J	500 U	592 U	165 J	601 U
Vanadium	2.48	--	520	39	1.1 J	1.1 J	1.3 J	2 J	2 J	1.5 J	2.3 J
Zinc	4.86	1,200	31,000	2,300	2.3	2.4	2.5 U	2 U	2.4 U	3	2.8

Notes:

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CTO-80
Surface Danger Zone
Validated Sediment Raw Analytical Results
May 2010

Station ID	SDZ-WN01/SD01	SDZ-WN02/SD02	SDZ-WN03/SD03	SDZ-WN04/SD04	SDZ-WN05/SD05	SDZ-WN06/SD06	SDZ-WN07/SD07	SDZ-WN08/SD08	SDZ-WN09/SD09		SDZ-WN10/SD10	SDZ-WN11/SD11	SDZ-WN12/SD12	SDZ-WN13/SD13	SDZ-WN14/SD14
Sample ID	SDZ-SD01-10B	SDZ-SD02-10B	SDZ-SD03-10B	SDZ-SD04-10B	SDZ-SD05-10B	SDZ-SD06-10B	SDZ-SD07-10B	SDZ-SD08-10B	SDZ-SD09-10B	SDZ-SD09D-10B	SDZ-SD10-10B	SDZ-SD11-10B	SDZ-SD12-10B	SDZ-SD13-10B	SDZ-SD14-10B
Sample Date	05/07/10	05/07/10	05/06/10	05/06/10	05/05/10	05/03/10	05/03/10	05/03/10	05/03/10	05/03/10	05/06/10	05/10/10	05/10/10	05/10/10	05/10/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
2,4-Dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,6-Dinitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
Nitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Explosives (µg/kg)															
1,3,5-Trinitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
1,3-Dinitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,4,6-Trinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Amino-4,6-dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
3-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
4-Amino-2,6-dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
4-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
HMX	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	5.4 U	3.9 U	3 U	3 U	3.2 U	2.9 U	2.7 U	3.1 U	3.6 U	3.5 U	3.3 U	2.7 U	2.8 U	2.5 U	2.8 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Tetryl	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R
Total Metals (mg/kg)															
Aluminum	16,700	7,910	4,860	5,350	6,810	2,430	3,130	8,530	5,790	7,160	4,800	2,630	1,390	299	2,480
Antimony	1.6 J	2.2 J	1.9 J	0.9 J	1.6 U	1.4 U	1.4 U	1.2 U	1.7 U	1.8 U	1.3 J	1.4 J	0.79 J	1.3 J	1.1 J
Arsenic	9.2	4.4	3.5	5.2	7.8	1.4	2.3	6.2	4.6	5.1	4.2	2.7	1.2 J	0.94 J	2.3
Barium	19.4 J	9.9 J	7.2 J	8 J	10.3 J	4.9 J	5.6 J	12.2 J	9 J	10.1 J	7.7 J	4.5 J	2.6 J	1.3 J	4.2 J
Beryllium	1.3 U	1 U	0.79 U	0.76 U	0.8 U	0.68 U	0.68 U	0.74 U	0.84 U	0.89 U	0.89 U	0.69 U	0.63 U	0.6 U	0.67 U
Cadmium	1.3 U	1 U	0.16 J	0.76 U	0.8 U	0.68 U	0.68 U	0.74 U	0.84 U	0.89 U	0.89 U	0.69 U	0.63 U	0.6 U	0.67 U
Calcium	2,490	1,180	111,000	37,500	21,200	20,100	22,100	41,200	14,100	16,800	4,950	22,900	14,300	9,300	24,500
Chromium	42.3	19.2	13.4	18.2	23.3	9.8	10.7	24	18.8	22	20.8	11.2	7.5	4	10.9
Cobalt	1.3 U	1 UJ	0.71 J-	0.76 U	0.6 J-	0.68 UJ	0.68 UJ	0.68 J-	0.84 UJ	0.89 UJ	0.89 U	0.69 U	0.63 U	0.6 U	0.67 U
Copper	9.7	4.5	2.4	2.4	2.5	1	3	5.1	3	3.4	1.8	2.8	0.63 U	0.6 U	2.6
Iron	24,300	9,510	6,190	7,960	10,600	3,390	3,820	10,200	7,530	8,990	8,410	4,000	2,190	796	3,800
Lead	22.9	11 J	5 J	4.6	4.9 J	2.9 J	3.8 J	9.2 J	6 J	6.7 J	4.3	3.4	2.2	0.99	3.4
Magnesium	4,950	2,380	2,830	3,170	3,780	1,460	1,870	4,130	3,100	3,630	2,750	2,020	1,210	591 J	1,890
Manganese	96	45.6	43.9	49.7	58.9	23.7	25.6	74.3	46.9	56	57.3	27.3	15	5.1	25.1
Mercury	0.072 J	0.072	0.016 J	0.052 U	0.054 U	0.015 J	0.012 J	0.028 J	0.043 J	0.027 J	0.063 U	0.048 U	0.043 U	0.041 U	0.044 U
Nickel	11.1	4.8	3.3	4.5	6.1	1.9	2.1	5.8	4.4	5.2	5.1	2.3	1.2	0.37 J	2.1
Potassium	2,830 J	1,410 J	1,120 J	1,330 J	1,920 J	468 J	732 J	1,920 J	1,430 J	1,790 J	1,200 J	690 U	635 U	598 U	669 U
Selenium	0.96 J-	1 U	0.79 UJ	0.6 J-	0.7 J-	0.68 UJ	0.68 UJ	0.74 UJ	0.84 U	0.89 U	0.73 J-	0.69 UJ	0.63 UJ	0.6 UJ	0.67 U
Silver	1.3 U	1 UJ	0.79 UJ	0.76 U	0.8 UJ	0.68 UJ	0.68 UJ	0.74 UJ	0.84 UJ	0.89 UJ	0.89 U	0.69 U	0.63 U	0.6 U	0.67 U
Sodium	6,300	4,360	6,180	5,170	7,200	2,750	4,540	6,370	8,550	9,290	7,420	4,740	3,180	2,150	4,200
Thallium	2.5 U	2 U	1.6 U	1.5 U	1.6 U	1.4 U	1.4 U	1.5 U	1.7 U	1.8 U	1.8 U	1.4 U	1.3 U	1.2 U	1.3 U
Vanadium	40.1	17.4	13.8	18.2	24.3	8.5	9.5	25.5	20.1	23	20.7	9.5	5.4	1.6 J	9.1
Zinc	55.6	26.3	19.7	16.2	18.9	8.4	10.5	24.5	19.8	20.5	17.2	11.5	6.6	2.6	10.4
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)	36,200	NA	NA	7,230	NA	2,520	NA	NA	NA	NA	18,500	NA	NA	1,920	NA
Grain Size (pct/p)															
Sieve No. 004 (4.75 mm)	99.6	NA	NA	91.8	NA	100	NA	NA	NA	NA	99.7	NA	NA	100	NA
Sieve No. 010 (2.00 mm)	91.8	NA	NA	71.4	NA	97.2	NA	NA	NA	NA	93.2	NA	NA	100	NA
Sieve No. 020 (850 um)	57.7	NA	NA	58.3	NA	93.1	NA	NA	NA	NA	84.6	NA	NA	98.9	NA
Sieve No. 040 (425 um)	39.5	NA	NA	51	NA	90.5	NA	NA	NA	NA	78.5	NA	NA	96.3	NA
Sieve No. 060 (250 um)	32.9	NA	NA	43.4	NA	87.7	NA	NA	NA	NA	72.2	NA	NA	76.8	NA
Sieve No. 080 (180 um)	23.2	NA	NA	36.4	NA	81	NA	NA	NA	NA	63.7	NA	NA	26.1	NA
Sieve No. 100 (150 um)	20.7	NA	NA	32.8	NA	66.2	NA	NA	NA	NA	59.1	NA	NA	8.5	NA
Sieve No. 230 (63-UM)	8.8	NA	NA	7.5	NA	2.7	NA	NA	NA	NA	10.4	NA	NA	0.04	NA
Sieve No. 200 (75 um)	11.6	NA	NA	10.5	NA	4.5	NA	NA	NA	NA	16.9	NA	NA	0.06	NA

CTO-80
Surface Danger Zone
Validated Sediment Raw Analytical Results
May 2010

Station ID	SDZ-WN01/SD01	SDZ-WN02/SD02	SDZ-WN03/SD03	SDZ-WN04/SD04	SDZ-WN05/SD05	SDZ-WN06/SD06	SDZ-WN07/SD07	SDZ-WN08/SD08	SDZ-WN09/SD09		SDZ-WN10/SD10	SDZ-WN11/SD11	SDZ-WN12/SD12	SDZ-WN13/SD13	SDZ-WN14/SD14
Sample ID	SDZ-SD01-10B	SDZ-SD02-10B	SDZ-SD03-10B	SDZ-SD04-10B	SDZ-SD05-10B	SDZ-SD06-10B	SDZ-SD07-10B	SDZ-SD08-10B	SDZ-SD09-10B	SDZ-SD09D-10B	SDZ-SD10-10B	SDZ-SD11-10B	SDZ-SD12-10B	SDZ-SD13-10B	SDZ-SD14-10B
Sample Date	05/07/10	05/07/10	05/06/10	05/06/10	05/05/10	05/03/10	05/03/10	05/03/10	05/03/10	05/03/10	05/06/10	05/10/10	05/10/10	05/10/10	05/10/10
Chemical Name															

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Sediment Raw Analytical Results
May 2010

Station ID	SDZ-WN15/SD15	SDZ-WN16/SD16	SDZ-WN17/SD17	SDZ-WN18/SD18	SDZ-WN19/SD19	SDZ-WN20/SD20	SDZ-WN21/SD21	SDZ-WN22/SD22	SDZ-WN23/SD23		SDZ-WN24/SD24	SDZ-WN25/SD25	SDZ-WN26/SD26	SDZ-WN27/SD27	SDZ-WN28/SD28
Sample ID	SDZ-SD15-10B	SDZ-SD16-10B	SDZ-SD17-10B	SDZ-SD18-10B	SDZ-SD19-10B	SDZ-SD20-10B	SDZ-SD21-10B	SDZ-SD22-10B	SDZ-SD23-10B	SDZ-SD23D-10B	SDZ-SD24-10B	SDZ-SD25-10B	SDZ-SD26-10B	SDZ-SD27-10B	SDZ-SD28-10B
Sample Date	05/10/10	05/08/10	05/05/10	05/08/10	05/08/10	05/08/10	05/08/10	05/05/10	05/05/10	05/05/10	05/04/10	05/04/10	05/04/10	05/04/10	05/05/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
2,4-Dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,6-Dinitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
Nitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Explosives (µg/kg)															
1,3,5-Trinitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
1,3-Dinitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,4,6-Trinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Amino-4,6-dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
3-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
4-Amino-2,6-dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
4-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
HMX	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	3 U	2.5 U	3.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.6 U	2.5 U	2.5 U	2.8 U	2.5 U	2.5 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Tetryl	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R
Total Metals (mg/kg)															
Aluminum	2,030	323	6,030	467	990	313	363	306	315	327	515	428	2,490	324	317
Antimony	1.1 J	0.98 J	1.7 U	1 J	1.1 J	1.4 J	1.2 J	1.2 J	1.7 J	1.4 J	1.7 J	1.7 J	1.5 U	1.3 J	1.3 J
Arsenic	2.1	0.58 J	4.8	1.1 J	1.3	1.5	1.2	2.4	1.1 J	0.86 J	0.89 J	0.76 J	2	0.94 J	0.99 J
Barium	4 J	1.1 J	8.6 J	1.7 J	2.2 J	1.7 J	1.6 J	1.8 J	1.4 J	2.1 J	1.8 J	1.4 J	4.6 J	1.7 J	1.7 J
Beryllium	0.72 U	0.61 U	0.83 U	0.58 U	0.6 U	0.6 U	0.6 U	0.62 U	0.65 U	0.61 U	0.6 U	0.64 U	0.75 U	0.6 U	0.62 U
Cadmium	0.72 U	0.61 U	0.83 U	0.58 U	0.6 U	0.6 U	0.6 U	0.62 U	0.65 U	0.61 U	0.6 U	0.64 U	0.75 U	0.6 U	0.62 U
Calcium	30,900	9,190	9,590	25,000	16,300	16,800	26,500	30,200	13,100	12,300	18,000	13,600	26,500	15,400	13,600
Chromium	10.1	4	19.6	4.9	6.3	5	4.8	4	4.6	4.4	5.3	5	10.2	3.9	4
Cobalt	0.72 U	0.61 U	0.83 UJ	0.58 U	0.6 U	0.6 U	0.6 U	0.62 UJ	0.65 UJ	0.61 UJ	0.6 U	0.64 U	0.75 UJ	0.6 UJ	0.62 UJ
Copper	0.87	0.61 U	3.3	0.58 U	0.85	0.6 U	0.6 U	0.13 J	0.11 J	0.21 J	0.11 J	0.12 J	1.1	0.6 U	0.62 U
Iron	3,220	804	7,920	1,230	1,900	1,030	1,270	1,470	991	985	1,210 J	1,020 J	3,420	900	895
Lead	2.7	1.1	6.3 J	1.1	1.7	1.3	1.1	1.1 J	1.1 J	1.2 J	1.2 J	1.1 J	3.2 J	0.96 J	1 J
Magnesium	1,980	716	3,170	1,020	1,160	715	1,210	911	803	673	929	868	2,130	710	687
Manganese	23.7	5.3	41.2	10.4	11.5	8.9	10.5	11	7.6	7.7	10	7.6	25.4	7.2	6.9
Mercury	0.048 U	0.042 U	0.028 J	0.041 U	0.043 U	0.041 U	0.042 U	0.041 U	0.043 U	0.041 U	0.013 J	0.01 J	0.022 J	0.042 U	0.011 J
Nickel	1.8	0.37 J	4.6	0.53 J	1	0.5 J	0.45 J	0.31 J	0.52 J	0.37 J	0.6 U	0.64 U	1.8	0.4 J	0.42 J
Potassium	720 U	612 U	1,540 J	583 U	603 U	604 U	601 U	17.3 J	47.1 J	17.9 J	90 J	86.7 J	675 J	28.3 J	26.6 J
Selenium	0.72 U	0.61 UJ	0.53 J	0.58 UJ	0.6 UJ	0.6 UJ	0.6 UJ	0.62 UJ	0.65 UJ	0.61 UJ	0.6 UJ	0.64 UJ	0.75 UJ	0.6 UJ	0.62 UJ
Silver	0.72 U	0.61 U	0.83 UJ	0.58 U	0.6 U	0.6 U	0.6 U	0.62 UJ	0.65 UJ	0.61 UJ	0.6 U	0.64 U	0.75 UJ	0.6 UJ	0.62 UJ
Sodium	4,920	3,100	8,440	2,720	3,560	2,430	3,350	2,760	3,330	2,380	2,750	3,180	6,320	2,450	2,520
Thallium	1.4 U	1.2 U	1.7 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.3 U	1.2 U	1.2 U	1.3 U	1.5 U	1.2 U	1.2 U
Vanadium	7.8	1.5 J	18.9	2.5	4	2 J	2.3 J	2.7	1.7 J	1.9 J	2.4 J	2 J	8.7	1.8 J	1.8 J
Zinc	9.4	2.6	19.1	3.3	5.3	3	3.1	2.6	2.8	2.6	3.8	3.4	9.3	2.5	2.5
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	1,050	NA	1,250	NA	1,420	NA	NA	NA	NA	NA	2,930	NA
Grain Size (pct/p)															
Sieve No. 004 (4.75 mm)	NA	NA	NA	100	NA	99.5	NA	99.5	NA	NA	NA	NA	NA	99.9	NA
Sieve No. 010 (2.00 mm)	NA	NA	NA	99.8	NA	99.2	NA	98.9	NA	NA	NA	NA	NA	99.8	NA
Sieve No. 020 (850 um)	NA	NA	NA	98.5	NA	98	NA	97.2	NA	NA	NA	NA	NA	99.1	NA
Sieve No. 040 (425 um)	NA	NA	NA	95.1	NA	93.9	NA	85.7	NA	NA	NA	NA	NA	95.2	NA
Sieve No. 060 (250 um)	NA	NA	NA	75.4	NA	70.2	NA	38.4	NA	NA	NA	NA	NA	59.3	NA
Sieve No. 080 (180 um)	NA	NA	NA	40	NA	16.3	NA	10.9	NA	NA	NA	NA	NA	17.3	NA
Sieve No. 100 (150 um)	NA	NA	NA	23	NA	4.5	NA	3.7	NA	NA	NA	NA	NA	5.5	NA
Sieve No. 230 (63-UM)	NA	NA	NA	0.16	NA	0.19	NA	0.2	NA	NA	NA	NA	NA	0.12	NA
Sieve No. 200 (75 um)	NA	NA	NA	0.25	NA	0.21	NA	0.21	NA	NA	NA	NA	NA	0.15	NA

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Surface Danger Zone
Validated Sediment Raw Analytical Results
May 2010

Station ID	SDZ-WN15/SD15	SDZ-WN16/SD16	SDZ-WN17/SD17	SDZ-WN18/SD18	SDZ-WN19/SD19	SDZ-WN20/SD20	SDZ-WN21/SD21	SDZ-WN22/SD22	SDZ-WN23/SD23		SDZ-WN24/SD24	SDZ-WN25/SD25	SDZ-WN26/SD26	SDZ-WN27/SD27	SDZ-WN28/SD28
Sample ID	SDZ-SD15-10B	SDZ-SD16-10B	SDZ-SD17-10B	SDZ-SD18-10B	SDZ-SD19-10B	SDZ-SD20-10B	SDZ-SD21-10B	SDZ-SD22-10B	SDZ-SD23-10B	SDZ-SD23D-10B	SDZ-SD24-10B	SDZ-SD25-10B	SDZ-SD26-10B	SDZ-SD27-10B	SDZ-SD28-10B
Sample Date	05/10/10	05/08/10	05/05/10	05/08/10	05/08/10	05/08/10	05/08/10	05/05/10	05/05/10	05/05/10	05/04/10	05/04/10	05/04/10	05/04/10	05/05/10
Chemical Name															

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Sediment Raw Analytical Results
May 2010

Station ID	SDZ-WN29/SD29		SDZ-WN30/SD30
Sample ID	SDZ-SD29-10B	SDZ-SD29D-10B	SDZ-SD30-10B
Sample Date	05/04/10	05/04/10	05/05/10
Chemical Name			
Semivolatile Organic Compounds (µg/kg)			
2,4-Dinitrotoluene	1,500 U	1,500 U	1,500 U
2,6-Dinitrotoluene	3,000 U	3,000 U	3,000 U
Nitrobenzene	1,500 U	1,500 U	1,500 U
Explosives (µg/kg)			
1,3,5-Trinitrobenzene	1,500 U	1,500 U	1,500 U
1,3-Dinitrobenzene	1,500 U	1,500 U	1,500 U
2,4,6-Trinitrotoluene	1,500 U	1,500 U	1,500 U
2-Amino-4,6-dinitrotoluene	1,500 U	1,500 U	1,500 U
2-Nitrotoluene	3,000 U	3,000 U	3,000 U
3-Nitrotoluene	3,000 U	3,000 U	3,000 U
4-Amino-2,6-dinitrotoluene	1,500 U	1,500 U	1,500 U
4-Nitrotoluene	3,000 U	3,000 U	3,000 U
HMX	1,500 U	1,500 U	1,500 U
Nitroglycerin	4,000 U	4,000 U	4,000 U
Perchlorate	2.7 U	2.7 U	2.9 U
PETN	2,500 U	2,500 U	2,500 U
RDX	1,500 U	1,500 U	1,500 U
Tetryl	3,000 R	3,000 R	3,000 R
Total Metals (mg/kg)			
Aluminum	2,050	2,120	5,770
Antimony	1.3 J	1.3 U	1.6 J
Arsenic	2	1.9	4.9
Barium	3.7 J	4.2 J	9.1 J
Beryllium	0.63 U	0.64 U	0.77 U
Cadmium	0.63 U	0.64 U	0.77 U
Calcium	14,800	15,000	30,200
Chromium	9	8.9	18.8
Cobalt	0.63 UJ	0.64 UJ	0.93
Copper	0.74	1	2.4
Iron	3,100	3,110	7,490 J
Lead	2.2 J	2.3 J	4.9 J
Magnesium	1,290	1,300	3,070
Manganese	20	20.1	50.6
Mercury	0.043 U	0.044 U	0.051 U
Nickel	1.7	1.7	4.6
Potassium	466 J	489 J	1,530 J
Selenium	0.63 UJ	0.64 UJ	0.77 UJ
Silver	0.63 UJ	0.64 UJ	0.77 U
Sodium	2,710	2,730	5,560
Thallium	1.3 U	1.3 U	1.5 U
Vanadium	7.1	7	18.2
Zinc	6.6	6.6	16.8
Wet Chemistry			
Total organic carbon (TOC) (mg/kg)	NA	NA	7,640
Grain Size (pct/p)			
Sieve No. 004 (4.75 mm)	NA	NA	97.5
Sieve No. 010 (2.00 mm)	NA	NA	84.7
Sieve No. 020 (850 um)	NA	NA	72.3
Sieve No. 040 (425 um)	NA	NA	65.4
Sieve No. 060 (250 um)	NA	NA	62.8
Sieve No. 080 (180 um)	NA	NA	50.2
Sieve No. 100 (150 um)	NA	NA	42.6
Sieve No. 230 (63-UM)	NA	NA	8.3
Sieve No. 200 (75 um)	NA	NA	12.3

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Surface Danger Zone
Validated Sediment Raw Analytical Results
May 2010

Station ID	SDZ-WN29/SD29		SDZ-WN30/SD30
Sample ID	SDZ-SD29-10B	SDZ-SD29D-10B	SDZ-SD30-10B
Sample Date	05/04/10	05/04/10	05/05/10
Chemical Name			

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Sediment Detected Analytical Results
May 2010

Station ID	SDZ-WN01/SD01	SDZ-WN02/SD02	SDZ-WN03/SD03	SDZ-WN04/SD04	SDZ-WN05/SD05	SDZ-WN06/SD06	SDZ-WN07/SD07	SDZ-WN08/SD08	SDZ-WN09/SD09		SDZ-WN10/SD10	SDZ-WN11/SD11	SDZ-WN12/SD12	SDZ-WN13/SD13	SDZ-WN14/SD14
Sample ID	SDZ-SD01-10B	SDZ-SD02-10B	SDZ-SD03-10B	SDZ-SD04-10B	SDZ-SD05-10B	SDZ-SD06-10B	SDZ-SD07-10B	SDZ-SD08-10B	SDZ-SD09-10B	SDZ-SD09D-10B	SDZ-SD10-10B	SDZ-SD11-10B	SDZ-SD12-10B	SDZ-SD13-10B	SDZ-SD14-10B
Sample Date	05/07/10	05/07/10	05/06/10	05/06/10	05/05/10	05/03/10	05/03/10	05/03/10	05/03/10	05/03/10	05/06/10	05/10/10	05/10/10	05/10/10	05/10/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	16,700	7,910	4,860	5,350	6,810	2,430	3,130	8,530	5,790	7,160	4,800	2,630	1,390	299	2,480
Antimony	1.6 J	2.2 J	1.9 J	0.9 J	1.6 U	1.4 U	1.4 U	1.2 U	1.7 U	1.8 U	1.3 J	1.4 J	0.79 J	1.3 J	1.1 J
Arsenic	9.2	4.4	3.5	5.2	7.8	1.4	2.3	6.2	4.6	5.1	4.2	2.7	1.2 J	0.94 J	2.3
Barium	19.4 J	9.9 J	7.2 J	8 J	10.3 J	4.9 J	5.6 J	12.2 J	9 J	10.1 J	7.7 J	4.5 J	2.6 J	1.3 J	4.2 J
Cadmium	1.3 U	1 U	0.16 J	0.76 U	0.8 U	0.68 U	0.68 U	0.74 U	0.84 U	0.89 U	0.89 U	0.69 U	0.63 U	0.6 U	0.67 U
Calcium	2,490	1,180	111,000	37,500	21,200	20,100	22,100	41,200	14,100	16,800	4,950	22,900	14,300	9,300	24,500
Chromium	42.3	19.2	13.4	18.2	23.3	9.8	10.7	24	18.8	22	20.8	11.2	7.5	4	10.9
Cobalt	1.3 U	1 UJ	0.71 J-	0.76 U	0.6 J-	0.68 UJ	0.68 UJ	0.68 J-	0.84 UJ	0.89 UJ	0.89 U	0.69 U	0.63 U	0.6 U	0.67 U
Copper	9.7	4.5	2.4	2.4	2.5	1	3	5.1	3	3.4	1.8	2.8	0.63 U	0.6 U	2.6
Iron	24,300	9,510	6,190	7,960	10,600	3,390	3,820	10,200	7,530	8,990	8,410	4,000	2,190	796	3,800
Lead	22.9	11 J	5 J	4.6	4.9 J	2.9 J	3.8 J	9.2 J	6 J	6.7 J	4.3	3.4	2.2	0.99	3.4
Magnesium	4,950	2,380	2,830	3,170	3,780	1,460	1,870	4,130	3,100	3,630	2,750	2,020	1,210	591 J	1,890
Manganese	96	45.6	43.9	49.7	58.9	23.7	25.6	74.3	46.9	56	57.3	27.3	15	5.1	25.1
Mercury	0.072 J	0.072	0.016 J	0.052 U	0.054 U	0.015 J	0.012 J	0.028 J	0.043 J	0.027 J	0.063 U	0.048 U	0.043 U	0.041 U	0.044 U
Nickel	11.1	4.8	3.3	4.5	6.1	1.9	2.1	5.8	4.4	5.2	5.1	2.3	1.2	0.37 J	2.1
Potassium	2,830 J	1,410 J	1,120 J	1,330 J	1,920 J	468 J	732 J	1,920 J	1,430 J	1,790 J	1,200 J	690 U	635 U	598 U	669 U
Selenium	0.96 J-	1 U	0.79 UJ	0.6 J-	0.7 J-	0.68 UJ	0.68 UJ	0.74 UJ	0.84 U	0.89 U	0.73 J-	0.69 UJ	0.63 UJ	0.6 UJ	0.67 U
Sodium	6,300	4,360	6,180	5,170	7,200	2,750	4,540	6,370	8,550	9,290	7,420	4,740	3,180	2,150	4,200
Vanadium	40.1	17.4	13.8	18.2	24.3	8.5	9.5	25.5	20.1	23	20.7	9.5	5.4	1.6 J	9.1
Zinc	55.6	26.3	19.7	16.2	18.9	8.4	10.5	24.5	19.8	20.5	17.2	11.5	6.6	2.6	10.4
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)	36,200	NA	NA	7,230	NA	2,520	NA	NA	NA	NA	18,500	NA	NA	1,920	NA
Grain Size (pct/p)															
Sieve No. 004 (4.75 mm)	99.6	NA	NA	91.8	NA	100	NA	NA	NA	NA	99.7	NA	NA	100	NA
Sieve No. 010 (2.00 mm)	91.8	NA	NA	71.4	NA	97.2	NA	NA	NA	NA	93.2	NA	NA	100	NA
Sieve No. 020 (850 um)	57.7	NA	NA	58.3	NA	93.1	NA	NA	NA	NA	84.6	NA	NA	98.9	NA
Sieve No. 040 (425 um)	39.5	NA	NA	51	NA	90.5	NA	NA	NA	NA	78.5	NA	NA	96.3	NA
Sieve No. 060 (250 um)	32.9	NA	NA	43.4	NA	87.7	NA	NA	NA	NA	72.2	NA	NA	76.8	NA
Sieve No. 080 (180 um)	23.2	NA	NA	36.4	NA	81	NA	NA	NA	NA	63.7	NA	NA	26.1	NA
Sieve No. 100 (150 um)	20.7	NA	NA	32.8	NA	66.2	NA	NA	NA	NA	59.1	NA	NA	8.5	NA
Sieve No. 230 (63-UM)	8.8	NA	NA	7.5	NA	2.7	NA	NA	NA	NA	10.4	NA	NA	0.04	NA
Sieve No. 200 (75 um)	11.6	NA	NA	10.5	NA	4.5	NA	NA	NA	NA	16.9	NA	NA	0.06	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Sediment Detected Analytical Results
May 2010

Station ID	SDZ-WN15/SD15	SDZ-WN16/SD16	SDZ-WN17/SD17	SDZ-WN18/SD18	SDZ-WN19/SD19	SDZ-WN20/SD20	SDZ-WN21/SD21	SDZ-WN22/SD22	SDZ-WN23/SD23		SDZ-WN24/SD24	SDZ-WN25/SD25	SDZ-WN26/SD26	SDZ-WN27/SD27	SDZ-WN28/SD28
Sample ID	SDZ-SD15-10B	SDZ-SD16-10B	SDZ-SD17-10B	SDZ-SD18-10B	SDZ-SD19-10B	SDZ-SD20-10B	SDZ-SD21-10B	SDZ-SD22-10B	SDZ-SD23-10B	SDZ-SD23D-10B	SDZ-SD24-10B	SDZ-SD25-10B	SDZ-SD26-10B	SDZ-SD27-10B	SDZ-SD28-10B
Sample Date	05/10/10	05/08/10	05/05/10	05/08/10	05/08/10	05/08/10	05/08/10	05/05/10	05/05/10	05/05/10	05/04/10	05/04/10	05/04/10	05/04/10	05/05/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	2,030	323	6,030	467	990	313	363	306	315	327	515	428	2,490	324	317
Antimony	1.1 J	0.98 J	1.7 U	1 J	1.1 J	1.4 J	1.2 J	1.2 J	1.7 J	1.4 J	1.7 J	1.7 J	1.5 U	1.3 J	1.3 J
Arsenic	2.1	0.58 J	4.8	1.1 J	1.3	1.5	1.2	2.4	1.1 J	0.86 J	0.89 J	0.76 J	2	0.94 J	0.99 J
Barium	4 J	1.1 J	8.6 J	1.7 J	2.2 J	1.7 J	1.6 J	1.8 J	1.4 J	2.1 J	1.8 J	1.4 J	4.6 J	1.7 J	1.7 J
Cadmium	0.72 U	0.61 U	0.83 U	0.58 U	0.6 U	0.6 U	0.6 U	0.62 U	0.65 U	0.61 U	0.6 U	0.64 U	0.75 U	0.6 U	0.62 U
Calcium	30,900	9,190	9,590	25,000	16,300	16,800	26,500	30,200	13,100	12,300	18,000	13,600	26,500	15,400	13,600
Chromium	10.1	4	19.6	4.9	6.3	5	4.8	4	4.6	4.4	5.3	5	10.2	3.9	4
Cobalt	0.72 U	0.61 U	0.83 UJ	0.58 U	0.6 U	0.6 U	0.6 U	0.62 UJ	0.65 UJ	0.61 UJ	0.6 U	0.64 U	0.75 UJ	0.6 UJ	0.62 UJ
Copper	0.87	0.61 U	3.3	0.58 U	0.85	0.6 U	0.6 U	0.13 J	0.11 J	0.21 J	0.11 J	0.12 J	1.1	0.6 U	0.62 U
Iron	3,220	804	7,920	1,230	1,900	1,030	1,270	1,470	991	985	1,210 J	1,020 J	3,420	900	895
Lead	2.7	1.1	6.3 J	1.1	1.7	1.3	1.1	1.1 J	1.1 J	1.2 J	1.2 J	1.1 J	3.2 J	0.96 J	1 J
Magnesium	1,980	716	3,170	1,020	1,160	715	1,210	911	803	673	929	868	2,130	710	687
Manganese	23.7	5.3	41.2	10.4	11.5	8.9	10.5	11	7.6	7.7	10	7.6	25.4	7.2	6.9
Mercury	0.048 U	0.042 U	0.028 J	0.041 U	0.043 U	0.041 U	0.042 U	0.041 U	0.043 U	0.041 U	0.013 J	0.01 J	0.022 J	0.042 U	0.011 J
Nickel	1.8	0.37 J	4.6	0.53 J	1	0.5 J	0.45 J	0.31 J	0.52 J	0.37 J	0.6 U	0.64 U	1.8	0.4 J	0.42 J
Potassium	720 U	612 U	1,540 J	583 U	603 U	604 U	601 U	17.3 J	47.1 J	17.9 J	90 J	86.7 J	675 J	28.3 J	26.6 J
Selenium	0.72 U	0.61 UJ	0.53 J	0.58 UJ	0.6 UJ	0.6 UJ	0.6 UJ	0.62 UJ	0.65 UJ	0.61 UJ	0.6 UJ	0.64 UJ	0.75 UJ	0.6 UJ	0.62 UJ
Sodium	4,920	3,100	8,440	2,720	3,560	2,430	3,350	2,760	3,330	2,380	2,750	3,180	6,320	2,450	2,520
Vanadium	7.8	1.5 J	18.9	2.5	4	2 J	2.3 J	2.7	1.7 J	1.9 J	2.4 J	2 J	8.7	1.8 J	1.8 J
Zinc	9.4	2.6	19.1	3.3	5.3	3	3.1	2.6	2.8	2.6	3.8	3.4	9.3	2.5	2.5
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	1,050	NA	1,250	NA	1,420	NA	NA	NA	NA	NA	2,930	NA
Grain Size (pct/p)															
Sieve No. 004 (4.75 mm)	NA	NA	NA	100	NA	99.5	NA	99.5	NA	NA	NA	NA	NA	99.9	NA
Sieve No. 010 (2.00 mm)	NA	NA	NA	99.8	NA	99.2	NA	98.9	NA	NA	NA	NA	NA	99.8	NA
Sieve No. 020 (850 um)	NA	NA	NA	98.5	NA	98	NA	97.2	NA	NA	NA	NA	NA	99.1	NA
Sieve No. 040 (425 um)	NA	NA	NA	95.1	NA	93.9	NA	85.7	NA	NA	NA	NA	NA	95.2	NA
Sieve No. 060 (250 um)	NA	NA	NA	75.4	NA	70.2	NA	38.4	NA	NA	NA	NA	NA	59.3	NA
Sieve No. 080 (180 um)	NA	NA	NA	40	NA	16.3	NA	10.9	NA	NA	NA	NA	NA	17.3	NA
Sieve No. 100 (150 um)	NA	NA	NA	23	NA	4.5	NA	3.7	NA	NA	NA	NA	NA	5.5	NA
Sieve No. 230 (63-UM)	NA	NA	NA	0.16	NA	0.19	NA	0.2	NA	NA	NA	NA	NA	0.12	NA
Sieve No. 200 (75 um)	NA	NA	NA	0.25	NA	0.21	NA	0.21	NA	NA	NA	NA	NA	0.15	NA

Notes:

Shading indicates detections

NA - Not analyzed

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UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Sediment Detected Analytical Results
May 2010

Station ID	SDZ-WN29/SD29		SDZ-WN30/SD30
Sample ID	SDZ-SD29-10B	SDZ-SD29D-10B	SDZ-SD30-10B
Sample Date	05/04/10	05/04/10	05/05/10
Chemical Name			
Semivolatile Organic Compounds (µg/kg)			
No Detections			
Explosives (µg/kg)			
No Detections			
Total Metals (mg/kg)			
Aluminum	2,050	2,120	5,770
Antimony	1.3 J	1.3 U	1.6 J
Arsenic	2	1.9	4.9
Barium	3.7 J	4.2 J	9.1 J
Cadmium	0.63 U	0.64 U	0.77 U
Calcium	14,800	15,000	30,200
Chromium	9	8.9	18.8
Cobalt	0.63 UJ	0.64 UJ	0.93
Copper	0.74	1	2.4
Iron	3,100	3,110	7,490 J
Lead	2.2 J	2.3 J	4.9 J
Magnesium	1,290	1,300	3,070
Manganese	20	20.1	50.6
Mercury	0.043 U	0.044 U	0.051 U
Nickel	1.7	1.7	4.6
Potassium	466 J	489 J	1,530 J
Selenium	0.63 UJ	0.64 UJ	0.77 UJ
Sodium	2,710	2,730	5,560
Vanadium	7.1	7	18.2
Zinc	6.6	6.6	16.8
Wet Chemistry			
Total organic carbon (TOC) (mg/kg)	NA	NA	7,640
Grain Size (pct/p)			
Sieve No. 004 (4.75 mm)	NA	NA	97.5
Sieve No. 010 (2.00 mm)	NA	NA	84.7
Sieve No. 020 (850 um)	NA	NA	72.3
Sieve No. 040 (425 um)	NA	NA	65.4
Sieve No. 060 (250 um)	NA	NA	62.8
Sieve No. 080 (180 um)	NA	NA	50.2
Sieve No. 100 (150 um)	NA	NA	42.6
Sieve No. 230 (63-UM)	NA	NA	8.3
Sieve No. 200 (75 um)	NA	NA	12.3

Notes:

Shading indicates detections

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J- - Analyte present, value may be biased low, actual value may be higher

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Sediment Exceedance Results
May 2010

Station ID	Camp Lejeune Background SD 2X Mean	SDZ-WN01/SD01	SDZ-WN02/SD02	SDZ-WN03/SD03	SDZ-WN04/SD04	SDZ-WN05/SD05	SDZ-WN06/SD06	SDZ-WN07/SD07	SDZ-WN08/SD08	SDZ-WN09/SD09		SDZ-WN10/SD10	SDZ-WN11/SD11	SDZ-WN12/SD12	SDZ-WN13/SD13
Sample ID		SDZ-SD01-10B	SDZ-SD02-10B	SDZ-SD03-10B	SDZ-SD04-10B	SDZ-SD05-10B	SDZ-SD06-10B	SDZ-SD07-10B	SDZ-SD08-10B	SDZ-SD09-10B	SDZ-SD09D-10B	SDZ-SD10-10B	SDZ-SD11-10B	SDZ-SD12-10B	SDZ-SD13-10B
Sample Date		05/07/10	05/07/10	05/06/10	05/06/10	05/05/10	05/03/10	05/03/10	05/03/10	05/03/10	05/03/10	05/06/10	05/10/10	05/10/10	05/10/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	5,471	16,700	7,910	4,860	5,350	6,810	2,430	3,130	8,530	5,790	7,160	4,800	2,630	1,390	299
Antimony	2.8	1.6 J	2.2 J	1.9 J	0.9 J	1.6 U	1.4 U	1.4 U	1.2 U	1.7 U	1.8 U	1.3 J	1.4 J	0.79 J	1.3 J
Arsenic	5.3	**9.2**	**4.4**	**3.5**	**5.2**	**7.8**	1.4	**2.3**	**6.2**	**4.6**	**5.1**	**4.2**	**2.7**	1.2 J	0.94 J
Barium	10	19.4 J	9.9 J	7.2 J	8 J	10.3 J	4.9 J	5.6 J	12.2 J	9 J	10.1 J	7.7 J	4.5 J	2.6 J	1.3 J
Cadmium	0.68	1.3 U	1 U	0.16 J	0.76 U	0.8 U	0.68 U	0.68 U	0.74 U	0.84 U	0.89 U	0.89 U	0.69 U	0.63 U	0.6 U
Calcium	39,200	2,490	1,180	111,000	37,500	21,200	20,100	22,100	41,200	14,100	16,800	4,950	22,900	14,300	9,300
Chromium	21.2	**42.3**	**19.2**	**13.4**	**18.2**	**23.3**	**9.8**	**10.7**	**24**	**18.8**	**22**	**20.8**	**11.2**	**7.5**	4
Cobalt	1.04	1.3 U	1 UJ	0.71 J-	0.76 U	0.6 J-	0.68 UJ	0.68 UJ	0.68 J-	0.84 UJ	0.89 UJ	0.89 U	0.69 U	0.63 U	0.6 U
Copper	2.5	9.7	4.5	2.4	2.4	2.5	1	3	5.1	3	3.4	1.8	2.8	0.63 U	0.6 U
Iron	7,663	24,300	9,510	6,190	7,960	10,600	3,390	3,820	10,200	7,530	8,990	8,410	4,000	2,190	796
Lead	5.5	22.9	11 J	5 J	4.6	4.9 J	2.9 J	3.8 J	9.2 J	6 J	6.7 J	4.3	3.4	2.2	0.99
Magnesium	3,371	4,950	2,380	2,830	3,170	3,780	1,460	1,870	4,130	3,100	3,630	2,750	2,020	1,210	591 J
Manganese	51.7	96	45.6	43.9	49.7	58.9	23.7	25.6	74.3	46.9	56	57.3	27.3	15	5.1
Mercury	0.04	0.072 J	0.072	0.016 J	0.052 U	0.054 U	0.015 J	0.012 J	0.028 J	0.043 J	0.027 J	0.063 U	0.048 U	0.043 U	0.041 U
Nickel	4.5	11.1	4.8	3.3	4.5	6.1	1.9	2.1	5.8	4.4	5.2	5.1	2.3	1.2	0.37 J
Potassium	1,364	2,830 J	1,410 J	1,120 J	1,330 J	1,920 J	468 J	732 J	1,920 J	1,430 J	1,790 J	1,200 J	690 U	635 U	598 U
Selenium	0.68	0.96 J-	1 U	0.79 UJ	0.6 J-	0.7 J-	0.68 UJ	0.68 UJ	0.74 UJ	0.84 U	0.89 U	0.73 J-	0.69 UJ	0.63 UJ	0.6 UJ
Sodium	7,207	6,300	4,360	6,180	5,170	7,200	2,750	4,540	6,370	8,550	9,290	7,420	4,740	3,180	2,150
Vanadium	18.1	40.1	17.4	13.8	18.2	24.3	8.5	9.5	25.5	20.1	23	20.7	9.5	5.4	1.6 J
Zinc	17.3	55.6	26.3	19.7	16.2	18.9	8.4	10.5	24.5	19.8	20.5	17.2	11.5	6.6	2.6
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)		36,200	NA	NA	7,230	NA	2,520	NA	NA	NA	NA	18,500	NA	NA	1,920
Grain Size (pct/p)															
Sieve No. 004 (4.75 mm)		99.6	NA	NA	91.8	NA	100	NA	NA	NA	NA	99.7	NA	NA	100
Sieve No. 010 (2.00 mm)		91.8	NA	NA	71.4	NA	97.2	NA	NA	NA	NA	93.2	NA	NA	100
Sieve No. 020 (850 um)		57.7	NA	NA	58.3	NA	93.1	NA	NA	NA	NA	84.6	NA	NA	98.9
Sieve No. 040 (425 um)		39.5	NA	NA	51	NA	90.5	NA	NA	NA	NA	78.5	NA	NA	96.3
Sieve No. 060 (250 um)		32.9	NA	NA	43.4	NA	87.7	NA	NA	NA	NA	72.2	NA	NA	76.8
Sieve No. 080 (180 um)		23.2	NA	NA	36.4	NA	81	NA	NA	NA	NA	63.7	NA	NA	26.1
Sieve No. 100 (150 um)		20.7	NA	NA	32.8	NA	66.2	NA	NA	NA	NA	59.1	NA	NA	8.5
Sieve No. 230 (63-UM)		8.8	NA	NA	7.5	NA	2.7	NA	NA	NA	NA	10.4	NA	NA	0.04
Sieve No. 200 (75 um)		11.6	NA	NA	10.5	NA	4.5	NA	NA	NA	NA	16.9	NA	NA	0.06

Notes:

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

Shading indicates exceedance of two times the mean base background concentration for sediment

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Sediment Exceedance Results
May 2010

Station ID	Camp Lejeune	SDZ-WN14/SD14	SDZ-WN15/SD15	SDZ-WN16/SD16	SDZ-WN17/SD17	SDZ-WN18/SD18	SDZ-WN19/SD19	SDZ-WN20/SD20	SDZ-WN21/SD21	SDZ-WN22/SD22	SDZ-WN23/SD23		SDZ-WN24/SD24	SDZ-WN25/SD25	SDZ-WN26/SD26
Sample ID	**Background SD 2X**	SDZ-SD14-10B	SDZ-SD15-10B	SDZ-SD16-10B	SDZ-SD17-10B	SDZ-SD18-10B	SDZ-SD19-10B	SDZ-SD20-10B	SDZ-SD21-10B	SDZ-SD22-10B	SDZ-SD23-10B	SDZ-SD23D-10B	SDZ-SD24-10B	SDZ-SD25-10B	SDZ-SD26-10B
Sample Date	**Mean**	05/10/10	05/10/10	05/08/10	05/05/10	05/08/10	05/08/10	05/08/10	05/08/10	05/05/10	05/05/10	05/05/10	05/04/10	05/04/10	05/04/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	5,471	2,480	2,030	323	6,030	467	990	313	363	306	315	327	515	428	2,490
Antimony	2.8	1.1 J	1.1 J	0.98 J	1.7 U	1 J	1.1 J	1.4 J	1.2 J	1.2 J	1.7 J	1.4 J	1.7 J	1.7 J	1.5 U
Arsenic	5.3	**2.3**	**2.1**	0.58 J	**4.8**	1.1 J	1.3	1.5	1.2	**2.4**	1.1 J	0.86 J	0.89 J	0.76 J	**2**
Barium	10	4.2 J	4 J	1.1 J	8.6 J	1.7 J	2.2 J	1.7 J	1.6 J	1.8 J	1.4 J	2.1 J	1.8 J	1.4 J	4.6 J
Cadmium	0.68	0.67 U	0.72 U	0.61 U	0.83 U	0.58 U	0.6 U	0.6 U	0.6 U	0.62 U	0.65 U	0.61 U	0.6 U	0.64 U	0.75 U
Calcium	39,200	24,500	30,900	9,190	9,590	25,000	16,300	16,800	26,500	30,200	13,100	12,300	18,000	13,600	26,500
Chromium	21.2	**10.9**	**10.1**	4	**19.6**	4.9	**6.3**	5	4.8	4	4.6	4.4	5.3	5	**10.2**
Cobalt	1.04	0.67 U	0.72 U	0.61 U	0.83 UJ	0.58 U	0.6 U	0.6 U	0.6 U	0.62 UJ	0.65 UJ	0.61 UJ	0.6 U	0.64 U	0.75 UJ
Copper	2.5	2.6	0.87	0.61 U	3.3	0.58 U	0.85	0.6 U	0.6 U	0.13 J	0.11 J	0.21 J	0.11 J	0.12 J	1.1
Iron	7,663	3,800	3,220	804	7,920	1,230	1,900	1,030	1,270	1,470	991	985	1,210 J	1,020 J	3,420
Lead	5.5	3.4	2.7	1.1	6.3 J	1.1	1.7	1.3	1.1	1.1 J	1.1 J	1.2 J	1.2 J	1.1 J	3.2 J
Magnesium	3,371	1,890	1,980	716	3,170	1,020	1,160	715	1,210	911	803	673	929	868	2,130
Manganese	51.7	25.1	23.7	5.3	41.2	10.4	11.5	8.9	10.5	11	7.6	7.7	10	7.6	25.4
Mercury	0.04	0.044 U	0.048 U	0.042 U	0.028 J	0.041 U	0.043 U	0.041 U	0.042 U	0.041 U	0.043 U	0.041 U	0.013 J	0.01 J	0.022 J
Nickel	4.5	2.1	1.8	0.37 J	4.6	0.53 J	1	0.5 J	0.45 J	0.31 J	0.52 J	0.37 J	0.6 U	0.64 U	1.8
Potassium	1,364	669 U	720 U	612 U	1,540 J	583 U	603 U	604 U	601 U	17.3 J	47.1 J	17.9 J	90 J	86.7 J	675 J
Selenium	0.68	0.67 U	0.72 U	0.61 UJ	0.53 J	0.58 UJ	0.6 UJ	0.6 UJ	0.6 UJ	0.62 UJ	0.65 UJ	0.61 UJ	0.6 UJ	0.64 UJ	0.75 UJ
Sodium	7,207	4,200	4,920	3,100	8,440	2,720	3,560	2,430	3,350	2,760	3,330	2,380	2,750	3,180	6,320
Vanadium	18.1	9.1	7.8	1.5 J	18.9	2.5	4	2 J	2.3 J	2.7	1.7 J	1.9 J	2.4 J	2 J	8.7
Zinc	17.3	10.4	9.4	2.6	19.1	3.3	5.3	3	3.1	2.6	2.8	2.6	3.8	3.4	9.3
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)		NA	NA	NA	NA	1,050	NA	1,250	NA	1,420	NA	NA	NA	NA	NA
Grain Size (pct/p)															
Sieve No. 004 (4.75 mm)		NA	NA	NA	NA	100	NA	99.5	NA	99.5	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)		NA	NA	NA	NA	99.8	NA	99.2	NA	98.9	NA	NA	NA	NA	NA
Sieve No. 020 (850 um)		NA	NA	NA	NA	98.5	NA	98	NA	97.2	NA	NA	NA	NA	NA
Sieve No. 040 (425 um)		NA	NA	NA	NA	95.1	NA	93.9	NA	85.7	NA	NA	NA	NA	NA
Sieve No. 060 (250 um)		NA	NA	NA	NA	75.4	NA	70.2	NA	38.4	NA	NA	NA	NA	NA
Sieve No. 080 (180 um)		NA	NA	NA	NA	40	NA	16.3	NA	10.9	NA	NA	NA	NA	NA
Sieve No. 100 (150 um)		NA	NA	NA	NA	23	NA	4.5	NA	3.7	NA	NA	NA	NA	NA
Sieve No. 230 (63-UM)		NA	NA	NA	NA	0.16	NA	0.19	NA	0.2	NA	NA	NA	NA	NA
Sieve No. 200 (75 um)		NA	NA	NA	NA	0.25	NA	0.21	NA	0.21	NA	NA	NA	NA	NA

Notes:

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

Shading indicates exceedance of two times the mean base background concentration for sediment.

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Sediment Exceedance Results
May 2010

Station ID	Camp Lejeune Background SD 2X Mean	SDZ-WN27/SD27	SDZ-WN28/SD28	SDZ-WN29/SD29		SDZ-WN30/SD30
Sample ID		SDZ-SD27-10B	SDZ-SD28-10B	SDZ-SD29-10B	SDZ-SD29D-10B	SDZ-SD30-10B
Sample Date		05/04/10	05/05/10	05/04/10	05/04/10	05/05/10
Chemical Name						
Semivolatile Organic Compounds (µg/kg)						
No Detections						
Explosives (µg/kg)						
No Detections						
Total Metals (mg/kg)						
Aluminum	5,471	324	317	2,050	2,120	5,770
Antimony	2.8	1.3 J	1.3 J	1.3 J	1.3 U	1.6 J
Arsenic	5.3	0.94 J	0.99 J	**2**	**1.9**	**4.9**
Barium	10	1.7 J	1.7 J	3.7 J	4.2 J	9.1 J
Cadmium	0.68	0.6 U	0.62 U	0.63 U	0.64 U	0.77 U
Calcium	39,200	15,400	13,600	14,800	15,000	30,200
Chromium	21.2	3.9	4	**9**	**8.9**	**18.8**
Cobalt	1.04	0.6 UJ	0.62 UJ	0.63 UJ	0.64 UJ	0.93
Copper	2.5	0.6 U	0.62 U	0.74	1	2.4
Iron	7,663	900	895	3,100	3,110	7,490 J
Lead	5.5	0.96 J	1 J	2.2 J	2.3 J	4.9 J
Magnesium	3,371	710	687	1,290	1,300	3,070
Manganese	51.7	7.2	6.9	20	20.1	50.6
Mercury	0.04	0.042 U	0.011 J	0.043 U	0.044 U	0.051 U
Nickel	4.5	0.4 J	0.42 J	1.7	1.7	4.6
Potassium	1,364	28.3 J	26.6 J	466 J	489 J	1,530 J
Selenium	0.68	0.6 UJ	0.62 UJ	0.63 UJ	0.64 UJ	0.77 UJ
Sodium	7,207	2,450	2,520	2,710	2,730	5,560
Vanadium	18.1	1.8 J	1.8 J	7.1	7	18.2
Zinc	17.3	2.5	2.5	6.6	6.6	16.8
Wet Chemistry						
Total organic carbon (TOC) (mg/kg)		2,930	NA	NA	NA	7,640
Grain Size (pct/p)						
Sieve No. 004 (4.75 mm)		99.9	NA	NA	NA	97.5
Sieve No. 010 (2.00 mm)		99.8	NA	NA	NA	84.7
Sieve No. 020 (850 um)		99.1	NA	NA	NA	72.3
Sieve No. 040 (425 um)		95.2	NA	NA	NA	65.4
Sieve No. 060 (250 um)		59.3	NA	NA	NA	62.8
Sieve No. 080 (180 um)		17.3	NA	NA	NA	50.2
Sieve No. 100 (150 um)		5.5	NA	NA	NA	42.6
Sieve No. 230 (63-UM)		0.12	NA	NA	NA	8.3
Sieve No. 200 (75 um)		0.15	NA	NA	NA	12.3

Notes:

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Underline indicates exceedance of Adjusted Residential Soil RSLs

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U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54		BIBG-GW55/SO55	BIBG-GW56/SO56	BIBG-GW57/SO57	BI-GW01/SO01		BI-GW02/SO02	BI-GW03/SO03
Sample ID	BI-SS50-10A	BI-SS51-10A	BI-SS52-10A	BI-SS53-10A	BI-SS54-10A	BI-SS54D-10A	BI-SS55-10A	BI-SS56-10A	BI-SS57-10A	BI-SS01-10A	BI-SS01D-10A	BI-SS02-10A	BI-SS03-10A
Sample Date	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/25/10	01/31/10	01/28/10	01/28/10	01/28/10	01/28/10
Chemical Name													
Semivolatile Organic Compounds (µg/kg)													
2,4-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
2,6-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
Nitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Explosives (µg/kg)													
1,3,5-Trinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
1,3-Dinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2,4,6-Trinitrotoluene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2-Amino-4,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
2-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
3-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
4-Amino-2,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
4-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
HMX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	2.1 U	2.1 U	2 U	2 UJ	2 U	2 U	2 U	2.1 U	2.1 U	2.1 U	2.1 U	2 U	2 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Tetryl	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,250 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R
Total Metals (mg/kg)													
Aluminum	290	343	411	388	344	353	353	297	323	319	326	350	338
Antimony	0.97 U	0.98	0.29 J	1	0.98 U	1 U	0.95 U	1 U	0.96 U	0.81 J	0.89 J	0.71 J	0.79 J
Arsenic	0.28 J	0.96 U	0.53 J	0.91 J	0.44 J	0.44 J	0.95 U	0.33 J	0.96 U	0.87 J	0.83 J	1.2	0.91 J
Barium	1.7 J	19.2 UJ	2.7 J	19.6 UJ	2.6 J	2.3 J	2.3 J	2.3 J	19.2 UJ	1.1 J	1.2 J	1.5 J	1.2 J
Beryllium	0.49 U	0.48 U	0.5 U	0.49 U	0.49 U	0.5 U	0.48 U	0.52 U	0.48 U	0.5 U	0.5 U	0.47 U	0.51 U
Cadmium	0.49 U	0.48 U	0.5 U	0.49 U	0.49 U	0.5 U	0.48 U	0.52 U	0.48 U	0.5 U	0.5 U	0.47 U	0.51 U
Calcium	1,390	1,340	2,150	3,440	2,280	2,180	1,800	1,340	1,710	6,240	6,400	7,200	4,990
Chromium	4	4.4	5.4	5.9	4.8	4.9	4.7	3.8	4	4.7	4.7	5.6	5.1
Cobalt	0.1 J	0.48 U	0.18 J	0.49 U	0.14 J	0.13 J	0.14 J	0.52 U	0.48 U	0.5 U	0.5 U	0.47 U	0.51 U
Copper	0.19 J	0.48 U	0.26 J	0.49 U	0.21 J	0.22 J	0.17 J	0.52 U	0.22 J	0.5 U	0.5 U	0.47 U	0.51 U
Iron	635	725	894	859	735	780	733	642	661	761	772	831	745
Lead	1.1 J	1.5 J	2.8 J	1.8 J	1.6 J	1.5 J	1.5 J	1.4 J	1.1 J	1.2 J	1.2 J	1.5 J	1.3 J
Magnesium	486 UJ	479 U	502 UJ	489 U	489 UJ	503 UJ	477 UJ	524 U	118 J	262 J	268 J	284 J	262 J
Manganese	4.3	5.9	8.7	7.9	5.8	6	6.2	5.5	4.9	6.2	6.5	7.1	6.1
Mercury	0.033 U	0.032 U	0.033 U	0.034 U	0.033 U	0.031 U	0.034 U	0.035 U	0.034 U	0.034 U	0.032 U	0.033 U	0.033 U
Nickel	0.18 J	0.27 J	0.34 J	0.41 J	0.26 J	0.32 J	0.26 J	4.2 U	0.29 J	0.26 J	0.32 J	0.35 J	0.27 J
Potassium	486 U	479 U	502 U	489 U	489 U	503 U	477 U	524 U	481 U	49 J	51.3 J	56.8 J	50.3 J
Selenium	0.49 U	0.48 UJ	0.5 U	0.49 UJ	0.49 U	0.5 U	0.48 U	0.52 UJ	0.48 UJ	0.5 U	0.5 U	0.47 U	0.51 U
Silver	0.49 U	0.48 U	0.5 U	0.49 U	0.49 U	0.5 U	0.48 U	0.52 U	0.48 U	0.5 U	0.5 U	0.47 U	0.51 U
Sodium	486 U	479 U	502 U	489 U	489 U	503 U	477 U	524 U	481 U	503 U	498 U	466 U	506 U
Thallium	0.97 U	0.96 U	1 U	0.98 U	0.98 U	1 U	0.95 U	1 U	0.96 U	1 U	1 U	0.93 U	1 U
Vanadium	1.9 U	1.4 J	2 U	1.9 J	2 U	2 U	1.9 U	2.1 U	1.4 J	1.8 J	1.8 J	2	1.8 J
Zinc	2.6	2.7	4.8	3.4	2.4	2.5	2.6	2.8 J	2.4	2.7	2.6	3.5	3
Wet Chemistry													
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	NA	NA	NA	NA	3,197	NA	NA	NA	NA	1,368
Grain Size (pct/p)													
Sieve No. 005 (4-MM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	NA	99.9	NA	NA	NA	NA	100
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	NA	NA	NA	99.8	NA	NA	NA	NA	100
Sieve No. 020 (850 um)	NA	NA	NA	NA	NA	NA	NA	99.7	NA	NA	NA	NA	100
Sieve No. 040 (425 um)	NA	NA	NA	NA	NA	NA	NA	99.5	NA	NA	NA	NA	100
Sieve No. 060 (250 um)	NA	NA	NA	NA	NA	NA	NA	88.6	NA	NA	NA	NA	82

CTO-80
Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54		BIBG-GW55/SO55	BIBG-GW56/SO56	BIBG-GW57/SO57	BI-GW01/SO01		BI-GW02/SO02	BI-GW03/SO03
Sample ID	BI-SS50-10A	BI-SS51-10A	BI-SS52-10A	BI-SS53-10A	BI-SS54-10A	BI-SS54D-10A	BI-SS55-10A	BI-SS56-10A	BI-SS57-10A	BI-SS01-10A	BI-SS01D-10A	BI-SS02-10A	BI-SS03-10A
Sample Date	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/25/10	01/31/10	01/28/10	01/28/10	01/28/10	01/28/10
Chemical Name													
Sieve No. 080 (180 um)	NA	NA	NA	NA	NA	NA	NA	17.1	NA	NA	NA	NA	14.2
Sieve No. 100 (150 um)	NA	NA	NA	NA	NA	NA	NA	6.1	NA	NA	NA	NA	4
Sieve No. 230 (63-UM)	NA	NA	NA	NA	NA	NA	NA	0.3	NA	NA	NA	NA	0.1
Sieve No. 200 (75 um)	NA	NA	NA	NA	NA	NA	NA	0.3	NA	NA	NA	NA	0.1

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	BI-GW04/GW04	BI-GW05/SO05	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08	BI-GW09/SO09	BI-GW10/SO10	BI-GW11/SO11	BI-GW12/SO12	BI-GW13/SO13	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17
Sample ID	BI-SS04-10A	BI-SS05-10A	BI-SS06-10A	BI-SS07-10A	BI-SS08-10A	BI-SS09-10A	BI-SS10-10A	BI-SS11-10A	BI-SS12-10A	BI-SS13-10A	BI-SS14-10A	BI-SS15-10A	BI-SS16-10A	BI-SS17-10A
Sample Date	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10
Chemical Name														
Semivolatile Organic Compounds (µg/kg)														
2,4-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U
2,6-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U
Nitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Explosives (µg/kg)														
1,3,5-Trinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
1,3-Dinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2,4,6-Trinitrotoluene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2-Amino-4,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U
2-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U
3-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U
4-Amino-2,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U
4-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U
HMX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	2 U	2 U	2.1 U	2 U	2.1 U	2.1 U	2.1 U	2.3 U	2.2 U	2.1 U	2.3 U	2.1 U	2.1 U	2.1 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Tetryl	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,250 R
Total Metals (mg/kg)														
Aluminum	325	326	330	377 J	465 J	404	363	421	366	438	245	286	302 J	356
Antimony	0.8 J	0.82 J	0.66 J	0.99 U	1 U	1 U	1 U	1 U	0.99 U	1.1	1 U	1.1	1 U	0.96 U
Arsenic	0.84 J	0.74 J	0.99	0.87 J	0.94 J	1	1.2	1	0.92 J	1 U	1 U	0.66 J	1 U	0.38 J
Barium	0.94 J	1.2 J	1.2 J	2.3 J	2.8 J	20 UJ	20.3 UJ	20.6 UJ	19.9 UJ	20.4 UJ	1.6 J	20.8 UJ	1.8 J	2.5 J
Beryllium	0.47 U	0.48 U	0.07 J	0.49 U	0.5 U	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U	0.52 U	0.52 U	0.52 U	0.48 U
Cadmium	0.47 U	0.48 U	0.48 U	0.04 J	0.04 J	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U	0.52 U	0.52 U	0.52 U	0.48 U
Calcium	3,590	4,620	6,570	4,420	3,380	6,240	6,780	4,960	5,680	1,640	594	1,620	1,910	1,340
Chromium	4.2	4.8	4.8	5.9	6.3	5.8	6.5	6.6	5.4	5.4	3.6	4.1	4.3	4.6
Cobalt	0.47 U	0.48 U	0.48 U	0.13 J	0.15 J	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U	0.52 U	0.52 U	0.52 U	0.48 U
Copper	0.47 U	0.48 U	0.48 U	0.49 U	0.5 U	0.5 U	0.37 J	0.24 J	0.5 U	0.28 J	0.41 J	0.52 U	0.52 U	0.48 U
Iron	711	748	786	900	935	899	853	897	847	889	602	627	679	746
Lead	1.1 J	1.4 J	1.3 J	2 J	2.5 J	1.7 J	2 J	2 J	1.5 J	2.2 J	2.2 J	1.1 J	1.3 J	1.5 J
Magnesium	217 J	255 J	243 J	494 U	498 U	279 J	286 J	296 J	266 J	170 J	516 UJ	519 U	517 U	481 U
Manganese	5.4	6.7	6.1	7.5	10	7.8	8.1	9.5	7.4	8.8	3.6	4.5	4.8	6.6
Mercury	0.034 U	0.034 U	0.033 U	0.033 U	0.033 U	0.03 U	0.034 U	0.035 U	0.032 U	0.035 U	0.036 U	0.035 U	0.034 U	0.033 U
Nickel	0.26 J	0.34 J	0.24 J	0.28 J	0.38 J	0.42 J	0.44 J	0.41 J	0.47 J	0.4 J	0.28 J	0.24 J	0.13 J	3.9 U
Potassium	48.8 J	49.8 J	50.5 J	40.6 J	55.5 J	500 U	508 U	516 U	496 U	510 U	516 U	519 U	31 J	481 U
Selenium	0.47 U	0.48 U	0.48 U	0.49 U	0.5 U	0.5 UJ	0.51 UJ	0.52 UJ	0.5 UJ	0.51 UJ	0.52 U	0.52 UJ	0.52 U	0.48 UJ
Silver	0.47 U	0.48 U	0.48 U	0.49 U	0.5 U	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U	0.52 U	0.52 U	0.52 U	0.48 U
Sodium	474 U	477 U	478 U	494 U	498 U	500 U	508 U	516 U	496 U	510 U	516 U	519 U	517 U	481 U
Thallium	0.95 U	0.95 U	0.96 U	0.99 U	1 U	1 U	1 U	1 U	0.99 U	1 U	1 U	1 U	1 U	0.96 U
Vanadium	1.5 J	1.7 J	1.8 J	2	2.2	2.1	2.2	2.3	1.9 J	1.9 J	2.1 U	1.3 J	1.4 J	1.9 U
Zinc	2.8	2.7	2.8	3.5	5.3	3	3.3	3.4	3.4	4.5	2.3	2.7	2.5	2.5 J
Wet Chemistry														
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	NA	NA	NA	NA	1,905	NA	NA	NA	NA	NA	NA
Grain Size (pct/p)														
Sieve No. 005 (4-MM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	NA	99.9	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	NA	NA	NA	99.9	NA	NA	NA	NA	NA	NA
Sieve No. 020 (850 um)	NA	NA	NA	NA	NA	NA	NA	99.8	NA	NA	NA	NA	NA	NA
Sieve No. 040 (425 um)	NA	NA	NA	NA	NA	NA	NA	99.5	NA	NA	NA	NA	NA	NA
Sieve No. 060 (250 um)	NA	NA	NA	NA	NA	NA	NA	76.4	NA	NA	NA	NA	NA	NA

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Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	BI-GW04/GW04	BI-GW05/SO05	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08	BI-GW09/SO09	BI-GW10/SO10	BI-GW11/SO11	BI-GW12/SO12	BI-GW13/SO13	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17
Sample ID	BI-SS04-10A	BI-SS05-10A	BI-SS06-10A	BI-SS07-10A	BI-SS08-10A	BI-SS09-10A	BI-SS10-10A	BI-SS11-10A	BI-SS12-10A	BI-SS13-10A	BI-SS14-10A	BI-SS15-10A	BI-SS16-10A	BI-SS17-10A
Sample Date	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10
Chemical Name														
Sieve No. 080 (180 um)	NA	NA	NA	NA	NA	NA	NA	15	NA	NA	NA	NA	NA	NA
Sieve No. 100 (150 um)	NA	NA	NA	NA	NA	NA	NA	6.7	NA	NA	NA	NA	NA	NA
Sieve No. 230 (63-UM)	NA	NA	NA	NA	NA	NA	NA	0.5	NA	NA	NA	NA	NA	NA
Sieve No. 200 (75 um)	NA	NA	NA	NA	NA	NA	NA	0.5	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	BI-GW19/SO19		BI-GW20/SO20	BI-GW21/SO21	BI-GW22/SO22	BI-GW23/SO23	BI-GW24/SO24	BI-GW25/SO25	BI-GW26/SO26		BI-GW27/SO27	BI-GW28/SO28	BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31
Sample ID	BI-SS19-10A	BI-SS19D-10A	BI-SS20-10A	BI-SS21-10A	BI-SS22-10A	BI-SS23-10A	BI-SS24-10A	BI-SS25-10A	BI-SS26-10A	BI-SS26D-10A	BI-SS27-10A	BI-SS28-10A	BI-SS29-10A	BI-SS30-10A	BI-SS31-10A
Sample Date	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/31/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
2,4-Dinitrotoluene	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
2,6-Dinitrotoluene	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
Nitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Explosives (µg/kg)															
1,3,5-Trinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
1,3-Dinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2,4,6-Trinitrotoluene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2-Amino-4,6-dinitrotoluene	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
2-Nitrotoluene	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
3-Nitrotoluene	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
4-Amino-2,6-dinitrotoluene	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
4-Nitrotoluene	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
HMX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	2.2 U	2.2 U	2.2 U	2.2 U	2.1 U	2.2 U	2 UJ	2 U	2.2 U	2.2 U	2 U	2.2 U	2 U	2.1 U	2.1 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Tetryl	1,250 R	1,250 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R
Total Metals (mg/kg)															
Aluminum	297	289	297	372	320	159	349	393	315	308	256	321 J	340 J	306 J	344 J
Antimony	1.1 U	1 U	1.1	1 U	1 U	1.1	1	0.64 J	0.89 J	0.84 J	0.87 J	0.33 J	1 U	1 U	1 U
Arsenic	1.1 U	1 U	1 U	1 U	1 U	1.1 U	0.7 J	0.67 J	0.7 J	0.7 J	0.71 J	0.34 J	0.44 J	1 U	0.65 J
Barium	2 J	2.1 J	20.7 UJ	20.4 UJ	20.9 UJ	21.6 UJ	19 UJ	1.3 J	1.3 J	1.1 J	1 J	1.9 J	2.3 J	1.8 J	1.5 J
Beryllium	0.53 U	0.5 U	0.52 U	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U
Cadmium	0.53 U	0.5 U	0.52 U	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U
Calcium	1,070	1,010	1,200	989	732	541 U	3,010	2,880	2,300	2,160	4,330	1,690	2,200	1,470	3,710
Chromium	3.4	3.3	4.3	5	3.9	2.4	4.5	5.1	4.1	4	3.5	4.4	5.2	4	4.6
Cobalt	0.53 U	0.5 U	0.52 U	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U	0.51 U	0.52 U	0.48 U	0.52 U	0.08 J	0.5 U	0.12 J
Copper	0.32 J	0.22 J	0.36 J	0.51 U	0.26 J	0.54 U	0.47 U	0.22 J	0.21 J	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U
Iron	645	614	633	772	686	354	788	817	713	723	644	664	729	653	757
Lead	2.1 J	2.1 J	2.2	3.4	3.7	2.8 J	1.9 J	1.5 J	1.6 J	1.4 J	1.2 J	2.7 J	2.4 J	2.5 J	1.3 J
Magnesium	528 U	502 U	93.4 J	108 J	522 U	541 U	474 U	248 J	176 J	175 J	177 J	524 U	505 U	505 U	503 U
Manganese	6.5	5.6	7.7	11.7	6.4	2.9	6.8	7.6	5.8	5.6	5.7	5.1	7.1	6.2	5.6
Mercury	0.034 U	0.033 U	0.032 U	0.034 U	0.035 U	0.033 U	0.031 U	0.034 U	0.033 U	0.035 U	0.034 U	0.035 U	0.032 U	0.035 U	0.02 J
Nickel	4.2 U	4 U	0.29 J	0.29 J	0.27 J	4.3 U	0.32 J	0.31 J	4.1 U	4.2 U	3.9 U	0.18 J	0.23 J	0.19 J	0.28 J
Potassium	528 U	502 U	45.6 J	60 J	522 U	541 U	474 U	61.1 J	56.7 J	56.5 J	41.9 J	39.5 J	39 J	37.4 J	37.6 J
Selenium	0.53 UJ	0.5 UJ	0.52 U	0.51 U	0.52 UJ	0.54 UJ	0.47 UJ	0.49 U	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U
Silver	0.53 U	0.5 U	0.52 U	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U
Sodium	528 U	502 U	518 U	511 U	522 U	541 U	474 U	489 U	507 U	522 U	484 U	524 U	505 U	505 U	503 U
Thallium	1.1 U	1 U	1 U	1 U	1 U	1.1 U	0.95 U	0.98 U	1 U	1 U	0.97 U	1 U	1 U	1 U	1 U
Vanadium	2.1 U	2 U	2.1 U	2 U	1.3 J	0.92 J	1.5 J	1.7 J	1.5 J	1.5 J	1.4 J	2.1 U	2 U	2 U	2 U
Zinc	5 J	4.4 J	3.9	5.5	5.4	8	3.6	3.2	4.5	3.6	2.3	4.9	4	5.5	2.8
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)	NA	NA	2,858	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4,102	NA
Grain Size (pct/p)															
Sieve No. 005 (4-MM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	99.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.6	NA
Sieve No. 010 (2.00 mm)	NA	NA	99.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.5	NA
Sieve No. 020 (850 um)	NA	NA	98.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.7	NA
Sieve No. 040 (425 um)	NA	NA	98.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97	NA
Sieve No. 060 (250 um)	NA	NA	51.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	92.6	NA

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Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	BI-GW19/SO19		BI-GW20/SO20	BI-GW21/SO21	BI-GW22/SO22	BI-GW23/SO23	BI-GW24/SO24	BI-GW25/SO25	BI-GW26/SO26		BI-GW27/SO27	BI-GW28/SO28	BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31
Sample ID	BI-SS19-10A	BI-SS19D-10A	BI-SS20-10A	BI-SS21-10A	BI-SS22-10A	BI-SS23-10A	BI-SS24-10A	BI-SS25-10A	BI-SS26-10A	BI-SS26D-10A	BI-SS27-10A	BI-SS28-10A	BI-SS29-10A	BI-SS30-10A	BI-SS31-10A
Sample Date	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/31/10
Chemical Name															
Sieve No. 080 (180 um)	NA	NA	9.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	29.1	NA
Sieve No. 100 (150 um)	NA	NA	4.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	11.7	NA
Sieve No. 230 (63-UM)	NA	NA	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.7	NA
Sieve No. 200 (75 um)	NA	NA	0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.8	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	BI-GW32/SO32	BI-GW33/SO33	BI-GW34/SO34	BI-GW35/SO35		BI-GW36/SO36	BI-GW38/SO38	BI-GW39/SO39	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42	BI-GW43/SO43	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46
Sample ID	BI-SS32-10A	BI-SS33-10A	BI-SS34-10A	BI-SS35-10A	BI-SS35D-10A	BI-SS36-10A	BI-SS38-10A	BI-SS39-10A	BI-SS40-10A	BI-SS41-10A	BI-SS42-10A	BI-SS43-10A	BI-SS44-10A	BI-SS45-10A	BI-SS46-10A
Sample Date	01/31/10	01/31/10	01/27/10	01/26/10	01/26/10	01/26/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/29/10	01/27/10	01/27/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
2,4-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
2,6-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
Nitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Explosives (µg/kg)															
1,3,5-Trinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
1,3-Dinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2,4,6-Trinitrotoluene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
2-Amino-4,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
2-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
3-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
4-Amino-2,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
4-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,250 U	1,250 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U
HMX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.3 U	2.2 U	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.2 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U
Tetryl	1,200 R	1,200 R	1,200 R	1,250 R	1,250 R	1,250 R	1,250 R	1,250 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R
Total Metals (mg/kg)															
Aluminum	369 J	344 J	339	330	423	338	286	171	295	218	349	356	406 J	332	345
Antimony	1.1 U	0.3 J	1 U	1 U	1.2 U	1 U	1 U	1.4 U	1.1 U	1 U	0.97 U	0.87 J	0.97 U	1 U	1 U
Arsenic	1.1 J	0.67 J	0.36 J	1 U	0.43 J	0.38 J	1 U	1.4 U	1.1 U	1 U	0.62 J	0.59 J	0.97 U	1 U	0.56 J
Barium	2.1 J	1.9 J	2.4 J	2.8 J	3.2 J	2.3 J	2 J	1.6 J	21.1 UJ	20.8 UJ	19.5 UJ	1.6 J	2.5 J	20.6 UJ	2.3 J
Beryllium	0.54 U	0.5 U	0.51 U	0.51 U	0.62 U	0.5 U	0.5 U	0.7 U	0.53 U	0.52 U	0.49 U	0.48 U	0.49 U	0.52 U	0.51 U
Cadmium	0.54 U	0.5 U	0.51 U	0.51 U	0.62 U	0.5 U	0.5 U	0.7 U	0.53 U	0.52 U	0.49 U	0.48 U	0.49 U	0.52 U	0.51 U
Calcium	7,180	4,710	1,600	1,380	1,710	2,020	571	700 U	660	520 U	2,030	1,880	836	975	2,240
Chromium	5.6	5.1	4.4	4.1	5.1	4.7	3.6	2	3.7	2.8	4.6	4.4	5	4.4	5.1
Cobalt	0.15 J	0.11 J	0.13 J	0.51 U	0.62 U	0.5 U	0.5 U	0.7 U	0.53 U	0.52 U	0.49 U	0.48 U	0.14 J	0.52 U	0.11 J
Copper	0.54 U	0.5 U	0.39 J	0.21 J	0.22 J	0.15 J	0.16 J	0.7 U	0.26 J	0.52 U	0.49 U	0.48 U	0.49 U	0.52 U	0.21 J
Iron	888	786	740	707	903	745	649	291	677	526	751	771	916	726	777
Lead	1.9 J	1.6 J	1.6 J	1.6 J	2 J	1.6 J	2.4 J	2 J	2.4	2.7	1.6 J	2.3 J	3.2 J	2.4 J	1.8 J
Magnesium	541 U	503 U	507 UJ	505 U	623 U	504 U	499 U	700 U	91.7 J	51.6 J	486 U	154 J	487 U	516 U	511 UJ
Manganese	6.6	6.8	8.6	6.3	8.1	6.1	7.8	2	5.9	3.6	6.6	7.4	10.2	6.8	7
Mercury	0.035 U	0.033 U	0.033 U	0.033 U	0.042 U	0.032 U	0.034 U	0.048 U	0.033 U	0.032 U	0.033 U	0.033 U	0.03 U	0.034 U	0.035 U
Nickel	0.32 J	0.33 J	0.24 J	4 U	5 U	4 U	4 U	5.6 U	4.2 U	4.2 U	0.28 J	0.24 J	0.2 J	4.1 U	0.27 J
Potassium	40.2 J	37.6 J	507 U	505 U	623 U	504 U	499 U	700 U	528 U	520 U	486 U	65.8 J	45.6 J	516 U	511 U
Selenium	0.54 U	0.5 U	0.51 U	0.51 UJ	0.62 UJ	0.5 UJ	0.5 UJ	0.7 UJ	0.53 UJ	0.52 UJ	0.49 UJ	0.48 U	0.49 U	0.52 UJ	0.51 U
Silver	0.54 U	0.5 U	0.51 U	0.51 U	0.62 U	0.5 U	0.5 U	0.7 U	0.53 U	0.52 U	0.49 U	0.48 U	0.49 U	0.52 U	0.51 U
Sodium	541 U	503 U	507 U	505 U	623 U	504 U	499 U	700 U	528 U	520 U	486 U	478 U	487 U	516 U	511 U
Thallium	1.1 U	1 U	1 U	1 U	1.2 U	1 U	1 U	1.4 U	1.1 U	1 U	0.97 U	0.96 U	0.97 U	1 U	1 U
Vanadium	2.2 U	2 U	2 U	2 U	2.5 U	2 U	2 U	2.8 U	1.3 J	1.2 J	1.4 J	1.6 J	1.9 U	1.4 J	2 U
Zinc	2.9	2.7	3.4	4.3 J	5.4 J	2.3 J	3 J	2.8 UJ	2.8	2.1 U	3.2	4.8	5.2	4.1	3
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA	10,810	NA	NA	NA	2,542	NA
Grain Size (pct/p)															
Sieve No. 005 (4-MM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.7	NA	NA	NA	99.7	NA
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.7	NA	NA	NA	99.5	NA
Sieve No. 020 (850 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.1	NA	NA	NA	99.3	NA
Sieve No. 040 (425 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	91.9	NA	NA	NA	99.1	NA
Sieve No. 060 (250 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	75.7	NA	NA	NA	91.3	NA

CTO-80
Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	BI-GW32/SO32	BI-GW33/SO33	BI-GW34/SO34	BI-GW35/SO35		BI-GW36/SO36	BI-GW38/SO38	BI-GW39/SO39	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42	BI-GW43/SO43	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46
Sample ID	BI-SS32-10A	BI-SS33-10A	BI-SS34-10A	BI-SS35-10A	BI-SS35D-10A	BI-SS36-10A	BI-SS38-10A	BI-SS39-10A	BI-SS40-10A	BI-SS41-10A	BI-SS42-10A	BI-SS43-10A	BI-SS44-10A	BI-SS45-10A	BI-SS46-10A
Sample Date	01/31/10	01/31/10	01/27/10	01/26/10	01/26/10	01/26/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/29/10	01/27/10	01/27/10
Chemical Name															
Sieve No. 080 (180 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	23.5	NA	NA	NA	20.4	NA
Sieve No. 100 (150 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.7	NA	NA	NA	8	NA
Sieve No. 230 (63-UM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4	NA	NA	NA	0.5	NA
Sieve No. 200 (75 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5	NA	NA	NA	0.5	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	BI-GW47/SO47		BI-GW48/SO48	BI-GW49/SO49	BI-GW59/SO59	BI-SO18	BI-SO37	BI-SO58	BI-SO60	ICWBG-GW20/SO20		ICWBG-GW21/SO21	ICWBG-GW22/SO22	ICW-GW01/SO01	ICW-GW02/SO02
Sample ID	BI-SS47-10A	BI-SS47D-10A	BI-SS48-10A	BI-SS49-10A	BI-SS59-10A	BI-SS18-10A	BI-SS37-10A	BI-SS58-10A	BI-SS60-10A	ICW-SS20-10A	ICW-SS20D-10A	ICW-SS21-10A	ICW-SS22-10A	ICW-SS01-10A	ICW-SS02-10A
Sample Date	02/01/10	02/01/10	02/01/10	01/28/10	02/01/10	01/26/10	01/26/10	01/26/10	01/27/10	03/26/10	03/26/10	03/26/10	03/25/10	03/23/10	03/23/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
2,4-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,200 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,6-Dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,200 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
Nitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Explosives (µg/kg)															
1,3,5-Trinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
1,3-Dinitrobenzene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,4,6-Trinitrotoluene	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Amino-4,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,200 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,200 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
3-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,200 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
4-Amino-2,6-dinitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,200 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
4-Nitrotoluene	1,200 U	1,200 U	1,200 U	1,200 U	1,200 U	1,250 U	1,250 U	1,250 U	1,200 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
HMX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	2.1 U	2.1 U	2.1 U	2 U	3.3 UJ	2.1 U	2.1 U	2.1 U	2.1 UJ	3.6 UJ	3.6 UJ	2.8 U	3.9 U	2.1 U	2 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	620 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Tetryl	1,200 R	1,200 R	1,200 R	1,200 R	1,200 R	1,250 R	1,250 R	1,250 R	1,200 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R
Total Metals (mg/kg)															
Aluminum	351	322	352	322	481	440	302	322	358	2,080	1,810	1,560	4,790	337	381
Antimony	1.1	1	1 U	0.98 U	1.6 U	1.3 U	1 U	1 U	0.46 J	1.7 U	1.7 U	1.3 U	2 U	1 U	1 U
Arsenic	0.97 U	1 U	1 U	0.61 J	1.6 U	1.3 U	1 U	1 U	0.41 J	0.9 J	0.53 J	1.3 U	2.4	1 U	0.33 J
Barium	19.3 UJ	20 UJ	20.5 UJ	19.7 UJ	32.8 UJ	2.8 J	1.9 J	1.7 J	1.9 J	34.9 U	34.6 U	26.9 U	40.4 U	1.4 J	1.7 J
Beryllium	0.48 U	0.5 U	0.51 U	0.49 U	0.82 U	0.64 U	0.51 U	0.51 U	0.51 U	0.87 U	0.87 U	0.67 U	1 U	0.05 J	0.02 J
Cadmium	0.48 U	0.5 U	0.51 U	0.49 U	0.82 U	0.64 U	0.51 U	0.51 U	0.51 U	0.87 U	0.87 U	0.67 U	0.18 J	0.51 UJ	0.51 UJ
Calcium	597	643	791	1,820	1,030	1,190	945	739	1,580	9,530	11,100	2,070	25,600	9,880	15,500
Chromium	4	3.8	4.6	4.5	4.6	5.3	3.8	3.7	4.4	8.6	8	6.1	15.5	3.6	4.5
Cobalt	0.48 U	0.5 U	0.51 U	0.49 U	0.82 U	0.64 U	0.51 U	0.51 U	0.13 J	0.49 J	0.37 J	0.2 J	1.1	0.51 U	0.51 U
Copper	0.26 J	0.32 J	0.35 J	0.21 J	0.57 J	0.64 U	0.51 U	0.23 J	0.86	1.7	1.4	0.77	4.5	0.19 J	0.22 J
Iron	735	652	738	710	966	947	657	713	693	3,020	2,650	1,610	6,700	893	1,010
Lead	1.8	1.5	2.3	1.8 J	3.8	2.6 J	1.5 J	2.6 J	1.7 J	5.2	4.9	4.2	11.6	1.2	1.2
Magnesium	107 J	104 J	102 J	492 U	236 J	641 U	514 U	512 U	4,500 J	1,760	1,510	799	3,370	510 U	508 U
Manganese	7.6	6.5	6.2	7	5.9	9.3	4.5	5.6	5.8	31.6	26	9.1	61.7	6.5 J	7.4 J
Mercury	0.034 U	0.033 U	0.033 U	0.032 U	0.056 U	0.042 U	0.034 U	0.034 U	0.034 U	0.068	0.12	0.048	0.17	0.032 U	0.034 U
Nickel	0.28 J	0.26 J	0.32 J	0.24 J	0.48 J	5.1 U	4.1 U	4.1 U	0.36 J	1.4	1.1	0.73	3.5	0.51 U	0.51 U
Potassium	41.5 J	42.4 J	46.3 J	492 U	820 U	641 U	514 U	512 U	511 U	307 J	278 J	318 J	672 J	40.8 J	42.3 J
Selenium	0.48 U	0.5 U	0.51 U	0.49 UJ	0.82 UJ	0.64 UJ	0.51 UJ	0.51 UJ	0.51 U	0.87 UJ	0.87 UJ	0.67 UJ	1 UJ	0.51 R	0.51 R
Silver	0.48 U	0.5 U	0.51 U	0.49 U	0.82 U	0.64 U	0.51 U	0.51 U	0.51 U	0.87 U	0.87 U	0.67 U	1 U	0.51 U	0.51 U
Sodium	483 U	500 U	512 U	492 U	820 U	641 U	514 U	512 U	511 U	266 J	287 J	1,390	428 J	195 J	250 J
Thallium	0.97 U	1 U	1 U	0.98 U	1.6 U	1.3 U	1 U	1 U	1 U	1.7 U	1.7 U	1.3 U	2 U	1 U	1 U
Vanadium	1.9 U	2 U	2 U	1.4 J	1.5 J	2.6 U	2.1 U	2 U	2 U	6.5	5.7	5.1	13.8	1.7 J	1.8 J
Zinc	3.3	2.6	3.9	4	5.3	4.5 J	3.5 J	4.2 J	24.6	8.8	7.8	5.2	26.7	2.7 J	4.8 J
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA	96,840	NA	NA	NA	NA	NA
Grain Size (pct/p)															
Sieve No. 005 (4-MM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	100	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	99	NA	NA	NA	NA	NA
Sieve No. 020 (850 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.2	NA	NA	NA	NA	NA
Sieve No. 040 (425 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	92	NA	NA	NA	NA	NA
Sieve No. 060 (250 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	83.1	NA	NA	NA	NA	NA

CTO-80
Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	BI-GW47/SO47		BI-GW48/SO48	BI-GW49/SO49	BI-GW59/SO59	BI-SO18	BI-SO37	BI-SO58	BI-SO60	ICWBG-GW20/SO20		ICWBG-GW21/SO21	ICWBG-GW22/SO22	ICW-GW01/SO01	ICW-GW02/SO02
Sample ID	BI-SS47-10A	BI-SS47D-10A	BI-SS48-10A	BI-SS49-10A	BI-SS59-10A	BI-SS18-10A	BI-SS37-10A	BI-SS58-10A	BI-SS60-10A	ICW-SS20-10A	ICW-SS20D-10A	ICW-SS21-10A	ICW-SS22-10A	ICW-SS01-10A	ICW-SS02-10A
Sample Date	02/01/10	02/01/10	02/01/10	01/28/10	02/01/10	01/26/10	01/26/10	01/26/10	01/27/10	03/26/10	03/26/10	03/26/10	03/25/10	03/23/10	03/23/10
Chemical Name															
Sieve No. 080 (180 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	48.5	NA	NA	NA	NA	NA
Sieve No. 100 (150 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	35.3	NA	NA	NA	NA	NA
Sieve No. 230 (63-UM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	3	NA	NA	NA	NA	NA
Sieve No. 200 (75 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	ICW-GW03/SO03		ICW-GW04/SO04	ICW-GW05/SO05	ICW-GW06/SO06	ICW-GW07/SO07	ICW-GW08/SO08	ICW-GW09/SO09	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW12/SO12	ICW-GW13/SO13	ICW-GW14/SO14	ICW-GW15/SO15
Sample ID	ICW-SS03-10A	ICW-SS03D-10A	ICW-SS04-10A	ICW-SS05-10A	ICW-SS06-10A	ICW-SS07-10A	ICW-SS08-10A	ICW-SS09-10A	ICW-SS10-10A	ICW-SS11-10A	ICW-SS12-10A	ICW-SS13-10A	ICW-SS14-10A	ICW-SS15-10A
Sample Date	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10	03/22/10	03/23/10	03/23/10	03/23/10	03/23/10	03/24/10	03/25/10	03/25/10	03/25/10
Chemical Name														
Semivolatile Organic Compounds (µg/kg)														
2,4-Dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,6-Dinitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
Nitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Explosives (µg/kg)														
1,3,5-Trinitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 UJ	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
1,3-Dinitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,4,6-Trinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Amino-4,6-dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
3-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
4-Amino-2,6-dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
4-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
HMX	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	2.5 UJ	2.5 UJ	5.6 U	2.9 UJ	3.2 UJ	2.7 U	3 UJ	3 U	2.7 UJ	5.2 UJ	3.3 UJ	7.6 UJ	2.9 U	7.3 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Tetryl	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R
Total Metals (mg/kg)														
Aluminum	510	487	2,140	855	1,370	639	1,040	3,090	825	3,970	602	7,800	2,790	2,820
Antimony	1.3 U	1.2 U	2.7 U	1.2 U	1.6 U	1.3 U	1.4 U	1.6 U	1.3 U	2.5 U	1.8 U	2.4 U	1.4 U	2.3 U
Arsenic	1.3 U	1.2 U	2.7 U	1.2 U	1.6 U	1.3 U	1.4 U	1.6 U	1.3 U	1.1 J	1.8 U	3.1	0.75 J	2.3 U
Barium	2.5 J	1.9 J	7.8 J	24.6 U	4.2 J	3.2 J	3.4 J	9.3 J	3.5 J	8 J	2.6 J	47.1 U	27.1 U	46.5 U
Beryllium	0.05 J	0.07 J	0.09 J	0.71	0.04 J	0.67 U	0.72 U	0.08 J	0.04 J	0.13 J	0.06 J	1.2 U	0.68 U	1.2 U
Cadmium	0.63 UJ	0.62 UJ	1.4 UJ	1.1 J-	0.81 UJ	0.67 UJ	0.72 UJ	0.82 UJ	0.66 UJ	1.3 UJ	0.88 UJ	0.23 J	0.05 J	1.2 U
Calcium	19,100	16,400	5,080	1,770	1,500	983	1,580	861	1,680	11,800	21,700	8,930	3,300	7,040
Chromium	6.1	5.7	7.3	4.2	5.7	2.6	4.6	9.8	3	11.1	7.6	22.1	10	8.3
Cobalt	0.16 J	0.62 U	0.48 J	0.44 J	0.15 J	0.67 U	0.72 U	0.54 J	0.66 U	1 J	0.88 U	1.8	0.57 J	0.62 J
Copper	0.27 J	0.22 J	1.7	1.2	0.74 J	0.77	0.92	1.2	0.85	3.4	0.36 J	7	1.3	3.4
Iron	1,290	1,220	2,820	1,220	1,960	898	1,460	3,660	1,220	5,230	1,480	10,200	3,630	3,790
Lead	1.8	1.8	11.7	4.3	6.5	5.1	4.4	8	4.9	13.1	2.1	20.2	5	20.9
Magnesium	634 U	621 U	2,750	591 J	977	674 U	1,080	1,260	1,180	5,470	882 U	5,230	1,280	3,760
Manganese	10.6 J	9.9 J	19 J	9.1 J	8.5 J	3.8 J	11.8 J	17.3 J	7.4 J	35.2 J	11.1 J	91.8	16.7	50.8
Mercury	0.042 U	0.04 U	0.074 J	0.041 U	0.054 J	0.027 J	0.028 J	0.05 U	0.034 J	0.17	0.052 J	0.17	0.046 U	0.14
Nickel	0.18 J	0.16 J	1 J	0.49 J	0.55 J	0.15 J	0.72 U	1.7	0.31 J	2.7	0.88 U	5.6	1.5	2.1
Potassium	70.3 J	63.8 J	453 J	111 J	247 J	286 J	266 J	588 J	236 J	627 J	72 J	1,760 J	526 J	774 J
Selenium	0.63 R	0.62 R	1.4 R	0.58 J-	0.81 R	0.67 R	0.72 R	0.82 R	0.49 J-	0.97 J-	0.88 R	1.1 J-	0.68 UJ	0.9 J-
Silver	0.63 U	0.62 U	1.4 U	0.35 J	0.81 U	0.67 U	0.72 U	0.82 U	0.66 U	1.3 U	0.88 U	1.2 U	0.68 U	1.2 U
Sodium	292 J	260 J	1,560	164 J	914	237 J	611 J	732 J	333 J	417 J	380 J	3,110	934	1,410
Thallium	1.3 U	1.2 U	2.7 U	1.2 U	1.6 U	1.3 U	1.4 U	1.6 U	1.3 U	2.5 U	1.8 U	2.4 U	1.4 U	2.3 U
Vanadium	2.6	2.3 J	6.4	2.7	4.8	2.4 J	3.4	8	3.4	13.7	2.8 J	21.2	8.4	8.5
Zinc	3.5 J	3.4 J	11.8 J	3.4 J	3.6 J	3.9 J	4 J	8.3 J	3.3 J	21.8 J	4.6 J	52.7	8.7	15
Wet Chemistry														
Total organic carbon (TOC) (mg/kg)	4,284	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Grain Size (pct/p)														
Sieve No. 005 (4-MM)	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)	99.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 020 (850 um)	98.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 040 (425 um)	96.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 060 (250 um)	88.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

CTO-80
Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	ICW-GW03/SO03		ICW-GW04/SO04	ICW-GW05/SO05	ICW-GW06/SO06	ICW-GW07/SO07	ICW-GW08/SO08	ICW-GW09/SO09	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW12/SO12	ICW-GW13/SO13	ICW-GW14/SO14	ICW-GW15/SO15
Sample ID	ICW-SS03-10A	ICW-SS03D-10A	ICW-SS04-10A	ICW-SS05-10A	ICW-SS06-10A	ICW-SS07-10A	ICW-SS08-10A	ICW-SS09-10A	ICW-SS10-10A	ICW-SS11-10A	ICW-SS12-10A	ICW-SS13-10A	ICW-SS14-10A	ICW-SS15-10A
Sample Date	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10	03/22/10	03/23/10	03/23/10	03/23/10	03/23/10	03/24/10	03/25/10	03/25/10	03/25/10
Chemical Name														
Sieve No. 080 (180 um)	24.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 100 (150 um)	11.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 230 (63-UM)	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 200 (75 um)	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	ICW-GW16/SO16	ICW-GW17/SO17	ICW-GW18/SO18	ICW-GW19/SO19	SI-GW01/SO01		SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID	ICW-SS16-10A	ICW-SS17-10A	ICW-SS18-10A	ICW-SS19-10A	SI-SS01-10A	SI-SS01D-10A	SI-SS02-10A	SI-SS03-10A	SI-SS04-10A	SI-SS05-10A	SI-SS06-10A
Sample Date	03/25/10	03/25/10	03/25/10	03/25/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name											
Semivolatile Organic Compounds (µg/kg)											
2,4-Dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,6-Dinitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
Nitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Explosives (µg/kg)											
1,3,5-Trinitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
1,3-Dinitrobenzene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2,4,6-Trinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Amino-4,6-dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
2-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
3-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
4-Amino-2,6-dinitrotoluene	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
4-Nitrotoluene	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U	3,000 U
HMX	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Nitroglycerin	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U	4,000 U
Perchlorate	2.7 U	3 U	2.8 U	2.9 U	2.1 U	2.1 U	2.1 U	2.5 U	2 U	2.1 U	2.2 U
PETN	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U	2,500 U
RDX	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U	1,500 U
Tetryl	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R	3,000 R
Total Metals (mg/kg)											
Aluminum	1,220	1,660	898	1,100	817	274	310	389	242	261	282
Antimony	1.3 U	1.5 U	1.4 U	1.4 U	1.1 U	1.1 U	1 U	0.99 U	0.95 U	1 U	1.1 U
Arsenic	1.3 U	1.5 U	1.4 U	0.51 J	1.1 U	9.2	0.38 J	0.99 U	0.95 U	8.1	0.73 J
Barium	26.1 U	29.8 U	27.8 U	28.1 U	1.7 J	2.3 J	1.7 J	1.3 J	1.5 J	2.2 J	1.8 J
Beryllium	0.65 U	0.74 U	0.7 U	0.7 U	0.05 J	0.54 U	0.04 J	0.49 U	0.03 J	0.51 U	0.05 J
Cadmium	0.65 U	0.74 U	0.7 U	0.7 U	0.53 UJ	0.54 UJ	0.5 UJ	0.49 UJ	0.48 UJ	0.51 UJ	0.53 UJ
Calcium	3,610	2,110	5,290	8,660	1,540	535 U	17,300	1,330	6,100	509 U	15,100
Chromium	5.7	6.2	5.5	6.5	2.7	12.7	3.8	3.8	3.6	11.7	3.7
Cobalt	0.19 J	0.3 J	0.15 J	0.25 J	0.12 J	0.54 U	0.5 U	0.49 U	0.48 U	0.51 U	0.53 U
Copper	0.63 J	1.3	0.56 J	0.62 J	0.93	17.6	0.21 J	0.25 J	0.15 J	16.3	0.2 J
Iron	1,670	2,170	1,460	1,740	1,100	485	970	697	622	435	1,040
Lead	2.5	7.7	2.4	2.9	5.5	4.7	1.2	1.9	1.4	4.4	1.3
Magnesium	701	1,320	614 J	815	1,230	125 J	500 U	495 U	476 U	509 U	526 U
Manganese	10.1	21.9	9.7	13	27.3 J	4.4 J	7.5 J	5.4 J	4.5 J	4.3 J	7.4 J
Mercury	0.043 U	0.051 U	0.047 U	0.047	0.036 U	0.052	0.034 U	0.019 J	0.098	0.081	0.032 U
Nickel	0.65 U	0.86	0.7 U	0.58 J	0.46 J	0.54 U	0.5 U	0.49 U	0.48 U	0.51 U	0.53 U
Potassium	240 J	292 J	155 J	147 J	286 J	101 J	37.1 J	48.2 J	35.1 J	50.9 J	37.8 J
Selenium	0.65 UJ	0.74 UJ	0.7 UJ	0.7 UJ	0.53 R	0.54 R	0.5 R	0.49 R	0.48 R	0.51 R	0.53 R
Silver	0.65 U	0.74 U	0.7 U	0.7 U	0.53 U	0.54 U	0.5 U	0.49 U	0.48 U	0.51 U	0.53 U
Sodium	808	459 J	379 J	267 J	934	158 J	265 J	119 J	170 J	111 J	245 J
Thallium	1.3 U	1.5 U	1.4 U	1.4 U	1.1 U	1.1 U	1 U	0.99 U	0.95 U	1 U	1.1 U
Vanadium	4.5	4.7	3.4	4.4	2.7	1.2 J	2.1	1.4 J	1.5 J	0.92 J	2.1 J
Zinc	4.2	7.6	4	4.5	4.2 J	8 J	2.5 J	3.1 J	2 J	6.9 J	2.6 J
Wet Chemistry											
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	NA	7,073	NA	NA	NA	NA	NA	NA
Grain Size (pct/p)											
Sieve No. 005 (4-MM)	NA	NA	NA	NA	99.4	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	98.6	NA	NA	NA	NA	NA	NA
Sieve No. 020 (850 um)	NA	NA	NA	NA	97.7	NA	NA	NA	NA	NA	NA
Sieve No. 040 (425 um)	NA	NA	NA	NA	96.7	NA	NA	NA	NA	NA	NA
Sieve No. 060 (250 um)	NA	NA	NA	NA	78	NA	NA	NA	NA	NA	NA

CTO-80
Surface Danger Zone
Validated Surface Soil Raw Analytical Results
January - March 2010

Station ID	ICW-GW16/SO16	ICW-GW17/SO17	ICW-GW18/SO18	ICW-GW19/SO19	SI-GW01/SO01		SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID	ICW-SS16-10A	ICW-SS17-10A	ICW-SS18-10A	ICW-SS19-10A	SI-SS01-10A	SI-SS01D-10A	SI-SS02-10A	SI-SS03-10A	SI-SS04-10A	SI-SS05-10A	SI-SS06-10A
Sample Date	03/25/10	03/25/10	03/25/10	03/25/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name											
Sieve No. 080 (180 um)	NA	NA	NA	NA	13.2	NA	NA	NA	NA	NA	NA
Sieve No. 100 (150 um)	NA	NA	NA	NA	6	NA	NA	NA	NA	NA	NA
Sieve No. 230 (63-UM)	NA	NA	NA	NA	1	NA	NA	NA	NA	NA	NA
Sieve No. 200 (75 um)	NA	NA	NA	NA	1.1	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Detected Analytical Results
January - March 2010

Station ID	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54		BIBG-GW55/SO55	BIBG-GW56/SO56	BIBG-GW57/SO57	BI-GW01/SO01		BI-GW02/SO02	BI-GW03/SO03	BI-GW04/GW04
Sample ID	BI-SS50-10A	BI-SS51-10A	BI-SS52-10A	BI-SS53-10A	BI-SS54-10A	BI-SS54D-10A	BI-SS55-10A	BI-SS56-10A	BI-SS57-10A	BI-SS01-10A	BI-SS01D-10A	BI-SS02-10A	BI-SS03-10A	BI-SS04-10A
Sample Date	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/25/10	01/31/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10
Chemical Name														
Semivolatile Organic Compounds (µg/kg)														
No Detections														
Explosives (µg/kg)														
No Detections														
Total Metals (mg/kg)														
Aluminum	290	343	411	388	344	353	353	297	323	319	326	350	338	325
Antimony	0.97 U	0.98	0.29 J	1	0.98 U	1 U	0.95 U	1 U	0.96 U	0.81 J	0.89 J	0.71 J	0.79 J	0.8 J
Arsenic	0.28 J	0.96 U	0.53 J	0.91 J	0.44 J	0.44 J	0.95 U	0.33 J	0.96 U	0.87 J	0.83 J	1.2	0.91 J	0.84 J
Barium	1.7 J	19.2 UJ	2.7 J	19.6 UJ	2.6 J	2.3 J	2.3 J	2.3 J	19.2 UJ	1.1 J	1.2 J	1.5 J	1.2 J	0.94 J
Beryllium	0.49 U	0.48 U	0.5 U	0.49 U	0.49 U	0.5 U	0.48 U	0.52 U	0.48 U	0.5 U	0.5 U	0.47 U	0.51 U	0.47 U
Cadmium	0.49 U	0.48 U	0.5 U	0.49 U	0.49 U	0.5 U	0.48 U	0.52 U	0.48 U	0.5 U	0.5 U	0.47 U	0.51 U	0.47 U
Calcium	1,390	1,340	2,150	3,440	2,280	2,180	1,800	1,340	1,710	6,240	6,400	7,200	4,990	3,590
Chromium	4	4.4	5.4	5.9	4.8	4.9	4.7	3.8	4	4.7	4.7	5.6	5.1	4.2
Cobalt	0.1 J	0.48 U	0.18 J	0.49 U	0.14 J	0.13 J	0.14 J	0.52 U	0.48 U	0.5 U	0.5 U	0.47 U	0.51 U	0.47 U
Copper	0.19 J	0.48 U	0.26 J	0.49 U	0.21 J	0.22 J	0.17 J	0.52 U	0.22 J	0.5 U	0.5 U	0.47 U	0.51 U	0.47 U
Iron	635	725	894	859	735	780	733	642	661	761	772	831	745	711
Lead	1.1 J	1.5 J	2.8 J	1.8 J	1.6 J	1.5 J	1.5 J	1.4 J	1.1 J	1.2 J	1.2 J	1.5 J	1.3 J	1.1 J
Magnesium	486 UJ	479 U	502 UJ	489 U	489 UJ	503 UJ	477 UJ	524 U	118 J	262 J	268 J	284 J	262 J	217 J
Manganese	4.3	5.9	8.7	7.9	5.8	6	6.2	5.5	4.9	6.2	6.5	7.1	6.1	5.4
Mercury	0.033 U	0.032 U	0.033 U	0.034 U	0.033 U	0.031 U	0.034 U	0.035 U	0.034 U	0.034 U	0.032 U	0.033 U	0.033 U	0.034 U
Nickel	0.18 J	0.27 J	0.34 J	0.41 J	0.26 J	0.32 J	0.26 J	4.2 U	0.29 J	0.26 J	0.32 J	0.35 J	0.27 J	0.26 J
Potassium	486 U	479 U	502 U	489 U	489 U	503 U	477 U	524 U	481 U	49 J	51.3 J	56.8 J	50.3 J	48.8 J
Selenium	0.49 U	0.48 UJ	0.5 U	0.49 UJ	0.49 U	0.5 U	0.48 U	0.52 UJ	0.48 UJ	0.5 U	0.5 U	0.47 U	0.51 U	0.47 U
Silver	0.49 U	0.48 U	0.5 U	0.49 U	0.49 U	0.5 U	0.48 U	0.52 U	0.48 U	0.5 U	0.5 U	0.47 U	0.51 U	0.47 U
Sodium	486 U	479 U	502 U	489 U	489 U	503 U	477 U	524 U	481 U	503 U	498 U	466 U	506 U	474 U
Vanadium	1.9 U	1.4 J	2 U	1.9 J	2 U	2 U	1.9 U	2.1 U	1.4 J	1.8 J	1.8 J	2	1.8 J	1.5 J
Zinc	2.6	2.7	4.8	3.4	2.4	2.5	2.6	2.8 J	2.4	2.7	2.6	3.5	3	2.8
Wet Chemistry														
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	NA	NA	NA	NA	3,197	NA	NA	NA	NA	1,368	NA
Grain Size (pct/p)														
Sieve No. 005 (4-MM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	NA	99.9	NA	NA	NA	NA	100	NA
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	NA	NA	NA	99.8	NA	NA	NA	NA	100	NA
Sieve No. 020 (850 um)	NA	NA	NA	NA	NA	NA	NA	99.7	NA	NA	NA	NA	100	NA
Sieve No. 040 (425 um)	NA	NA	NA	NA	NA	NA	NA	99.5	NA	NA	NA	NA	100	NA
Sieve No. 060 (250 um)	NA	NA	NA	NA	NA	NA	NA	88.6	NA	NA	NA	NA	82	NA
Sieve No. 080 (180 um)	NA	NA	NA	NA	NA	NA	NA	17.1	NA	NA	NA	NA	14.2	NA
Sieve No. 100 (150 um)	NA	NA	NA	NA	NA	NA	NA	6.1	NA	NA	NA	NA	4	NA
Sieve No. 230 (63-UM)	NA	NA	NA	NA	NA	NA	NA	0.3	NA	NA	NA	NA	0.1	NA
Sieve No. 200 (75 um)	NA	NA	NA	NA	NA	NA	NA	0.3	NA	NA	NA	NA	0.1	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Detected Analytical Results
January - March 2010

Station ID	BI-GW05/SO05	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08	BI-GW09/SO09	BI-GW10/SO10	BI-GW11/SO11	BI-GW12/SO12	BI-GW13/SO13	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17	BI-GW19/SO19		BI-GW20/SO20
Sample ID	BI-SS05-10A	BI-SS06-10A	BI-SS07-10A	BI-SS08-10A	BI-SS09-10A	BI-SS10-10A	BI-SS11-10A	BI-SS12-10A	BI-SS13-10A	BI-SS14-10A	BI-SS15-10A	BI-SS16-10A	BI-SS17-10A	BI-SS19-10A	BI-SS19D-10A	BI-SS20-10A
Sample Date	01/29/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/31/10	01/31/10	01/27/10	01/31/10	01/31/10	01/26/10	01/26/10	01/26/10	02/01/10
Chemical Name																
Semivolatile Organic Compounds (µg/kg)																
No Detections																
Explosives (µg/kg)																
No Detections																
Total Metals (mg/kg)																
Aluminum	326	330	377 J	465 J	404	363	421	366	438	245	286	302 J	356	297	289	297
Antimony	0.82 J	0.66 J	0.99 U	1 U	1 U	1 U	1 U	0.99 U	1.1	1 U	1.1	1 U	0.96 U	1.1 U	1 U	1.1
Arsenic	0.74 J	0.99	0.87 J	0.94 J	1	1.2	1	0.92 J	1 U	1 U	0.66 J	1 U	0.38 J	1.1 U	1 U	1 U
Barium	1.2 J	1.2 J	2.3 J	2.8 J	20 UJ	20.3 UJ	20.6 UJ	19.9 UJ	20.4 UJ	1.6 J	20.8 UJ	1.8 J	2.5 J	2 J	2.1 J	20.7 UJ
Beryllium	0.48 U	0.07 J	0.49 U	0.5 U	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U	0.52 U	0.52 U	0.52 U	0.48 U	0.53 U	0.5 U	0.52 U
Cadmium	0.48 U	0.48 U	0.04 J	0.04 J	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U	0.52 U	0.52 U	0.52 U	0.48 U	0.53 U	0.5 U	0.52 U
Calcium	4,620	6,570	4,420	3,380	6,240	6,780	4,960	5,680	1,640	594	1,620	1,910	1,340	1,070	1,010	1,200
Chromium	4.8	4.8	5.9	6.3	5.8	6.5	6.6	5.4	5.4	3.6	4.1	4.3	4.6	3.4	3.3	4.3
Cobalt	0.48 U	0.48 U	0.13 J	0.15 J	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U	0.52 U	0.52 U	0.52 U	0.48 U	0.53 U	0.5 U	0.52 U
Copper	0.48 U	0.48 U	0.49 U	0.5 U	0.5 U	0.37 J	0.24 J	0.5 U	0.28 J	0.41 J	0.52 U	0.52 U	0.48 U	0.32 J	0.22 J	0.36 J
Iron	748	786	900	935	899	853	897	847	889	602	627	679	746	645	614	633
Lead	1.4 J	1.3 J	2 J	2.5 J	1.7 J	2 J	2 J	1.5 J	2.2 J	2.2 J	1.1 J	1.3 J	1.5 J	2.1 J	2.1 J	2.2
Magnesium	255 J	243 J	494 U	498 U	279 J	286 J	296 J	266 J	170 J	516 UJ	519 U	517 U	481 U	528 U	502 U	93.4 J
Manganese	6.7	6.1	7.5	10	7.8	8.1	9.5	7.4	8.8	3.6	4.5	4.8	6.6	6.5	5.6	7.7
Mercury	0.034 U	0.033 U	0.033 U	0.033 U	0.03 U	0.034 U	0.035 U	0.032 U	0.035 U	0.036 U	0.035 U	0.034 U	0.033 U	0.034 U	0.033 U	0.032 U
Nickel	0.34 J	0.24 J	0.28 J	0.38 J	0.42 J	0.44 J	0.41 J	0.47 J	0.4 J	0.28 J	0.24 J	0.13 J	3.9 U	4.2 U	4 U	0.29 J
Potassium	49.8 J	50.5 J	40.6 J	55.5 J	500 U	508 U	516 U	496 U	510 U	516 U	519 U	31 J	481 U	528 U	502 U	45.6 J
Selenium	0.48 U	0.48 U	0.49 U	0.5 U	0.5 UJ	0.51 UJ	0.52 UJ	0.5 UJ	0.51 UJ	0.52 U	0.52 UJ	0.52 U	0.48 UJ	0.53 UJ	0.5 UJ	0.52 U
Silver	0.48 U	0.48 U	0.49 U	0.5 U	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U	0.52 U	0.52 U	0.52 U	0.48 U	0.53 U	0.5 U	0.52 U
Sodium	477 U	478 U	494 U	498 U	500 U	508 U	516 U	496 U	510 U	516 U	519 U	517 U	481 U	528 U	502 U	518 U
Vanadium	1.7 J	1.8 J	2	2.2	2.1	2.2	2.3	1.9 J	1.9 J	2.1 U	1.3 J	1.4 J	1.9 U	2.1 U	2 U	2.1 U
Zinc	2.7	2.8	3.5	5.3	3	3.3	3.4	3.4	4.5	2.3	2.7	2.5	2.5 J	5 J	4.4 J	3.9
Wet Chemistry																
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	NA	NA	NA	1,905	NA	NA	NA	NA	NA	NA	NA	NA	2,858
Grain Size (pct/p)																
Sieve No. 005 (4-MM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	99.9	NA	NA	NA	NA	NA	NA	NA	NA	99.9
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	NA	NA	99.9	NA	NA	NA	NA	NA	NA	NA	NA	99.5
Sieve No. 020 (850 um)	NA	NA	NA	NA	NA	NA	99.8	NA	NA	NA	NA	NA	NA	NA	NA	98.7
Sieve No. 040 (425 um)	NA	NA	NA	NA	NA	NA	99.5	NA	NA	NA	NA	NA	NA	NA	NA	98.1
Sieve No. 060 (250 um)	NA	NA	NA	NA	NA	NA	76.4	NA	NA	NA	NA	NA	NA	NA	NA	51.7
Sieve No. 080 (180 um)	NA	NA	NA	NA	NA	NA	15	NA	NA	NA	NA	NA	NA	NA	NA	9.6
Sieve No. 100 (150 um)	NA	NA	NA	NA	NA	NA	6.7	NA	NA	NA	NA	NA	NA	NA	NA	4.1
Sieve No. 230 (63-UM)	NA	NA	NA	NA	NA	NA	0.5	NA	NA	NA	NA	NA	NA	NA	NA	0.3
Sieve No. 200 (75 um)	NA	NA	NA	NA	NA	NA	0.5	NA	NA	NA	NA	NA	NA	NA	NA	0.4

Notes:

Shading indicates detections

NA - Not analyzed

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J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Detected Analytical Results
January - March 2010

Station ID	BI-GW21/SO21	BI-GW22/SO22	BI-GW23/SO23	BI-GW24/SO24	BI-GW25/SO25	BI-GW26/SO26		BI-GW27/SO27	BI-GW28/SO28	BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31	BI-GW32/SO32	BI-GW33/SO33	BI-GW34/SO34
Sample ID	BI-SS21-10A	BI-SS22-10A	BI-SS23-10A	BI-SS24-10A	BI-SS25-10A	BI-SS26-10A	BI-SS26D-10A	BI-SS27-10A	BI-SS28-10A	BI-SS29-10A	BI-SS30-10A	BI-SS31-10A	BI-SS32-10A	BI-SS33-10A	BI-SS34-10A
Sample Date	02/01/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/27/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	372	320	159	349	393	315	308	256	321 J	340 J	306 J	344 J	369 J	344 J	339
Antimony	1 U	1 U	1.1	1	0.64 J	0.89 J	0.84 J	0.87 J	0.33 J	1 U	1 U	1 U	1.1 U	0.3 J	1 U
Arsenic	1 U	1 U	1.1 U	0.7 J	0.67 J	0.7 J	0.7 J	0.71 J	0.34 J	0.44 J	1 U	0.65 J	1.1 J	0.67 J	0.36 J
Barium	20.4 UJ	20.9 UJ	21.6 UJ	19 UJ	1.3 J	1.3 J	1.1 J	1 J	1.9 J	2.3 J	1.8 J	1.5 J	2.1 J	1.9 J	2.4 J
Beryllium	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.51 U
Cadmium	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.51 U
Calcium	989	732	541 U	3,010	2,880	2,300	2,160	4,330	1,690	2,200	1,470	3,710	7,180	4,710	1,600
Chromium	5	3.9	2.4	4.5	5.1	4.1	4	3.5	4.4	5.2	4	4.6	5.6	5.1	4.4
Cobalt	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U	0.51 U	0.52 U	0.48 U	0.52 U	0.08 J	0.5 U	0.12 J	0.15 J	0.11 J	0.13 J
Copper	0.51 U	0.26 J	0.54 U	0.47 U	0.22 J	0.21 J	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.39 J
Iron	772	686	354	788	817	713	723	644	664	729	653	757	888	786	740
Lead	3.4	3.7	2.8 J	1.9 J	1.5 J	1.6 J	1.4 J	1.2 J	2.7 J	2.4 J	2.5 J	1.3 J	1.9 J	1.6 J	1.6 J
Magnesium	108 J	522 U	541 U	474 U	248 J	176 J	175 J	177 J	524 U	505 U	505 U	503 U	541 U	503 U	507 UJ
Manganese	11.7	6.4	2.9	6.8	7.6	5.8	5.6	5.7	5.1	7.1	6.2	5.6	6.6	6.8	8.6
Mercury	0.034 U	0.035 U	0.033 U	0.031 U	0.034 U	0.033 U	0.035 U	0.034 U	0.035 U	0.032 U	0.035 U	0.02 J	0.035 U	0.033 U	0.033 U
Nickel	0.29 J	0.27 J	4.3 U	0.32 J	0.31 J	4.1 U	4.2 U	3.9 U	0.18 J	0.23 J	0.19 J	0.28 J	0.32 J	0.33 J	0.24 J
Potassium	60 J	522 U	541 U	474 U	61.1 J	56.7 J	56.5 J	41.9 J	39.5 J	39 J	37.4 J	37.6 J	40.2 J	37.6 J	507 U
Selenium	0.51 U	0.52 UJ	0.54 UJ	0.47 UJ	0.49 U	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.51 U
Silver	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.51 U
Sodium	511 U	522 U	541 U	474 U	489 U	507 U	522 U	484 U	524 U	505 U	505 U	503 U	541 U	503 U	507 U
Vanadium	2 U	1.3 J	0.92 J	1.5 J	1.7 J	1.5 J	1.5 J	1.4 J	2.1 U	2 U	2 U	2 U	2.2 U	2 U	2 U
Zinc	5.5	5.4	8	3.6	3.2	4.5	3.6	2.3	4.9	4	5.5	2.8	2.9	2.7	3.4
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4,102	NA	NA	NA	NA
Grain Size (pct/p)															
Sieve No. 005 (4-MM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.6	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.5	NA	NA	NA	NA
Sieve No. 020 (850 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.7	NA	NA	NA	NA
Sieve No. 040 (425 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97	NA	NA	NA	NA
Sieve No. 060 (250 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	92.6	NA	NA	NA	NA
Sieve No. 080 (180 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	29.1	NA	NA	NA	NA
Sieve No. 100 (150 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	11.7	NA	NA	NA	NA
Sieve No. 230 (63-UM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.7	NA	NA	NA	NA
Sieve No. 200 (75 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.8	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Detected Analytical Results
January - March 2010

Station ID	BI-GW35/SO35		BI-GW36/SO36	BI-GW38/SO38	BI-GW39/SO39	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42	BI-GW43/SO43	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46	BI-GW47/SO47		BI-GW48/SO48	BI-GW49/SO49	BI-GW59/SO59
Sample ID	BI-SS35-10A	BI-SS35D-10A	BI-SS36-10A	BI-SS38-10A	BI-SS39-10A	BI-SS40-10A	BI-SS41-10A	BI-SS42-10A	BI-SS43-10A	BI-SS44-10A	BI-SS45-10A	BI-SS46-10A	BI-SS47-10A	BI-SS47D-10A	BI-SS48-10A	BI-SS49-10A	BI-SS59-10A
Sample Date	01/26/10	01/26/10	01/26/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/29/10	01/27/10	01/27/10	02/01/10	02/01/10	02/01/10	01/28/10	02/01/10
Chemical Name																	
Semivolatile Organic Compounds (µg/kg)																	
No Detections																	
Explosives (µg/kg)																	
No Detections																	
Total Metals (mg/kg)																	
Aluminum	330	423	338	286	171	295	218	349	356	406 J	332	345	351	322	352	322	481
Antimony	1 U	1.2 U	1 U	1 U	1.4 U	1.1 U	1 U	0.97 U	0.87 J	0.97 U	1 U	1 U	1.1	1	1 U	0.98 U	1.6 U
Arsenic	1 U	0.43 J	0.38 J	1 U	1.4 U	1.1 U	1 U	0.62 J	0.59 J	0.97 U	1 U	0.56 J	0.97 U	1 U	1 U	0.61 J	1.6 U
Barium	2.8 J	3.2 J	2.3 J	2 J	1.6 J	21.1 UJ	20.8 UJ	19.5 UJ	1.6 J	2.5 J	20.6 UJ	2.3 J	19.3 UJ	20 UJ	20.5 UJ	19.7 UJ	32.8 UJ
Beryllium	0.51 U	0.62 U	0.5 U	0.5 U	0.7 U	0.53 U	0.52 U	0.49 U	0.48 U	0.49 U	0.52 U	0.51 U	0.48 U	0.5 U	0.51 U	0.49 U	0.82 U
Cadmium	0.51 U	0.62 U	0.5 U	0.5 U	0.7 U	0.53 U	0.52 U	0.49 U	0.48 U	0.49 U	0.52 U	0.51 U	0.48 U	0.5 U	0.51 U	0.49 U	0.82 U
Calcium	1,380	1,710	2,020	571	700 U	660	520 U	2,030	1,880	836	975	2,240	597	643	791	1,820	1,030
Chromium	4.1	5.1	4.7	3.6	2	3.7	2.8	4.6	4.4	5	4.4	5.1	4	3.8	4.6	4.5	4.6
Cobalt	0.51 U	0.62 U	0.5 U	0.5 U	0.7 U	0.53 U	0.52 U	0.49 U	0.48 U	0.14 J	0.52 U	0.11 J	0.48 U	0.5 U	0.51 U	0.49 U	0.82 U
Copper	0.21 J	0.22 J	0.15 J	0.16 J	0.7 U	0.26 J	0.52 U	0.49 U	0.48 U	0.49 U	0.52 U	0.21 J	0.26 J	0.32 J	0.35 J	0.21 J	0.57 J
Iron	707	903	745	649	291	677	526	751	771	916	726	777	735	652	738	710	966
Lead	1.6 J	2 J	1.6 J	2.4 J	2 J	2.4	2.7	1.6 J	2.3 J	3.2 J	2.4 J	1.8 J	1.8	1.5	2.3	1.8 J	3.8
Magnesium	505 U	623 U	504 U	499 U	700 U	91.7 J	51.6 J	486 U	154 J	487 U	516 U	511 UJ	107 J	104 J	102 J	492 U	236 J
Manganese	6.3	8.1	6.1	7.8	2	5.9	3.6	6.6	7.4	10.2	6.8	7	7.6	6.5	6.2	7	5.9
Mercury	0.033 U	0.042 U	0.032 U	0.034 U	0.048 U	0.033 U	0.032 U	0.033 U	0.033 U	0.03 U	0.034 U	0.035 U	0.034 U	0.033 U	0.033 U	0.032 U	0.056 U
Nickel	4 U	5 U	4 U	4 U	5.6 U	4.2 U	4.2 U	0.28 J	0.24 J	0.2 J	4.1 U	0.27 J	0.28 J	0.26 J	0.32 J	0.24 J	0.48 J
Potassium	505 U	623 U	504 U	499 U	700 U	528 U	520 U	486 U	65.8 J	45.6 J	516 U	511 U	41.5 J	42.4 J	46.3 J	492 U	820 U
Selenium	0.51 UJ	0.62 UJ	0.5 UJ	0.5 UJ	0.7 UJ	0.53 UJ	0.52 UJ	0.49 UJ	0.48 U	0.49 U	0.52 UJ	0.51 U	0.48 U	0.5 U	0.51 U	0.49 UJ	0.82 UJ
Silver	0.51 U	0.62 U	0.5 U	0.5 U	0.7 U	0.53 U	0.52 U	0.49 U	0.48 U	0.49 U	0.52 U	0.51 U	0.48 U	0.5 U	0.51 U	0.49 U	0.82 U
Sodium	505 U	623 U	504 U	499 U	700 U	528 U	520 U	486 U	478 U	487 U	516 U	511 U	483 U	500 U	512 U	492 U	820 U
Vanadium	2 U	2.5 U	2 U	2 U	2.8 U	1.3 J	1.2 J	1.4 J	1.6 J	1.9 U	1.4 J	2 U	1.9 U	2 U	2 U	1.4 J	1.5 J
Zinc	4.3 J	5.4 J	2.3 J	3 J	2.8 UJ	2.8	2.1 U	3.2	4.8	5.2	4.1	3	3.3	2.6	3.9	4	5.3
Wet Chemistry																	
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	NA	NA	NA	10,810	NA	NA	NA	2,542	NA	NA	NA	NA	NA	NA
Grain Size (pct/p)																	
Sieve No. 005 (4-MM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	99.7	NA	NA	NA	99.7	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	NA	NA	99.7	NA	NA	NA	99.5	NA	NA	NA	NA	NA	NA
Sieve No. 020 (850 um)	NA	NA	NA	NA	NA	NA	97.1	NA	NA	NA	99.3	NA	NA	NA	NA	NA	NA
Sieve No. 040 (425 um)	NA	NA	NA	NA	NA	NA	91.9	NA	NA	NA	99.1	NA	NA	NA	NA	NA	NA
Sieve No. 060 (250 um)	NA	NA	NA	NA	NA	NA	75.7	NA	NA	NA	91.3	NA	NA	NA	NA	NA	NA
Sieve No. 080 (180 um)	NA	NA	NA	NA	NA	NA	23.5	NA	NA	NA	20.4	NA	NA	NA	NA	NA	NA
Sieve No. 100 (150 um)	NA	NA	NA	NA	NA	NA	8.7	NA	NA	NA	8	NA	NA	NA	NA	NA	NA
Sieve No. 230 (63-UM)	NA	NA	NA	NA	NA	NA	0.4	NA	NA	NA	0.5	NA	NA	NA	NA	NA	NA
Sieve No. 200 (75 um)	NA	NA	NA	NA	NA	NA	0.5	NA	NA	NA	0.5	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Detected Analytical Results
January - March 2010

Station ID	BI-SO18	BI-SO37	BI-SO58	BI-SO60	ICWBG-GW20/SO20		ICWBG-GW21/SO21	ICWBG-GW22/SO22	ICW-GW01/SO01	ICW-GW02/SO02	ICW-GW03/SO03		ICW-GW04/SO04	ICW-GW05/SO05	ICW-GW06/SO06
Sample ID	BI-SS18-10A	BI-SS37-10A	BI-SS58-10A	BI-SS60-10A	ICW-SS20-10A	ICW-SS20D-10A	ICW-SS21-10A	ICW-SS22-10A	ICW-SS01-10A	ICW-SS02-10A	ICW-SS03-10A	ICW-SS03D-10A	ICW-SS04-10A	ICW-SS05-10A	ICW-SS06-10A
Sample Date	01/26/10	01/26/10	01/26/10	01/27/10	03/26/10	03/26/10	03/26/10	03/25/10	03/23/10	03/23/10	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	440	302	322	358	2,080	1,810	1,560	4,790	337	381	510	487	2,140	855	1,370
Antimony	1.3 U	1 U	1 U	0.46 J	1.7 U	1.7 U	1.3 U	2 U	1 U	1 U	1.3 U	1.2 U	2.7 U	1.2 U	1.6 U
Arsenic	1.3 U	1 U	1 U	0.41 J	0.9 J	0.53 J	1.3 U	2.4	1 U	0.33 J	1.3 U	1.2 U	2.7 U	1.2 U	1.6 U
Barium	2.8 J	1.9 J	1.7 J	1.9 J	34.9 U	34.6 U	26.9 U	40.4 U	1.4 J	1.7 J	2.5 J	1.9 J	7.8 J	24.6 U	4.2 J
Beryllium	0.64 U	0.51 U	0.51 U	0.51 U	0.87 U	0.87 U	0.67 U	1 U	0.05 J	0.02 J	0.05 J	0.07 J	0.09 J	0.71	0.04 J
Cadmium	0.64 U	0.51 U	0.51 U	0.51 U	0.87 U	0.87 U	0.67 U	0.18 J	0.51 UJ	0.51 UJ	0.63 UJ	0.62 UJ	1.4 UJ	1.1 J-	0.81 UJ
Calcium	1,190	945	739	1,580	9,530	11,100	2,070	25,600	9,880	15,500	19,100	16,400	5,080	1,770	1,500
Chromium	5.3	3.8	3.7	4.4	8.6	8	6.1	15.5	3.6	4.5	6.1	5.7	7.3	4.2	5.7
Cobalt	0.64 U	0.51 U	0.51 U	0.13 J	0.49 J	0.37 J	0.2 J	1.1	0.51 U	0.51 U	0.16 J	0.62 U	0.48 J	0.44 J	0.15 J
Copper	0.64 U	0.51 U	0.23 J	0.86	1.7	1.4	0.77	4.5	0.19 J	0.22 J	0.27 J	0.22 J	1.7	1.2	0.74 J
Iron	947	657	713	693	3,020	2,650	1,610	6,700	893	1,010	1,290	1,220	2,820	1,220	1,960
Lead	2.6 J	1.5 J	2.6 J	1.7 J	5.2	4.9	4.2	11.6	1.2	1.2	1.8	1.8	11.7	4.3	6.5
Magnesium	641 U	514 U	512 U	4,500 J	1,760	1,510	799	3,370	510 U	508 U	634 U	621 U	2,750	591 J	977
Manganese	9.3	4.5	5.6	5.8	31.6	26	9.1	61.7	6.5 J	7.4 J	10.6 J	9.9 J	19 J	9.1 J	8.5 J
Mercury	0.042 U	0.034 U	0.034 U	0.034 U	0.068	0.12	0.048	0.17	0.032 U	0.034 U	0.042 U	0.04 U	0.074 J	0.041 U	0.054 J
Nickel	5.1 U	4.1 U	4.1 U	0.36 J	1.4	1.1	0.73	3.5	0.51 U	0.51 U	0.18 J	0.16 J	1 J	0.49 J	0.55 J
Potassium	641 U	514 U	512 U	511 U	307 J	278 J	318 J	672 J	40.8 J	42.3 J	70.3 J	63.8 J	453 J	111 J	247 J
Selenium	0.64 UJ	0.51 UJ	0.51 UJ	0.51 U	0.87 UJ	0.87 UJ	0.67 UJ	1 UJ	0.51 R	0.51 R	0.63 R	0.62 R	1.4 R	0.58 J-	0.81 R
Silver	0.64 U	0.51 U	0.51 U	0.51 U	0.87 U	0.87 U	0.67 U	1 U	0.51 U	0.51 U	0.63 U	0.62 U	1.4 U	0.35 J	0.81 U
Sodium	641 U	514 U	512 U	511 U	266 J	287 J	1,390	428 J	195 J	250 J	292 J	260 J	1,560	164 J	914
Vanadium	2.6 U	2.1 U	2 U	2 U	6.5	5.7	5.1	13.8	1.7 J	1.8 J	2.6	2.3 J	6.4	2.7	4.8
Zinc	4.5 J	3.5 J	4.2 J	24.6	8.8	7.8	5.2	26.7	2.7 J	4.8 J	3.5 J	3.4 J	11.8 J	3.4 J	3.6 J
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	NA	96,840	NA	NA	NA	NA	NA	4,284	NA	NA	NA	NA
Grain Size (pct/p)															
Sieve No. 005 (4-MM)	NA	NA	NA	NA	100	NA	NA	NA	NA	NA	100	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	99	NA	NA	NA	NA	NA	99.6	NA	NA	NA	NA
Sieve No. 020 (850 um)	NA	NA	NA	NA	96.2	NA	NA	NA	NA	NA	98.4	NA	NA	NA	NA
Sieve No. 040 (425 um)	NA	NA	NA	NA	92	NA	NA	NA	NA	NA	96.5	NA	NA	NA	NA
Sieve No. 060 (250 um)	NA	NA	NA	NA	83.1	NA	NA	NA	NA	NA	88.5	NA	NA	NA	NA
Sieve No. 080 (180 um)	NA	NA	NA	NA	48.5	NA	NA	NA	NA	NA	24.3	NA	NA	NA	NA
Sieve No. 100 (150 um)	NA	NA	NA	NA	35.3	NA	NA	NA	NA	NA	11.7	NA	NA	NA	NA
Sieve No. 230 (63-UM)	NA	NA	NA	NA	3	NA	NA	NA	NA	NA	0.1	NA	NA	NA	NA
Sieve No. 200 (75 um)	NA	NA	NA	NA	4.3	NA	NA	NA	NA	NA	0.3	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Detected Analytical Results
January - March 2010

Station ID	ICW-GW07/SO07	ICW-GW08/SO08	ICW-GW09/SO09	ICW-GW10/SO10	ICW-GW11/SO11	ICW-GW12/SO12	ICW-GW13/SO13	ICW-GW14/SO14	ICW-GW15/SO15	ICW-GW16/SO16	ICW-GW17/SO17	ICW-GW18/SO18	ICW-GW19/SO19	SI-GW01/SO01	
Sample ID	ICW-SS07-10A	ICW-SS08-10A	ICW-SS09-10A	ICW-SS10-10A	ICW-SS11-10A	ICW-SS12-10A	ICW-SS13-10A	ICW-SS14-10A	ICW-SS15-10A	ICW-SS16-10A	ICW-SS17-10A	ICW-SS18-10A	ICW-SS19-10A	SI-SS01-10A	SI-SS01D-10A
Sample Date	03/22/10	03/23/10	03/23/10	03/23/10	03/23/10	03/24/10	03/25/10	03/25/10	03/25/10	03/25/10	03/25/10	03/25/10	03/25/10	03/24/10	03/24/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	639	1,040	3,090	825	3,970	602	7,800	2,790	2,820	1,220	1,660	898	1,100	817	274
Antimony	1.3 U	1.4 U	1.6 U	1.3 U	2.5 U	1.8 U	2.4 U	1.4 U	2.3 U	1.3 U	1.5 U	1.4 U	1.4 U	1.1 U	1.1 U
Arsenic	1.3 U	1.4 U	1.6 U	1.3 U	1.1 J	1.8 U	3.1	0.75 J	2.3 U	1.3 U	1.5 U	1.4 U	0.51 J	1.1 U	9.2
Barium	3.2 J	3.4 J	9.3 J	3.5 J	8 J	2.6 J	47.1 U	27.1 U	46.5 U	26.1 U	29.8 U	27.8 U	28.1 U	1.7 J	2.3 J
Beryllium	0.67 U	0.72 U	0.08 J	0.04 J	0.13 J	0.06 J	1.2 U	0.68 U	1.2 U	0.65 U	0.74 U	0.7 U	0.7 U	0.05 J	0.54 U
Cadmium	0.67 UJ	0.72 UJ	0.82 UJ	0.66 UJ	1.3 UJ	0.88 UJ	0.23 J	0.05 J	1.2 U	0.65 U	0.74 U	0.7 U	0.7 U	0.53 UJ	0.54 UJ
Calcium	983	1,580	861	1,680	11,800	21,700	8,930	3,300	7,040	3,610	2,110	5,290	8,660	1,540	535 U
Chromium	2.6	4.6	9.8	3	11.1	7.6	22.1	10	8.3	5.7	6.2	5.5	6.5	2.7	12.7
Cobalt	0.67 U	0.72 U	0.54 J	0.66 U	1 J	0.88 U	1.8	0.57 J	0.62 J	0.19 J	0.3 J	0.15 J	0.25 J	0.12 J	0.54 U
Copper	0.77	0.92	1.2	0.85	3.4	0.36 J	7	1.3	3.4	0.63 J	1.3	0.56 J	0.62 J	0.93	17.6
Iron	898	1,460	3,660	1,220	5,230	1,480	10,200	3,630	3,790	1,670	2,170	1,460	1,740	1,100	485
Lead	5.1	4.4	8	4.9	13.1	2.1	20.2	5	20.9	2.5	7.7	2.4	2.9	5.5	4.7
Magnesium	674 U	1,080	1,260	1,180	5,470	882 U	5,230	1,280	3,760	701	1,320	614 J	815	1,230	125 J
Manganese	3.8 J	11.8 J	17.3 J	7.4 J	35.2 J	11.1 J	91.8	16.7	50.8	10.1	21.9	9.7	13	27.3 J	4.4 J
Mercury	0.027 J	0.028 J	0.05 U	0.034 J	0.17	0.052 J	0.17	0.046 U	0.14	0.043 U	0.051 U	0.047 U	0.047	0.036 U	0.052
Nickel	0.15 J	0.72 U	1.7	0.31 J	2.7	0.88 U	5.6	1.5	2.1	0.65 U	0.86	0.7 U	0.58 J	0.46 J	0.54 U
Potassium	286 J	266 J	588 J	236 J	627 J	72 J	1,760 J	526 J	774 J	240 J	292 J	155 J	147 J	286 J	101 J
Selenium	0.67 R	0.72 R	0.82 R	0.49 J-	0.97 J-	0.88 R	1.1 J-	0.68 UJ	0.9 J-	0.65 UJ	0.74 UJ	0.7 UJ	0.7 UJ	0.53 R	0.54 R
Silver	0.67 U	0.72 U	0.82 U	0.66 U	1.3 U	0.88 U	1.2 U	0.68 U	1.2 U	0.65 U	0.74 U	0.7 U	0.7 U	0.53 U	0.54 U
Sodium	237 J	611 J	732 J	333 J	417 J	380 J	3,110	934	1,410	808	459 J	379 J	267 J	934	158 J
Vanadium	2.4 J	3.4	8	3.4	13.7	2.8 J	21.2	8.4	8.5	4.5	4.7	3.4	4.4	2.7	1.2 J
Zinc	3.9 J	4 J	8.3 J	3.3 J	21.8 J	4.6 J	52.7	8.7	15	4.2	7.6	4	4.5	4.2 J	8 J
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,073	NA
Grain Size (pct/p)															
Sieve No. 005 (4-MM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.4	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.6	NA
Sieve No. 020 (850 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.7	NA
Sieve No. 040 (425 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.7	NA
Sieve No. 060 (250 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	78	NA
Sieve No. 080 (180 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13.2	NA
Sieve No. 100 (150 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6	NA
Sieve No. 230 (63-UM)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1	NA
Sieve No. 200 (75 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.1	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Detected Analytical Results
January - March 2010

Station ID	SI-GW02/SO02	SI-GW03/SO03	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID	SI-SS02-10A	SI-SS03-10A	SI-SS04-10A	SI-SS05-10A	SI-SS06-10A
Sample Date	03/24/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name					
Semivolatile Organic Compounds (µg/kg)					
No Detections					
Explosives (µg/kg)					
No Detections					
Total Metals (mg/kg)					
Aluminum	310	389	242	261	282
Antimony	1 U	0.99 U	0.95 U	1 U	1.1 U
Arsenic	0.38 J	0.99 U	0.95 U	8.1	0.73 J
Barium	1.7 J	1.3 J	1.5 J	2.2 J	1.8 J
Beryllium	0.04 J	0.49 U	0.03 J	0.51 U	0.05 J
Cadmium	0.5 UJ	0.49 UJ	0.48 UJ	0.51 UJ	0.53 UJ
Calcium	17,300	1,330	6,100	509 U	15,100
Chromium	3.8	3.8	3.6	11.7	3.7
Cobalt	0.5 U	0.49 U	0.48 U	0.51 U	0.53 U
Copper	0.21 J	0.25 J	0.15 J	16.3	0.2 J
Iron	970	697	622	435	1,040
Lead	1.2	1.9	1.4	4.4	1.3
Magnesium	500 U	495 U	476 U	509 U	526 U
Manganese	7.5 J	5.4 J	4.5 J	4.3 J	7.4 J
Mercury	0.034 U	0.019 J	0.098	0.081	0.032 U
Nickel	0.5 U	0.49 U	0.48 U	0.51 U	0.53 U
Potassium	37.1 J	48.2 J	35.1 J	50.9 J	37.8 J
Selenium	0.5 R	0.49 R	0.48 R	0.51 R	0.53 R
Silver	0.5 U	0.49 U	0.48 U	0.51 U	0.53 U
Sodium	265 J	119 J	170 J	111 J	245 J
Vanadium	2.1	1.4 J	1.5 J	0.92 J	2.1 J
Zinc	2.5 J	3.1 J	2 J	6.9 J	2.6 J
Wet Chemistry					
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	NA	NA
Grain Size (pct/p)					
Sieve No. 005 (4-MM)	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	NA
Sieve No. 020 (850 um)	NA	NA	NA	NA	NA
Sieve No. 040 (425 um)	NA	NA	NA	NA	NA
Sieve No. 060 (250 um)	NA	NA	NA	NA	NA
Sieve No. 080 (180 um)	NA	NA	NA	NA	NA
Sieve No. 100 (150 um)	NA	NA	NA	NA	NA
Sieve No. 230 (63-UM)	NA	NA	NA	NA	NA
Sieve No. 200 (75 um)	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SS 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BIBG-GW50/SO50	BIBG-GW51/SO51	BIBG-GW52/SO52	BIBG-GW53/SO53	BIBG-GW54/SO54		BIBG-GW55/SO55	BIBG-GW56/SO56	BIBG-GW57/SO57	BI-GW01/SO01	
Sample ID					BI-SS50-10A	BI-SS51-10A	BI-SS52-10A	BI-SS53-10A	BI-SS54-10A	BI-SS54D-10A	BI-SS55-10A	BI-SS56-10A	BI-SS57-10A	BI-SS01-10A	BI-SS01D-10A
Sample Date					01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/27/10	01/25/10	01/31/10	01/28/10	01/28/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	2,040	--	99,000	7,700	290	343	411	388	344	353	353	297	323	319	326
Antimony	1.31	--	41	3.1	0.97 U	0.98	0.29 J	1	0.98 U	1 U	0.95 U	1 U	0.96 U	0.81 J	0.89 J
Arsenic	1.432	5.8	1.6	0.39	0.28 J	0.96 U	0.53 J	0.91 J	0.44 J	0.44 J	0.95 U	0.33 J	0.96 U	0.87 J	0.83 J
Barium	16.68	580	19,000	1,500	1.7 J	19.2 UJ	2.7 J	19.6 UJ	2.6 J	2.3 J	2.3 J	2.3 J	19.2 UJ	1.1 J	1.2 J
Beryllium	--	--	200	16	0.49 U	0.48 U	0.5 U	0.49 U	0.49 U	0.5 U	0.48 U	0.52 U	0.48 U	0.5 U	0.5 U
Cadmium	0.53	3	80	7	0.49 U	0.48 U	0.5 U	0.49 U	0.49 U	0.5 U	0.48 U	0.52 U	0.48 U	0.5 U	0.5 U
Calcium	9,580	--	--	--	1,390	1,340	2,150	3,440	2,280	2,180	1,800	1,340	1,710	6,240	6,400
Chromium	12.22	3.8	5.6	0.29	4	4.4	5.4	**5.9**	4.8	4.9	4.7	3.8	4	4.7	4.7
Cobalt	0.606	--	30	2.3	0.1 J	0.48 U	0.18 J	0.49 U	0.14 J	0.13 J	0.14 J	0.52 U	0.48 U	0.5 U	0.5 U
Copper	1.594	700	4,100	310	0.19 J	0.48 U	0.26 J	0.49 U	0.21 J	0.22 J	0.17 J	0.52 U	0.22 J	0.5 U	0.5 U
Iron	3,120	150	72,000	5,500	635	725	894	859	735	780	733	642	661	761	772
Lead	6.14	270	800	400	1.1 J	1.5 J	2.8 J	1.8 J	1.6 J	1.5 J	1.5 J	1.4 J	1.1 J	1.2 J	1.2 J
Magnesium	1,412	--	--	--	486 UJ	479 U	502 UJ	489 U	489 UJ	503 UJ	477 UJ	524 U	118 J	262 J	268 J
Manganese	27.6	65	2,300	180	4.3	5.9	8.7	7.9	5.8	6	6.2	5.5	4.9	6.2	6.5
Mercury	0.0764	1	31	2.3	0.033 U	0.032 U	0.033 U	0.034 U	0.033 U	0.031 U	0.034 U	0.035 U	0.034 U	0.034 U	0.032 U
Nickel	1.77	130	2,000	150	0.18 J	0.27 J	0.34 J	0.41 J	0.26 J	0.32 J	0.26 J	4.2 U	0.29 J	0.26 J	0.32 J
Potassium	592	--	--	--	486 U	479 U	502 U	489 U	489 U	503 U	477 U	524 U	481 U	49 J	51.3 J
Selenium	--	2.1	510	39	0.49 U	0.48 UJ	0.5 U	0.49 UJ	0.49 U	0.5 U	0.48 U	0.52 UJ	0.48 UJ	0.5 U	0.5 U
Silver	--	3.4	510	39	0.49 U	0.48 U	0.5 U	0.49 U	0.49 U	0.5 U	0.48 U	0.52 U	0.48 U	0.5 U	0.5 U
Sodium	736	--	--	--	486 U	479 U	502 U	489 U	489 U	503 U	477 U	524 U	481 U	503 U	498 U
Vanadium	6.38	--	520	39	1.9 U	1.4 J	2 U	1.9 J	2 U	2 U	1.9 U	2.1 U	1.4 J	1.8 J	1.8 J
Zinc	11.7	1,200	31,000	2,300	2.6	2.7	4.8	3.4	2.4	2.5	2.6	2.8 J	2.4	2.7	2.6
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)		--	--	--	NA	NA	NA	NA	NA	NA	NA	3,197	NA	NA	NA
Grain Size (pct/p)															
Sieve No. 005 (4-MM)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)		--	--	--	NA	NA	NA	NA	NA	NA	NA	99.9	NA	NA	NA
Sieve No. 010 (2.00 mm)		--	--	--	NA	NA	NA	NA	NA	NA	NA	99.8	NA	NA	NA
Sieve No. 020 (850 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	99.7	NA	NA	NA
Sieve No. 040 (425 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	99.5	NA	NA	NA
Sieve No. 060 (250 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	88.6	NA	NA	NA
Sieve No. 080 (180 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	17.1	NA	NA	NA
Sieve No. 100 (150 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	6.1	NA	NA	NA
Sieve No. 230 (63-UM)		--	--	--	NA	NA	NA	NA	NA	NA	NA	0.3	NA	NA	NA
Sieve No. 200 (75 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	0.3	NA	NA	NA

Notes:

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

Shading indicates exceedance of two times the mean base background concentration for surface soil

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SS 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW02/SO02	BI-GW03/SO03	BI-GW04/GW04	BI-GW05/SO05	BI-GW06/SO06	BI-GW07/SO07	BI-GW08/SO08	BI-GW09/SO09	BI-GW10/SO10	BI-GW11/SO11	BI-GW12/SO12	BI-GW13/SO13
Sample ID					BI-SS02-10A	BI-SS03-10A	BI-SS04-10A	BI-SS05-10A	BI-SS06-10A	BI-SS07-10A	BI-SS08-10A	BI-SS09-10A	BI-SS10-10A	BI-SS11-10A	BI-SS12-10A	BI-SS13-10A
Sample Date					01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/31/10	01/31/10
Chemical Name																
Semivolatile Organic Compounds (µg/kg)																
No Detections																
Explosives (µg/kg)																
No Detections																
Total Metals (mg/kg)																
Aluminum	2,040	--	99,000	7,700	350	338	325	326	330	377 J	465 J	404	363	421	366	438
Antimony	1.31	--	41	3.1	0.71 J	0.79 J	0.8 J	0.82 J	0.66 J	0.99 U	1 U	1 U	1 U	1 U	0.99 U	1.1
Arsenic	1.432	5.8	1.6	0.39	1.2	0.91 J	0.84 J	0.74 J	0.99	0.87 J	0.94 J	1	1.2	1	0.92 J	1 U
Barium	16.68	580	19,000	1,500	1.5 J	1.2 J	0.94 J	1.2 J	1.2 J	2.3 J	2.8 J	20 UJ	20.3 UJ	20.6 UJ	19.9 UJ	20.4 UJ
Beryllium	--	--	200	16	0.47 U	0.51 U	0.47 U	0.48 U	0.07 J	0.49 U	0.5 U	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U
Cadmium	0.53	3	80	7	0.47 U	0.51 U	0.47 U	0.48 U	0.48 U	0.04 J	0.04 J	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U
Calcium	9,580	--	--	--	7,200	4,990	3,590	4,620	6,570	4,420	3,380	6,240	6,780	4,960	5,680	1,640
Chromium	12.22	3.8	5.6	0.29	5.6	5.1	4.2	4.8	4.8	**5.9**	**6.3**	**5.8**	**6.5**	**6.6**	5.4	5.4
Cobalt	0.606	--	30	2.3	0.47 U	0.51 U	0.47 U	0.48 U	0.48 U	0.13 J	0.15 J	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U
Copper	1.594	700	4,100	310	0.47 U	0.51 U	0.47 U	0.48 U	0.48 U	0.49 U	0.5 U	0.5 U	0.37 J	0.24 J	0.5 U	0.28 J
Iron	3,120	150	72,000	5,500	831	745	711	748	786	900	935	899	853	897	847	889
Lead	6.14	270	800	400	1.5 J	1.3 J	1.1 J	1.4 J	1.3 J	2 J	2.5 J	1.7 J	2 J	2 J	1.5 J	2.2 J
Magnesium	1,412	--	--	--	284 J	262 J	217 J	255 J	243 J	494 U	498 U	279 J	286 J	296 J	266 J	170 J
Manganese	27.6	65	2,300	180	7.1	6.1	5.4	6.7	6.1	7.5	10	7.8	8.1	9.5	7.4	8.8
Mercury	0.0764	1	31	2.3	0.033 U	0.033 U	0.034 U	0.034 U	0.033 U	0.033 U	0.033 U	0.03 U	0.034 U	0.035 U	0.032 U	0.035 U
Nickel	1.77	130	2,000	150	0.35 J	0.27 J	0.26 J	0.34 J	0.24 J	0.28 J	0.38 J	0.42 J	0.44 J	0.41 J	0.47 J	0.4 J
Potassium	592	--	--	--	56.8 J	50.3 J	48.8 J	49.8 J	50.5 J	40.6 J	55.5 J	500 U	508 U	516 U	496 U	510 U
Selenium	--	2.1	510	39	0.47 U	0.51 U	0.47 U	0.48 U	0.48 U	0.49 U	0.5 U	0.5 UJ	0.51 UJ	0.52 UJ	0.5 UJ	0.51 UJ
Silver	--	3.4	510	39	0.47 U	0.51 U	0.47 U	0.48 U	0.48 U	0.49 U	0.5 U	0.5 U	0.51 U	0.52 U	0.5 U	0.51 U
Sodium	736	--	--	--	466 U	506 U	474 U	477 U	478 U	494 U	498 U	500 U	508 U	516 U	496 U	510 U
Vanadium	6.38	--	520	39	2	1.8 J	1.5 J	1.7 J	1.8 J	2	2.2	2.1	2.2	2.3	1.9 J	1.9 J
Zinc	11.7	1,200	31,000	2,300	3.5	3	2.8	2.7	2.8	3.5	5.3	3	3.3	3.4	3.4	4.5
Wet Chemistry																
Total organic carbon (TOC) (mg/kg)		--	--	--	NA	1,368	NA	NA	NA	NA	NA	NA	NA	1,905	NA	NA
Grain Size (pct/p)																
Sieve No. 005 (4-MM)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)		--	--	--	NA	100	NA	NA	NA	NA	NA	NA	NA	99.9	NA	NA
Sieve No. 010 (2.00 mm)		--	--	--	NA	100	NA	NA	NA	NA	NA	NA	NA	99.9	NA	NA
Sieve No. 020 (850 um)		--	--	--	NA	100	NA	NA	NA	NA	NA	NA	NA	99.8	NA	NA
Sieve No. 040 (425 um)		--	--	--	NA	100	NA	NA	NA	NA	NA	NA	NA	99.5	NA	NA
Sieve No. 060 (250 um)		--	--	--	NA	82	NA	NA	NA	NA	NA	NA	NA	76.4	NA	NA
Sieve No. 080 (180 um)		--	--	--	NA	14.2	NA	NA	NA	NA	NA	NA	NA	15	NA	NA
Sieve No. 100 (150 um)		--	--	--	NA	4	NA	NA	NA	NA	NA	NA	NA	6.7	NA	NA
Sieve No. 230 (63-UM)		--	--	--	NA	0.1	NA	NA	NA	NA	NA	NA	NA	0.5	NA	NA
Sieve No. 200 (75 um)		--	--	--	NA	0.1	NA	NA	NA	NA	NA	NA	NA	0.5	NA	NA

Notes:

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

Shading indicates exceedance of two times the mean base background concentration for surface soil

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SS 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW14/SO14	BI-GW15/SO15	BI-GW16/SO16	BI-GW17/SO17	BI-GW19/SO19		BI-GW20/SO20	BI-GW21/SO21	BI-GW22/SO22	BI-GW23/SO23	BI-GW24/SO24	BI-GW25/SO25
Sample ID					BI-SS14-10A	BI-SS15-10A	BI-SS16-10A	BI-SS17-10A	BI-SS19-10A	BI-SS19D-10A	BI-SS20-10A	BI-SS21-10A	BI-SS22-10A	BI-SS23-10A	BI-SS24-10A	BI-SS25-10A
Sample Date					01/27/10	01/31/10	01/31/10	01/26/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/28/10	01/28/10
Chemical Name																
Semivolatile Organic Compounds (µg/kg)																
No Detections																
Explosives (µg/kg)																
No Detections																
Total Metals (mg/kg)																
Aluminum	2,040	--	99,000	7,700	245	286	302 J	356	297	289	297	372	320	159	349	393
Antimony	1.31	--	41	3.1	1 U	1.1	1 U	0.96 U	1.1 U	1 U	1.1	1 U	1 U	1.1	1	0.64 J
Arsenic	1.432	5.8	1.6	0.39	1 U	0.66 J	1 U	0.38 J	1.1 U	1 U	1 U	1 U	1 U	1.1 U	0.7 J	0.67 J
Barium	16.68	580	19,000	1,500	1.6 J	20.8 UJ	1.8 J	2.5 J	2 J	2.1 J	20.7 UJ	20.4 UJ	20.9 UJ	21.6 UJ	19 UJ	1.3 J
Beryllium	--	--	200	16	0.52 U	0.52 U	0.52 U	0.48 U	0.53 U	0.5 U	0.52 U	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U
Cadmium	0.53	3	80	7	0.52 U	0.52 U	0.52 U	0.48 U	0.53 U	0.5 U	0.52 U	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U
Calcium	9,580	--	--	--	594	1,620	1,910	1,340	1,070	1,010	1,200	989	732	541 U	3,010	2,880
Chromium	12.22	3.8	5.6	0.29	3.6	4.1	4.3	4.6	3.4	3.3	4.3	5	3.9	2.4	4.5	5.1
Cobalt	0.606	--	30	2.3	0.52 U	0.52 U	0.52 U	0.48 U	0.53 U	0.5 U	0.52 U	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U
Copper	1.594	700	4,100	310	0.41 J	0.52 U	0.52 U	0.48 U	0.32 J	0.22 J	0.36 J	0.51 U	0.26 J	0.54 U	0.47 U	0.22 J
Iron	3,120	150	72,000	5,500	602	627	679	746	645	614	633	772	686	354	788	817
Lead	6.14	270	800	400	2.2 J	1.1 J	1.3 J	1.5 J	2.1 J	2.1 J	2.2	3.4	3.7	2.8 J	1.9 J	1.5 J
Magnesium	1,412	--	--	--	516 UJ	519 U	517 U	481 U	528 U	502 U	93.4 J	108 J	522 U	541 U	474 U	248 J
Manganese	27.6	65	2,300	180	3.6	4.5	4.8	6.6	6.5	5.6	7.7	11.7	6.4	2.9	6.8	7.6
Mercury	0.0764	1	31	2.3	0.036 U	0.035 U	0.034 U	0.033 U	0.034 U	0.033 U	0.032 U	0.034 U	0.035 U	0.033 U	0.031 U	0.034 U
Nickel	1.77	130	2,000	150	0.28 J	0.24 J	0.13 J	3.9 U	4.2 U	4 U	0.29 J	0.29 J	0.27 J	4.3 U	0.32 J	0.31 J
Potassium	592	--	--	--	516 U	519 U	31 J	481 U	528 U	502 U	45.6 J	60 J	522 U	541 U	474 U	61.1 J
Selenium	--	2.1	510	39	0.52 U	0.52 UJ	0.52 U	0.48 UJ	0.53 UJ	0.5 UJ	0.52 U	0.51 U	0.52 UJ	0.54 UJ	0.47 UJ	0.49 U
Silver	--	3.4	510	39	0.52 U	0.52 U	0.52 U	0.48 U	0.53 U	0.5 U	0.52 U	0.51 U	0.52 U	0.54 U	0.47 U	0.49 U
Sodium	736	--	--	--	516 U	519 U	517 U	481 U	528 U	502 U	518 U	511 U	522 U	541 U	474 U	489 U
Vanadium	6.38	--	520	39	2.1 U	1.3 J	1.4 J	1.9 U	2.1 U	2 U	2.1 U	2 U	1.3 J	0.92 J	1.5 J	1.7 J
Zinc	11.7	1,200	31,000	2,300	2.3	2.7	2.5	2.5 J	5 J	4.4 J	3.9	5.5	5.4	8	3.6	3.2
Wet Chemistry																
Total organic carbon (TOC) (mg/kg)		--	--	--	NA	NA	NA	NA	NA	NA	2,858	NA	NA	NA	NA	NA
Grain Size (pct/p)																
Sieve No. 005 (4-MM)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)		--	--	--	NA	NA	NA	NA	NA	NA	99.9	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)		--	--	--	NA	NA	NA	NA	NA	NA	99.5	NA	NA	NA	NA	NA
Sieve No. 020 (850 um)		--	--	--	NA	NA	NA	NA	NA	NA	98.7	NA	NA	NA	NA	NA
Sieve No. 040 (425 um)		--	--	--	NA	NA	NA	NA	NA	NA	98.1	NA	NA	NA	NA	NA
Sieve No. 060 (250 um)		--	--	--	NA	NA	NA	NA	NA	NA	51.7	NA	NA	NA	NA	NA
Sieve No. 080 (180 um)		--	--	--	NA	NA	NA	NA	NA	NA	9.6	NA	NA	NA	NA	NA
Sieve No. 100 (150 um)		--	--	--	NA	NA	NA	NA	NA	NA	4.1	NA	NA	NA	NA	NA
Sieve No. 230 (63-UM)		--	--	--	NA	NA	NA	NA	NA	NA	0.3	NA	NA	NA	NA	NA
Sieve No. 200 (75 um)		--	--	--	NA	NA	NA	NA	NA	NA	0.4	NA	NA	NA	NA	NA

Notes:

Bold box indicates exceedance of NC SSL

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Underline indicates exceedance of Adjusted Residential Soil RSLs

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

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U - The material was analyzed for, but not detected

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mg/kg - Milligrams per kilogram

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SS 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW26/SO26		BI-GW27/SO27	BI-GW28/SO28	BI-GW29/SO29	BI-GW30/SO30	BI-GW31/SO31	BI-GW32/SO32	BI-GW33/SO33	BI-GW34/SO34	BI-GW35/SO35	
Sample ID					BI-SS26-10A	BI-SS26D-10A	BI-SS27-10A	BI-SS28-10A	BI-SS29-10A	BI-SS30-10A	BI-SS31-10A	BI-SS32-10A	BI-SS33-10A	BI-SS34-10A	BI-SS35-10A	BI-SS35D-10A
Sample Date					01/28/10	01/28/10	01/28/10	01/29/10	01/29/10	01/29/10	01/31/10	01/31/10	01/31/10	01/27/10	01/26/10	01/26/10
Chemical Name																
Semivolatile Organic Compounds (µg/kg)																
No Detections																
Explosives (µg/kg)																
No Detections																
Total Metals (mg/kg)																
Aluminum	2,040	--	99,000	7,700	315	308	256	321 J	340 J	306 J	344 J	369 J	344 J	339	330	423
Antimony	1.31	--	41	3.1	0.89 J	0.84 J	0.87 J	0.33 J	1 U	1 U	1 U	1.1 U	0.3 J	1 U	1 U	1.2 U
Arsenic	1.432	5.8	1.6	0.39	0.7 J	0.7 J	0.71 J	0.34 J	0.44 J	1 U	0.65 J	1.1 J	0.67 J	0.36 J	1 U	0.43 J
Barium	16.68	580	19,000	1,500	1.3 J	1.1 J	1 J	1.9 J	2.3 J	1.8 J	1.5 J	2.1 J	1.9 J	2.4 J	2.8 J	3.2 J
Beryllium	--	--	200	16	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.51 U	0.51 U	0.62 U
Cadmium	0.53	3	80	7	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.51 U	0.51 U	0.62 U
Calcium	9,580	--	--	--	2,300	2,160	4,330	1,690	2,200	1,470	3,710	7,180	4,710	1,600	1,380	1,710
Chromium	12.22	3.8	5.6	0.29	4.1	4	3.5	4.4	5.2	4	4.6	5.6	5.1	4.4	4.1	5.1
Cobalt	0.606	--	30	2.3	0.51 U	0.52 U	0.48 U	0.52 U	0.08 J	0.5 U	0.12 J	0.15 J	0.11 J	0.13 J	0.51 U	0.62 U
Copper	1.594	700	4,100	310	0.21 J	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.39 J	0.21 J	0.22 J
Iron	3,120	150	72,000	5,500	713	723	644	664	729	653	757	888	786	740	707	903
Lead	6.14	270	800	400	1.6 J	1.4 J	1.2 J	2.7 J	2.4 J	2.5 J	1.3 J	1.9 J	1.6 J	1.6 J	1.6 J	2 J
Magnesium	1,412	--	--	--	176 J	175 J	177 J	524 U	505 U	505 U	503 U	541 U	503 U	507 UJ	505 U	623 U
Manganese	27.6	65	2,300	180	5.8	5.6	5.7	5.1	7.1	6.2	5.6	6.6	6.8	8.6	6.3	8.1
Mercury	0.0764	1	31	2.3	0.033 U	0.035 U	0.034 U	0.035 U	0.032 U	0.035 U	0.02 J	0.035 U	0.033 U	0.033 U	0.033 U	0.042 U
Nickel	1.77	130	2,000	150	4.1 U	4.2 U	3.9 U	0.18 J	0.23 J	0.19 J	0.28 J	0.32 J	0.33 J	0.24 J	4 U	5 U
Potassium	592	--	--	--	56.7 J	56.5 J	41.9 J	39.5 J	39 J	37.4 J	37.6 J	40.2 J	37.6 J	507 U	505 U	623 U
Selenium	--	2.1	510	39	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.51 U	0.51 UJ	0.62 UJ
Silver	--	3.4	510	39	0.51 U	0.52 U	0.48 U	0.52 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.51 U	0.51 U	0.62 U
Sodium	736	--	--	--	507 U	522 U	484 U	524 U	505 U	505 U	503 U	541 U	503 U	507 U	505 U	623 U
Vanadium	6.38	--	520	39	1.5 J	1.5 J	1.4 J	2.1 U	2 U	2 U	2 U	2.2 U	2 U	2 U	2 U	2.5 U
Zinc	11.7	1,200	31,000	2,300	4.5	3.6	2.3	4.9	4	5.5	2.8	2.9	2.7	3.4	4.3 J	5.4 J
Wet Chemistry																
Total organic carbon (TOC) (mg/kg)		--	--	--	NA	NA	NA	NA	NA	4,102	NA	NA	NA	NA	NA	NA
Grain Size (pct/p)																
Sieve No. 005 (4-MM)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)		--	--	--	NA	NA	NA	NA	NA	99.6	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)		--	--	--	NA	NA	NA	NA	NA	98.5	NA	NA	NA	NA	NA	NA
Sieve No. 020 (850 um)		--	--	--	NA	NA	NA	NA	NA	97.7	NA	NA	NA	NA	NA	NA
Sieve No. 040 (425 um)		--	--	--	NA	NA	NA	NA	NA	97	NA	NA	NA	NA	NA	NA
Sieve No. 060 (250 um)		--	--	--	NA	NA	NA	NA	NA	92.6	NA	NA	NA	NA	NA	NA
Sieve No. 080 (180 um)		--	--	--	NA	NA	NA	NA	NA	29.1	NA	NA	NA	NA	NA	NA
Sieve No. 100 (150 um)		--	--	--	NA	NA	NA	NA	NA	11.7	NA	NA	NA	NA	NA	NA
Sieve No. 230 (63-UM)		--	--	--	NA	NA	NA	NA	NA	2.7	NA	NA	NA	NA	NA	NA
Sieve No. 200 (75 um)		--	--	--	NA	NA	NA	NA	NA	2.8	NA	NA	NA	NA	NA	NA

Notes:

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

Shading indicates exceedance of two times the mean base background concentration for surface soil

NA - Not analyzed

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

J- - Analyte present, value may be biased low, actual value may be higher

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

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SS 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW36/SO36	BI-GW38/SO38	BI-GW39/SO39	BI-GW40/SO40	BI-GW41/SO41	BI-GW42/SO42	BI-GW43/SO43	BI-GW44/SO44	BI-GW45/SO45	BI-GW46/SO46	BI-GW47/SO47	
Sample ID					BI-SS36-10A	BI-SS38-10A	BI-SS39-10A	BI-SS40-10A	BI-SS41-10A	BI-SS42-10A	BI-SS43-10A	BI-SS44-10A	BI-SS45-10A	BI-SS46-10A	BI-SS47-10A	BI-SS47D-10A
Sample Date					01/26/10	01/26/10	01/26/10	02/01/10	02/01/10	01/28/10	01/28/10	01/29/10	01/27/10	01/27/10	02/01/10	02/01/10
Chemical Name																
Semivolatile Organic Compounds (µg/kg)																
No Detections																
Explosives (µg/kg)																
No Detections																
Total Metals (mg/kg)																
Aluminum	2,040	--	99,000	7,700	338	286	171	295	218	349	356	406 J	332	345	351	322
Antimony	1.31	--	41	3.1	1 U	1 U	1.4 U	1.1 U	1 U	0.97 U	0.87 J	0.97 U	1 U	1 U	1.1	1
Arsenic	1.432	5.8	1.6	0.39	0.38 J	1 U	1.4 U	1.1 U	1 U	0.62 J	0.59 J	0.97 U	1 U	0.56 J	0.97 U	1 U
Barium	16.68	580	19,000	1,500	2.3 J	2 J	1.6 J	21.1 UJ	20.8 UJ	19.5 UJ	1.6 J	2.5 J	20.6 UJ	2.3 J	19.3 UJ	20 UJ
Beryllium	--	--	200	16	0.5 U	0.5 U	0.7 U	0.53 U	0.52 U	0.49 U	0.48 U	0.49 U	0.52 U	0.51 U	0.48 U	0.5 U
Cadmium	0.53	3	80	7	0.5 U	0.5 U	0.7 U	0.53 U	0.52 U	0.49 U	0.48 U	0.49 U	0.52 U	0.51 U	0.48 U	0.5 U
Calcium	9,580	--	--	--	2,020	571	700 U	660	520 U	2,030	1,880	836	975	2,240	597	643
Chromium	12.22	3.8	5.6	0.29	4.7	3.6	2	3.7	2.8	4.6	4.4	5	4.4	5.1	4	3.8
Cobalt	0.606	--	30	2.3	0.5 U	0.5 U	0.7 U	0.53 U	0.52 U	0.49 U	0.48 U	0.14 J	0.52 U	0.11 J	0.48 U	0.5 U
Copper	1.594	700	4,100	310	0.15 J	0.16 J	0.7 U	0.26 J	0.52 U	0.49 U	0.48 U	0.49 U	0.52 U	0.21 J	0.26 J	0.32 J
Iron	3,120	150	72,000	5,500	745	649	291	677	526	751	771	916	726	777	735	652
Lead	6.14	270	800	400	1.6 J	2.4 J	2 J	2.4	2.7	1.6 J	2.3 J	3.2 J	2.4 J	1.8 J	1.8	1.5
Magnesium	1,412	--	--	--	504 U	499 U	700 U	91.7 J	51.6 J	486 U	154 J	487 U	516 U	511 UJ	107 J	104 J
Manganese	27.6	65	2,300	180	6.1	7.8	2	5.9	3.6	6.6	7.4	10.2	6.8	7	7.6	6.5
Mercury	0.0764	1	31	2.3	0.032 U	0.034 U	0.048 U	0.033 U	0.032 U	0.033 U	0.033 U	0.03 U	0.034 U	0.035 U	0.034 U	0.033 U
Nickel	1.77	130	2,000	150	4 U	4 U	5.6 U	4.2 U	4.2 U	0.28 J	0.24 J	0.2 J	4.1 U	0.27 J	0.28 J	0.26 J
Potassium	592	--	--	--	504 U	499 U	700 U	528 U	520 U	486 U	65.8 J	45.6 J	516 U	511 U	41.5 J	42.4 J
Selenium	--	2.1	510	39	0.5 UJ	0.5 UJ	0.7 UJ	0.53 UJ	0.52 UJ	0.49 UJ	0.48 U	0.49 U	0.52 UJ	0.51 U	0.48 U	0.5 U
Silver	--	3.4	510	39	0.5 U	0.5 U	0.7 U	0.53 U	0.52 U	0.49 U	0.48 U	0.49 U	0.52 U	0.51 U	0.48 U	0.5 U
Sodium	736	--	--	--	504 U	499 U	700 U	528 U	520 U	486 U	478 U	487 U	516 U	511 U	483 U	500 U
Vanadium	6.38	--	520	39	2 U	2 U	2.8 U	1.3 J	1.2 J	1.4 J	1.6 J	1.9 U	1.4 J	2 U	1.9 U	2 U
Zinc	11.7	1,200	31,000	2,300	2.3 J	3 J	2.8 UJ	2.8	2.1 U	3.2	4.8	5.2	4.1	3	3.3	2.6
Wet Chemistry																
Total organic carbon (TOC) (mg/kg)		--	--	--	NA	NA	NA	NA	10,810	NA	NA	NA	2,542	NA	NA	NA
Grain Size (pct/p)																
Sieve No. 005 (4-MM)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)		--	--	--	NA	NA	NA	NA	99.7	NA	NA	NA	99.7	NA	NA	NA
Sieve No. 010 (2.00 mm)		--	--	--	NA	NA	NA	NA	99.7	NA	NA	NA	99.5	NA	NA	NA
Sieve No. 020 (850 um)		--	--	--	NA	NA	NA	NA	97.1	NA	NA	NA	99.3	NA	NA	NA
Sieve No. 040 (425 um)		--	--	--	NA	NA	NA	NA	91.9	NA	NA	NA	99.1	NA	NA	NA
Sieve No. 060 (250 um)		--	--	--	NA	NA	NA	NA	75.7	NA	NA	NA	91.3	NA	NA	NA
Sieve No. 080 (180 um)		--	--	--	NA	NA	NA	NA	23.5	NA	NA	NA	20.4	NA	NA	NA
Sieve No. 100 (150 um)		--	--	--	NA	NA	NA	NA	8.7	NA	NA	NA	8	NA	NA	NA
Sieve No. 230 (63-UM)		--	--	--	NA	NA	NA	NA	0.4	NA	NA	NA	0.5	NA	NA	NA
Sieve No. 200 (75 um)		--	--	--	NA	NA	NA	NA	0.5	NA	NA	NA	0.5	NA	NA	NA

Notes:

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Underline indicates exceedance of Adjusted Residential Soil RSLs

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µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SS 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	BI-GW48/SO48	BI-GW49/SO49	BI-GW59/SO59	BI-SO18	BI-SO37	BI-SO58	BI-SO60	ICWBG-GW20/SO20		ICWBG-GW21/SO21	ICWBG-GW22/SO22	ICW-GW01/SO01
Sample ID					BI-SS48-10A	BI-SS49-10A	BI-SS59-10A	BI-SS18-10A	BI-SS37-10A	BI-SS58-10A	BI-SS60-10A	ICW-SS20-10A	ICW-SS20D-10A	ICW-SS21-10A	ICW-SS22-10A	ICW-SS01-10A
Sample Date					02/01/10	01/28/10	02/01/10	01/26/10	01/26/10	01/26/10	01/27/10	03/26/10	03/26/10	03/26/10	03/25/10	03/23/10
Chemical Name																
Semivolatile Organic Compounds (µg/kg)																
No Detections																
Explosives (µg/kg)																
No Detections																
Total Metals (mg/kg)																
Aluminum	2,040	--	99,000	7,700	352	322	481	440	302	322	358	2,080	1,810	1,560	4,790	337
Antimony	1.31	--	41	3.1	1 U	0.98 U	1.6 U	1.3 U	1 U	1 U	0.46 J	1.7 U	1.7 U	1.3 U	2 U	1 U
Arsenic	1.432	5.8	1.6	0.39	1 U	0.61 J	1.6 U	1.3 U	1 U	1 U	0.41 J	0.9 J	0.53 J	1.3 U	**2.4**	1 U
Barium	16.68	580	19,000	1,500	20.5 UJ	19.7 UJ	32.8 UJ	2.8 J	1.9 J	1.7 J	1.9 J	34.9 U	34.6 U	26.9 U	40.4 U	1.4 J
Beryllium	--	--	200	16	0.51 U	0.49 U	0.82 U	0.64 U	0.51 U	0.51 U	0.51 U	0.87 U	0.87 U	0.67 U	1 U	0.05 J
Cadmium	0.53	3	80	7	0.51 U	0.49 U	0.82 U	0.64 U	0.51 U	0.51 U	0.51 U	0.87 U	0.87 U	0.67 U	0.18 J	0.51 UJ
Calcium	9,580	--	--	--	791	1,820	1,030	1,190	945	739	1,580	9,530	11,100	2,070	25,600	9,880
Chromium	12.22	3.8	5.6	0.29	4.6	4.5	4.6	5.3	3.8	3.7	4.4	**8.6**	**8**	**6.1**	**15.5**	3.6
Cobalt	0.606	--	30	2.3	0.51 U	0.49 U	0.82 U	0.64 U	0.51 U	0.51 U	0.13 J	0.49 J	0.37 J	0.2 J	1.1	0.51 U
Copper	1.594	700	4,100	310	0.35 J	0.21 J	0.57 J	0.64 U	0.51 U	0.23 J	0.86	1.7	1.4	0.77	4.5	0.19 J
Iron	3,120	150	72,000	5,500	738	710	966	947	657	713	693	3,020	2,650	1,610	6,700	893
Lead	6.14	270	800	400	2.3	1.8 J	3.8	2.6 J	1.5 J	2.6 J	1.7 J	5.2	4.9	4.2	11.6	1.2
Magnesium	1,412	--	--	--	102 J	492 U	236 J	641 U	514 U	512 U	4,500 J	1,760	1,510	799	3,370	510 U
Manganese	27.6	65	2,300	180	6.2	7	5.9	9.3	4.5	5.6	5.8	31.6	26	9.1	61.7	6.5 J
Mercury	0.0764	1	31	2.3	0.033 U	0.032 U	0.056 U	0.042 U	0.034 U	0.034 U	0.034 U	0.068	0.12	0.048	0.17	0.032 U
Nickel	1.77	130	2,000	150	0.32 J	0.24 J	0.48 J	5.1 U	4.1 U	4.1 U	0.36 J	1.4	1.1	0.73	3.5	0.51 U
Potassium	592	--	--	--	46.3 J	492 U	820 U	641 U	514 U	512 U	511 U	307 J	278 J	318 J	672 J	40.8 J
Selenium	--	2.1	510	39	0.51 U	0.49 UJ	0.82 UJ	0.64 UJ	0.51 UJ	0.51 UJ	0.51 U	0.87 UJ	0.87 UJ	0.67 UJ	1 UJ	0.51 R
Silver	--	3.4	510	39	0.51 U	0.49 U	0.82 U	0.64 U	0.51 U	0.51 U	0.51 U	0.87 U	0.87 U	0.67 U	1 U	0.51 U
Sodium	736	--	--	--	512 U	492 U	820 U	641 U	514 U	512 U	511 U	266 J	287 J	1,390	428 J	195 J
Vanadium	6.38	--	520	39	2 U	1.4 J	1.5 J	2.6 U	2.1 U	2 U	2 U	6.5	5.7	5.1	13.8	1.7 J
Zinc	11.7	1,200	31,000	2,300	3.9	4	5.3	4.5 J	3.5 J	4.2 J	24.6	8.8	7.8	5.2	26.7	2.7 J
Wet Chemistry																
Total organic carbon (TOC) (mg/kg)		--	--	--	NA	NA	NA	NA	NA	NA	NA	96,840	NA	NA	NA	NA
Grain Size (pct/p)																
Sieve No. 005 (4-MM)		--	--	--	NA	NA	NA	NA	NA	NA	NA	100	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)		--	--	--	NA	NA	NA	NA	NA	NA	NA	99	NA	NA	NA	NA
Sieve No. 020 (850 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	96.2	NA	NA	NA	NA
Sieve No. 040 (425 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	92	NA	NA	NA	NA
Sieve No. 060 (250 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	83.1	NA	NA	NA	NA
Sieve No. 080 (180 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	48.5	NA	NA	NA	NA
Sieve No. 100 (150 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	35.3	NA	NA	NA	NA
Sieve No. 230 (63-UM)		--	--	--	NA	NA	NA	NA	NA	NA	NA	3	NA	NA	NA	NA
Sieve No. 200 (75 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	4.3	NA	NA	NA	NA

Notes:

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

Shading indicates exceedance of two times the mean base background concentration for surface soil

NA - Not analyzed

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R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

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pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SS 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	ICW-GW02/SO02	ICW-GW03/SO03		ICW-GW04/SO04	ICW-GW05/SO05	ICW-GW06/SO06	ICW-GW07/SO07	ICW-GW08/SO08	ICW-GW09/SO09	ICW-GW10/SO10	ICW-GW11/SO11
Sample ID					ICW-SS02-10A	ICW-SS03-10A	ICW-SS03D-10A	ICW-SS04-10A	ICW-SS05-10A	ICW-SS06-10A	ICW-SS07-10A	ICW-SS08-10A	ICW-SS09-10A	ICW-SS10-10A	ICW-SS11-10A
Sample Date					03/23/10	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10	03/22/10	03/23/10	03/23/10	03/23/10	03/23/10
Chemical Name															
Semivolatile Organic Compounds (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Aluminum	2,040	--	99,000	7,700	381	510	487	2,140	855	1,370	639	1,040	3,090	825	3,970
Antimony	1.31	--	41	3.1	1 U	1.3 U	1.2 U	2.7 U	1.2 U	1.6 U	1.3 U	1.4 U	1.6 U	1.3 U	2.5 U
Arsenic	1.432	5.8	1.6	0.39	0.33 J	1.3 U	1.2 U	2.7 U	1.2 U	1.6 U	1.3 U	1.4 U	1.6 U	1.3 U	1.1 J
Barium	16.68	580	19,000	1,500	1.7 J	2.5 J	1.9 J	7.8 J	24.6 U	4.2 J	3.2 J	3.4 J	9.3 J	3.5 J	8 J
Beryllium	--	--	200	16	0.02 J	0.05 J	0.07 J	0.09 J	0.71	0.04 J	0.67 U	0.72 U	0.08 J	0.04 J	0.13 J
Cadmium	0.53	3	80	7	0.51 UJ	0.63 UJ	0.62 UJ	1.4 UJ	1.1 J-	0.81 UJ	0.67 UJ	0.72 UJ	0.82 UJ	0.66 UJ	1.3 UJ
Calcium	9,580	--	--	--	15,500	19,100	16,400	5,080	1,770	1,500	983	1,580	861	1,680	11,800
Chromium	12.22	3.8	5.6	0.29	4.5	**6.1**	**5.7**	**7.3**	4.2	**5.7**	2.6	4.6	**9.8**	3	**11.1**
Cobalt	0.606	--	30	2.3	0.51 U	0.16 J	0.62 U	0.48 J	0.44 J	0.15 J	0.67 U	0.72 U	0.54 J	0.66 U	1 J
Copper	1.594	700	4,100	310	0.22 J	0.27 J	0.22 J	1.7	1.2	0.74 J	0.77	0.92	1.2	0.85	3.4
Iron	3,120	150	72,000	5,500	1,010	1,290	1,220	2,820	1,220	1,960	898	1,460	3,660	1,220	5,230
Lead	6.14	270	800	400	1.2	1.8	1.8	11.7	4.3	6.5	5.1	4.4	8	4.9	13.1
Magnesium	1,412	--	--	--	508 U	634 U	621 U	2,750	591 J	977	674 U	1,080	1,260	1,180	5,470
Manganese	27.6	65	2,300	180	7.4 J	10.6 J	9.9 J	19 J	9.1 J	8.5 J	3.8 J	11.8 J	17.3 J	7.4 J	35.2 J
Mercury	0.0764	1	31	2.3	0.034 U	0.042 U	0.04 U	0.074 J	0.041 U	0.054 J	0.027 J	0.028 J	0.05 U	0.034 J	0.17
Nickel	1.77	130	2,000	150	0.51 U	0.18 J	0.16 J	1 J	0.49 J	0.55 J	0.15 J	0.72 U	1.7	0.31 J	2.7
Potassium	592	--	--	--	42.3 J	70.3 J	63.8 J	453 J	111 J	247 J	286 J	266 J	588 J	236 J	627 J
Selenium	--	2.1	510	39	0.51 R	0.63 R	0.62 R	1.4 R	0.58 J-	0.81 R	0.67 R	0.72 R	0.82 R	0.49 J-	0.97 J-
Silver	--	3.4	510	39	0.51 U	0.63 U	0.62 U	1.4 U	0.35 J	0.81 U	0.67 U	0.72 U	0.82 U	0.66 U	1.3 U
Sodium	736	--	--	--	250 J	292 J	260 J	1,560	164 J	914	237 J	611 J	732 J	333 J	417 J
Vanadium	6.38	--	520	39	1.8 J	2.6	2.3 J	6.4	2.7	4.8	2.4 J	3.4	8	3.4	13.7
Zinc	11.7	1,200	31,000	2,300	4.8 J	3.5 J	3.4 J	11.8 J	3.4 J	3.6 J	3.9 J	4 J	8.3 J	3.3 J	21.8 J
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)		--	--	--	NA	4,284	NA	NA	NA	NA	NA	NA	NA	NA	NA
Grain Size (pct/p)															
Sieve No. 005 (4-MM)		--	--	--	NA	100	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)		--	--	--	NA	99.6	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 020 (850 um)		--	--	--	NA	98.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 040 (425 um)		--	--	--	NA	96.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 060 (250 um)		--	--	--	NA	88.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 080 (180 um)		--	--	--	NA	24.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 100 (150 um)		--	--	--	NA	11.7	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 230 (63-UM)		--	--	--	NA	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 200 (75 um)		--	--	--	NA	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Bold box indicates exceedance of NC SSL

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Underline indicates exceedance of Adjusted Residential Soil RSLs

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

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mg/kg - Milligrams per kilogram

pct/p - Percent Passed

µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SS 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	ICW-GW12/SO12	ICW-GW13/SO13	ICW-GW14/SO14	ICW-GW15/SO15	ICW-GW16/SO16	ICW-GW17/SO17	ICW-GW18/SO18	ICW-GW19/SO19	SI-GW01/SO01		SI-GW02/SO02	SI-GW03/SO03
Sample ID					ICW-SS12-10A	ICW-SS13-10A	ICW-SS14-10A	ICW-SS15-10A	ICW-SS16-10A	ICW-SS17-10A	ICW-SS18-10A	ICW-SS19-10A	SI-SS01-10A	SI-SS01D-10A	SI-SS02-10A	SI-SS03-10A
Sample Date					03/24/10	03/25/10	03/25/10	03/25/10	03/25/10	03/25/10	03/25/10	03/25/10	03/24/10	03/24/10	03/24/10	03/24/10
Chemical Name																
Semivolatile Organic Compounds (µg/kg)																
No Detections																
Explosives (µg/kg)																
No Detections																
Total Metals (mg/kg)																
Aluminum	2,040	--	99,000	7,700	602	7,800	2,790	2,820	1,220	1,660	898	1,100	817	274	310	389
Antimony	1.31	--	41	3.1	1.8 U	2.4 U	1.4 U	2.3 U	1.3 U	1.5 U	1.4 U	1.4 U	1.1 U	1.1 U	1 U	0.99 U
Arsenic	1.432	5.8	1.6	0.39	1.8 U	**3.1**	0.75 J	2.3 U	1.3 U	1.5 U	1.4 U	0.51 J	1.1 U	**9.2**	0.38 J	0.99 U
Barium	16.68	580	19,000	1,500	2.6 J	47.1 U	27.1 U	46.5 U	26.1 U	29.8 U	27.8 U	28.1 U	1.7 J	2.3 J	1.7 J	1.3 J
Beryllium	--	--	200	16	0.06 J	1.2 U	0.68 U	1.2 U	0.65 U	0.74 U	0.7 U	0.7 U	0.05 J	0.54 U	0.04 J	0.49 U
Cadmium	0.53	3	80	7	0.88 UJ	0.23 J	0.05 J	1.2 U	0.65 U	0.74 U	0.7 U	0.7 U	0.53 UJ	0.54 UJ	0.5 UJ	0.49 UJ
Calcium	9,580	--	--	--	21,700	8,930	3,300	7,040	3,610	2,110	5,290	8,660	1,540	535 U	17,300	1,330
Chromium	12.22	3.8	5.6	0.29	**7.6**	**22.1**	**10**	**8.3**	**5.7**	**6.2**	5.5	**6.5**	2.7	**12.7**	3.8	3.8
Cobalt	0.606	--	30	2.3	0.88 U	1.8	0.57 J	0.62 J	0.19 J	0.3 J	0.15 J	0.25 J	0.12 J	0.54 U	0.5 U	0.49 U
Copper	1.594	700	4,100	310	0.36 J	7	1.3	3.4	0.63 J	1.3	0.56 J	0.62 J	0.93	17.6	0.21 J	0.25 J
Iron	3,120	150	72,000	5,500	1,480	10,200	3,630	3,790	1,670	2,170	1,460	1,740	1,100	485	970	697
Lead	6.14	270	800	400	2.1	20.2	5	20.9	2.5	7.7	2.4	2.9	5.5	4.7	1.2	1.9
Magnesium	1,412	--	--	--	882 U	5,230	1,280	3,760	701	1,320	614 J	815	1,230	125 J	500 U	495 U
Manganese	27.6	65	2,300	180	11.1 J	91.8	16.7	50.8	10.1	21.9	9.7	13	27.3 J	4.4 J	7.5 J	5.4 J
Mercury	0.0764	1	31	2.3	0.052 J	0.17	0.046 U	0.14	0.043 U	0.051 U	0.047 U	0.047	0.036 U	0.052	0.034 U	0.019 J
Nickel	1.77	130	2,000	150	0.88 U	5.6	1.5	2.1	0.65 U	0.86	0.7 U	0.58 J	0.46 J	0.54 U	0.5 U	0.49 U
Potassium	592	--	--	--	72 J	1,760 J	526 J	774 J	240 J	292 J	155 J	147 J	286 J	101 J	37.1 J	48.2 J
Selenium	--	2.1	510	39	0.88 R	1.1 J-	0.68 UJ	0.9 J-	0.65 UJ	0.74 UJ	0.7 UJ	0.7 UJ	0.53 R	0.54 R	0.5 R	0.49 R
Silver	--	3.4	510	39	0.88 U	1.2 U	0.68 U	1.2 U	0.65 U	0.74 U	0.7 U	0.7 U	0.53 U	0.54 U	0.5 U	0.49 U
Sodium	736	--	--	--	380 J	3,110	934	1,410	808	459 J	379 J	267 J	934	158 J	265 J	119 J
Vanadium	6.38	--	520	39	2.8 J	21.2	8.4	8.5	4.5	4.7	3.4	4.4	2.7	1.2 J	2.1	1.4 J
Zinc	11.7	1,200	31,000	2,300	4.6 J	52.7	8.7	15	4.2	7.6	4	4.5	4.2 J	8 J	2.5 J	3.1 J
Wet Chemistry																
Total organic carbon (TOC) (mg/kg)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	7,073	NA	NA	NA
Grain Size (pct/p)																
Sieve No. 005 (4-MM)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	99.4	NA	NA	NA
Sieve No. 004 (4.75 mm)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	98.6	NA	NA	NA
Sieve No. 020 (850 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	97.7	NA	NA	NA
Sieve No. 040 (425 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	96.7	NA	NA	NA
Sieve No. 060 (250 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	78	NA	NA	NA
Sieve No. 080 (180 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	13.2	NA	NA	NA
Sieve No. 100 (150 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	6	NA	NA	NA
Sieve No. 230 (63-UM)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	1	NA	NA	NA
Sieve No. 200 (75 um)		--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	1.1	NA	NA	NA

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µg/kg - Micrograms per kilogram

CTO-80
Surface Danger Zone
Validated Surface Soil Exceedance Results
January - March 2010

Station ID	Camp Lejeune Background SS 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May 2010)	Adjusted Residential Soil RSLs (May 2010)	SI-GW04/SO04	SI-GW05/SO05	SI-GW06/SO06
Sample ID					SI-SS04-10A	SI-SS05-10A	SI-SS06-10A
Sample Date					03/24/10	03/24/10	03/24/10
Chemical Name							
Semivolatile Organic Compounds (µg/kg)							
No Detections							
Explosives (µg/kg)							
No Detections							
Total Metals (mg/kg)							
Aluminum	2,040	--	99,000	7,700	242	261	282
Antimony	1.31	--	41	3.1	0.95 U	1 U	1.1 U
Arsenic	1.432	5.8	1.6	0.39	0.95 U	**8.1**	0.73 J
Barium	16.68	580	19,000	1,500	1.5 J	2.2 J	1.8 J
Beryllium	--	--	200	16	0.03 J	0.51 U	0.05 J
Cadmium	0.53	3	80	7	0.48 UJ	0.51 UJ	0.53 UJ
Calcium	9,580	--	--	--	6,100	509 U	15,100
Chromium	12.22	3.8	5.6	0.29	3.6	**11.7**	3.7
Cobalt	0.606	--	30	2.3	0.48 U	0.51 U	0.53 U
Copper	1.594	700	4,100	310	0.15 J	16.3	0.2 J
Iron	3,120	150	72,000	5,500	622	435	1,040
Lead	6.14	270	800	400	1.4	4.4	1.3
Magnesium	1,412	--	--	--	476 U	509 U	526 U
Manganese	27.6	65	2,300	180	4.5 J	4.3 J	7.4 J
Mercury	0.0764	1	31	2.3	0.098	0.081	0.032 U
Nickel	1.77	130	2,000	150	0.48 U	0.51 U	0.53 U
Potassium	592	--	--	--	35.1 J	50.9 J	37.8 J
Selenium	--	2.1	510	39	0.48 R	0.51 R	0.53 R
Silver	--	3.4	510	39	0.48 U	0.51 U	0.53 U
Sodium	736	--	--	--	170 J	111 J	245 J
Vanadium	6.38	--	520	39	1.5 J	0.92 J	2.1 J
Zinc	11.7	1,200	31,000	2,300	2 J	6.9 J	2.6 J
Wet Chemistry							
Total organic carbon (TOC) (mg/kg)		--	--	--	NA	NA	NA
Grain Size (pct/p)							
Sieve No. 005 (4-MM)		--	--	--	NA	NA	NA
Sieve No. 004 (4.75 mm)		--	--	--	NA	NA	NA
Sieve No. 010 (2.00 mm)		--	--	--	NA	NA	NA
Sieve No. 020 (850 um)		--	--	--	NA	NA	NA
Sieve No. 040 (425 um)		--	--	--	NA	NA	NA
Sieve No. 060 (250 um)		--	--	--	NA	NA	NA
Sieve No. 080 (180 um)		--	--	--	NA	NA	NA
Sieve No. 100 (150 um)		--	--	--	NA	NA	NA
Sieve No. 230 (63-UM)		--	--	--	NA	NA	NA
Sieve No. 200 (75 um)		--	--	--	NA	NA	NA

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CTO-80
Surface Danger Zone
Validated Porewater Raw Analytical Results
May 2010

Station ID	SDZ-WN02/SD02	SDZ-WN03/SD03	SDZ-WN06/SD06	SDZ-WN07/SD07	SDZ-WN10/SD10	SDZ-WN11/SD11	SDZ-WN12/SD12	SDZ-WN13/SD13	SDZ-WN14/SD14	SDZ-WN15/SD15	SDZ-WN16/SD16	SDZ-WN17/SD17
Sample ID	SDZ-WN02-10B	SDZ-WN03-10B	SDZ-WN06-10B	SDZ-WN07-10B	SDZ-WN10-10B	SDZ-WN11-10B	SDZ-WN12-10B	SDZ-WN13-10B	SDZ-WN14-10B	SDZ-WN15-10B	SDZ-WN16-10B	SDZ-WN17-10B
Sample Date	05/07/10	05/06/10	05/03/10	05/03/10	05/07/10	05/10/10	05/10/10	05/10/10	05/10/10	05/10/10	05/08/10	05/05/10
Chemical Name												
Semivolatile Organic Compounds (µg/l)												
2,4-Dinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2,6-Dinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Nitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Explosives (µg/l)												
1,3,5-Trinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,3-Dinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2,4,6-Trinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-Amino-4,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Amino-2,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
HMX	2.5 U	2.5 U	2.5 UJ	2.5 UJ	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ
Nitroglycerin	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
Perchlorate	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
PETN	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
RDX	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Tetryl	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total Metals (µg/l)												
Aluminum	200 U	3,790 J	3,330 J	424 J	8,630 J	1,620 J	180 J	80.9 J	1,660 J	657 J	104 J	215 J
Antimony	4.4 J	2.7 J	4.2 J	4.2 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	10 U	2.9 J	5.5 J	7.5 J	9 J	10 U	10 U	10 U	4.1 J	10 U	8.4 J	10 U
Barium	200 U	18.4 J	16 J	200 U	19.9 J	16.8 J	200 U	200 U	200 U	18.2 J	200 U	200 U
Beryllium	5 U	2.3 J	1.6 J	5 U	0.79 J	5 U	5 U	5 U	5 U	5 U	5 U	2 J
Cadmium	5 U	5.1	7.7	7	9.3	9	8.9	8.9	9.4	10.2	8.8	8.3
Calcium	5,000 U	258,000	388,000	414,000	401,000	506,000	478,000	395,000	488,000	556,000	425,000	426,000
Chromium	10 U	10 U	17.1	10 U	22.6	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cobalt	5 U	19	28.2	26.5	32.5	34	34	32	34.4	37.1	31.7	30.7
Copper	5 U	1.3 J	5 U	5 U	1.7 J+	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	14.1 J	3,310 J	3,310 J	945 J	7,540	1,680	594	734	2,420	1,510	2,160	594 J
Lead	3 U	3.7	3 U	3 U	4.6	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	5,000 U	840,000	1,250,000	1,320,000	1,280,000	1,240,000	1,310,000	1,340,000	1,310,000	1,430,000	1,350,000	#######
Manganese	10 U	23.3	10 U	10 U	44.2	137	83.6	10 U	34.4	140	10 U	10 U
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.091 J	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	5 U	4 J	9.9	5 U	9.7	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Potassium	5,000 U	347,000 J	554,000 J	557,000 J	508,000 J	501,000 J	537,000 J	552,000 J	506,000 J	656,000 J	521,000 J	565,000 J
Selenium	5 U	5 U	5 U	5 U	5 U	3.1 J+	5 U	5 U	5 U	5 U	5 U	5 U
Silver	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	5,000 U	6,990,000	9,990,000	10,300,000	9,730,000 J	9,510,000	9,990,000	10,300,000	9,940,000	11,400,000	10,100,000 J	########
Thallium	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U
Vanadium	20 U	11.8 J	10.2 J	4.3 J	22	5.3 J	1.5 J	2.1 J	5.9 J	2.9 J	1.8 J	1.5 J
Zinc	22.9	13.3 J	11.1 J	9.3 J	20.9	8.7 J	20 U	20 U	10.6 J	5.7 J	4.5 J	20 U
Dissolved Metals (µg/l)												
Aluminum, Dissolved	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Antimony, Dissolved	7.4 J	4.9 J	10 U	10 U	5.4 J	10 U	10 U	10 U	10 U	10 U	5.8 J	5.5 J
Arsenic, Dissolved	10 U	9.3 J	2.9 J	5.2 J	3.7 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Barium, Dissolved	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	15.3 J	200 U	200 U
Beryllium, Dissolved	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium, Dissolved	5 U	6	8.2	8.1	8.6	7.9	7.6	8.2	8.2	8.2	9.2	8.5
Calcium, Dissolved	25,200	295,000	388,000	440,000	395,000	468,000	420,000	396,000	426,000	488,000	354,000	449,000
Chromium, Dissolved	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	0.81 J	10 U	10 U
Cobalt, Dissolved	5 U	21.5	30	29.6	31.6	29.3	28.2	30.1	29.4	30.3	31.1	32
Copper, Dissolved	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron, Dissolved	100 U	224 J	423 J	534 J	454 J	415	473	817	431	909	1,680	461 J
Lead, Dissolved	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 UJ	3 U
Magnesium, Dissolved	29,400 J	881,000 J	1,180,000 J	1,350,000 J	1,270,000 J	1,170,000	1,180,000	1,290,000	1,190,000	1,280,000	1,180,000	####### J

CTO-80
Surface Danger Zone
Validated Porewater Raw Analytical Results
May 2010

Station ID	SDZ-WN02/SD02	SDZ-WN03/SD03	SDZ-WN06/SD06	SDZ-WN07/SD07	SDZ-WN10/SD10	SDZ-WN11/SD11	SDZ-WN12/SD12	SDZ-WN13/SD13	SDZ-WN14/SD14	SDZ-WN15/SD15	SDZ-WN16/SD16	SDZ-WN17/SD17
Sample ID	SDZ-WN02-10B	SDZ-WN03-10B	SDZ-WN06-10B	SDZ-WN07-10B	SDZ-WN10-10B	SDZ-WN11-10B	SDZ-WN12-10B	SDZ-WN13-10B	SDZ-WN14-10B	SDZ-WN15-10B	SDZ-WN16-10B	SDZ-WN17-10B
Sample Date	05/07/10	05/06/10	05/03/10	05/03/10	05/07/10	05/10/10	05/10/10	05/10/10	05/10/10	05/10/10	05/08/10	05/05/10
Chemical Name												
Manganese, Dissolved	10 U	32.2 J	10 U	10 U	10 U	125	78.7	10 U	18.2	127	10 U	10 U
Mercury, Dissolved	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel, Dissolved	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.7 J	1.3 J	5 U
Potassium, Dissolved	22,100	345,000	499,000	561,000	557,000	472,000 J	481,000 J	537,000 J	469,000 J	521,000 J	523,000 J	564,000
Selenium, Dissolved	5 U	5 U	5 U	5 U	4.5 J	5 U	5 U	5 U	5 U	5 U	5 U	2.3 J
Silver, Dissolved	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium, Dissolved	219,000 J	7,040,000 J	9,170,000 J	10,200,000 J	10,100,000 J	9,040,000	9,130,000	9,960,000	9,260,000	9,700,000	9,600,000	####### J
Thallium, Dissolved	10 U	10 U	10 U	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U
Vanadium, Dissolved	20 U	7.9 J	2.1 J	3.1 J	3.4 J	2.5 J	1.9 J	1.8 J	1.7 J	1.9 J	20 U	20 U
Zinc, Dissolved	4.4 J	20 U	4.6 J	20 U	20 U	20 U	6.2 J	20 U	20 U	5.6 J	20 U	20 U

Notes:

Shading indicates detections

NA - Not analyzed

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

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

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Station ID	SDZ-WN18/SD18	SDZ-WN19/SD19		SDZ-WN20/SD20		SDZ-WN21/SD21	SDZ-WN22/SD22	SDZ-WN23/SD23	SDZ-WN24/SD24	SDZ-WN25/SD25	SDZ-WN26/SD26	SDZ-WN27/SD27	SDZ-WN28/SD28	
Sample ID	SDZ-WN18-10B	SDZ-WN19-10B	SDZ-WN19D-10B	SDZ-WN20-10B	SDZ-WN20D-10B	SDZ-WN21-10B	SDZ-WN22-10B	SDZ-WN23-10B	SDZ-WN24-10B	SDZ-WN25-10B	SDZ-WN26-10B	SDZ-WN27-10B	SDZ-WN28-10B	SDZ-WN28D-10B
Sample Date	05/08/10	05/08/10	05/08/10	05/08/10	05/08/10	05/08/10	05/05/10	05/05/10	05/04/10	05/04/10	05/04/10	05/04/10	05/05/10	05/05/10
Chemical Name														
Semivolatile Organic Compounds (µg/l)														
2,4-Dinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2,6-Dinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Nitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Explosives (µg/l)														
1,3,5-Trinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,3-Dinitrobenzene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2,4,6-Trinitrotoluene	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-Amino-4,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Amino-2,6-dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Nitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
HMX	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ
Nitroglycerin	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
Perchlorate	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
PETN	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
RDX	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Tetryl	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total Metals (µg/l)														
Aluminum	88.3 J	161 J	297 J	200 U	200 U	35.3 J	52.1 J	57.1 J	295 J	200 U	200 U	200 U	200 U	200 U
Antimony	10 U	10 U	10 U	10 U	10 U	10 U	10 U	4.2 J	5 U	10 U	4 J	2.3 J	10 U	2.1 J
Arsenic	10 U	10 U	10 U	3.1 J	2.7 J	6.8 J	7.1 J	27.2	39.6	31.9	5.7 J	10 U	10.3	10.9
Barium	200 U	16.2 J	15.9 J	200 U	200 U	200 U	200 U	200 U	200 U	200 U	15.4 J	200 U	200 U	200 U
Beryllium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.9 J	5 U	5 U	5 U	5 U	2.1 J
Cadmium	8.8	9.6	9.5	8.7	8.3	8.4	9.3	7.5	8.1	8.1	8.2	8.3	8.4	7.8
Calcium	449,000	####	######	421,000	424,000	389,000	418,000	######	364,000	######	######	#####	####	#####
Chromium	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cobalt	31.3	36.3	34.9	32.4	31.2	30.1	34.7	27.2	28.4	28.1	30.9	31.4	30.9	28.5
Copper	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	2,070	654	930	518	524	1,050	526	4,090 J	9,030 J	7,240 J	504 J	1,330 J	#### J	2,120 J
Lead	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	######	####	######	######	########	1,330,000	1,320,000	######	########	######	######	#####	####	#####
Manganese	31	10 U	10 U	39.5	38.5	10 U	175	16.2	171	54.8	10 U	10 U	28	29.8
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.3 J	5 U	5 U	5 U	5 U	5 U	5 U
Potassium	505,000 J	#### J	###### J	544,000 J	572,000 J	514,000 J	511,000 J	###### J	562,000 J	###### J	###### J	##### J	#### J	##### J
Selenium	5 U	5 U	5 U	2.3 J	5 U	5 U	5 U	5 U	5 U	5 U	2.6 J	5 U	5 U	5 U
Silver	5 U	5 U	5 U	5 U	5 U	5 U	0.68 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	###### J	#### J	###### J	###### J	######## J	9,980,000 J	9,910,000 J	######	#######	######	######	#####	####	#####
Thallium	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U	5 J	10 U	10 U	10 U	10 U	10 U
Vanadium	1.6 J	3.2 J	3.7 J	20 U	20 U	20 U	3 J	20 U	20 U	20 U	2.2 J	1.6 J	20 U	20 U
Zinc	10.9 J	20 U	20 U	4.7 J	5.1 J	6.4 J	6.7 J	9.9 J	20 U	20 U	20 U	7.7 J	10.7 J	20 U
Dissolved Metals (µg/l)														
Aluminum, Dissolved	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Antimony, Dissolved	6.5 J	3.1 J	4.2 J	2.8 J	2.2 J	2.1 J	2.4 J	4.6 J	3.8 J	5.5 J	10 U	2.7 J	3.7 J	6.5 J
Arsenic, Dissolved	10 U	10 U	10 U	10 U	10 U	10 U	10 U	24.7	36.5	30.3	4.6 J	6.7 J	10.2	10.4
Barium, Dissolved	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Beryllium, Dissolved	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium, Dissolved	8.5	9.5	9.2	8.9	8.3	8.9	9.4	8.8	8.4	8.3	8.2	9.1	8.4	8.7
Calcium, Dissolved	459,000	####	######	358,000	352,000	341,000	364,000	######	378,000	######	######	#####	####	#####
Chromium, Dissolved	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cobalt, Dissolved	31.7	35.1	33.5	31.6	31	31.5	33.3	30.3	29.3	28.8	30.1	32.5	30.7	31.9
Copper, Dissolved	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron, Dissolved	1,860 J	477	434	345	322	852	383	3,700 J	7,490 J	7,330 J	384 J	1,140 J	#### J	2,100 J
Lead, Dissolved	3 U	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium, Dissolved	###### J	####	######	######	########	1,210,000	1,250,000	###### J	####### J	###### J	###### J	##### J	#### J	##### J

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Station ID	SDZ-WN18/SD18	SDZ-WN19/SD19		SDZ-WN20/SD20		SDZ-WN21/SD21	SDZ-WN22/SD22	SDZ-WN23/SD23	SDZ-WN24/SD24	SDZ-WN25/SD25	SDZ-WN26/SD26	SDZ-WN27/SD27	SDZ-WN28/SD28	
Sample ID	SDZ-WN18-10B	SDZ-WN19-10B	SDZ-WN19D-10B	SDZ-WN20-10B	SDZ-WN20D-10B	SDZ-WN21-10B	SDZ-WN22-10B	SDZ-WN23-10B	SDZ-WN24-10B	SDZ-WN25-10B	SDZ-WN26-10B	SDZ-WN27-10B	SDZ-WN28-10B	SDZ-WN28D-10B
Sample Date	05/08/10	05/08/10	05/08/10	05/08/10	05/08/10	05/08/10	05/05/10	05/05/10	05/04/10	05/04/10	05/04/10	05/04/10	05/05/10	05/05/10
Chemical Name														
Manganese, Dissolved	27.1 J	10 U	10 U	29.7	31.3	10 U	149	18.5 J	149 J	55.2 J	10 U	10 U	28.5 J	28.4 J
Mercury, Dissolved	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel, Dissolved	5 U	1.4 J	1.2 J	1 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Potassium, Dissolved	497,000	#### J	###### J	520,000 J	527,000 J	561,000 J	537,000 J	######	523,000	######	######	#####	####	#####
Selenium, Dissolved	5 U	5 U	5 U	2.5 J	5 U	5 U	5 U	5 U	5 U	5 U	2.2 J	5 U	5 U	5 U
Silver, Dissolved	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium, Dissolved	###### J	####	######	######	########	9,900,000	9,900,000	###### J	####### J	###### J	###### J	##### J	#### J	##### J
Thallium, Dissolved	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium, Dissolved	1.6 J	1.9 J	2 J	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Zinc, Dissolved	20 U	20 U	20 U	20 U	19.6 J	15.6 J	4.4 J	4.7 J	5.8 J	5.6 J	20 U	20 U	6.3 J	20 U

Notes:

Shading indicates detections

NA - Not analyzed

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µg/l - Micrograms per liter

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Validated Porewater Raw Analytical Results
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Station ID	SDZ-WN29/SD29	SDZ-WN30/SD30
Sample ID	SDZ-WN29-10B	SDZ-WN30-10B
Sample Date	05/04/10	05/06/10
Chemical Name		
Semivolatile Organic Compounds (µg/l)		
2,4-Dinitrotoluene	2.5 U	2.5 U
2,6-Dinitrotoluene	2.5 U	2.5 U
Nitrobenzene	2.5 U	2.5 U
Explosives (µg/l)		
1,3,5-Trinitrobenzene	2.5 U	2.5 U
1,3-Dinitrobenzene	2.5 U	2.5 U
2,4,6-Trinitrotoluene	2.5 U	2.5 U
2-Amino-4,6-dinitrotoluene	5 U	5 U
2-Nitrotoluene	5 U	5 U
3-Nitrotoluene	5 U	5 U
4-Amino-2,6-dinitrotoluene	5 U	5 U
4-Nitrotoluene	5 U	5 U
HMX	2.5 UJ	2.5 U
Nitroglycerin	16 UJ	16 U
Perchlorate	0.2 U	0.2 U
PETN	10 UJ	10 U
RDX	4 U	4 U
Tetryl	5 U	5 U
Total Metals (µg/l)		
Aluminum	463 J	200 U
Antimony	10 U	3.6 J
Arsenic	10 U	4.4 J
Barium	200 U	200 U
Beryllium	5 U	1.8 J
Cadmium	7.6	8
Calcium	479,000	387,000
Chromium	10 U	0.81 J
Cobalt	27.5	29.2
Copper	5 U	5 U
Iron	783 J	901 J
Lead	3 U	3 U
Magnesium	1,020,000	1,280,000
Manganese	23.9	46.7
Mercury	0.2 U	0.2 U
Nickel	5 U	5 U
Potassium	428,000 J	585,000 J
Selenium	5 U	5 U
Silver	5 U	5 U
Sodium	8,470,000	10,400,000
Thallium	10 U	10 U
Vanadium	8.7 J	2.5 J
Zinc	7.3 J	20 U
Dissolved Metals (µg/l)		
Aluminum, Dissolved	200 U	200 U
Antimony, Dissolved	10 U	4.3 J
Arsenic, Dissolved	10 U	6.7 J
Barium, Dissolved	200 U	200 U
Beryllium, Dissolved	5 U	5 U
Cadmium, Dissolved	7.1	8.1
Calcium, Dissolved	484,000	394,000
Chromium, Dissolved	2 J	10 U
Cobalt, Dissolved	26.4	29.5
Copper, Dissolved	5 U	5 U
Iron, Dissolved	358 J	721 J
Lead, Dissolved	3 U	3 U
Magnesium, Dissolved	1,020,000 J	1,240,000 J

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Station ID	SDZ-WN29/SD29	SDZ-WN30/SD30
Sample ID	SDZ-WN29-10B	SDZ-WN30-10B
Sample Date	05/04/10	05/06/10
Chemical Name		
Manganese, Dissolved	22.1 J	46.8 J
Mercury, Dissolved	0.2 U	0.2 U
Nickel, Dissolved	5 U	5 U
Potassium, Dissolved	417,000	502,000
Selenium, Dissolved	5 U	5 U
Silver, Dissolved	5 U	5 U
Sodium, Dissolved	8,190,000 J	9,580,000 J
Thallium, Dissolved	10 U	10 U
Vanadium, Dissolved	7.6 J	1.9 J
Zinc, Dissolved	6.9 J	20 U

Notes:

Shading indicates detections

NA - Not analyzed

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

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

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Surface Danger Zone
Validated Porewater Detected Analytical Results
May 2010

Station ID	SDZ-WN02/SD02	SDZ-WN03/SD03	SDZ-WN06/SD06	SDZ-WN07/SD07	SDZ-WN10/SD10	SDZ-WN11/SD11	SDZ-WN12/SD12	SDZ-WN13/SD13	SDZ-WN14/SD14	SDZ-WN15/SD15	SDZ-WN16/SD16	SDZ-WN17/SD17	SDZ-WN18/SD18	SDZ-WN19/SD19	
Sample ID	SDZ-WN02-10B	SDZ-WN03-10B	SDZ-WN06-10B	SDZ-WN07-10B	SDZ-WN10-10B	SDZ-WN11-10B	SDZ-WN12-10B	SDZ-WN13-10B	SDZ-WN14-10B	SDZ-WN15-10B	SDZ-WN16-10B	SDZ-WN17-10B	SDZ-WN18-10B	SDZ-WN19-10B	SDZ-WN19D-10B
Sample Date	05/07/10	05/06/10	05/03/10	05/03/10	05/07/10	05/10/10	05/10/10	05/10/10	05/10/10	05/10/10	05/08/10	05/05/10	05/08/10	05/08/10	05/08/10
Chemical Name															
Semivolatile Organic Compounds (µg/l)															
No Detections															
Explosives (µg/l)															
No Detections															
Total Metals (µg/l)															
Aluminum	200 U	3,790 J	3,330 J	424 J	8,630 J	1,620 J	180 J	80.9 J	1,660 J	657 J	104 J	215 J	88.3 J	161 J	297 J
Antimony	4.4 J	2.7 J	4.2 J	4.2 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	10 U	2.9 J	5.5 J	7.5 J	9 J	10 U	10 U	10 U	4.1 J	10 U	8.4 J	10 U	10 U	10 U	10 U
Barium	200 U	18.4 J	16 J	200 U	19.9 J	16.8 J	200 U	200 U	200 U	18.2 J	200 U	200 U	200 U	16.2 J	15.9 J
Beryllium	5 U	2.3 J	1.6 J	5 U	0.79 J	5 U	5 U	5 U	5 U	5 U	5 U	2 J	5 U	5 U	5 U
Cadmium	5 U	5.1	7.7	7	9.3	9	8.9	8.9	9.4	10.2	8.8	8.3	8.8	9.6	9.5
Calcium	5,000 U	258,000	388,000	414,000	401,000	506,000	478,000	395,000	488,000	556,000	425,000	426,000	449,000	494,000	508,000
Chromium	10 U	10 U	17.1	10 U	22.6	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cobalt	5 U	19	28.2	26.5	32.5	34	34	32	34.4	37.1	31.7	30.7	31.3	36.3	34.9
Copper	5 U	1.3 J	5 U	5 U	1.7 J+	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	14.1 J	3,310 J	3,310 J	945 J	7,540	1,680	594	734	2,420	1,510	2,160	594 J	2,070	654	930
Lead	3 U	3.7	3 U	3 U	4.6	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	5,000 U	840,000	1,250,000	1,320,000	1,280,000	1,240,000	1,310,000	1,340,000	1,310,000	1,430,000	1,350,000	1,280,000	1,230,000	1,420,000	1,400,000
Manganese	10 U	23.3	10 U	10 U	44.2	137	83.6	10 U	34.4	140	10 U	10 U	31	10 U	10 U
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.091 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	5 U	4 J	9.9	5 U	9.7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Potassium	5,000 U	347,000 J	554,000 J	557,000 J	508,000 J	501,000 J	537,000 J	552,000 J	506,000 J	656,000 J	521,000 J	565,000 J	505,000 J	565,000 J	550,000 J
Selenium	5 U	5 U	5 U	5 U	5 U	3.1 J+	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	5,000 U	6,990,000	9,990,000	10,300,000	9,730,000 J	9,510,000	9,990,000	10,300,000	9,940,000	11,400,000	10,100,000 J	10,300,000	9,700,000 J	11,400,000 J	10,400,000 J
Thallium	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 UJ	10 UJ
Vanadium	20 U	11.8 J	10.2 J	4.3 J	22	5.3 J	1.5 J	2.1 J	5.9 J	2.9 J	1.8 J	1.5 J	1.6 J	3.2 J	3.7 J
Zinc	22.9	13.3 J	11.1 J	9.3 J	20.9	8.7 J	20 U	20 U	10.6 J	5.7 J	4.5 J	20 U	10.9 J	20 U	20 U
Dissolved Metals (µg/l)															
Antimony, Dissolved	7.4 J	4.9 J	10 U	10 U	5.4 J	10 U	10 U	10 U	10 U	10 U	5.8 J	5.5 J	6.5 J	3.1 J	4.2 J
Arsenic, Dissolved	10 U	9.3 J	2.9 J	5.2 J	3.7 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Barium, Dissolved	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	15.3 J	200 U	200 U	200 U	200 U	200 U
Cadmium, Dissolved	5 U	6	8.2	8.1	8.6	7.9	7.6	8.2	8.2	8.2	9.2	8.5	8.5	9.5	9.2
Calcium, Dissolved	25,200	295,000	388,000	440,000	395,000	468,000	420,000	396,000	426,000	488,000	354,000	449,000	459,000	433,000	415,000
Chromium, Dissolved	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	0.81 J	10 U	10 U	10 U	10 U	10 U
Cobalt, Dissolved	5 U	21.5	30	29.6	31.6	29.3	28.2	30.1	29.4	30.3	31.1	32	31.7	35.1	33.5
Iron, Dissolved	100 U	224 J	423 J	534 J	454 J	415	473	817	431	909	1,680	461 J	1,860 J	477	434
Magnesium, Dissolved	29,400 J	881,000 J	1,180,000 J	1,350,000 J	1,270,000 J	1,170,000	1,180,000	1,290,000	1,190,000	1,280,000	1,180,000	1,330,000 J	1,240,000 J	1,300,000	1,240,000
Manganese, Dissolved	10 U	32.2 J	10 U	10 U	10 U	125	78.7	10 U	18.2	127	10 U	10 U	27.1 J	10 U	10 U
Nickel, Dissolved	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.7 J	1.3 J	5 U	5 U	1.4 J	1.2 J
Potassium, Dissolved	22,100	345,000	499,000	561,000	557,000	472,000 J	481,000 J	537,000 J	469,000 J	521,000 J	523,000 J	564,000	497,000	602,000 J	550,000 J
Selenium, Dissolved	5 U	5 U	5 U	5 U	4.5 J	5 U	5 U	5 U	5 U	5 U	5 U	2.3 J	5 U	5 U	5 U
Sodium, Dissolved	219,000 J	7,040,000 J	9,170,000 J	10,200,000 J	10,100,000 J	9,040,000	9,130,000	9,960,000	9,260,000	9,700,000	9,600,000	10,300,000 J	9,680,000 J	10,500,000	9,940,000
Vanadium, Dissolved	20 U	7.9 J	2.1 J	3.1 J	3.4 J	2.5 J	1.9 J	1.8 J	1.7 J	1.9 J	20 U	20 U	1.6 J	1.9 J	2 J
Zinc, Dissolved	4.4 J	20 U	4.6 J	20 U	20 U	20 U	6.2 J	20 U	20 U	5.6 J	20 U	20 U	20 U	20 U	20 U

Notes:

Shading indicates detections

NA - Not analyzed

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

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Porewater Detected Analytical Results
May 2010

Station ID	SDZ-WN20/SD20		SDZ-WN21/SD21	SDZ-WN22/SD22	SDZ-WN23/SD23	SDZ-WN24/SD24	SDZ-WN25/SD25	SDZ-WN26/SD26	SDZ-WN27/SD27	SDZ-WN28/SD28		SDZ-WN29/SD29	SDZ-WN30/SD30
Sample ID	SDZ-WN20-10B	SDZ-WN20D-10B	SDZ-WN21-10B	SDZ-WN22-10B	SDZ-WN23-10B	SDZ-WN24-10B	SDZ-WN25-10B	SDZ-WN26-10B	SDZ-WN27-10B	SDZ-WN28-10B	SDZ-WN28D-10B	SDZ-WN29-10B	SDZ-WN30-10B
Sample Date	05/08/10	05/08/10	05/08/10	05/05/10	05/05/10	05/04/10	05/04/10	05/04/10	05/04/10	05/05/10	05/05/10	05/04/10	05/06/10
Chemical Name													
Semivolatile Organic Compounds (µg/l)													
No Detections													
Explosives (µg/l)													
No Detections													
Total Metals (µg/l)													
Aluminum	200 U	200 U	35.3 J	52.1 J	57.1 J	295 J	200 U	200 U	200 U	200 U	200 U	463 J	200 U
Antimony	10 U	10 U	10 U	10 U	4.2 J	5 U	10 U	4 J	2.3 J	10 U	2.1 J	10 U	3.6 J
Arsenic	3.1 J	2.7 J	6.8 J	7.1 J	27.2	39.6	31.9	5.7 J	10 U	10.3	10.9	10 U	4.4 J
Barium	200 U	200 U	200 U	200 U	200 U	200 U	200 U	15.4 J	200 U	200 U	200 U	200 U	200 U
Beryllium	5 U	5 U	5 U	5 U	5 U	2.9 J	5 U	5 U	5 U	5 U	2.1 J	5 U	1.8 J
Cadmium	8.7	8.3	8.4	9.3	7.5	8.1	8.1	8.2	8.3	8.4	7.8	7.6	8
Calcium	421,000	424,000	389,000	418,000	400,000	364,000	366,000	394,000	392,000	380,000	383,000	479,000	387,000
Chromium	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	0.81 J
Cobalt	32.4	31.2	30.1	34.7	27.2	28.4	28.1	30.9	31.4	30.9	28.5	27.5	29.2
Copper	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	518	524	1,050	526	4,090 J	9,030 J	7,240 J	504 J	1,330 J	2,100 J	2,120 J	783 J	901 J
Lead	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	1,340,000	1,390,000	1,330,000	1,320,000	1,310,000	1,260,000	1,240,000	1,260,000	1,280,000	1,280,000	1,320,000	1,020,000	1,280,000
Manganese	39.5	38.5	10 U	175	16.2	171	54.8	10 U	10 U	28	29.8	23.9	46.7
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	5 U	5 U	5 U	5 U	1.3 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Potassium	544,000 J	572,000 J	514,000 J	511,000 J	599,000 J	562,000 J	530,000 J	579,000 J	548,000 J	549,000 J	575,000 J	428,000 J	585,000 J
Selenium	2.3 J	5 U	5 U	5 U	5 U	5 U	5 U	2.6 J	5 U	5 U	5 U	5 U	5 U
Silver	5 U	5 U	5 U	0.68 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	10,200,000 J	10,500,000 J	9,980,000 J	9,910,000 J	10,900,000	10,200,000	9,860,000	10,200,000	10,200,000	10,100,000	10,500,000	8,470,000	10,400,000
Thallium	10 UJ	10 UJ	10 UJ	10 UJ	10 U	5 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	20 U	20 U	20 U	3 J	20 U	20 U	20 U	2.2 J	1.6 J	20 U	20 U	8.7 J	2.5 J
Zinc	4.7 J	5.1 J	6.4 J	6.7 J	9.9 J	20 U	20 U	20 U	7.7 J	10.7 J	20 U	7.3 J	20 U
Dissolved Metals (µg/l)													
Antimony, Dissolved	2.8 J	2.2 J	2.1 J	2.4 J	4.6 J	3.8 J	5.5 J	10 U	2.7 J	3.7 J	6.5 J	10 U	4.3 J
Arsenic, Dissolved	10 U	10 U	10 U	10 U	24.7	36.5	30.3	4.6 J	6.7 J	10.2	10.4	10 U	6.7 J
Barium, Dissolved	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Cadmium, Dissolved	8.9	8.3	8.9	9.4	8.8	8.4	8.3	8.2	9.1	8.4	8.7	7.1	8.1
Calcium, Dissolved	358,000	352,000	341,000	364,000	403,000	378,000	391,000	391,000	408,000	396,000	417,000	484,000	394,000
Chromium, Dissolved	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	2 J	10 U
Cobalt, Dissolved	31.6	31	31.5	33.3	30.3	29.3	28.8	30.1	32.5	30.7	31.9	26.4	29.5
Iron, Dissolved	345	322	852	383	3,700 J	7,490 J	7,330 J	384 J	1,140 J	2,010 J	2,100 J	358 J	721 J
Magnesium, Dissolved	1,210,000	1,200,000	1,210,000	1,250,000	1,320,000 J	1,270,000 J	1,280,000 J	1,260,000 J	1,360,000 J	1,310,000 J	1,340,000 J	1,020,000 J	1,240,000 J
Manganese, Dissolved	29.7	31.3	10 U	149	18.5 J	149 J	55.2 J	10 U	10 U	28.5 J	28.4 J	22.1 J	46.8 J
Nickel, Dissolved	1 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Potassium, Dissolved	520,000 J	527,000 J	561,000 J	537,000 J	547,000	523,000	555,000	535,000	568,000	546,000	551,000	417,000	502,000
Selenium, Dissolved	2.5 J	5 U	5 U	5 U	5 U	5 U	5 U	2.2 J	5 U	5 U	5 U	5 U	5 U
Sodium, Dissolved	9,560,000	9,630,000	9,900,000	9,900,000	10,100,000 J	9,690,000 J	9,910,000 J	9,720,000 J	10,400,000 J	10,000,000 J	10,100,000 J	8,190,000 J	9,580,000 J
Vanadium, Dissolved	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	7.6 J	1.9 J
Zinc, Dissolved	20 U	19.6 J	15.6 J	4.4 J	4.7 J	5.8 J	5.6 J	20 U	20 U	6.3 J	20 U	6.9 J	20 U

Notes:

Shading indicates detections

NA - Not analyzed

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

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Porewater Exceedance Results
May 2010

Station ID	Camp Lejeune Background WN 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May, 2010)	SDZ-WN02/SD02	SDZ-WN03/SD03	SDZ-WN06/SD06	SDZ-WN07/SD07	SDZ-WN10/SD10	SDZ-WN11/SD11	SDZ-WN12/SD12	SDZ-WN13/SD13	SDZ-WN14/SD14	SDZ-WN15/SD15	SDZ-WN16/SD16	SDZ-WN17/SD17	SDZ-WN18/SD18
Sample ID				SDZ-WN02-10B	SDZ-WN03-10B	SDZ-WN06-10B	SDZ-WN07-10B	SDZ-WN10-10B	SDZ-WN11-10B	SDZ-WN12-10B	SDZ-WN13-10B	SDZ-WN14-10B	SDZ-WN15-10B	SDZ-WN16-10B	SDZ-WN17-10B	SDZ-WN18-10B
Sample Date				05/07/10	05/06/10	05/03/10	05/03/10	05/07/10	05/10/10	05/10/10	05/10/10	05/10/10	05/10/10	05/08/10	05/05/10	05/08/10
Chemical Name																
Semivolatile Organic Compounds (µg/l)																
No Detections																
Explosives (µg/l)																
No Detections																
Total Metals (µg/l)																
Aluminum	442	--	3,700	200 U	**3,790 J**	3,330 J	424 J	**8,630 J**	1,620 J	180 J	80.9 J	1,660 J	657 J	104 J	215 J	88.3 J
Antimony	7.1	6	1.5	**4.4 J**	**2.7 J**	**4.2 J**	**4.2 J**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	13.5	10	0.045	10 U	**2.9 J**	**5.5 J**	**7.5 J**	**9 J**	10 U	10 U	10 U	**4.1 J**	10 U	**8.4 J**	10 U	10 U
Barium	200	700	730	200 U	18.4 J	16 J	200 U	19.9 J	16.8 J	200 U	200 U	200 U	18.2 J	200 U	200 U	200 U
Beryllium	4.3	4	7.3	5 U	2.3 J	1.6 J	5 U	0.79 J	5 U	5 U	5 U	5 U	5 U	5 U	2 J	5 U
Cadmium	16	2	1.8	5 U	**5.1**	**7.7**	**7**	**9.3**	**9**	**8.9**	**8.9**	**9.4**	**10.2**	**8.8**	**8.3**	**8.8**
Calcium	832,667	--	--	5,000 U	258,000	388,000	414,000	401,000	506,000	478,000	395,000	488,000	556,000	425,000	426,000	449,000
Chromium	7.2	10	0.043	10 U	10 U	**17.1**	10 U	**22.6**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cobalt	58.4	--	1.1	5 U	**19**	**28.2**	**26.5**	**32.5**	**34**	**34**	**32**	**34.4**	**37.1**	**31.7**	**30.7**	**31.3**
Copper	5	1,000	150	5 U	1.3 J	5 U	5 U	1.7 J+	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	2,536	300	2,600	14.1 J	**3,310 J**	**3,310 J**	945 J	**7,540**	1,680	594	734	2,420	1,510	2,160	594 J	2,070
Lead	3	15	15	3 U	3.7	3 U	3 U	4.6	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	2,413,333	--	--	5,000 U	840,000	1,250,000	1,320,000	1,280,000	1,240,000	1,310,000	1,340,000	1,310,000	1,430,000	1,350,000	1,280,000	1,230,000
Manganese	66.9	50	88	10 U	23.3	10 U	10 U	44.2	**137**	83.6	10 U	34.4	**140**	10 U	10 U	31
Mercury	0.2	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.091 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	5	100	73	5 U	4 J	9.9	5 U	9.7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Potassium	1,058,667	--	--	5,000 U	347,000 J	554,000 J	557,000 J	508,000 J	501,000 J	537,000 J	552,000 J	506,000 J	656,000 J	521,000 J	565,000 J	505,000 J
Selenium	5	20	18	5 U	5 U	5 U	5 U	5 U	3.1 J+	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	5	20	18	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	19,580,000	--	--	5,000 U	6,990,000	9,990,000	10,300,000	9,730,000 J	9,510,000	9,990,000	10,300,000	9,940,000	11,400,000	10,100,000 J	10,300,000	9,700,000 J
Thallium	10	2	--	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 UJ
Vanadium	14.1	--	18	20 U	11.8 J	10.2 J	4.3 J	**22**	5.3 J	1.5 J	2.1 J	5.9 J	2.9 J	1.8 J	1.5 J	1.6 J
Zinc	18.7	1,000	1,100	22.9	13.3 J	11.1 J	9.3 J	20.9	8.7 J	20 U	20 U	10.6 J	5.7 J	4.5 J	20 U	10.9 J
Dissolved Metals (µg/l)																
Antimony, Dissolved	10.5	6	1.5	**7.4 J**	**4.9 J**	10 U	10 U	**5.4 J**	10 U	10 U	10 U	10 U	10 U	**5.8 J**	**5.5 J**	**6.5 J**
Arsenic, Dissolved	14.7	10	0.045	10 U	**9.3 J**	**2.9 J**	**5.2 J**	**3.7 J**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Barium, Dissolved	200	700	730	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	15.3 J	200 U	200 U	200 U
Cadmium, Dissolved	15.9	2	1.8	5 U	**6**	**8.2**	**8.1**	**8.6**	**7.9**	**7.6**	**8.2**	**8.2**	**8.2**	**9.2**	**8.5**	**8.5**
Calcium, Dissolved	863,333	--	--	25,200	295,000	388,000	440,000	395,000	468,000	420,000	396,000	426,000	488,000	354,000	449,000	459,000
Chromium, Dissolved	8	10	0.043	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**0.81 J**	10 U	10 U	10 U
Cobalt, Dissolved	58.5	--	1.1	5 U	**21.5**	**30**	**29.6**	**31.6**	**29.3**	**28.2**	**30.1**	**29.4**	**30.3**	**31.1**	**32**	**31.7**
Iron, Dissolved	2,119	300	2,600	100 U	224 J	423 J	534 J	454 J	415	473	817	431	909	1,680	461 J	1,860 J
Magnesium, Dissolved	2,400,000	--	--	29,400 J	881,000 J	1,180,000 J	1,350,000 J	1,270,000 J	1,170,000	1,180,000	1,290,000	1,190,000	1,280,000	1,180,000	1,330,000 J	1,240,000 J
Manganese, Dissolved	64.9	50	88	10 U	32.2 J	10 U	10 U	10 U	**125**	78.7	10 U	18.2	**127**	10 U	10 U	27.1 J
Nickel, Dissolved	5	100	73	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.7 J	1.3 J	5 U	5 U
Potassium, Dissolved	980,000	--	--	22,100	345,000	499,000	561,000	557,000	472,000 J	481,000 J	537,000 J	469,000 J	521,000 J	523,000 J	564,000	497,000
Selenium, Dissolved	5	20	18	5 U	5 U	5 U	5 U	4.5 J	5 U	5 U	5 U	5 U	5 U	5 U	2.3 J	5 U
Sodium, Dissolved	18,580,000	--	--	219,000 J	7,040,000 J	9,170,000 J	10,200,000 J	10,100,000 J	9,040,000	9,130,000	9,960,000	9,260,000	9,700,000	9,600,000	10,300,000 J	9,680,000 J
Vanadium, Dissolved	13	--	18	20 U	7.9 J	2.1 J	3.1 J	3.4 J	2.5 J	1.9 J	1.8 J	1.7 J	1.9 J	20 U	20 U	1.6 J
Zinc, Dissolved	15.5	1,000	1,100	4.4 J	20 U	4.6 J	20 U	20 U	20 U	6.2 J	20 U	20 U	5.6 J	20 U	20 U	20 U

Notes:

Bold box indicates exceedance of NC2LGW or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

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

* - The MCL-Groundwater value is reported in place of the NC2LGW where the MCL value is more conservative.

Shading indicates exceedance of two times the mean base background concentration for pore water

NA - Not analyzed

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

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Porewater Exceedance Results
May 2010

Station ID	Camp Lejeune Background WN 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May, 2010)	SDZ-WN19/SD19		SDZ-WN20/SD20		SDZ-WN21/SD21	SDZ-WN22/SD22	SDZ-WN23/SD23	SDZ-WN24/SD24	SDZ-WN25/SD25	SDZ-WN26/SD26	SDZ-WN27/SD27	SDZ-WN28/SD28	
Sample ID				SDZ-WN19-10B	SDZ-WN19D-10B	SDZ-WN20-10B	SDZ-WN20D-10B	SDZ-WN21-10B	SDZ-WN22-10B	SDZ-WN23-10B	SDZ-WN24-10B	SDZ-WN25-10B	SDZ-WN26-10B	SDZ-WN27-10B	SDZ-WN28-10B	SDZ-WN28D-10B
Sample Date				05/08/10	05/08/10	05/08/10	05/08/10	05/08/10	05/05/10	05/05/10	05/04/10	05/04/10	05/04/10	05/04/10	05/05/10	05/05/10
Chemical Name																
Semivolatile Organic Compounds (µg/l)																
No Detections																
Explosives (µg/l)																
No Detections																
Total Metals (µg/l)																
Aluminum	442	--	3,700	161 J	297 J	200 U	200 U	35.3 J	52.1 J	57.1 J	295 J	200 U	200 U	200 U	200 U	200 U
Antimony	7.1	6	1.5	10 U	10 U	10 U	10 U	10 U	10 U	**4.2 J**	5 U	10 U	**4 J**	**2.3 J**	10 U	**2.1 J**
Arsenic	13.5	10	0.045	10 U	10 U	**3.1 J**	**2.7 J**	**6.8 J**	**7.1 J**	**27.2**	**39.6**	**31.9**	**5.7 J**	10 U	**10.3**	**10.9**
Barium	200	700	730	16.2 J	15.9 J	200 U	200 U	200 U	200 U	200 U	200 U	200 U	15.4 J	200 U	200 U	200 U
Beryllium	4.3	4	7.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.9 J	5 U	5 U	5 U	5 U	2.1 J
Cadmium	16	2	1.8	**9.6**	**9.5**	**8.7**	**8.3**	**8.4**	**9.3**	**7.5**	**8.1**	**8.1**	**8.2**	**8.3**	**8.4**	**7.8**
Calcium	832,667	--	--	494,000	508,000	421,000	424,000	389,000	418,000	400,000	364,000	366,000	394,000	392,000	380,000	383,000
Chromium	7.2	10	0.043	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cobalt	58.4	--	1.1	**36.3**	**34.9**	**32.4**	**31.2**	**30.1**	**34.7**	**27.2**	**28.4**	**28.1**	**30.9**	**31.4**	**30.9**	**28.5**
Copper	5	1,000	150	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	2,536	300	2,600	654	930	518	524	1,050	526	**4,090 J**	**9,030 J**	**7,240 J**	504 J	1,330 J	2,100 J	2,120 J
Lead	3	15	15	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	2,413,333	--	--	1,420,000	1,400,000	1,340,000	1,390,000	1,330,000	1,320,000	1,310,000	1,260,000	1,240,000	1,260,000	1,280,000	1,280,000	1,320,000
Manganese	66.9	50	88	10 U	10 U	39.5	38.5	10 U	**175**	16.2	**171**	54.8	10 U	10 U	28	29.8
Mercury	0.2	1	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	5	100	73	5 U	5 U	5 U	5 U	5 U	5 U	1.3 J	5 U	5 U	5 U	5 U	5 U	5 U
Potassium	1,058,667	--	--	565,000 J	550,000 J	544,000 J	572,000 J	514,000 J	511,000 J	599,000 J	562,000 J	530,000 J	579,000 J	548,000 J	549,000 J	575,000 J
Selenium	5	20	18	5 U	5 U	2.3 J	5 U	5 U	5 U	5 U	5 U	5 U	2.6 J	5 U	5 U	5 U
Silver	5	20	18	5 U	5 U	5 U	5 U	5 U	0.68 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	19,580,000	--	--	11,400,000 J	10,400,000 J	10,200,000 J	10,500,000 J	9,980,000 J	9,910,000 J	10,900,000	10,200,000	9,860,000	10,200,000	10,200,000	10,100,000	10,500,000
Thallium	10	2	--	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U	5 J	10 U	10 U	10 U	10 U	10 U
Vanadium	14.1	--	18	3.2 J	3.7 J	20 U	20 U	20 U	3 J	20 U	20 U	20 U	2.2 J	1.6 J	20 U	20 U
Zinc	18.7	1,000	1,100	20 U	20 U	4.7 J	5.1 J	6.4 J	6.7 J	9.9 J	20 U	20 U	20 U	7.7 J	10.7 J	20 U
Dissolved Metals (µg/l)																
Antimony, Dissolved	10.5	6	1.5	**3.1 J**	**4.2 J**	**2.8 J**	**2.2 J**	**2.1 J**	**2.4 J**	**4.6 J**	**3.8 J**	**5.5 J**	10 U	**2.7 J**	**3.7 J**	**6.5 J**
Arsenic, Dissolved	14.7	10	0.045	10 U	10 U	10 U	10 U	10 U	10 U	**24.7**	**36.5**	**30.3**	**4.6 J**	**6.7 J**	**10.2**	**10.4**
Barium, Dissolved	200	700	730	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Cadmium, Dissolved	15.9	2	1.8	**9.5**	**9.2**	**8.9**	**8.3**	**8.9**	**9.4**	**8.8**	**8.4**	**8.3**	**8.2**	**9.1**	**8.4**	**8.7**
Calcium, Dissolved	863,333	--	--	433,000	415,000	358,000	352,000	341,000	364,000	403,000	378,000	391,000	391,000	408,000	396,000	417,000
Chromium, Dissolved	8	10	0.043	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cobalt, Dissolved	58.5	--	1.1	**35.1**	**33.5**	**31.6**	**31**	**31.5**	**33.3**	**30.3**	**29.3**	**28.8**	**30.1**	**32.5**	**30.7**	**31.9**
Iron, Dissolved	2,119	300	2,600	477	434	345	322	852	383	**3,700 J**	**7,490 J**	**7,330 J**	384 J	1,140 J	2,010 J	2,100 J
Magnesium, Dissolved	2,400,000	--	--	1,300,000	1,240,000	1,210,000	1,200,000	1,210,000	1,250,000	1,320,000 J	1,270,000 J	1,280,000 J	1,260,000 J	1,360,000 J	1,310,000 J	1,340,000 J
Manganese, Dissolved	64.9	50	88	10 U	10 U	29.7	31.3	10 U	**149**	18.5 J	**149 J**	55.2 J	10 U	10 U	28.5 J	28.4 J
Nickel, Dissolved	5	100	73	1.4 J	1.2 J	1 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Potassium, Dissolved	980,000	--	--	602,000 J	550,000 J	520,000 J	527,000 J	561,000 J	537,000 J	547,000	523,000	555,000	535,000	568,000	546,000	551,000
Selenium, Dissolved	5	20	18	5 U	5 U	2.5 J	5 U	5 U	5 U	5 U	5 U	5 U	2.2 J	5 U	5 U	5 U
Sodium, Dissolved	18,580,000	--	--	10,500,000	9,940,000	9,560,000	9,630,000	9,900,000	9,900,000	10,100,000 J	9,690,000 J	9,910,000 J	9,720,000 J	10,400,000 J	10,000,000 J	10,100,000 J
Vanadium, Dissolved	13	--	18	1.9 J	2 J	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Zinc, Dissolved	15.5	1,000	1,100	20 U	20 U	20 U	19.6 J	15.6 J	4.4 J	4.7 J	5.8 J	5.6 J	20 U	20 U	6.3 J	20 U

Notes:

Bold box indicates exceedance of NC2LGW or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

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

* - The MCL-Groundwater value is reported in place of the NC2LGW where the MCL value is more conservative.

Shading indicates exceedance of two times the mean base background concentration for pore water

NA - Not analyzed

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

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

CTO-80
Surface Danger Zone
Validated Porewater Exceedance Results
May 2010

Station ID Sample ID Sample Date	Camp Lejeune Background WN 2X Mean	NC2LGW (January, 2010) *	Adjusted Tap Water RSLs (May, 2010)	SDZ-WN29/SD29 SDZ-WN29-10B 05/04/10	SDZ-WN30/SD30 SDZ-WN30-10B 05/06/10
Chemical Name					
Semivolatile Organic Compounds (µg/l)					
No Detections					
Explosives (µg/l)					
No Detections					
Total Metals (µg/l)					
Aluminum	442	--	3,700	463 J	200 U
Antimony	7.1	6	1.5	10 U	**3.6 J**
Arsenic	13.5	10	0.045	10 U	**4.4 J**
Barium	200	700	730	200 U	200 U
Beryllium	4.3	4	7.3	5 U	1.8 J
Cadmium	16	2	1.8	**7.6**	**8**
Calcium	832,667	--	--	479,000	387,000
Chromium	7.2	10	0.043	10 U	**0.81 J**
Cobalt	58.4	--	1.1	**27.5**	**29.2**
Copper	5	1,000	150	5 U	5 U
Iron	2,536	300	2,600	783 J	901 J
Lead	3	15	15	3 U	3 U
Magnesium	2,413,333	--	--	1,020,000	1,280,000
Manganese	66.9	50	88	23.9	46.7
Mercury	0.2	1	1.1	0.2 U	0.2 U
Nickel	5	100	73	5 U	5 U
Potassium	1,058,667	--	--	428,000 J	585,000 J
Selenium	5	20	18	5 U	5 U
Silver	5	20	18	5 U	5 U
Sodium	19,580,000	--	--	8,470,000	10,400,000
Thallium	10	2	--	10 U	10 U
Vanadium	14.1	--	18	8.7 J	2.5 J
Zinc	18.7	1,000	1,100	7.3 J	20 U
Dissolved Metals (µg/l)					
Antimony, Dissolved	10.5	6	1.5	10 U	**4.3 J**
Arsenic, Dissolved	14.7	10	0.045	10 U	**6.7 J**
Barium, Dissolved	200	700	730	200 U	200 U
Cadmium, Dissolved	15.9	2	1.8	**7.1**	**8.1**
Calcium, Dissolved	863,333	--	--	484,000	394,000
Chromium, Dissolved	8	10	0.043	**2 J**	10 U
Cobalt, Dissolved	58.5	--	1.1	**26.4**	**29.5**
Iron, Dissolved	2,119	300	2,600	358 J	721 J
Magnesium, Dissolved	2,400,000	--	--	1,020,000 J	1,240,000 J
Manganese, Dissolved	64.9	50	88	22.1 J	46.8 J
Nickel, Dissolved	5	100	73	5 U	5 U
Potassium, Dissolved	980,000	--	--	417,000	502,000
Selenium, Dissolved	5	20	18	5 U	5 U
Sodium, Dissolved	18,580,000	--	--	8,190,000 J	9,580,000 J
Vanadium, Dissolved	13	--	18	7.6 J	1.9 J
Zinc, Dissolved	15.5	1,000	1,100	6.9 J	20 U

Notes:

Bold box indicates exceedance of NC2LGW or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

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

* - The MCL-Groundwater value is reported in place of the NC2LGW where the MCL value is more conservative.

Shading indicates exceedance of two times the mean base background concentration for pore water

NA - Not analyzed

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

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

µg/l - Micrograms per liter

Appendix J
Human Health Risk Assessment Tables

Table 2.1

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

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

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

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 Used for Screening [2]	Background Value [3]	Screening Toxicity Value [4]		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection [5]
Surface Soil	121-14-2	2,4-Dinitrotolu	ND	ND	MG/KG		0/74	1.2 - 1.5	1.5E+00		1.6E+00	C*	N/A	N/A	NO	DLBSL
	606-20-2	2,6-Dinitrotolu	ND	ND	MG/KG		0/74	1.2 - 3	3.0E+00		6.1E+00	N	N/A	N/A	NO	DLBSL
	98-95-3	Nitrobenzene	ND	ND	MG/KG		0/74	0.62 - 1.5	1.5E+00		4.8E+00	C*	N/A	N/A	NO	DLBSL
	99-35-4	1,3,5-Trinitrob	ND	ND	MG/KG		0/74	0.62 - 1.5	1.5E+00		2.2E+02	N	N/A	N/A	NO	DLBSL
	99-65-0	1,3-Dinitrober	ND	ND	MG/KG		0/74	0.62 - 1.5	1.5E+00		6.1E-01	N	N/A	N/A	YES	DLASL
	118-96-7	2,4,6-Trinitrot	ND	ND	MG/KG		0/74	0.62 - 1.5	1.5E+00		3.6E+00	C**	N/A	N/A	NO	DLBSL
	35572-78-2	2-Amino-4,6-d	ND	ND	MG/KG		0/74	1.2 - 1.5	1.5E+00		1.5E+01	N	N/A	N/A	NO	DLBSL
	88-72-2	2-Nitrotoluene	ND	ND	MG/KG		0/74	1.2 - 3	3.0E+00		2.9E+00	C*	N/A	N/A	YES	DLASL
	99-08-1	3-Nitrotoluene	ND	ND	MG/KG		0/74	1.2 - 3	3.0E+00		6.1E-01	N	N/A	N/A	YES	DLASL
	19406-51-0	4-Amino-2,6-d	ND	ND	MG/KG		0/74	1.2 - 1.5	1.5E+00		1.5E+01	N	N/A	N/A	NO	DLBSL
	99-99-0	4-Nitrotoluene	ND	ND	MG/KG		0/74	1.2 - 3	3.0E+00		2.4E+01	C**	N/A	N/A	NO	DLBSL
	2691-41-0	HMX	ND	ND	MG/KG		0/74	0.62 - 1.5	1.5E+00		3.8E+02	N	N/A	N/A	NO	DLBSL
	55-63-0	Nitroglycerin	ND	ND	MG/KG		0/74	4 - 4	4.0E+00		6.1E-01	N	N/A	N/A	YES	DLASL
	14797-73-0	Perchlorate	ND	ND	MG/KG		0/74	0.002 - 0.007	7.6E-03		5.5E+00	N	N/A	N/A	NO	DLBSL
	78-11-5	PETN	ND	ND	MG/KG		0/74	2.5 - 2.5	2.5E+00		N/A		N/A	N/A	NO	NTX
	121-82-4	RDX	ND	ND	MG/KG		0/74	0.62 - 1.5	1.5E+00		5.5E+00	C*	N/A	N/A	NO	DLBSL
	479-45-8	Tetryl [6]	ND	ND	MG/KG		0/74	0 - 0	0.0E+00		2.4E+01	N	N/A	N/A	NO	DLBSL
	7429-90-5	Aluminum	1.6E+02	7.8E+03	MG/KG	CW-SS13-10A	74/74	18.6 - 54.2	7.8E+03	NSD	7.7E+03	N	N/A	N/A	NO	BBK
	7440-36-0	Antimony	3.0E-01 J	1.1E+00	MG/KG	BI-SS13-10A : BI-SS15-10A : BI-SS20-10A : BI-SS23-10A : BI-SS47-10A	18/74	0.93 - 2.7	1.1E+00	NSD	3.1E+00	N	N/A	N/A	NO	BSL
	7440-38-2	Arsenic	3.3E-01 J	9.2E+00	MG/KG	SI-SS01D-10A	39/74	0.93 - 2.7	9.2E+00	NSD	3.9E-01	C*	5.8E+00	Csoil	NO	BBK
	7440-39-3	Barium	9.4E-01 J	9.3E+00 J	MG/KG	CW-SS09-10A	48/74	18.6 - 54.2	9.3E+00	NSD	1.5E+03	N	5.8E+02	Csoil	NO	BSL
	7440-41-7	Beryllium	2.0E-02 J	7.1E-01	MG/KG	CW-SS05-10A	15/74	0.47 - 1.4	7.1E-01	NSD	1.6E+01	N	N/A	N/A	NO	BSL
	7440-43-9	Cadmium	4.0E-02 J	1.1E+00 J-	MG/KG	CW-SS05-10A	5/74	0.47 - 1.4	1.1E+00	Site > Bkgd	7.0E+00	N	3.0E+00	Csoil	NO	BSL
	7440-70-2	Calcium	5.7E+02	2.2E+04	MG/KG	CW-SS12-10A	70/74	466 - 1350	2.2E+04	NSD	N/A		N/A	N/A	NO	NUT
	7440-47-3	Chromium	2.0E+00	2.2E+01	MG/KG	CW-SS13-10A	74/74	0.93 - 2.7	2.2E+01	NSD	2.9E-01	C	3.8E+00	Csoil	NO	BBK
	7440-48-4	Cobalt	8.0E-02 J	1.8E+00	MG/KG	CW-SS13-10A	23/74	0.47 - 1.4	1.8E+00	NSD	2.3E+00	N	N/A	N/A	NO	BSL
	7440-50-8	Copper	1.5E-01 J	1.8E+01	MG/KG	SI-SS01D-10A	43/74	0.47 - 1.4	1.8E+01	NSD	3.1E+02	N	7.0E+02	Csoil	NO	BSL
	7439-89-6	Iron	2.9E+02	1.0E+04	MG/KG	CW-SS13-10A	74/74	9.3 - 27.1	1.0E+04	NSD	5.5E+03	N	1.5E+02	Csoil	NO	BBK
	7439-92-1	Lead	1.1E+00 J	2.1E+01	MG/KG	CW-SS15-10A	74/74	0.28 - 0.81	2.1E+01	NSD	4.0E+02	N	2.7E+02	Csoil	NO	BSL
	7439-95-4	Magnesium	5.2E+01 J	5.5E+03	MG/KG	CW-SS11-10A	36/74	466 - 1350	5.5E+03	NSD	N/A		N/A	N/A	NO	NUT
	7439-96-5	Manganese	2.0E+00	9.2E+01	MG/KG	CW-SS13-10A	74/74	0.93 - 2.7	9.2E+01	NSD	1.8E+02	N	6.5E+01	Csoil	NO	BSL
	7439-97-6	Mercury	1.9E-02 J	1.7E-01	MG/KG	1-10A : ICW-S	15/74	0.03 - 0.094	1.7E-01	NSD	2.3E+00	N	1.0E+00	Csoil	NO	BSL
	7440-02-0	Nickel	1.3E-01 J	5.6E+00	MG/KG	CW-SS13-10A	49/74	0.48 - 5.6	5.6E+00	NSD	1.5E+02	N	1.3E+02	Csoil	NO	BSL

Table 2.1

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

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

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration	Minimum [1] Qualifier	Maximum [1] Concentration	Maximum [1] Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening [2]	Background Value [3]	Screening Toxicity Value [4]		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection [5]
	7440-09-7	Potassium	3.1E+01	J	1.8E+03	J	MG/KG	CW-SS13-10A	49/74	466 - 1350	1.8E+03	NSD	N/A		N/A	N/A	NO	NUT
	7782-49-2	Selenium	4.9E-01	J-	1.1E+00	J-	MG/KG	CW-SS13-10A	5/59	0.47 - 1.3	1.1E+00	NSD	3.9E+01	N	2.1E+00	Csoil	NO	BSL
	7440-22-4	Silver	3.5E-01	J	3.5E-01	J	MG/KG	CW-SS05-10A	1/74	0.47 - 1.4	3.5E-01	NSD	3.9E+01	N	3.4E+00	Csoil	NO	BSL
	7440-23-5	Sodium	1.1E+02	J	3.1E+03		MG/KG	CW-SS13-10A	25/74	466 - 1350	3.1E+03	NSD	N/A		N/A	N/A	NO	NUT
	7440-28-0	Thallium	ND		ND		MG/KG		0/74	0.93 - 2.7	2.7E+00	NA	N/A		N/A	N/A	NO	NTX
	7440-62-2	Vanadium	9.2E-01	J	2.1E+01		MG/KG	CW-SS13-10A	52/74	1.9 - 5.4	2.1E+01	NSD	3.9E+01	N	N/A	N/A	NO	BSL
	7440-66-6	Zinc	2.0E+00	J	5.3E+01		MG/KG	CW-SS13-10A	72/74	1.9 - 5.4	5.3E+01	NSD	2.3E+03	N	1.2E+03	Csoil	NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Central tendency background comparison performed (see report Section 4.3). Results of comparison presented here.

[4] Oak Ridge National Laboratory (ORNL). May, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
http://epa-prgs.ornl.gov/chemicals/index.shtml
Residential Soil RSL, RSL based on non-cancer divided by 10.
RSL value for chromium(VI) used as surrogate for chromium.
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.
RSL value for manganese (water) used as surrogate for manganese.
RSL value for mercury (inorganic salts) used as surrogate for mercury.

[5] Rationale Codes

Selection Reason:
- Above Screening Level (ASL)
- Detection Limit Above Screening Level (DLASL)

Deletion Reason:
- No Toxicity Information (NTX)
- Essential Nutrient (NUT)
- Below Screening Level (BSL)
- Detection Limit Below Screening Level (DLBSL)
- Below Background (BBK)

[6] All data for tetryl were R-qualified (rejected).

COPC = Chemical of Potential Concern

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

J = Estimated Value

J- = Analyte present. Value may be biased low, actual value may be higher.

C = Carcinogenic

C* = N screening level < 100x C screening level, therefore N screening value used as screening level

C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level

N = Noncarcinogenic

Csoil = Federal Remediation Branch Target Screening Values, calculated source concentration for soil which is protective of groundwater, January 2010

MG/KG = Milligrams per kilogram

NSD = No Statistical Difference Between Site and Background Concentration

Site > Bkgd = Site concentration exceeds background concentration

Table 2.2

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

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

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 Water	121-14-2	2,4-Dinitrotoluene	ND	ND	UG/L		0/5	2.5 - 2.5	2.5E+00		3.4E+00 A			NO	DLBSL
	606-20-2	2,6-Dinitrotoluene	ND	ND	UG/L		0/5	2.5 - 2.5	2.5E+00		3.7E+00 R-n			NO	DLBSL
	98-95-3	Nitrobenzene	ND	ND	UG/L		0/5	2.5 - 2.5	2.5E+00		6.9E+02 A			NO	DLBSL
	99-35-4	1,3,5-Trinitrobenzene	ND	ND	UG/L		0/5	2.5 - 2.5	2.5E+00		1.1E+02 R-n			NO	DLBSL
	99-65-0	1,3-Dinitrobenzene	ND	ND	UG/L		0/5	2.5 - 2.5	2.5E+00		3.7E-01 R-n			YES	DLASL
	118-96-7	2,4,6-Trinitrotoluene	ND	ND	UG/L		0/5	2.5 - 2.5	2.5E+00		1.8E+00 R-c**			YES	DLASL
	35572-78-2	2-Amino-4,6-dinitrotoluene	ND	ND	UG/L		0/5	5 - 5	5.0E+00		7.3E+00 R-n			NO	DLBSL
	88-72-2	2-Nitrotoluene	ND	ND	UG/L		0/5	5 - 5	5.0E+00		3.1E-01 R-c			YES	DLASL
	99-08-1	3-Nitrotoluene	ND	ND	UG/L		0/5	5 - 5	5.0E+00		3.7E-01 R-n			YES	DLASL
	19406-51-0	4-Amino-2,6-dinitrotoluene	ND	ND	UG/L		0/5	5 - 5	5.0E+00		7.3E+00 R-n			NO	DLBSL
	99-99-0	4-Nitrotoluene	ND	ND	UG/L		0/5	5 - 5	5.0E+00		4.2E+00 R-c*			YES	DLASL
	2691-41-0	HMX	ND	ND	UG/L		0/5	2.5 - 2.5	2.5E+00		1.8E+02 R-n			NO	DLBSL
	55-63-0	Nitroglycerin	ND	ND	UG/L		0/5	16 - 16	1.6E+01		3.7E-01 R-n			YES	DLASL
	14797-73-0	Perchlorate	8.0E-02 J	8.0E-02 J	UG/L	SDZ-SW03-10B : SDZ-SW06-10B	2/5	0.2 - 0.2	8.0E-02		2.6E+00 R-n			NO	BSL
	78-11-5	PETN	ND	ND	UG/L		0/5	10 - 10	1.0E+01		N/A			NO	NTX
	121-82-4	RDX	ND	ND	UG/L		0/5	4 - 4	4.0E+00		6.1E-01 R-c			YES	DLASL
	479-45-8	Tetryl	ND	ND	UG/L		0/5	5 - 5	5.0E+00		1.5E+01 R-n			NO	DLBSL
	7429-90-5	Aluminum	7.0E+01 J	6.3E+02 J	UG/L	SDZ-SW06-10B	5/5	200 - 200	6.3E+02	2.9E+02	3.7E+03 R-n			NO	BSL
	7440-36-0	Antimony	5.2E+00 J	5.2E+00 J	UG/L	SDZ-SW02-10B	1/5	10 - 10	5.2E+00		6.4E+02 A			NO	BSL
	7440-38-2	**Arsenic**	**3.7E+00 J**	**3.7E+00 J**	**UG/L**	**SDZ-SW01-10B**	**1/5**	**10 - 10**	**3.7E+00**		**1.4E-01 A**	**1.0E+01**	**N**	**YES**	**ASL**
	7440-39-3	Barium	1.9E+01 J	1.9E+01 J	UG/L	SDZ-SW06-10B	1/5	200 - 200	1.9E+01		7.3E+02 R-n			NO	DLBSL
	7440-41-7	Beryllium	ND	ND	UG/L		0/5	5 - 5	5.0E+00	7.3E-01	7.3E+00 R-n			NO	DLBSL
	7440-43-9	**Cadmium**	**6.5E-01 J**	**9.0E+00**	**UG/L**	**SDZ-SW01D-10B**	**5/5**	**5 - 5**	**9.0E+00**	**8.5E+00**	**5.0E+00 M**			**YES**	**ASL**
	7440-70-2	Calcium	4.3E+04	4.4E+05	UG/L	SDZ-SW01D-10B	5/5	5000 - 5000	4.4E+05	4.1E+05	N/A			NO	NUT
	7440-47-3	Chromium	ND	ND	UG/L		0/5	10 - 10	1.0E+01		1.0E+02 M			NO	DLBSL
	7440-48-4	Cobalt	2.2E+00 J	3.3E+01	UG/L	SDZ-SW01D-10B	5/5	5 - 5	3.3E+01	3.1E+02	1.1E+00 R-n			NO	BBK
	7440-50-8	Copper	5.0E+00 J+	5.0E+00 J+	UG/L	SDZ-SW06-10B	1/5	5 - 5	5.0E+00		1.0E+03 M			NO	BSL
	7439-89-6	**Iron**	**5.1E+02**	**1.0E+03**	**UG/L**	**SDZ-SW06-10B**	**5/5**	**100 - 100**	**1.0E+03**	**6.1E+02**	**3.0E+02 A**			**YES**	**ASL**
	7439-92-1	Lead	2.1E+00 J	2.1E+00 J	UG/L	SDZ-SW06-10B	1/5	3 - 3	2.1E+00		1.5E+01 M			NO	BSL
	7439-95-4	Magnesium	7.2E+04	1.4E+06	UG/L	SDZ-SW01-10B	5/5	5000 - 75000	1.4E+06	1.3E+06	N/A			NO	NUT
	7439-96-5	Manganese	1.1E+01	1.1E+01	UG/L	SDZ-SW06-10B	1/5	10 - 10	1.1E+01		1.0E+02 A			NO	BSL
	7439-97-6	Mercury	ND	ND	UG/L		0/5	0.2 - 0.2	2.0E-01		1.1E+00 R-n			NO	DLBSL
	7440-02-0	Nickel	ND	ND	UG/L		0/5	5 - 5	5.0E+00		4.6E+03 A			NO	DLBSL
	7440-09-7	Potassium	3.2E+04 J	5.9E+05 J	UG/L	SDZ-SW01-10B	5/5	5000 - 75000	5.9E+05	5.7E+05	N/A			NO	NUT
	7782-49-2	Selenium	3.3E+00 J	3.3E+00 J	UG/L	SDZ-SW02-10B	1/5	5 - 5	3.3E+00		4.2E+03 A			NO	BSL
	7440-22-4	Silver	ND	ND	UG/L		0/5	5 - 5	5.0E+00		1.8E+01 R-n			NO	DLBSL

Table 2.2

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

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

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
	7440-23-5	Sodium	5.8E+05 J	1.1E+07 J	UG/L	SDZ-SW01-10B	5/5	5000 - 100000	1.1E+07	1.1E+07	N/A			NO	NUT
	7440-28-0	Thallium	ND	ND	UG/L		0/5	10 - 10	1.0E+01		4.7E-01 A			YES	DLASL
	7440-62-2	Vanadium	2.1E+00 J	3.5E+00 J	UG/L	SDZ-SW01D-10B : SDZ-SW03-10B	5/5	20 - 20	3.5E+00	3.8E+00	1.8E+01 R-n			NO	BSL
	7440-66-6	Zinc	5.9E+00 J	7.1E+00 J	UG/L	SDZ-SW01D-10B	2/5	20 - 20	7.1E+00		2.6E+04 A			NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values from sample SDZ-SW05

[4] North Carolina WQS for Human Health, National Recommended Water Quality Criteria, Consumption of Organisms, or USEPA Regional Screening Levels for Tap Water.

[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)

COPC = Chemical of Potential Concern

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

J = Estimated Value

J+ = Analyte present. Value may be biased high, actual value may be lower.

N = North Carolina 15A NCAC 2B Human Health, Amended Feb. 2010.

A= National Recommended Water Quality Criteria, Consumption of Organisms, or if not availabile, Consumption of Water and Organism

M = Safe Drinking Water Act Maximum Contaminant Level (MCL), since the National Recommended Water Quality Criteria (NR) refers to the MCL, value is the MCL.

R-n = USEPA Regional Screening Level, noncarcinogenic (therefore, RSL divided by 10, see text)

R-c = USEPA Regional Screening Level, Carcinogenic

R-c* = R-n screening level < 100x R-c screening level

R-c** = R-n screening level < 10x R-c screening level, therefore R-n screening value/10 used as screening level

N/A = Not available

AL = Action Level from Safe Drinking Water Act.

Generated by: Debbie Stannard/WDC Checked by: Geanine Howard-Peebles/DAY

Table 2.2a

Risk Ratio Screening for Surface Water, Maximum Detected Concentration

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample	Screening Level	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Index[b]	Target Organ
Metals (ug/L)								
Arsenic	**1 / 5**	**3.7E+00 J**	**SDZ-SW01-10B**	**4.5E-02**	**1E-06**	**NA**	**8E-05**	**NA**
Cadmium	5 / 5	9.0E+00	SDZ-SW01D-10B	1.8E+01	1	0.5	N/A	Blood
Iron	5 / 5	1.0E+03	SDZ-SW06-10B	2.6E+04	1	0.04	N/A	Gastrointestinal
Cumulative Corresponding Hazard Index[c]						**0.5**		
Cumulative Corresponding Cancer Risk[d]							**8E-05**	

Total Gastrointestinal HI =	0.04
Total Blood HI =	0.5

Screening level used for Step 2, risk ratio evaluation is the Tap Water RSL, May 2010. The North Carolina WQS for Human Health and Federal Ambient Water Quality Criteria are not risk-based, and are not appropriate for use in Step 2.

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

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the SL 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 = Constituent of Potential Concern

HI = Hazard Index

ug/L = micrograms per liter

N/A = Not available/not applicable.

Generated by: Debbie Stannard/WDC Checked by: Geanine Howard-Peebles/DAY

Table 2.3

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Scenario Timeframe: Current/Future
Medium: Pore Water
Exposure Medium: Pore Water

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
Pore Water	121-14-2	2,4-Dinitrotoluene	ND	ND	UG/L		0/22	2.5 - 2.5	2.5E+00	N/A	3.4E+00 A			NO	DLBSL
	606-20-2	2,6-Dinitrotoluene	ND	ND	UG/L		0/22	2.5 - 2.5	2.5E+00	N/A	3.7E+00 R-n			NO	DLBSL
	98-95-3	Nitrobenzene	ND	ND	UG/L		0/22	2.5 - 2.5	2.5E+00	N/A	6.9E+02 A			NO	DLBSL
	99-35-4	1,3,5-Trinitrobenzene	ND	ND	UG/L		0/22	2.5 - 2.5	2.5E+00	N/A	1.1E+02 R-n			NO	DLBSL
	99-65-0	1,3-Dinitrobenzene	ND	ND	UG/L		0/22	2.5 - 2.5	2.5E+00	N/A	3.7E-01 R-n			YES	DLASL
	118-96-7	2,4,6-Trinitrotoluene	ND	ND	UG/L		0/22	2.5 - 2.5	2.5E+00	N/A	1.8E+00 R-c**			YES	DLASL
	35572-78-2	2-Amino-4,6-dinitrotoluene	ND	ND	UG/L		0/22	5 - 5	5.0E+00	N/A	7.3E+00 R-n			NO	DLBSL
	88-72-2	2-Nitrotoluene	ND	ND	UG/L		0/22	5 - 5	5.0E+00	N/A	3.1E-01 R-c			YES	DLASL
	99-08-1	3-Nitrotoluene	ND	ND	UG/L		0/22	5 - 5	5.0E+00	N/A	3.7E-01 R-n			YES	DLASL
	19406-51-0	4-Amino-2,6-dinitrotoluene	ND	ND	UG/L		0/22	5 - 5	5.0E+00	N/A	7.3E+00 R-n			NO	DLBSL
	99-99-0	4-Nitrotoluene	ND	ND	UG/L		0/22	5 - 5	5.0E+00	N/A	4.2E+00 R-c*			YES	DLASL
	2691-41-0	HMX	ND	ND	UG/L		0/22	2.5 - 2.5	2.5E+00	N/A	1.8E+02 R-n			NO	DLBSL
	55-63-0	Nitroglycerin	ND	ND	UG/L		0/22	16 - 16	1.6E+01	N/A	3.7E-01 R-n			YES	DLASL
	14797-73-0	Perchlorate	ND	ND	UG/L		0/22	0.2 - 0.2	2.0E-01	N/A	2.6E+00 R-n			NO	DLBSL
	78-11-5	PETN	ND	ND	UG/L		0/22	10 - 10	1.0E+01	N/A	N/A			NO	NTX
	121-82-4	RDX	ND	ND	UG/L		0/22	4 - 4	4.0E+00	N/A	6.1E-01 R-c			YES	DLASL
	479-45-8	Tetryl	ND	ND	UG/L		0/22	5 - 5	5.0E+00	N/A	1.5E+01 R-n			NO	DLBSL
	7429-90-5	**Aluminum**	**3.5E+01 J**	**8.6E+03 J**	**UG/L**	**SDZ-WN10-10B**	**17/22**	**200 - 200**	**8.6E+03**	**4.4E+02**	**3.7E+03 R-n**			**YES**	**ASL**
	7440-36-0	Antimony	2.3E+00 J	4.4E+00 J	UG/L	SDZ-WN02-10B	7/22	10 - 10	4.4E+00	7.1E+00	6.4E+02 A			NO	BSL
	7440-38-2	**Arsenic**	**2.9E+00 J**	**4.0E+01**	**UG/L**	**SDZ-WN24-10B**	**13/22**	**10 - 10**	**4.0E+01**	**1.4E+01**	**1.4E-01 A**	**1.0E+01**	**N**	**YES**	**ASL**
	7440-39-3	Barium	1.5E+01 J	2.0E+01 J	UG/L	SDZ-WN10-10B	7/22	200 - 200	2.0E+01	2.0E+02	7.3E+02 R-n			NO	BSL
	7440-41-7	Beryllium	7.9E-01 J	2.9E+00 J	UG/L	SDZ-WN24-10B	5/22	5 - 5	2.9E+00	4.3E+00	7.3E+00 R-n			NO	BSL
	7440-43-9	Cadmium	5.1E+00	1.0E+01	UG/L	SDZ-WN15-10B	21/22	5 - 5	1.0E+01	1.6E+01	5.0E+00 M			NO	BBK
	7440-70-2	Calcium	2.6E+05	5.6E+05	UG/L	SDZ-WN15-10B	21/22	5000 - 5000	5.6E+05	8.3E+05	N/A			NO	NUT
	7440-47-3	Chromium	1.7E+01	2.3E+01	UG/L	SDZ-WN10-10B	2/22	10 - 10	2.3E+01	7.2E+00	1.0E+02 M			NO	BSL
	7440-48-4	Cobalt	1.9E+01	3.7E+01	UG/L	SDZ-WN15-10B	21/22	5 - 5	3.7E+01	5.8E+01	1.1E+00 R-n			NO	BBK
	7440-50-8	Copper	1.3E+00 J	1.7E+00 J+	UG/L	SDZ-WN10-10B	2/22	5 - 5	1.7E+00	5.0E+00	1.0E+03 M			NO	BSL
	7439-89-6	**Iron**	**1.4E+01 J**	**9.0E+03 J**	**UG/L**	**SDZ-WN24-10B**	**22/22**	**100 - 100**	**9.0E+03**	**2.5E+03**	**3.0E+02 A**			**YES**	**ASL**
	7439-92-1	Lead	3.7E+00	4.6E+00	UG/L	SDZ-WN10-10B	2/22	3 - 3	4.6E+00	3.0E+00	1.5E+01 M			NO	BSL
	7439-95-4	Magnesium	8.4E+05	1.4E+06	UG/L	SDZ-WN15-10B	21/22	5000 - 75000	1.4E+06	2.4E+06	N/A			NO	NUT
	7439-96-5	**Manganese**	**1.6E+01**	**1.8E+02**	**UG/L**	**SDZ-WN22-10B**	**12/22**	**10 - 10**	**1.8E+02**	**6.7E+01**	**1.0E+02 A**			**YES**	**ASL**
	7439-97-6	Mercury	9.1E-02 J	9.1E-02 J	UG/L	SDZ-WN13-10B	1/22	0.2 - 0.2	9.1E-02	2.0E-01	1.1E+00 R-n			NO	BSL
	7440-02-0	Nickel	1.3E+00 J	9.9E+00	UG/L	SDZ-WN06-10B	4/22	5 - 5	9.9E+00	5.0E+00	4.6E+03 A			NO	BSL
	7440-09-7	Potassium	3.5E+05 J	6.6E+05 J	UG/L	SDZ-WN15-10B	21/22	5000 - 75000	6.6E+05	1.1E+06	N/A			NO	NUT

Table 2.3

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Scenario Timeframe: Current/Future
Medium: Pore Water
Exposure Medium: Pore Water

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
	7782-49-2	Selenium	2.3E+00 J	3.1E+00 J+	UG/L	SDZ-WN11-10B	3/22	5 - 5	3.1E+00	5.0E+00	4.2E+03 A			NO	BSL
	7440-22-4	Silver	6.8E-01 J	6.8E-01 J	UG/L	SDZ-WN22-10B	1/22	5 - 5	6.8E-01	5.0E+00	1.8E+01 R-n			NO	BSL
	7440-23-5	Sodium	7.0E+06	1.1E+07 J	UG/L	SDZ-WN15-10B : SDZ-WN19-10B	21/22	5000 - 125000	1.1E+07	2.0E+07	N/A			NO	NUT
	7440-28-0	Thallium	5.0E+00 J	5.0E+00 J	UG/L	SDZ-WN24-10B	1/22	10 - 10	5.0E+00	1.0E+01	4.7E-01 A			NO	BBK
	7440-62-2	**Vanadium**	**1.5E+00 J**	**2.2E+01**	**UG/L**	**SDZ-WN10-10B**	**16/22**	**20 - 20**	**2.2E+01**	**1.4E+01**	**1.8E+01 R-n**			**YES**	**ASL**
	7440-66-6	Zinc	4.5E+00 J	2.3E+01	UG/L	SDZ-WN02-10B	15/22	20 - 20	2.3E+01	1.9E+01	2.6E+04 A			NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values are two times the arithmetic mean background pore water concentrations.

[4] North Carolina WQS for Human Health and Water Supply, Federal Ambient Water Quality Criteria, Consumption of Water and Organisms, or USEPA Regional Screening Levels for Tap Water.

[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)

COPC = Chemical of Potential Concern

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

J = Estimated Value

J+ = Analyte present. Value may be biased high, actual value may be lower.

N = North Carolina 15A NCAC 2B Human Health, Amended Feb. 2010.

A= Federal Ambient Water Quality Criteria, Consumption of Organisms

M = Safe Drinking Water Act Maximum Contaminant Level (MCL), since the National Recommended Water Quality Criteria (NR) refers to the MCL, value is the MCL.

R-n = USEPA Regional Screening Level, noncarcinogenic (therefore, RSL divided by 10, see text)

R-c = USEPA Regional Screening Level, Carcinogenic

R-c* = R-n screening level < 100x R-c screening level

R-c** = R-n screening level < 10x R-c screening level, therefore R-n screening value/10 used as screening level

N/A = Not available

Table 2.3a

Risk Ratio Screening for Pore Water, Maximum Detected Concentration

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample	Screening Level	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Index[b]	Target Organ
Metals (ug/L)								
Aluminum	17 / 22	8.6E+03 J	SDZ-WN10-10B	3.7E+04	1	0.2	N/A	Neurological, Developmental
Arsenic	**13 / 22**	**4.0E+01**	**SDZ-WN24-10B**	**4.5E-02**	**1E-06**	**N/A**	**9E-04**	**NA**
Iron	22 / 22	9.0E+03 J	SDZ-WN24-10B	2.6E+04	1	0.3	N/A	Gastrointestinal
Manganese	12 / 22	1.8E+02	SDZ-WN22-10B	8.8E+02	1	0.2	N/A	CNS
Vanadium	16 / 22	2.2E+01	SDZ-WN10-10B	1.8E+02	1	0.1	N/A	Hair, Blood
Cumulative Corresponding Hazard Index[c]						**0.9**		
Cumulative Corresponding Cancer Risk[d]							**9E-04**	

Total Blood HI =	0.1
Total Developmental HI =	0.2
Total Gastrointestinal HI =	0.3
Total Hair HI =	0.1
Total Neurological HI =	0.4

Screening level used for Step 2, risk ratio evaluation is the Tap Water RSL, May 2010. The North Carolina WQS for Human Health and Federal Ambient Water Quality Criteria are not risk-based, and are not appropriate for use in Step 2.

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

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the SL 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 = Constituent of Potential Concern

HI = Hazard Index

J = Estimated Value

N/A = Not available/not applicable

Generated by: Debbie Stannard/WDC Checked by: Geanine Howard-Peebles/DAY

Table 2.3b

Risk Ratio Screening for Pore Water, 95% UCL Concentration

Off-Base SDZs MRA

PA/SI 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
Metals (mg/kg)								
Arsenic	13 / 22	1.3E+01 1	95% KM-t	3.9E-01	1E-06	N/A	3E-05	N/A
Cumulative Corresponding Hazard Index[c]						**N/A**		
Cumulative Corresponding Cancer Risk[d]							**3E-05**	

Notes:

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

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

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

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

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
N/A = Not available/not applicable

ProUCL, Version 4.00.05 used to determine distribution of data and calculate 95% UCL, following recommendations in users guide (USEPA. May 2010. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).
Options: 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

Generated by: Debbie Stannard/WDC Checked by: Geanine Howard-Peebles/DAY

Table 2.4

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

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
Sediment	121-14-2	2,4-Dinitrotoluene	ND	ND	MG/KG		0/27	1.5 - 1.5	1.5E+00	N/A	1.6E+00 C*	N/A	N/A	NO	DLBSL
	606-20-2	2,6-Dinitrotoluene	ND	ND	MG/KG		0/27	3 - 3	3.0E+00	N/A	6.1E+00 N	N/A	N/A	NO	DLBSL
	98-95-3	Nitrobenzene	ND	ND	MG/KG		0/27	1.5 - 1.5	1.5E+00	N/A	4.8E+00 C*	N/A	N/A	NO	DLBSL
	99-35-4	1,3,5-Trinitrobenzene	ND	ND	MG/KG		0/27	1.5 - 1.5	1.5E+00	N/A	2.2E+02 N	N/A	N/A	NO	DLBSL
	99-65-0	1,3-Dinitrobenzene	ND	ND	MG/KG		0/27	1.5 - 1.5	1.5E+00	N/A	6.1E-01 N	N/A	N/A	YES	DLASL
	118-96-7	2,4,6-Trinitrotoluene	ND	ND	MG/KG		0/27	1.5 - 1.5	1.5E+00	N/A	3.6E+00 C**	N/A	N/A	NO	DLBSL
	35572-78-2	2-Amino-4,6-dinitrotoluene	ND	ND	MG/KG		0/27	1.5 - 1.5	1.5E+00	N/A	1.5E+01 N	N/A	N/A	NO	DLBSL
	88-72-2	2-Nitrotoluene	ND	ND	MG/KG		0/27	3 - 3	3.0E+00	N/A	2.9E+00 C*	N/A	N/A	YES	DLASL
	99-08-1	3-Nitrotoluene	ND	ND	MG/KG		0/27	3 - 3	3.0E+00	N/A	6.1E-01 N	N/A	N/A	YES	DLASL
	19406-51-0	4-Amino-2,6-dinitrotoluene	ND	ND	MG/KG		0/27	1.5 - 1.5	1.5E+00	N/A	1.5E+01 N	N/A	N/A	NO	DLBSL
	99-99-0	4-Nitrotoluene	ND	ND	MG/KG		0/27	3 - 3	3.0E+00	N/A	2.4E+01 C**	N/A	N/A	NO	DLBSL
	2691-41-0	HMX	ND	ND	MG/KG		0/27	1.5 - 1.5	1.5E+00	N/A	3.8E+02 N	N/A	N/A	NO	DLBSL
	55-63-0	Nitroglycerin	ND	ND	MG/KG		0/27	4 - 4	4.0E+00	N/A	6.1E-01 N	N/A	N/A	YES	DLASL
	14797-73-0	Perchlorate	ND	ND	MG/KG		0/27	0.0025 - 0.0054	5.4E-03	N/A	5.5E+00 N	N/A	N/A	NO	DLBSL
	78-11-5	PETN	ND	ND	MG/KG		0/27	2.5 - 2.5	2.5E+00	N/A	N/A	N/A	N/A	NO	NTX
	121-82-4	RDX	ND	ND	MG/KG		0/27	1.5 - 1.5	1.5E+00	N/A	5.5E+00 C*	N/A	N/A	NO	DLBSL
	479-45-8	Tetryl [6]	ND	ND	MG/KG		0/27	0 - 0	0.0E+00	N/A	2.4E+01 N	N/A	N/A	NO	DLBSL
	7429-90-5	**Aluminum**	**3.0E+02**	**1.7E+04**	**MG/KG**	**SDZ-SD01-10B**	**27/27**	**23.3 - 50.9**	**1.7E+04**	**5.5E+03**	**7.7E+03 N**	**N/A**	**N/A**	**YES**	**ASL**
	7440-36-0	Antimony	7.9E-01 J	2.2E+00 J	MG/KG	SDZ-SD02-10B	20/27	1.2 - 2.5	2.2E+00	2.8E+00	3.1E+00 N	N/A	N/A	NO	BSL
	7440-38-2	**Arsenic**	**5.8E-01 J**	**9.2E+00**	**MG/KG**	**SDZ-SD01-10B**	**27/27**	**1.2 - 2.5**	**9.2E+00**	**5.3E+00**	**3.9E-01 C***	**N/A**	**N/A**	**YES**	**ASL**
	7440-39-3	Barium	1.1E+00 J	1.9E+01 J	MG/KG	SDZ-SD01-10B	27/27	23.3 - 50.9	1.9E+01	1.0E+01	1.5E+03 N	N/A	N/A	NO	BSL
	7440-41-7	Beryllium	ND	ND	MG/KG		0/27	0.58 - 1.3	1.3E+00	6.8E-01	1.6E+01 N	N/A	N/A	NO	DLBSL
	7440-43-9	Cadmium	1.6E-01 J	1.6E-01 J	MG/KG	SDZ-SD03-10B	1/27	0.58 - 1.3	1.6E-01	6.8E-01	7.0E+00 N	N/A	N/A	NO	BSL
	7440-70-2	Calcium	1.2E+03	1.1E+05	MG/KG	SDZ-SD03-10B	27/27	583 - 1570	1.1E+05	3.9E+04	N/A	N/A	N/A	NO	NUT
	7440-47-3	**Chromium**	**3.9E+00**	**4.2E+01**	**MG/KG**	**SDZ-SD01-10B**	**27/27**	**1.2 - 2.5**	**4.2E+01**	**2.1E+01**	**2.9E-01 C**	**N/A**	**N/A**	**YES**	**ASL**
	7440-48-4	Cobalt	6.0E-01 J-	7.1E-01 J-	MG/KG	SDZ-SD03-10B	3/27	0.58 - 1.3	7.1E-01	1.0E+00	2.3E+00 N	N/A	N/A	NO	BSL
	7440-50-8	Copper	1.1E-01 J	9.7E+00	MG/KG	SDZ-SD01-10B	20/27	0.58 - 1.3	9.7E+00	2.5E+00	3.1E+02 N	N/A	N/A	NO	BSL
	7439-89-6	**Iron**	**8.0E+02**	**2.4E+04**	**MG/KG**	**SDZ-SD01-10B**	**27/27**	**11.7 - 25.4**	**2.4E+04**	**7.7E+03**	**5.5E+03 N**	**N/A**	**N/A**	**YES**	**ASL**
	7439-92-1	Lead	9.6E-01 J	2.3E+01	MG/KG	SDZ-SD01-10B	27/27	0.35 - 0.76	2.3E+01	5.5E+00	4.0E+02 N	N/A	N/A	NO	BSL
	7439-95-4	Magnesium	5.9E+02 J	5.0E+03	MG/KG	SDZ-SD01-10B	27/27	583 - 1270	5.0E+03	3.4E+03	N/A	N/A	N/A	NO	NUT
	7439-96-5	Manganese	5.1E+00	9.6E+01	MG/KG	SDZ-SD01-10B	27/27	1.2 - 2.5	9.6E+01	5.2E+01	1.8E+02 N	N/A	N/A	NO	BSL
	7439-97-6	Mercury	1.0E-02 J	7.2E-02	MG/KG	SDZ-SD01-10B : SDZ-SD02-10B	11/27	0.041 - 0.091	7.2E-02	3.9E-02	2.3E+00 N	N/A	N/A	NO	BSL
	7440-02-0	Nickel	3.1E-01 J	1.1E+01	MG/KG	SDZ-SD01-10B	25/27	0.58 - 1.3	1.1E+01	4.5E+00	1.5E+02 N	N/A	N/A	NO	BSL
	7440-09-7	Potassium	1.7E+01 J	2.8E+03 J	MG/KG	SDZ-SD01-10B	17/27	583 - 1270	2.8E+03	1.4E+03	N/A	N/A	N/A	NO	NUT

Table 2.4

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

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
	7782-49-2	Selenium	5.3E-01 J	9.6E-01 J-	MG/KG	SDZ-SD01-10B	5/27	0.58 - 1.3	9.6E-01	6.8E-01	3.9E+01 N	N/A	N/A	NO	BSL
	7440-22-4	Silver	ND	ND	MG/KG		0/27	0.58 - 1.3	1.3E+00	6.8E-01	3.9E+01 N	N/A	N/A	NO	DLBSL
	7440-23-5	Sodium	2.2E+03	9.3E+03	MG/KG	SDZ-SD09D-10B	27/27	583 - 1270	9.3E+03	7.2E+03	N/A	N/A	N/A	NO	NUT
	7440-28-0	Thallium	ND	ND	MG/KG		0/27	1.2 - 2.5	2.5E+00	1.3E+00	N/A	N/A	N/A	NO	NTX
	7440-62-2	**Vanadium**	**1.5E+00 J**	**4.0E+01**	**MG/KG**	**SDZ-SD01-10B**	**27/27**	**2.3 - 5.1**	**4.0E+01**	**1.8E+01**	**3.9E+01 N**	**N/A**	**N/A**	**YES**	**ASL**
	7440-66-6	Zinc	2.5E+00	5.6E+01	MG/KG	SDZ-SD01-10B	27/27	2.3 - 5.1	5.6E+01	1.7E+01	2.3E+03 N	N/A	N/A	NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values are two times the arithmetic mean background sediment concentrations.

[4] Oak Ridge National Laboratory (ORNL). May, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
http://epa-prgs.ornl.gov/chemicals/index.shtml
Residential Soil RSL, RSL based on non-cancer divided by 10.
RSL value for Chromium(VI) used as surrogate for chromium.
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.
RSL value for manganese (water) used as surrogate for manganese.
RSL value for mercury (inorganic salts) used as surrogate for mercury.

[5] Rationale Codes

Selection Reason:	Above Screening Level (ASL)
	Detection Limit Above Screening Level (DLASL)
Deletion Reason:	No Toxicity Information (NTX)
	Essential Nutrient (NUT)
	Below Screening Level (BSL)
	Detection Limit Below Screening Level (DLBSL)
	Below Background (BBK)

[6] All data for tetryl were R-qualified (rejected).

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
J- = Analyte present. Value may be biased low, actual value may be higher.
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
MG/KG = Milligrams per kilogram

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Table 2.4a

Risk Ratio Screening for Sediment, Maximum Detected Concentration

Off-Base SDZs MRA

PA/SI 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
Metals (mg/kg)								
Aluminum	27 / 27	1.7E+04	SDZ-SD01-10B	7.7E+04	1	0.2	N/A	Neurological, Developmental
Arsenic	**27 / 27**	**9.2E+00**	**SDZ-SD01-10B**	**3.9E-01**	**1E-06**	**NA**	**2E-05**	**NA**
Chromium	**27 / 27**	**4.2E+01**	**SDZ-SD01-10B**	**2.9E-01**	**1E-06**	**NA**	**1E-04**	**NA**
Iron	27 / 27	2.4E+04	SDZ-SD01-10B	5.5E+04	1	0.4	N/A	Gastrointestinal
Vanadium	27 / 27	4.0E+01	SDZ-SD01-10B	3.9E+02	1	0.1	N/A	Hair
Cumulative Corresponding Hazard Index[c]						**0.8**		
Cumulative Corresponding Cancer Risk[d]							**2E-04**	

Total Developmental HI =	0.2
Total Gastrointestinal HI =	0.4
Total Hair HI =	0.1
Total Neurological HI =	0.2

Notes:

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

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

[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

mg/kg = milligrams per kilogram

N/A = Not available/not applicable.

Generated by: Debbie Stannard/WDC Checked by: Geanine Howard-Peebles/DAY

Table 2.4b

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

Off-Base SDZs MRA

PA/SI 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
Metals (mg/kg)									
Arsenic	**27 / 27**	**3.7E+00**	**1, 3**	**Gamma**	**3.9E-01**	**1E-06**	**NA**	**1E-05**	**NA**
Chromium	**27 / 27**	**1.5E+01**	**3**	**Gamma**	**2.9E-01**	**1E-06**	**NA**	**5E-05**	**NA**
Cumulative Corresponding Hazard Index[c]							**NA**		
Cumulative Corresponding Cancer Risk[d]								**6E-05**	

Notes:

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

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

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

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

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 4.00.05 used to determine distribution of data and calculate 95% UCL, following recommendations in users guide (USEPA. May 2010. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).
Options: 95% Approximate Gamma UCL (Gamma)

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

Table 2.5

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: 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
Subsurface Soil	121-14-2	2,4-Dinitrotoluene	ND	ND	MG/KG		0/64	1.2 - 1.5	1.5E+00		1.6E+00 C*	N/A	N/A	NO	DLBSL
	606-20-2	2,6-Dinitrotoluene	ND	ND	MG/KG		0/64	1.2 - 3	3.0E+00		6.1E+00 N	N/A	N/A	NO	DLBSL
	98-95-3	Nitrobenzene	ND	ND	MG/KG		0/64	0.62 - 1.5	1.5E+00		4.8E+00 C*	N/A	N/A	NO	DLBSL
	99-35-4	1,3,5-Trinitrobenzene	ND	ND	MG/KG		0/64	0.62 - 1.5	1.5E+00		2.2E+02 N	N/A	N/A	NO	DLBSL
	99-65-0	1,3-Dinitrobenzene	ND	ND	MG/KG		0/64	0.62 - 1.5	1.5E+00		6.1E-01 N	N/A	N/A	YES	DLASL
	118-96-7	2,4,6-Trinitrotoluene	ND	ND	MG/KG		0/64	0.62 - 1.5	1.5E+00		3.6E+00 C**	N/A	N/A	NO	DLBSL
	35572-78-2	2-Amino-4,6-dinitrotoluene	ND	ND	MG/KG		0/64	1.2 - 1.5	1.5E+00		1.5E+01 N	N/A	N/A	NO	DLBSL
	88-72-2	2-Nitrotoluene	ND	ND	MG/KG		0/64	1.2 - 3	3.0E+00		2.9E+00 C*	N/A	N/A	YES	DLASL
	99-08-1	3-Nitrotoluene	ND	ND	MG/KG		0/64	1.2 - 3	3.0E+00		6.1E-01 N	N/A	N/A	YES	DLASL
	19406-51-0	4-Amino-2,6-dinitrotoluene	ND	ND	MG/KG		0/64	1.2 - 1.5	1.5E+00		1.5E+01 N	N/A	N/A	NO	DLBSL
	99-99-0	4-Nitrotoluene	ND	ND	MG/KG		0/64	1.2 - 3	3.0E+00		2.4E+01 C**	N/A	N/A	NO	DLBSL
	2691-41-0	HMX	ND	ND	MG/KG		0/64	0.62 - 1.5	1.5E+00		3.8E+02 N	N/A	N/A	NO	DLBSL
	55-63-0	Nitroglycerin	ND	ND	MG/KG		0/64	4 - 4	4.0E+00		6.1E-01 N	N/A	N/A	YES	DLASL
	14797-73-0	Perchlorate	ND	ND	MG/KG		0/64	0.0021 - 0.0026	2.6E-03		5.5E+00 N	N/A	N/A	NO	DLBSL
	78-11-5	PETN	ND	ND	MG/KG		0/64	2.5 - 2.5	2.5E+00		N/A	N/A	N/A	NO	NTX
	121-82-4	RDX	ND	ND	MG/KG		0/64	0.62 - 1.5	1.5E+00		5.5E+00 C*	N/A	N/A	NO	DLBSL
	479-45-8	Tetryl	ND	ND	MG/KG		0/13	3 - 3	3.0E+00		2.4E+01 N	N/A	N/A	NO	DLBSL
	7429-90-5	Aluminum	1.4E+02	1.7E+03	MG/KG	ICW-IS15-1-2-10A	64/64	19.4 - 26.3	1.7E+03	NSD	7.7E+03 N	N/A	N/A	NO	BSL
	7440-36-0	Antimony	5.2E-01 J	1.2E+00	MG/KG	BI-IS20-8-9-10A : BI-IS21D-17-18-10A : BI-IS49-4-5-10A	19/64	0.97 - 1.3	1.2E+00	Site > Bkgd	3.1E+00 N	N/A	N/A	NO	BSL
	7440-38-2	Arsenic	3.2E-01 J	2.1E+00	MG/KG	BI-IS09-1-2-10A	44/64	0.97 - 1.3	2.1E+00	NSD	3.9E-01 C*	5.8E+00	Csoil	NO	BBK
	7440-39-3	Barium	7.6E-01 J	8.5E+00 J	MG/KG	ICW-IS11-1-2-10A	43/64	19.4 - 26.3	8.5E+00	NSD	1.5E+03 N	5.8E+02	Csoil	NO	BSL
	7440-41-7	Beryllium	6.0E-02 J	7.0E-02 J	MG/KG	ICW-IS11-1-2-10A	2/64	0.49 - 0.66	7.0E-02	NSD	1.6E+01 N	N/A	N/A	NO	BSL
	7440-43-9	Cadmium	ND	ND	MG/KG		0/64	0.49 - 0.66	6.6E-01	NA	7.0E+00 N	3.0E+00	Csoil	NO	BSL
	7440-70-2	Calcium	6.0E+02	3.5E+04	MG/KG	ICW-IS13-1-1_5-10A	62/64	485 - 657	3.5E+04	Site > Bkgd	N/A	N/A	N/A	NO	NUT
	7440-47-3	Chromium	1.8E+00	6.4E+00	MG/KG	ICW-IS15-1-2-10A	64/64	0.97 - 1.3	6.4E+00	NSD	2.9E-01 C	3.8E+00	Csoil	NO	BBK
	7440-48-4	Cobalt	9.0E-02 J	2.7E-01 J	MG/KG	ICW-IS15-1-2-10A	17/64	0.49 - 0.66	2.7E-01	NSD	2.3E+00 N	N/A	N/A	NO	BSL
	7440-50-8	Copper	1.8E-01 J	9.6E-01	MG/KG	SI-IS01D-1-1_5-10A	11/64	0.49 - 0.66	9.6E-01	Site > Bkgd	3.1E+02 N	7.0E+02	Csoil	NO	BSL
	7439-89-6	Iron	2.0E+02	2.2E+03	MG/KG	ICW-IS15-1-2-10A	64/64	9.7 - 13.1	2.2E+03	NSD	5.5E+03 N	1.5E+02	Csoil	NO	BSL
	7439-92-1	Lead	7.2E-01 J	2.9E+00	MG/KG	ICW-IS08-1-2-10A	64/64	0.29 - 0.39	2.9E+00	NSD	4.0E+02 N	2.7E+02	Csoil	NO	BSL
	7439-95-4	Magnesium	2.6E+01 J	7.9E+02	MG/KG	ICW-IS13-1-1_5-10A	23/64	485 - 657	7.9E+02	NSD	N/A	N/A	N/A	NO	NUT
	7439-96-5	Manganese	2.4E+00	1.4E+01	MG/KG	ICW-IS13-1-1_5-10A	64/64	0.97 - 1.3	1.4E+01	NSD	1.8E+02 N	6.5E+01	Csoil	NO	BSL
	7439-97-6	Mercury	2.1E-02 J	1.4E-01	MG/KG	ICW-IS05-1-1_5-10A	5/64	0.031 - 0.044	1.4E-01	NSD	2.3E+00 N	1.0E+00	Csoil	NO	BSL
	7440-02-0	Nickel	1.2E-01 J	7.7E-01	MG/KG	ICW-IS15-1-2-10A	45/64	0.57 - 5.3	7.7E-01	NSD	1.5E+02 N	1.3E+02	Csoil	NO	BSL
	7440-09-7	Potassium	1.4E+01 J	2.6E+02 J	MG/KG	ICW-IS13-1-1_5-10A	36/64	485 - 657	2.6E+02	NSD	N/A	N/A	N/A	NO	NUT
	7782-49-2	Selenium	ND	ND	MG/KG		0/51	0.49 - 0.66	6.6E-01	NA	3.9E+01 N	2.1E+00	Csoil	NO	BSL
	7440-22-4	Silver	ND	ND	MG/KG		0/64	0.49 - 0.66	6.6E-01	NA	3.9E+01 N	3.4E+00	Csoil	NO	BSL
	7440-23-5	Sodium	1.7E+02 J	8.1E+02	MG/KG	ICW-IS13-1-1_5-10A	4/64	485 - 657	8.1E+02	NSD	N/A	N/A	N/A	NO	NUT
	7440-28-0	Thallium	ND	ND	MG/KG		0/64	0.97 - 1.3	1.3E+00	NA	N/A	N/A	N/A	NO	NTX
	7440-62-2	Vanadium	1.0E+00 J	6.5E+00	MG/KG	ICW-IS15-1-2-10A	40/64	1.9 - 2.6	6.5E+00	NSD	3.9E+01 N	N/A	N/A	NO	BSL
	7440-66-6	Zinc	7.7E-01 J	4.3E+00	MG/KG	BI-IS05-5-6-10A	49/64	1.9 - 2.6	4.3E+00	NSD	2.3E+03 N	1.2E+03	Csoil	NO	BSL

Table 2.5

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

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

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Central tendency background comparison performed (see report Section 4.3). Results of comparison presented here.

[4] Oak Ridge National Laboratory (ORNL). May, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
http://epa-prgs.ornl.gov/chemicals/index.shtml
Residential Soil RSL, RSL based on non-cancer divided by 10.
RSL value for Chromium(VI) used as surrogate for chromium.
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.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.

[5] Rationale Codes

Selection Reason:
- Above Screening Level (ASL)
- Detection Limit Above Screening Level (DLASL)

Deletion Reason:
- No Toxicity Information (NTX)
- Essential Nutrient (NUT)
- Below Screening Level (BSL)
- Detection Limit Below Screening Level (DLBSL)
- Below Background (BBK)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
C = Carcinogenic
C* = N screening level < 100x C screening level, therefore N screening value used as screening level
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N = Noncarcinogenic
Csoil = Federal Remediation Branch Target Screening Values, calculated source concentration for soil which is protective of groundwater, January 2010
MG/KG = Milligrams per kilogram
NSD = No Statistical Difference Between Site and Background Concentration
Site > Bkgd = Site concentration exceeds background concentration

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Table 2.6

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Scenario Timeframe: Current/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	121-14-2	2,4-Dinitrotoluene	ND	ND	UG/L		0/71	2.5 - 5	5.0E+00		2.2E-01 C	N/A	N/A	YES	DLASL
	606-20-2	2,6-Dinitrotoluene	ND	ND	UG/L		0/71	2.5 - 5	5.0E+00		3.7E+00 N	N/A	N/A	YES	DLASL
	98-95-3	Nitrobenzene	ND	ND	UG/L		0/71	2.5 - 2.5	2.5E+00		1.2E-01 C	N/A	N/A	YES	DLASL
	99-35-4	1,3,5-Trinitrobenzene	ND	ND	UG/L		0/71	2.5 - 2.5	2.5E+00		1.1E+02 N	N/A	N/A	NO	DLBSL
	99-65-0	1,3-Dinitrobenzene	ND	ND	UG/L		0/71	2.5 - 2.5	2.5E+00		3.7E-01 N	N/A	N/A	YES	DLASL
	118-96-7	2,4,6-Trinitrotoluene	ND	ND	UG/L		0/71	2.5 - 2.5	2.5E+00		1.8E+00 C**	N/A	N/A	YES	DLASL
	35572-78-2	2-Amino-4,6-dinitrotoluene	ND	ND	UG/L		0/71	5 - 5	5.0E+00		7.3E+00 N	N/A	N/A	NO	DLBSL
	88-72-2	2-Nitrotoluene	ND	ND	UG/L		0/71	5 - 5	5.0E+00		3.1E-01 C	N/A	N/A	YES	DLASL
	99-08-1	3-Nitrotoluene	ND	ND	UG/L		0/71	5 - 5	5.0E+00		3.7E-01 N	N/A	N/A	YES	DLASL
	19406-51-0	4-Amino-2,6-dinitrotoluene	ND	ND	UG/L		0/71	5 - 5	5.0E+00		7.3E+00 N	N/A	N/A	NO	DLBSL
	99-99-0	4-Nitrotoluene	ND	ND	UG/L		0/71	5 - 5	5.0E+00		4.2E+00 C*	N/A	N/A	YES	DLASL
	2691-41-0	HMX	ND	ND	UG/L		0/71	2.5 - 2.5	2.5E+00		1.8E+02 N	N/A	N/A	NO	DLBSL
	55-63-0	Nitroglycerin	ND	ND	UG/L		0/71	16 - 16	1.6E+01		3.7E-01 N	N/A	N/A	YES	DLASL
	14797-73-0	Perchlorate	3.0E-02 J	2.1E-01	UG/L	BI-GW21-10A	15/71	0.2 - 0.2	2.1E-01		2.6E+00 N	N/A	N/A	NO	BSL
	78-11-5	PETN	ND	ND	UG/L		0/71	10 - 10	1.0E+01		N/A	N/A	N/A	NO	NTX
	121-82-4	RDX	ND	ND	UG/L		0/71	2.5 - 4	4.0E+00		6.1E-01 C	N/A	N/A	YES	DLASL
	479-45-8	Tetryl	ND	ND	UG/L		0/71	5 - 5	5.0E+00		1.5E+01 N	N/A	N/A	NO	DLBSL
	7429-90-5	Aluminum	3.6E+01 J	7.0E+03	UG/L	ICW-GW12-10A	44/71	200 - 200	7.0E+03	NSD	3.7E+03 N	50 - 200	SMCL	NO	BBK
	7440-36-0	Antimony	5.1E+02	2.0E+04	UG/L	ICW-GW01-10A	2/71	10 - 10	2.0E+04	NSD	1.5E+00 N	6.0E+00	MCL	NO	BBK
	7440-38-2	Arsenic	3.0E+00 J	4.3E+01	UG/L	SI-GW05-10A	23/71	10 - 10	4.3E+01	NSD	4.5E-02 C	1.0E+01	MCL	NO	BBK
												1.0E+01	15A NCAC 2L		
	7440-39-3	**Barium**	**3.7E-01 J**	**2.0E+03**	**UG/L**	**SI-GW05-10A**	**39/71**	**200 - 200**	**2.0E+03**	**Site > Bkgd**	**7.3E+02 N**	**2.0E+03**	**MCL**	**YES**	**ASL**
												7.0E+02	**15A NCAC 2L**		
	7440-41-7	Beryllium	8.4E+00	9.9E+02	UG/L	ICW-GW03-10A	3/71	5 - 5	9.9E+02	NSD	7.3E+00 N	4.0E+00	MCL	NO	BBK
	7440-43-9	Cadmium	4.1E-01 J	4.6E+01	UG/L	SI-GW05-10A	4/71	5 - 5	4.6E+01	NSD	1.8E+00 N	5.0E+00	MCL	NO	BBK
												2.0E+00	15A NCAC 2L		
	7440-70-2	Calcium	6.0E+03	3.3E+05	UG/L	ICW-GW13-10A	70/71	5000 - 5000	3.3E+05	NSD	N/A	N/A	N/A	NO	NUT
	7440-47-3	Chromium	9.5E-01 J	2.0E+02	UG/L	SI-GW05-10A	66/71	10 - 10	2.0E+02	NSD	4.3E-02 C	1.0E+02	MCL	NO	BBK
												1.0E+01	15A NCAC 2L		
	7440-48-4	Cobalt	8.3E-01 J	4.9E+02	UG/L	SI-GW05-10A	6/71	5 - 5	4.9E+02	NSD	1.1E+00 N	N/A	N/A	NO	BBK
	7440-50-8	Copper	1.6E+00 J	2.5E+02	UG/L	SI-GW05-10A	16/71	5 - 5	2.5E+02	NSD	1.5E+02 N	1.3E+03	MCL	NO	BBK
												1.0E+03	15A NCAC 2L		
	7439-89-6	Iron	3.4E+01 J	8.9E+03	UG/L	ICW-GW04-10A	55/71	100 - 100	8.9E+03	NSD	2.6E+03 N	3.0E+02	15A NCAC 2L	NO	BBK
	7439-92-1	Lead	2.3E+00 J	1.2E+04	UG/L	ICW-GW01-10A	14/71	3 - 3	1.2E+04	NSD	1.5E+01 N	1.5E+01	MCL, 15A NCAC 2L	NO	BBK

Table 2.6

Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Off-Base SDZs MRA

PA/SI Report

MCB CamLej, North Carolina

Scenario Timeframe: Current/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
	7439-95-4	Magnesium	5.2E+03	5.9E+05	UG/L	ICW-GW13-10A	44/71	5000 - 5000	5.9E+05	NSD	N/A	N/A	N/A	NO	NUT
	7439-96-5	Manganese	4.4E-01 J	5.2E+02	UG/L	SI-GW05-10A	68/71	10 - 10	5.2E+02	NSD	8.8E+01 N	5.0E+01	15A NCAC 2L	NO	BBK
	7439-97-6	Mercury	1.0E-01 J	3.8E-01	UG/L	BI-GW40-10A	4/71	0.2 - 0.2	3.8E-01	NSD	1.1E+00 N	2.0E+00	MCL	NO	BBK
												1.0E+00	15A NCAC 2L		
	7440-02-0	Nickel	1.0E+00 J	4.7E+02	UG/L	SI-GW05-10A	23/71	5 - 40	4.7E+02	NSD	7.3E+01 N	1.0E+02	15A NCAC 2L	NO	BBK
	7440-09-7	Potassium	4.1E+01 J	3.1E+05 J	UG/L	ICW-GW03-10A	65/71	5000 - 5000	3.1E+05	NSD	N/A	N/A	N/A	NO	NUT
	7782-49-2	Selenium	3.8E+00 J	5.8E+00	UG/L	ICW-GW04-10A	10/62	5 - 5	5.8E+00	NSD	1.8E+01 N	5.0E+01	MCL	NO	BBK
												2.0E+01	15A NCAC 2L		
	7440-22-4	Silver	1.2E+00 J	4.6E+01	UG/L	SI-GW05-10A	4/71	5 - 5	4.6E+01	NSD	1.8E+01 N	2.0E+01	15A NCAC 2L	NO	BBK
	7440-23-5	Sodium	5.2E+03	3.9E+06 J	UG/L	ICW-GW13-10A	54/71	5000 - 50000	3.9E+06	NSD	N/A	N/A	N/A	NO	NUT
	7440-28-0	Thallium	9.5E+00 J	5.4E+03	UG/L	ICW-GW01-10A	6/71	10 - 10	5.4E+03	NSD	N/A	2.0E+00	MCL	NO	NTX
	7440-62-2	Vanadium	7.2E-01 J	5.2E+02	UG/L	SI-GW05-10A	66/71	20 - 20	5.2E+02	NSD	1.8E+01 N	N/A	N/A	YES	ASL
	7440-66-6	Zinc	4.4E+02	4.8E+02	UG/L	SI-GW05-10A	2/71	20 - 20	4.8E+02	NSD	1.1E+03 N	1.0E+03	15A NCAC 2L	NO	BSL

[1] Minimum/Maximum detected concentration.

[2] Maximum concentration is used for screening.

[3] Background values from central tendency comparison. See discussion in report, section 4.3.

[4] Oak Ridge National Laboratory (ORNL). May, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Available: http://epa-prgs.ornl.gov/chemicals/index.shtml. Adjusted (noncarcinogenic RSLs adjusted by dividing by 10) tap water RSLs.
RSL value for Chromium(VI) used as surrogate for chromium.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.

[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)

MCL = Maximum Contaminant Level from EPA's National Primary Drinking Water Standards
15A NCAC 2L = North Carolina Classifications and Groundwater Quality Standards, Amended January 2010.
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
C = Carcinogenic
N = Noncarcinogenic
ND = Not detected
ug/L = micrograms per liter
C* = N screening level < 100x C screening level
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N/A = Not available
Site > Bkgd = Site data statisticallygreater background concentration
NSD = No Statistical Difference Between Site and Background Concentration

Table 2.6a

Risk Ratio Screening for Groundwater, Maximum Detected Concentration

Off-Base SDZs MRA

PA/SI 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
Total Metals (ug/L)								
Barium	39 / 71	2.0E+03	SI-GW05-10A	7.3E+03	1	0.3	NA	Kidney
Cumulative Corresponding Hazard Index[c]						**0.3**		
Cumulative Corresponding Cancer Risk[d]							**NA**	
							Total Kidney HI =	0.3

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.

COPC = Constituent of Potential Concern

HI = Hazard Index

ug/L = micrograms per liter

N/A = Not available/not applicable.

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Appendix K
Ecological Risk Screening Tables

CHECKLIST FOR ECOLOGICAL ASSESSMENTS/SAMPLING

I. SITE LOCATION

1. Site Name_ Off-base Surface Danger Zones (SDZs) – CTO-080 Site
   US EPA ID Number _____
   Location United States Marine Corps Base (MCB), Camp Lejeune
   County_____Onslow_____ City_Jacksonville_____ State__NC_____

2. Latitude___34°37'38.77" N_____ Longitude__77°11'27.90" 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 3-4 of this report presents site boundaries and surface soil sampling locations. Figure 3-6 is an aerial figure showing sediment sample locations. Figure 3-7 shows groundwater sample locations, and Figure 3-8 shows the surface water and pore water sample locations.

II. SITE CHARACTERIZATION

1. Indicate the approximate area of the site (i.e., acres or sq. ft.) The entire Off-base SDZs site encompasses 1,620 acres. However, the investigation area is approximately 231 acres and includes portions of Bear Creek, Bear Island, Sanders Island, and the Intercoastal Waterway Islands.

2. Is this the first site visit? Yes X 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 performed several site investigations in 2009 and 2010.

3. Are aerial or other site photographs available? X Yes No
   If yes, please attach any available photo(s) to the site map to the report.
   Figures 3-4, 3-6, 3-7, and 3-8 of this report.

4. Provide an approximate breakdown of the land uses on the site:

_____% Heavy Industrial	_____% Light Industrial	_____% Urban
_____% Residential	_____%Rural	_____% Agricultural[b]
_20__% Recreational[a]	_80__% Undisturbed	_____% Other[c]

[a]For recreational areas, please describe the use of the area (e.g., park, playing field, etc).
Hammocks Beach State Park includes Bear Island.

[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.

_____

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	_____% Light Industrial	___% Urban
_20__% 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? X 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. The intercoastal waterway island are dredge spoils

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.* Yes. Wetlands are present within the site boundaries. Bear Island is within in the Hammocks Beach State Park.

Please provide the source(s) of information used to identify these sensitive areas, and indicate their general location on the site map.

National Wetlands Inventory (NWI) maps, field observations, and aerial photography

8. What type of facility is located at the site?

□ Chemical □ Manufacturing □ Mixing

□ Waste Disposal X Other (specify)
The site is undisturbed private and state owned land directly adjacent to MCB Camp Lejeune.

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).
Explosives and inorganics were detected in the media onsite. Refer to the ERS for detailed analysis.

10. Check any potential routes of off-site migration of contaminants observed at the site:

□ Swales X Depressions □ Drainage Ditches

X Runoff □ Windblown Particulates □ Vehicular Traffic

X Other (specify): Groundwater and tidal transport

11. Indicate the approximate depth to groundwater (in feet below ground surface [(bgs)].
Depth to groundwater ranges from surface to 5 bgs.

12. Indicate the direction of groundwater flow (e.g., north, southeast, etc.)
Groundwater generally flows south towards the Atlantic Ocean.

13. Is the direction of surface runoff apparent from site observations? X Yes No
If yes, to which of the following does the surface runoff discharge? Indicate all that apply.

X Surface water X Groundwater □ Sewer

□ Collection Impoundment

14. Is there a navigable water body or tributary to a navigable water body?
X 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.

X Yes No

16. Is there evidence of flooding? X 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? X 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.

The federally protected loggerhead sea turtle and piping plover are known to nest on the beaches of Bear Island. The federally protected seabeach amaranth also occurs on Bear Island. The Off-base SDZs site also includes suitable foraging habitat for other protected species such as the bald eagle, leatherback sea turtle, green sea turtle, West Indian manatee, and American alligator.

USFWS. 2010. Endangered Species, Threatened Species, Federal Species of Concern, and Candidate Species in Onslow County, North Carolina. http://www.fws.gov/nc-es/es/cntylist/onslow.html

United States Marine Corps (USMC). 2006. Integrated Natural Resource Management Plan (INRMP) 2007-2011, Marine Corps Base Camp Lejeune, Onslow County, North Carolina. November.

19. Record weather conditions at the site at the time of the site visit when information for completion of this checklist was prepared:

DATE December 2009

Temperature (°C/°F) Cool

Wind (direction/speed):

Cloud Cover: Cloudy

Normal daily high temperature (°C/°F):

Precipitation (rain, snow): Chance of rain

20. Describe reasonable and likely future land and/or water use(s) at the site.
Land and water use will likely remain the same.

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.).
In July 2009, CH2M HILL completed a detailed historical review of information relating to past uses of the Off-Base SDZs site. The site consists of the following former ranges described in the Range Identification and Preliminary Range Assessment (PRA) (USACE, 2001a) and Archives Search Report (ASR) (USACE, 2001b):

Rocket Range Number 1 (ASR #2.33)
Direct Fire Artillery Range (G-7) (ASR #2.61)
G-6 Artillery Range (ASR #2.62), and
Impact Area BT-3/N-1 (ASR #2.207)

The Off-Base SDZs area was used jointly by MCB Camp Lejeune and Marine Corps Air Station (MCAS) Cherry Point. The danger zones related to activities within MCB Camp Lejeune are primarily from land-based artillery ranges, and the danger zones related to MCAS Cherry Point were used for airborne strafing, rocket firing and bombing.

United States Army Corps of Engineers (USACE). 2001a. *Final Range Identification and Preliminary Range Assessment, MCB Camp Lejeune, Onslow, North Carolina*. St. Louis District. December.
USACE. 2001b. *Archives Search Report, MCAS Cherry Point, New Bern, North Carolina.* St. Louis District. December.

22. Identify the media (e.g., soil [surface or subsurface], surface water, air, groundwater) which are known or suspected to contain COCs.
Inorganics were detected in the surface soil, subsurface soil, groundwater, surface water, sediment, and pore water. Explosives were detected in groundwater and surface water.

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.
Receptors may be exposed to contaminants in soil, surface water, and sediment. They may also be exposed to contaminants in groundwater, upon discharge to surface water.

Checklist Completed by Sara Kent

Affiliation CH2M HILL

Author Assisted by_____

Date 10/1/2010

III. HABITAT EVALUATION

III.A Terrestrial Habitat Checklist

III.A.1 Wooded

Are any wooded areas on or adjacent to the site? X 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

X On-site Off-site

Name or Designation: Maritime forests occurred on Bear Island, and mixed hardwood forests occur on the Intercoastal Waterway Islands

1. Estimate the approximate size of the wooded area (Approximately 127 acres of Maritime forest on Bear Island; Approximately 45 acres of mixed hardwood forests forest on the Intercoastal Waterway Islands)
   Please identify what information was used to determine the wooded area of the site (e.g., direct observation, photos, etc).
   Aerial photography available through Google Earth and direct field observations.

2. Indicate the dominant type of vegetation in the wooded area. Provide photographs, if available.
   - ❑ Evergreen
   - X Deciduous
   - X Mixed

   Dominant plant species, if known:
   Maritime Forest – yaupon holly (*Ilex vomitoria*), live oak (*Quercus virginiana*), and wax myrtle (*Myrica cerifera*)
   Mixed Hardwood Forest – live oak (*Quercus virginiana*), scrub oaks (*Quercus laevis*, *Q. marilandica*, *Q. margarettae*, and *Q. incana*), Atlantic White cedar (*Chamaecyparis thyoides*), and slash pine (*Pinus elliottii*)

3. Estimate the vegetation density of the wooded area.
   - X 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.
   - X 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.



Bear Island – Maritime forest



Intercoastal Waterway Island – mixed hardwood forest

III.A.2 Shrub/Scrub

Are any shrub/scrub areas on or adjacent to the site? □ Yes X 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? □ Yes X 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

III.A.4 Miscellaneous

Are other types of terrestrial habitats present at the site, other than woods, scrub/shrub and open field? X 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.

Miscellaneous Area Questions

X On-site □ Off-site

Name or Designation: Sander's Island and Bear Island

1. Provide a description of the terrestrial miscellaneous habitat and identify the area on the site map. Beach dunes/beaches on Bear Island and intertidal areas on Sander's Island



Beach dunes/beaches on Bear Island



Intertidal areas

2. Estimate the approximate size of the area (beach dunes/beaches – approximately 25% of the 127 acres of Bear Island; intertidal areas – approximately 53 acres)

3. What observations, if any, were made at the site regarding the presence and/or absence of insects, birds, mammals, etc.?
   Shore birds and crabs were observed on the beach dunes and beaches. Wading birds and shore birds were observed in the intertidal area.

4. Review the questions in Section I to determine if any additional habitat checklists should be completed for this site.

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?

X 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





Non-Flowing Aquatic Feature Questions

X On-site □ Off-site

Name or Designation: Ephemeral, interdunal ponds and swales on Bear Island

1. Indicate the type of aquatic feature present:

   X Natural (e.g., pond or lake) Ephemeral ponds
   ❑ Man-made (e.g., impoundment, lagoon, canal, etc.)

2. Estimate the approximate size of the water body (in acres or sq. ft.) The ponds ranged from approximately 100 sq. ft. to 0.5 acres.

3. If known, indicate the depth of the water body (in ft. or in.). Unknown

4. If a water body is present, what are its known uses (e.g.: recreation, navigation, etc.)? Wildlife habitat. The ponds have no human uses.

5. Is aquatic vegetation present? X Yes □ No
   If yes, please identify the type of vegetation present if known.

   X Emergent X Submergent □ Floating

6. Indicate the general composition of the bottom substrate. Mark all sources that apply from the following list.

□ Bedrock	X Sand	□ Concrete
□ Boulder (>10 in.)	X Silt	□ Debris
□ Cobble (2.5 - 10 in.)	□ Clay	X Detritus
□ Gravel (0.1 - 2.5 in.)	X Muck (fine/black)	

□ Other (please specify):_____

7. Indicate the source(s) of the water in the aquatic feature. Mark all sources that apply from the following list.

   ❑ River/Stream/Creek
   ❑ Groundwater
   ❑ Industrial Discharge
   ❑ Surface Runoff
   X Other (please specify): tidal and rain fed

Non-Flowing Aquatic Feature Questions (Continued)

8. Is there a discharge from the facility to the aquatic feature? X Yes No
   If yes, describe the origin of each discharge and its migration path.
   The ponds are within the site boundaries on Bear Island

9. Does the aquatic feature discharge to the surrounding environment? X Yes No
   If yes, indicate the features from the following list into which the aquatic feature discharges, and indicate whether the discharge occurs onsite or offsite:

❑	River/Stream/Creek	☐ on-site ☐ off-site
X	Groundwater	X on-site ☐ off-site
❑	Wetland	☐ on-site ☐ off-site
❑	Impoundment	☐ on-site ☐ off-site
X	Other (please describe) Evaporation	

10. Identify any field measurements and observations of water quality that were made. Provide the measurement and the units of measure in the appropriate space below:

_____ Area

_____ Depth (average)

_____ Temperature (depth of water where the reading was taken)_____

_____ pH

_____ Dissolved oxygen

_____ Salinity

_____ Turbidity (clear, slightly turbid, turbid, opaque)
(Secchi disk depth_____)

_____ Other (specify)

11. Describe observed color and area of coloration. Some ponds had an orange tint.

12. Mark the open-water, non-flowing system on the site map attached to this checklist.

13. What observations, if any, were made at the water body regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc? Shorebirds and wading birds were observed in the ponds.

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?

X 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.

Flowing Aquatic Systems Questions

X On-site □ Off-site

Name or Designation: Bear Creek, the Intercoastal waterway, and Sanders Creek

1. Indicate the type of flowing aquatic feature present.

   - ❑ River
   - X Stream/Creek/Brook
   - ❑ Intermittent stream
   - X Artificially created (ditch, etc.) The intercoastal waterway is a dredged channel.
   - ❑ Channeling
   - ❑ Other (specify)

2. For natural systems, are there any indicators of physical alteration (e.g., channeling, debris, etc.)? □ Yes X No
   If yes, please describe the indicators observed.

3. Indicate the general composition of the bottom substrate.

□ Bedrock	X Sand (course)	□ Concrete
□ Boulder (>10 in.)	□ Silt (fine)	X Debris
□ Cobble (2.5 - 10 in.)	□ Clay (slick)	X Detritus
□ Gravel (0.1 - 2.5 in.)	X Muck (fine/black)	X Marl (Shells)

□ Other (please specify):_____

4. Describe the condition of the bank (e.g., height, slope, extent of vegetative cover).
   The banks of Bear Creek are predominantly vegetated with *Juncus effusus*. The banks of the Intercoastal waterway are predominately forested or vegetated with *Spartina alterniflora*. The banks of Sander's Creek are predominantly vegetated with *Spartina alterniflora*. The banks of all three waterbodies have heights of 1-2 feet with a gradual slope.

5. Is the system influenced by tides? X Yes □ No
   What information was used to make this determination? Proximity to the Atlantic Ocean

6. Is the flow intermittent? □ Yes X No
   If yes, please note the information used to make this determination.

7. Is there a discharge from the site to the water body? X Yes □ No
   If yes, describe the origin of each discharge and its migration path.
   Surface water runoff (overland flow) and groundwater reach all the waterbodies.

8. Indicate the discharge point of the water body. Specify name of the discharge, if known.
   Atlantic Ocean

9. Identify any field measurements and observations of water quality that were made. Provide the measurement and the units of measure in the appropriate space below:

   _____ Width (ft.)

   _____ Depth (average)

   _____ Velocity (specify units):_____

   _____ Temperature (depth of water where the reading was taken)_____

   _____ pH

   _____ Dissolved oxygen

   _____ Salinity

   _____ Turbidity (clear, slightly turbid, turbid, opaque)
   (Secchi disk depth_____)

   _____ Other (specify)

10. Describe observed color and area of coloration. None observed

11. Is any aquatic vegetation present? X Yes □ No
    If yes, please identify the type of vegetation present, if known.

X Emergent (predominately *Juncus effusus* or *Spartina alterniflora*) □ Submergent □ Floating

12. Mark the flowing water system on the attached site map. Figure 3-6

13. What observations were made at the water body regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc? Birds (predominately wading and shore birds), mussels, oysters, barnacles, and crabs were observed.

III.C Wetland Habitats

Are any wetland[1] areas such as marshes or swamps on or adjacent to the site?

X 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.

Field observations, aerial photography and NWI maps.

If no wetland areas are present, proceed to Section III.D: Sensitive Environments and Receptors.



Salt Marsh

[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.

Wetland Area Questions

X On-site □ Off-site

Name or Designation: Salt marsh wetlands occur in the area between the Intercoastal Waterway and Bear Island. Brackish wetlands occur along Bear Creek.

1. Indicate the approximate area of the wetland (acres or ft.^{2}) A wetland delineation has not been conducted by CH2M HILL personnel for this area. Wetland habitats were observed during the site visits and are the predominate cover type.

2. Identify the type(s) of vegetation present in the wetland.

   - ❑ Submergent (i.e., underwater) vegetation
   - X Emergent (i.e., rooted in the water, but rising above it) vegetation
   - ❑ Floating vegetation
   - ❑ Scrub/shrub
   - ❑ Wooded
   - ❑ Other (Please describe):

3. Provide a general description of the vegetation present in and around the wetland (height, color, etc). Provide a photograph of the known or suspected wetlands, if available. Observations were not recorded.

4. Estimate the vegetation density of the wetland area.

   - X Dense (i.e., greater than 75% vegetation)
   - ❑ Moderate (i.e., 25% to 75% vegetation)
   - ❑ Sparse (i.e., less than 25% vegetation)

5. Is standing water present? X Yes □ No
   If yes, is the water primarily: □ Fresh X Brackish X Marine
   Indicate the approximate area of the standing water (ft.^{2}): Unknown
   Indicate the approximate depth of the standing water, if known (ft. or in.) Unknown

Wetland Area Questions (Continued)

6. Identify any field measurements and observations of water quality that were made. Provide the measurement and the units of measure in the appropriate space below:

   Depth (average)

   Temperature (depth of water where the reading was taken)

   pH

   Dissolved oxygen

   Salinity

   Turbidity (clear, slightly turbid, turbid, opaque) (Secchi disk depth_____)

   Other (specify)

   Other(specify)

7. Describe observed color and area of coloration. None recorded

8. If known, indicate the source of the water in the wetland.

   X Stream/River/Creek/Lake/Pond (Atlantic Ocean)
   □ Flooding
   X Groundwater
   X Surface runoff

9. Is there a discharge from the site to the wetland? X Yes □ No
   If yes, please describe:
   Both the salt marsh (south of the Intercoastal waterway) and brackish wetland areas (Bear Creek) are within the site boundaries.

Wetland Area Questions (Continued)

10. Is there a discharge from the wetland? X Yes ☐ No
If yes, to what water body is discharge released?

- X Marine (Name: Atlantic Ocean)
- X Surface stream/River (Name: Intercoastal Waterway)
- ❑ Lake/Pond (Name: _____)
- ❑ Groundwater
- ❑ Not sure

11. Does the area show evidence of flooding? X Yes ☐ No
If yes, indicate which of the following are present (mark all that apply).

- X Standing water
- X Water-saturated soils
- ❑ Water marks
- ❑ Buttressing
- ❑ Debris lines
- ❑ Mud cracks
- ❑ Other (Please describe)

11. If a soil sample was collected, describe the appearance of the soil in the wetland area. Circle or write in the best response. None collected.

Color (blue/gray, brown, black, mottled) _____

Water content (dry, wet, saturated/unsaturated)_____

13. Mark the observed wetland area(s) on the attached site map.

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.*
   Yes, the federally protected loggerhead sea turtles and piping plover are known to nest on the beaches of Bear Island (CH2M HILL, 2009).

   CH2M HILL. 2009. *Site Specific Work Plan Addendum for Preliminary Assessment/Site Inspection Off-base Surface Danger Zones*. October.

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.*
   Yes, the federally protected loggerhead sea turtle and piping plover are known to nest on the beaches of Bear Island. The federally protected seabeach amaranth also occurs on Bear Island. The Off-base SDZs site also includes suitable foraging habitat for other protected species such as the bald eagle, leatherback sea turtle, green sea turtle, West Indian manatee, and American alligator.

4. Is the site potentially used as a breeding, roosting or feeding area by migratory bird species? If yes, identify which species.
   Yes, piping plover.

5. Is the site used by any ecologically[3], recreationally or commercially important species? If yes, explain.
   Yes.

---

[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?

   X Yes
   ❑ No
   ❑ Uncertain

   Please provide an explanation for your answer.
   Data were collected from each medium both within the Off-base SDZs site and outside the boundary, 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
   X No
   ❑ Uncertain
   ❑ No offsite contamination

   Please provide an explanation for your answer.

   The offsite area is predominately the Atlantic Ocean.

3. Do existing data address potential migration pathways of contaminants at the site?

   X 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?

   X Yes
   ❑ No
   ❑ Uncertain
   ❑ No offsite contamination

   Please provide an explanation for your answer. Concentration of COPCs in groundwater are not expected to be high enough to cause any discernable impact to the Atlantic Ocean.

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.

   Metals and explosives were detected in areas where receptors may be exposed.

7. Are receptors located in or using habitats where chemicals exist in air, soil, sediment or surface water? If yes, explain.

   Yes. Receptors were observed in the terrestrial and aquatic habitats within the site.

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 south to the adjacent Atlantic Ocean. Should the low level concentrations in groundwater migrate toward the Atlantic Ocean, 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.

   Runoff into the salt marsh, Intercoastal waterway, or Bear Creek could reach receptors.

10. What is the approximate distance from the contaminated area to the nearest watercourse?

- X 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

11. What is the slope of the ground in the contaminated area?

- X 0-10%
- ❑ 10-30%
- ❑ > 30%

12. What is the approximate amount of ground and canopy vegetative cover in the contaminated area?

- ❑ < 25%
- ❑ 25-75%
- X > 75%

13. Is there visible evidence of erosion (e.g., a rill or gully) in or near the contaminated area?

- ❑ Yes
- X No
- ❑ Do not know

14. 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?

- X Yes
- ❑ No
- ❑ Do not know

15. Could chemicals reach receptors through the dispersion of contaminants in air (e.g., volatilization, vapors, fugitive dust)? If yes, explain.

No

16. 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

Table K-1

Off-Base SDZs Surface Soil Screen

Off Base SDZs MRA

PA/SI Report

MCB Camp Lej, 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	Arithmetic Mean	Arithmetic Mean Hazard Quotient	Site Concentrations Consistent with Background? [2]	Retain?	Rationale
Semivolatile Organic Compounds (UG/KG)												
2,4-Dinitrotoluene	1,200 - 1,500	0 / 74	--	--	NSV	-- / --	NSV	653	NSV	--	NO	Not Detected
2,6-Dinitrotoluene	1,200 - 3,000	0 / 74	--	--	NSV	-- / --	NSV	907	NSV	--	NO	Not Detected
Nitrobenzene	620 - 1,500	0 / 74	--	--	40,000	-- / --	0.038	459	0.01	--	NO	Not Detected, HQ less than one
Explosives (UG/KG)												
1,3,5-Trinitrobenzene	620 - 1,500	0 / 74	--	--	NSV	-- / --	NSV	459	NSV	--	NO	Not Detected
1,3-Dinitrobenzene	620 - 1,500	0 / 74	--	--	NSV	-- / --	NSV	459	NSV	--	NO	Not Detected
2,4,6-Trinitrotoluene	620 - 1,500	0 / 74	--	--	NSV	-- / --	NSV	459	NSV	--	NO	Not Detected
2-Amino-4,6-dinitrotoluene	1,200 - 1,500	0 / 74	--	--	NSV	-- / --	NSV	653	NSV	--	NO	Not Detected
2-Nitrotoluene	1,200 - 3,000	0 / 74	--	--	NSV	-- / --	NSV	907	NSV	--	NO	Not Detected
3-Nitrotoluene	1,200 - 3,000	0 / 74	--	--	NSV	-- / --	NSV	907	NSV	--	NO	Not Detected
4-Amino-2,6-dinitrotoluene	1,200 - 1,500	0 / 74	--	--	NSV	-- / --	NSV	653	NSV	--	NO	Not Detected
4-Nitrotoluene	1,200 - 3,000	0 / 74	--	--	NSV	-- / --	NSV	907	NSV	--	NO	Not Detected
HMX	620 - 1,500	0 / 74	--	--	NSV	-- / --	NSV	459	NSV	--	NO	Not Detected
Nitroglycerin	4,000 - 4,000	0 / 74	--	--	NSV	-- / --	NSV	2,000	NSV	--	NO	Not Detected
Perchlorate	2.00 - 7.60	0 / 74	--	--	NSV	-- / --	NSV	1.24	NSV	--	NO	Not Detected
PETN	2,500 - 2,500	0 / 74	--	--	NSV	-- / --	NSV	1,250	NSV	--	NO	Not Detected
RDX	620 - 1,500	0 / 74	--	--	NSV	-- / --	NSV	459	NSV	--	NO	Not Detected
Inorganics (MG/KG)												
Aluminum	-- - --	74 / 74	7,800	ICW-SS13-10A	50.0	74 / 74	156	713	14.3	Yes	NO	Consistent with background
Antimony	0.95 - 2.70	18 / 74	1.10	SDZ-WN10-10B	0.27	18 / 74	4.07	0.67	2.47	Yes	NO	Consistent with background
Arsenic	0.95 - 2.70	39 / 74	9.20	SI-SS01-10A	18.0	0 / 74	0.51	0.92	0.05	Yes	NO	HQ less than one
Barium	19.0 - 47.1	48 / 74	9.30	ICW-SS09-10A	330	0 / 74	0.028	5.79	0.02	Yes	NO	HQ less than one
Beryllium	0.47 - 1.20	15 / 74	0.71	ICW-SS05-10A	21.0	0 / 74	0.034	0.24	0.01	Yes	NO	HQ less than one
Cadmium	0.47 - 1.40	5 / 74	1.10	ICW-SS05-10A	0.36	1 / 74	3.06	0.29	0.81	No	NO	Low frequency and magnitude of exceedance
Calcium [3]	509 - 700	70 / 74	21,700	ICW-SS12-10A	NSV	-- / --	NSV	4,084	NSV	Yes	NO	Macronutrient
Chromium	-- - --	74 / 74	22.1	ICW-SS13-10A	26.0	0 / 74	0.85	5.39	0.21	Yes	NO	HQ less than one
Cobalt	0.47 - 0.88	23 / 74	1.80	ICW-SS13-10A	13.0	0 / 74	0.14	0.29	0.02	Yes	NO	HQ less than one
Copper	0.47 - 0.70	43 / 74	17.6	SI-SS01-10A	28.0	0 / 74	0.63	1.00	0.04	Yes	NO	HQ less than one
Iron	-- - --	74 / 74	10,200	ICW-SS13-10A	200	74 / 74	51.0	1,202	6.01	Yes	NO	Consistent with background
Lead	-- - --	74 / 74	20.9	ICW-SS15-10A	11.0	4 / 74	1.90	3.22	0.29	Yes	NO	Consistent with background
Magnesium [3]	474 - 882	36 / 74	5,470	ICW-SS11-10A	NSV	-- / --	NSV	575	NSV	Yes	NO	Macronutrient
Manganese	-- - --	74 / 74	91.8	ICW-SS13-10A	220	0 / 74	0.42	10.1	0.05	Yes	NO	HQ less than one
Mercury	0.030 - 0.051	15 / 74	0.17	ICW-SS11-10A	0.10	3 / 74	1.70	0.029	0.29	Yes	NO	Consistent with background
Nickel	0.48 - 5.60	49 / 74	5.60	ICW-SS13-10A	38.0	0 / 74	0.15	0.84	0.02	Yes	NO	HQ less than one
Potassium [3]	474 - 700	49 / 74	1,760	ICW-SS13-10A	NSV	-- / --	NSV	205	NSV	Yes	NO	Macronutrient
Selenium	0.47 - 0.74	5 / 59	1.10	ICW-SS13-10A	0.52	4 / 59	2.12	0.31	0.60	Yes	NO	Consistent with background
Silver	0.47 - 1.40	1 / 74	0.35	ICW-SS05-10A	4.20	0 / 74	0.083	0.30	0.07	Yes	NO	HQ less than one
Sodium [3]	466 - 700	25 / 74	3,110	ICW-SS13-10A	NSV	-- / --	NSV	377	NSV	Yes	NO	Macronutrient
Thallium	0.93 - 2.70	0 / 74	--	--	1.00	-- / --	2.70	0.58	0.58	Yes	NO	Not Detected, HQ less than one
Vanadium	1.90 - 2.80	52 / 74	21.2	ICW-SS13-10A	7.80	5 / 74	2.72	2.53	0.32	Yes	NO	Consistent with background
Zinc	2.10 - 2.80	72 / 74	52.7	ICW-SS13-10A	46.0	1 / 74	1.15	5.06	0.11	Yes	NO	Consistent with background

NOTES

1 - Count of detected samples exceeding or equaling Screening Value

2 - Metals data from site and background samples were evaluted using statistical analysis (Gehan or Wilcoxon Ranks Sum) to determine if site data were significantly different than background data

3 - Macronutrient - Not considered to be a COPC

HQ - Hazard Quotient

MG/KG - Milligrams per kilogram

NSV - No Screening Value

UG/KG - Micrograms per kilogram

Generated by: Sara Kent

Checked by: Jon Weir

Table K-2

Off-Base SDZs Subsurface Soil Screen

Off Base SDZs MRA

PA/SI Report

MCB Camp Lej, 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	Arithmetic Mean	Arithmetic Mean Hazard Quotient	Site Concentrations Consistent with Background?[2]	Step 2 COPC?	Rationale
Semivolatile Organic Compounds (UG/KG)												
2,4-Dinitrotoluene	1,200 - 1,500	0 / 45	--	--	NSV	-- / --	NSV	648	NSV	--	NO	Not detected
2,6-Dinitrotoluene	1,200 - 3,000	0 / 45	--	--	NSV	-- / --	NSV	881	NSV	--	NO	Not detected
Nitrobenzene	620 - 1,500	0 / 45	--	--	40,000	-- / --	0.038	447	0.01	--	NO	Not detected, HQ less than one
Explosives (UG/KG)												
1,3,5-Trinitrobenzene	620 - 1,500	0 / 45	--	--	NSV	-- / --	NSV	447	NSV	--	NO	Not detected
1,3-Dinitrobenzene	620 - 1,500	0 / 45	--	--	NSV	-- / --	NSV	447	NSV	--	NO	Not detected
2,4,6-Trinitrotoluene	620 - 1,500	0 / 45	--	--	NSV	-- / --	NSV	447	NSV	--	NO	Not detected
2-Amino-4,6-dinitrotoluene	1,200 - 1,500	0 / 45	--	--	NSV	-- / --	NSV	648	NSV	--	NO	Not detected
2-Nitrotoluene	1,200 - 3,000	0 / 45	--	--	NSV	-- / --	NSV	881	NSV	--	NO	Not detected
3-Nitrotoluene	1,200 - 3,000	0 / 45	--	--	NSV	-- / --	NSV	881	NSV	--	NO	Not detected
4-Amino-2,6-dinitrotoluene	1,200 - 1,500	0 / 45	--	--	NSV	-- / --	NSV	648	NSV	--	NO	Not detected
4-Nitrotoluene	1,200 - 3,000	0 / 45	--	--	NSV	-- / --	NSV	881	NSV	--	NO	Not detected
HMX	620 - 1,500	0 / 45	--	--	NSV	-- / --	NSV	447	NSV	--	NO	Not detected
Nitroglycerin	4,000 - 4,000	0 / 45	--	--	NSV	-- / --	NSV	2,000	NSV	--	NO	Not detected
Perchlorate	2.10 - 2.60	0 / 45	--	--	NSV	-- / --	NSV	1.11	NSV	--	NO	Not detected
PETN	2,500 - 2,500	0 / 45	--	--	NSV	-- / --	NSV	1,250	NSV	--	NO	Not detected
RDX	620 - 1,500	0 / 45	--	--	NSV	-- / --	NSV	447	NSV	--	NO	Not detected
Tetryl	3,000 - 3,000	0 / 12	--	--	NSV	-- / --	NSV	1,500	NSV	--	NO	Not detected
Inorganics (MG/KG)												
Aluminum	-- - --	45 / 45	1,740	SDZ-WN10-10B	50.0	45 / 45	34.8	406	8.12	Yes	NO	Consistent with background
Antimony	0.99 - 1.30	10 / 45	1.20	BI-IS49-4-5-10A	0.27	10 / 45	4.44	0.63	2.32	No	NO	Low magnitude of exceedance
Arsenic	0.99 - 1.30	31 / 45	2.10	BI-IS09-1-2-10A	18.0	0 / 45	0.12	0.70	0.04	Yes	NO	HQ less than one
Barium	19.7 - 24.1	32 / 45	8.50	ICW-IS11-1-2-10A	330	0 / 45	0.026	4.60	0.01	Yes	NO	HQ less than one
Beryllium	0.49 - 0.66	2 / 45	0.070	ICW-IS11-1-2-10A	21.0	0 / 45	0.0033	0.26	0.01	Yes	NO	HQ less than one
Cadmium	0.49 - 0.66	0 / 45	--	--	0.36	-- / --	1.83	0.27	0.75	Yes	NO	Not detected
Calcium [3]	530 - 530	44 / 45	35,300	ICW-IS13-1-1_5-10A	NSV	-- / --	NSV	6,904	NSV	No	NO	Macronutrient
Chromium	-- - --	45 / 45	6.40	ICW-IS15-1-2-10A	26.0	0 / 45	0.25	4.19	0.16	Yes	NO	HQ less than one
Cobalt	0.49 - 0.63	14 / 45	0.27	ICW-IS15-1-2-10A	13.0	0 / 45	0.021	0.23	0.02	Yes	NO	HQ less than one
Copper	0.49 - 0.63	10 / 45	0.96	SI-IS01-1-1_5-10A	28.0	0 / 45	0.034	0.29	0.01	No	NO	HQ less than one
Iron	-- - --	45 / 45	2,150	ICW-IS15-1-2-10A	200	45 / 45	10.8	823	4.12	Yes	NO	Consistent with background
Lead	-- - --	45 / 45	2.90	ICW-IS08-1-2-10A	11.0	0 / 45	0.26	1.36	0.12	Yes	NO	HQ less than one
Magnesium [3]	497 - 657	16 / 45	787	ICW-IS13-1-1_5-10A	NSV	-- / --	NSV	275	NSV	Yes	NO	Macronutrient
Manganese	-- - --	45 / 45	13.5	ICW-IS13-1-1_5-10A	220	0 / 45	0.061	5.93	0.03	Yes	NO	HQ less than one
Mercury	0.031 - 0.044	4 / 45	0.14	ICW-IS05-1-1_5-10A	0.10	1 / 45	1.40	0.021	0.21	Yes	NO	Consistent with background
Nickel	4.00 - 5.10	32 / 45	0.77	ICW-IS15-1-2-10A	38.0	0 / 45	0.020	0.87	0.02	Yes	NO	HQ less than one
Potassium [3]	493 - 657	27 / 45	258	ICW-IS13-1-1_5-10A	NSV	-- / --	NSV	140	NSV	Yes	NO	Macronutrient
Selenium	0.49 - 0.66	0 / 33	--	--	0.52	-- / --	1.27	0.27	0.51	Yes	NO	Not detected
Silver	0.49 - 0.66	0 / 45	--	--	4.20	-- / --	0.16	0.27	0.06	Yes	NO	Not detected, HQ less than one
Sodium [3]	493 - 657	4 / 45	813	ICW-IS13-1-1_5-10A	NSV	-- / --	NSV	275	NSV	Yes	NO	Macronutrient
Thallium	0.99 - 1.30	0 / 45	--	--	1.00	-- / --	1.30	0.54	0.54	Yes	NO	Not detected
Vanadium	2.00 - 2.60	30 / 45	6.50	ICW-IS15-1-2-10A	7.80	0 / 45	0.83	1.66	0.21	Yes	NO	HQ less than one
Zinc	2.00 - 2.60	33 / 45	3.90	ICW-IS13-1-1_5-10A	46.0	0 / 45	0.085	2.19	0.05	Yes	NO	HQ less than one

NOTES

1 - Count of detected samples exceeding or equaling Screening Value

2 - Metals data from site and background samples were evaluted using statistical analysis (Gehan or Wilcoxon Ranks Sum) to determine if site data were significantly different than background data

3 - Macronutrient - Not considered to be a COPC

HQ - Hazard Quotient

MG/KG - Milligrams per kilogram

NSV - No Screening Value

UG/KG - Micrograms per kilogram

Generated by: Sara Kent Checked by: Jon Weir

Table K-3

Off-Base SDZs Sediment Screen

Off Base SDZs MRA

PA/SI Report

MCB Camp Lej, 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	Arithmetic Mean	Arithmetic Mean Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Supplemental Screening Value	Supplemental Screening Value Source	Supplemental Screening Value Maximum HQ	Retain?	Rationale
Semivolatile Organic Compounds (UG/KG)																
2,4-Dinitrotoluene	1,500 - 1,500	0 / 27	--	--	NSV	-- / --	NSV	750	NSV	--	--	--	--	--	NO	Not detected
2,6-Dinitrotoluene	3,000 - 3,000	0 / 27	--	--	NSV	-- / --	NSV	1,500	NSV	--	--	--	--	--	NO	Not detected
Nitrobenzene	1,500 - 1,500	0 / 27	--	--	NSV	-- / --	NSV	750	NSV	--	--	--	--	--	NO	Not detected
Explosives (UG/KG)																
1,3,5-Trinitrobenzene	1,500 - 1,500	0 / 27	--	--	NSV	-- / --	NSV	750	NSV	--	--	--	--	--	NO	Not detected
1,3-Dinitrobenzene	1,500 - 1,500	0 / 27	--	--	NSV	-- / --	NSV	750	NSV	--	--	--	--	--	NO	Not detected
2,4,6-Trinitrotoluene	1,500 - 1,500	0 / 27	--	--	NSV	-- / --	NSV	750	NSV	--	--	--	--	--	NO	Not detected
2-Amino-4,6-dinitrotoluene	1,500 - 1,500	0 / 27	--	--	NSV	-- / --	NSV	750	NSV	--	--	--	--	--	NO	Not detected
2-Nitrotoluene	3,000 - 3,000	0 / 27	--	--	NSV	-- / --	NSV	1,500	NSV	--	--	--	--	--	NO	Not detected
3-Nitrotoluene	3,000 - 3,000	0 / 27	--	--	NSV	-- / --	NSV	1,500	NSV	--	--	--	--	--	NO	Not detected
4-Amino-2,6-dinitrotoluene	1,500 - 1,500	0 / 27	--	--	NSV	-- / --	NSV	750	NSV	--	--	--	--	--	NO	Not detected
4-Nitrotoluene	3,000 - 3,000	0 / 27	--	--	NSV	-- / --	NSV	1,500	NSV	--	--	--	--	--	NO	Not detected
HMX	1,500 - 1,500	0 / 27	--	--	NSV	-- / --	NSV	750	NSV	--	--	--	--	--	NO	Not detected
Nitroglycerin	4,000 - 4,000	0 / 27	--	--	NSV	-- / --	NSV	2,000	NSV	--	--	--	--	--	NO	Not detected
Perchlorate	2.50 - 5.40	0 / 27	--	--	NSV	-- / --	NSV	1.47	NSV	--	--	--	--	--	NO	Not detected
PETN	2,500 - 2,500	0 / 27	--	--	NSV	-- / --	NSV	1,250	NSV	--	--	--	--	--	NO	Not detected
RDX	1,500 - 1,500	0 / 27	--	--	NSV	-- / --	NSV	750	NSV	--	--	--	--	--	NO	Not detected
Inorganics (MG/KG)																
Aluminum	-- - --	27 / 27	16,700	SDZ-SD01-10B	NSV	-- / --	NSV	3,311	NSV	5471	Yes	25500	Ingersoll et al., 1996	0.65	NO	Supplemental HQ less than one
Antimony	1.20 - 1.80	20 / 27	2.20	SDZ-WN10-10B	2.00	1 / 27	1.10	1.19	0.60	2.8	No	--	--	--	NO	Consistent with background, low frequency and magnitude of exceedance
Arsenic	-- - --	27 / 27	9.20	SDZ-SD01-10B	7.24	2 / 27	1.27	2.86	0.39	5.3	Yes	--	--	--	NO	Low magnitude of exceedance
Barium	-- - --	27 / 27	19.4	SDZ-SD01-10B	NSV	-- / --	NSV	5.27	NSV	10.0	Yes	130.1	Buchman, 2008	0.15	NO	Supplemental HQ less than one
Beryllium	0.58 - 1.30	0 / 27	--	--	NSV	-- / --	NSV	0.36	NSV	0.68	Yes	--	--	--	NO	Not detected
Cadmium	0.58 - 1.30	1 / 27	0.16	SDZ-SD03-10B	0.68	0 / 27	0.24	0.35	0.52	0.68	No	--	--	--	NO	HQ less than one, consistent with background
Calcium [2]	-- - --	27 / 27	111,000	SDZ-SD03-10B	NSV	-- / --	NSV	22,244	NSV	39200	Yes	--	--	--	NO	Macronutrient
Chromium	-- - --	27 / 27	42.3	SDZ-SD01-10B	52.3	0 / 27	0.81	12.0	0.23	21.2	Yes	--	--	--	NO	HQ less than one
Cobalt	0.58 - 1.30	3 / 27	0.71	SDZ-SD03-10B	NSV	-- / --	NSV	0.39	NSV	1.04	No	50	TCEQ, 2006*	0.01	NO	Consistent with background, supplemental HQ less than one
Copper	0.58 - 0.63	20 / 27	9.70	SDZ-SD01-10B	18.7	0 / 27	0.52	1.85	0.10	2.5	Yes	--	--	--	NO	HQ less than one
Iron	-- - --	27 / 27	24,300	SDZ-SD01-10B	NSV	-- / --	NSV	4,835	NSV	7663	Yes	20,000	TCEQ, 2006*	1.22	NO	Low frequency and magnitude of exceedance
Lead	-- - --	27 / 27	22.9	SDZ-SD01-10B	30.2	0 / 27	0.76	4.05	0.13	5.5	Yes	--	--	--	NO	HQ less than one
Magnesium [2]	-- - --	27 / 27	4,950	SDZ-SD01-10B	NSV	-- / --	NSV	1,962	NSV	3371	Yes	--	--	--	NO	Macronutrient
Manganese	-- - --	27 / 27	96.0	SDZ-SD01-10B	NSV	-- / --	NSV	29.0	NSV	51.7	Yes	460	TCEQ, 2006*	0.21	NO	Supplemental HQ less than one
Mercury	0.041 - 0.063	11 / 27	0.072	SDZ-SD01-10B	0.13	0 / 27	0.55	0.026	0.20	0.04	Yes	--	--	--	NO	HQ less than one
Nickel	0.60 - 0.64	25 / 27	11.1	SDZ-SD01-10B	15.9	0 / 27	0.70	2.55	0.16	4.5	Yes	--	--	--	NO	HQ less than one
Potassium [2]	583 - 720	17 / 27	2,830	SDZ-SD01-10B	NSV	-- / --	NSV	754	NSV	1364	Yes	--	--	--	NO	Macronutrient
Selenium	0.58 - 1.00	5 / 27	0.96	SDZ-SD01-10B	NSV	-- / --	NSV	0.41	NSV	0.68	Yes	1	Buchman, 2008	0.96	NO	Supplemental HQ less than one
Silver	0.58 - 1.30	0 / 27	--	--	0.73	-- / --	1.77	0.36	0.49	0.68	Yes	--	--	--	NO	Not detected
Sodium [2]	-- - --	27 / 27	9,290	SDZ-SD09-10B	NSV	-- / --	NSV	4,561	NSV	7207	Yes	--	--	--	NO	Macronutrient
Thallium	1.20 - 2.50	0 / 27	--	--	NSV	-- / --	NSV	0.72	NSV	1.3	Yes	--	--	--	NO	Not detected
Vanadium	-- - --	27 / 27	40.1	SDZ-SD01-10B	NSV	-- / --	NSV	10.6	NSV	18.1	Yes	57	Buchman, 2008	0.70	NO	Supplemental HQ less than one
Zinc	-- - --	27 / 27	55.6	SDZ-SD01-10B	124	0 / 27	0.45	11.8	0.10	17.3	Yes	--	--	--	NO	HQ less than one

NOTES

* Freswater sediment screening values

1 - Count of detected samples exceeding or equaling Screening Value

2 - Macronutrient - Not considered to be a COPC

HQ - Hazard Quotient

MG/KG - Milligrams per kilogram

NSV - No Screening Value

PCT/P - Percent Passed

UG/KG - Micrograms per kilogram

Generated by: Sara Kent

Checked by: Jon Weir

Table K-4

Off-Base SDZs Surface Water Screen

Off Base SDZs MRA

PA/SI Report

MCB Camp Lej, 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	Arithmetic Mean	Arithmetic Mean Hazard Quotient	Background Concentration[3]	Maximum Exceeds Background?	Supplemental Screening Value	Supplemental Screening Value Source	Supplemental Screening Value Maximum HQ	Retain?	Rationale
Semivolatile Organic Compounds (UG/L)																
2,4-Dinitrotoluene	2.50 - 2.50	0 / 5	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	--	NO	Not detected
2,6-Dinitrotoluene	2.50 - 2.50	0 / 5	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	--	NO	Not detected
Nitrobenzene	2.50 - 2.50	0 / 5	--	--	66.8	-- / --	0.037	1.25	0.019	--	--	--	--	--	NO	Not detected, HQ less than one
Explosives (UG/L)																
1,3,5-Trinitrobenzene	2.50 - 2.50	0 / 5	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	--	NO	Not detected
1,3-Dinitrobenzene	2.50 - 2.50	0 / 5	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	--	NO	Not detected
2,4,6-Trinitrotoluene	2.50 - 2.50	0 / 5	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	--	NO	Not detected
2-Amino-4,6-dinitrotoluene	5.00 - 5.00	0 / 5	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	--	NO	Not detected
2-Nitrotoluene	5.00 - 5.00	0 / 5	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	--	NO	Not detected
3-Nitrotoluene	5.00 - 5.00	0 / 5	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	--	NO	Not detected
4-Amino-2,6-dinitrotoluene	5.00 - 5.00	0 / 5	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	--	NO	Not detected
4-Nitrotoluene	5.00 - 5.00	0 / 5	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	--	NO	Not detected
HMX	2.50 - 2.50	0 / 5	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	--	NO	Not detected
Nitroglycerin	16.0 - 16.0	0 / 5	--	--	NSV	-- / --	NSV	8.00	NSV	--	--	--	--	--	NO	Not detected
Perchlorate	0.20 - 0.20	2 / 5	0.080	SDZ-SW03-10B	NSV	-- / --	NSV	0.092	NSV	--	--	9,300	Dean et al., 2004*	8.60E-06	NO	Supplemental HQ less than one
PETN	10.0 - 10.0	0 / 5	--	--	NSV	-- / --	NSV	5.00	NSV	--	--	--	--	--	NO	Not detected
RDX	4.00 - 4.00	0 / 5	--	--	NSV	-- / --	NSV	2.00	NSV	--	--	--	--	--	NO	Not detected
Tetryl	5.00 - 5.00	0 / 5	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	--	NO	Not detected
Inorganics (UG/L)																
Aluminum	-- - --	5 / 5	628	SDZ-WN10-10B	NSV	-- / --	NSV	427	NSV	290	Yes	--	--	--	NO	Not detected in filtered sample
Antimony	10.0 - 10.0	1 / 5	5.20	SDZ-SW02-10B	NSV	-- / --	NSV	5.04	NSV	--	--	160	TCEQ, 2006*	0.03	NO	Supplemental HQ less than one
Arsenic	10.0 - 10.0	1 / 5	3.70	SDZ-SW01-10B	36.0	0 / 5	0.10	4.74	0.132	--	--	--	--	--	NO	HQ less than one
Barium	200 - 200	1 / 5	19.2	SDZ-SW06-10B	NSV	-- / --	NSV	83.8	NSV	--	--	25,000	TCEQ, 2006	7.68E-04	NO	Supplemental HQ less than one
Beryllium	5.00 - 5.00	0 / 5	--	--	NSV	-- / --	NSV	2.50	NSV	0.73	Yes	--	--	--	NO	Not detected
Cadmium	-- - --	5 / 5	9.00	SDZ-SW01-10B	8.80	1 / 5	1.02	6.27	0.713	8.5	Yes	--	--	--	NO	Low magnitude of exceedance
Calcium [4]	-- - --	5 / 5	435,000	SDZ-SW01-10B	NSV	-- / --	NSV	320,640	NSV	407000	Yes				NO	Macronutrient
Chromium	10.0 - 10.0	0 / 5	--	--	50.0	-- / --	0.20	5.00	0.100	--	--	--	--	--	NO	Not detected, HQ less than one
Cobalt	-- - --	5 / 5	32.8	SDZ-SW01-10B	NSV	-- / --	NSV	23.4	NSV	31.2	Yes	1,500	TCEQ, 2006*	0.02	NO	Supplemental HQ less than one
Copper	5.00 - 5.00	1 / 5	5.00	SDZ-SW06-10B	3.10	1 / 5	1.61	3.00	0.968	--	--	--	--	--	NO	Low magnitude of exceedance
Iron	-- - --	5 / 5	1,020	SDZ-SW06-10B	NSV	-- / --	NSV	775	NSV	612	Yes	1,000	TCEQ, 2006*	1.02	NO	Consistent with background in filtered sample
Lead	3.00 - 3.00	1 / 5	2.10	SDZ-SW06-10B	8.10	0 / 5	0.26	1.62	0.200	--	--	--	--	--	NO	HQ less than one
Magnesium [4]	-- - --	5 / 5	1,380,000	SDZ-SW01-10B	NSV	-- / --	NSV	1,007,820	NSV	1340000	Yes	--	--	--	NO	Macronutrient
Manganese	10.0 - 10.0	1 / 5	10.8	SDZ-SW06-10B	NSV	-- / --	NSV	6.16	NSV	--	--	120	TCEQ, 2006*	0.09	NO	Supplemental HQ less than one
Mercury	0.20 - 0.20	0 / 5	--	--	0.94	-- / --	0.21	0.10	0.106	--	--	--	--	--	NO	Not detected, HQ less than one
Nickel	5.00 - 5.00	0 / 5	--	--	8.20	-- / --	0.61	2.50	0.305	--	--	--	--	--	NO	Not detected, HQ less than one
Potassium [4]	-- - --	5 / 5	589,000	SDZ-SW01-10B	NSV	-- / --	NSV	419,780	NSV	574000	Yes	--	--	--	NO	Macronutrient
Selenium	5.00 - 5.00	1 / 5	3.30	SDZ-SW02-10B	71.0	0 / 5	0.046	2.66	0.037	--	--	--	--	--	NO	HQ less than one
Silver	5.00 - 5.00	0 / 5	--	--	0.23	-- / --	21.7	2.50	10.870	--	--	--	--	--	NO	Not detected
Sodium [4]	-- - --	5 / 5	10,800,000	SDZ-SW01-10B	NSV	-- / --	NSV	7,870,800	NSV	10500000	Yes	--	--	--	NO	Macronutrient
Thallium	10.0 - 10.0	0 / 5	--	--	21.3	-- / --	0.47	5.00	0.235	--	--	--	--	--	NO	Not detected, HQ less than one
Vanadium	-- - --	5 / 5	3.50	SDZ-SW01-10B	NSV	-- / --	NSV	2.94	NSV	3.8	No	--	--	--	NO	Consistent with background
Zinc	20.0 - 20.0	2 / 5	7.10	SDZ-SW01-10B	81.0	0 / 5	0.088	8.60	0.106	--	--	--	--	--	NO	HQ less than one
Dissolved Inorganics (UG/L)																
Aluminum, Dissolved	200 - 200	0 / 5	--	--	NSV	-- / --	NSV	100	NSV	290	Yes	--	--	--	NO	Not detected
Antimony, Dissolved	10.0 - 10.0	4 / 5	6.60	SDZ-SW01-10B	NSV	-- / --	NSV	4.98	NSV	--	--	160	TCEQ, 2006*	0.04	NO	Supplemental HQ less than one
Arsenic, Dissolved	10.0 - 10.0	0 / 5	--	--	36.0	-- / --	0.28	5.00	0.139	--	--	--	--	--	NO	Not detected, HQ less than one
Barium, Dissolved	200 - 200	1 / 5	17.9	SDZ-SW06-10B	NSV	-- / --	NSV	83.6	NSV	--	--	25,000	TCEQ, 2006	7.16E-04	NO	Supplemental HQ less than one
Beryllium, Dissolved	5.00 - 5.00	0 / 5	--	--	NSV	-- / --	NSV	2.50	NSV	0.73	Yes	--	--	--	NO	Not detected
Cadmium, Dissolved	5.00 - 5.00	4 / 5	9.40	SDZ-SW04-10B	8.80	2 / 5	1.07	7.06	0.802	8.5	Yes	--	--	--	NO	Low magnitude of exceedance
Calcium, Dissolved [4]	-- - --	5 / 5	411,000	SDZ-SW02-10B	NSV	-- / --	NSV	294,020	NSV	407000	Yes	--	--	--	NO	Macronutrient

Table K-4

Off-Base SDZs Surface Water Screen

Off Base SDZs MRA

PA/SI Report

MCB Camp Lej, 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	Arithmetic Mean	Arithmetic Mean Hazard Quotient	Background Concentration[3]	Maximum Exceeds Background?	Supplemental Screening Value	Supplemental Screening Value Source	Supplemental Screening Value Maximum HQ	Retain?	Rationale
Chromium, Dissolved	10.0 - 10.0	0 / 5	--	--	50.0	-- / --	0.20	5.00	0.100	--	--	--	--	--	NO	Not detected. HQ less than one
Cobalt, Dissolved	-- - --	5 / 5	34.4	SDZ-SW01-10B	NSV	-- / --	NSV	24.0	NSV	31.2	Yes	1,500	TCEQ, 2006*	0.02	NO	Supplemental HQ less than one
Copper, Dissolved	5.00 - 5.00	1 / 5	6.40	SDZ-SW06-10B	3.10	1 / 5	2.06	3.28	1.058	--	--	--	--	--	NO	Low magnitude of exceedance
Iron, Dissolved	100 - 100	4 / 5	449	SDZ-SW02-10B	NSV	-- / --	NSV	294	NSV	612	No	--	--	--	NO	Consistent with background
Lead, Dissolved	3.00 - 3.00	0 / 5	--	--	8.10	-- / --	0.37	1.50	0.185	--	--	--	--	--	NO	Not detected, HQ less than one
Magnesium, Dissolved[4]	-- - --	5 / 5	1,340,000	SDZ-SW02-10B	NSV	-- / --	NSV	951,040	NSV	1340000	No	--	--	--	NO	Consistent with background, macronutrient
Manganese, Dissolved	10.0 - 10.0	1 / 5	7.10	SDZ-SW06-10B	NSV	-- / --	NSV	5.42	NSV	--	--	120	TCEQ, 2006*	0.06	NO	Supplemental HQ less than one
Mercury, Dissolved	0.20 - 0.20	0 / 5	--	--	0.94	-- / --	0.21	0.10	0.106	--	--	--	--	--	NO	Not detected. HQ less than one
Nickel, Dissolved	5.00 - 5.00	0 / 5	--	--	8.20	-- / --	0.61	2.50	0.305	--	--	--	--	--	NO	Not detected. HQ less than one
Potassium, Dissolved[4]	-- - --	5 / 5	560,000	SDZ-SW02-10B	NSV	-- / --	NSV	399,460	NSV	574000	No	--	--	--	NO	Consistent with background, macronutrient
Selenium, Dissolved	5.00 - 5.00	1 / 5	2.30	SDZ-SW06-10B	71.0	0 / 5	0.032	2.46	0.035	--	--	--	--	--	NO	HQ less than one
Silver, Dissolved	5.00 - 5.00	0 / 5	--	--	0.23	-- / --	21.7	2.50	10.870	--	--	--	--	--	NO	Not detected
Sodium, Dissolved[4]	-- - --	5 / 5	10,200,000	SDZ-SW02-10B	NSV	-- / --	NSV	7,429,800	NSV	10500000	No	--	--	--	NO	Consistent with background, macronutrient
Thallium, Dissolved	10.0 - 10.0	0 / 5	--	--	21.3	-- / --	0.47	5.00	0.235	--	--	--	--	--	NO	Not detected, HQ less than one
Vanadium, Dissolved	20.0 - 20.0	4 / 5	2.70	SDZ-SW03-10B	NSV	-- / --	NSV	3.68	NSV	3.8	No	--	--	--	NO	Consistent with background
Zinc, Dissolved	20.0 - 20.0	1 / 5	5.30	SDZ-SW01-10B	81.0	0 / 5	0.065	9.06	0.112	--	--	--	--	--	NO	HQ less than one

NOTES

* Freshwater screening values

1 - Marine screening values

2 - Count of detected samples exceeding or equaling Screening Value

3 - Background Concentration based on one sample

4 - Macronutrient - Not considered to be a COPC

HQ - Hazard Quotients

NSV - No Screening Value

UG/L - Micrograms per liter

Generated by: Sara Kent

Checked by: Jon Weir

Table K-5

Off-Base SDZs Groundwater Screen

Off Base SDZs MRA

PA/SI Report

MCB Camp Lej, 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	Arithmetic Mean	Arithmetic Mean Hazard Quotient	Site Concentrations Consistent with Background?[3]	Supplemental Screening Value	Supplemental Screening Value Source	Supplemental Screening Value Maximum HQ	Retain?	Rationale
Semivolatile Organic Compounds (UG/L)															
2,4-Dinitrotoluene	2.50 - 5.00	0 / 71	--	--	NSV	-- / --	NSV	2.22	NSV	--	--	--	--	NO	Not detected
2,6-Dinitrotoluene	2.50 - 5.00	0 / 71	--	--	NSV	-- / --	NSV	2.22	NSV	--	--	--	--	NO	Not detected
Nitrobenzene	2.50 - 2.50	0 / 71	--	--	66.8	-- / --	0.037	1.25	0.02	--	--	--	--	NO	Not detected, HQ less than one
Explosives (UG/L)															
1,3,5-Trinitrobenzene	2.50 - 2.50	0 / 71	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	NO	Not detected
1,3-Dinitrobenzene	2.50 - 2.50	0 / 71	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	NO	Not detected
2,4,6-Trinitrotoluene	2.50 - 2.50	0 / 71	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	NO	Not detected
2-Amino-4,6-dinitrotoluene	5.00 - 5.00	0 / 71	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	NO	Not detected
2-Nitrotoluene	5.00 - 5.00	0 / 71	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	NO	Not detected
3-Nitrotoluene	5.00 - 5.00	0 / 71	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	NO	Not detected
4-Amino-2,6-dinitrotoluene	5.00 - 5.00	0 / 71	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	NO	Not detected
4-Nitrotoluene	5.00 - 5.00	0 / 71	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	NO	Not detected
HMX	2.50 - 2.50	0 / 71	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	NO	Not detected
Nitroglycerin	16.0 - 16.0	0 / 71	--	--	NSV	-- / --	NSV	8.00	NSV	--	--	--	--	NO	Not detected
Perchlorate	0.20 - 0.20	15 / 71	0.21	BI-GW21-10A	NSV	-- / --	NSV	0.097	NSV	--	9,300	Dean et al., 2004*	2.26E-05	NO	Supplemental HQ less than one
PETN	10.0 - 10.0	0 / 71	--	--	NSV	-- / --	NSV	5.00	NSV	--	--	--	--	NO	Not detected
RDX	2.50 - 4.00	0 / 71	--	--	NSV	-- / --	NSV	1.36	NSV	--	--	--	--	NO	Not detected
Tetryl	5.00 - 5.00	0 / 71	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	NO	Not detected
Inorganics (UG/L)															
Aluminum	200 - 200	44 / 71	7,040	SDZ-WN10-10B	NSV	-- / --	NSV	593	NSV	Yes	--	--	--	NO	Consistent with background
Antimony	10.0 - 10.0	2 / 71	19,800	ICW-GW01-10A	NSV	-- / --	NSV	291	NSV	Yes	--	--	--	NO	Low frequency of detection, consistent with background
Arsenic	10.0 - 10.0	23 / 71	43.0	SI-GW05-10A	36.0	1 / 71	1.19	6.72	0.19	Yes	--	--	--	NO	Consistent with background
Barium	200 - 200	39 / 71	1,970	SI-GW05-10A	NSV	-- / --	NSV	75.1	NSV	No	25,000	TCEQ, 2006	0.08	NO	Supplemental HQ less than one
Beryllium	5.00 - 5.00	3 / 71	985	ICW-GW03-10A	NSV	-- / --	NSV	17.1	NSV	Yes	--	--	--	NO	Low frequency of detection, consistent with background
Cadmium	5.00 - 5.00	4 / 71	46.0	SI-GW05-10A	8.80	2 / 71	5.23	3.40	0.39	Yes	--	--	--	NO	Consistent with background, not detected in filtered samples
Calcium[4]	5,000 - 5,000	70 / 71	334,000	ICW-GW13-10A	NSV	-- / --	NSV	72,629	NSV	Yes	--	--	--	NO	Macronutrient
Chromium	10.0 - 10.0	66 / 71	197	SI-GW05-10A	50.0	2 / 71	3.94	9.21	0.18	Yes	--	--	--	NO	Consistent with background
Cobalt	5.00 - 5.00	6 / 71	487	SI-GW05-10A	NSV	-- / --	NSV	9.79	NSV	Yes				NO	Consistent with background
Copper	5.00 - 5.00	16 / 71	246	SI-GW05-10A	3.10	13 / 71	79.4	7.57	2.44	Yes	--	--	--	NO	Consistent with background
Iron	100 - 100	55 / 71	8,920	ICW-GW04-10A	NSV	-- / --	NSV	1,241	NSV	Yes	--	--	--	NO	Consistent with background
Lead	3.00 - 3.00	14 / 71	11,800	ICW-GW01-10A	8.10	2 / 71	1,457	168	20.8	Yes	--	--	--	NO	Consistent with background
Magnesium[4]	5,000 - 5,000	44 / 71	594,000	ICW-GW13-10A	NSV	-- / --	NSV	47,397	NSV	Yes	--	--	--	NO	Macronutrient
Manganese	10.0 - 10.0	68 / 71	518	SI-GW05-10A	NSV	-- / --	NSV	28.0	NSV	Yes	--	--	--	NO	Consistent with background
Mercury	0.20 - 0.20	4 / 71	0.38	BI-GW40-10A	0.94	0 / 71	0.40	0.11	0.11	Yes	--	--	--	NO	HQ less than one
Nickel	5.00 - 40.0	23 / 71	471	SI-GW05-10A	8.20	2 / 71	57.4	24.4	2.97	Yes	--	--	--	NO	Consistent with background
Potassium[4]	5,000 - 5,000	65 / 71	310,000	ICW-GW03-10A	NSV	-- / --	NSV	24,087	NSV	Yes	--	--	--	NO	Macronutrient
Selenium	5.00 - 5.00	10 / 62	5.80	ICW-GW04-10A	71.0	0 / 62	0.082	2.85	0.04	Yes	--	--	--	NO	Consistent with background, not detected in filtered samples
Silver	5.00 - 5.00	4 / 71	46.2	SI-GW05-10A	0.23	4 / 71	201	3.24	14.1	Yes	--	--	--	NO	Consistent with background, not detected in filtered samples
Sodium[4]	5,000 - 5,000	54 / 71	3,900,000	ICW-GW13-10A	NSV	-- / --	NSV	344,906	NSV	Yes	--	--	--	NO	Macronutrient
Thallium	10.0 - 10.0	6 / 71	5,440	ICW-GW01-10A	21.3	3 / 71	255	87.3	4.10	Yes	--	--	--	NO	Consistent with background, not detected in filtered sample
Vanadium	20.0 - 20.0	66 / 71	521	SI-GW05-10A	NSV	-- / --	NSV	13.5	NSV	Yes	--	--	--	NO	Consistent with background

Table K-5

Off-Base SDZs Groundwater Screen

Off Base SDZs MRA

PA/SI Report

MCB Camp Lej, 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	Arithmetic Mean	Arithmetic Mean Hazard Quotient	Site Concentrations Consistent with Background?[3]	Supplemental Screening Value	Supplemental Screening Value Source	Supplemental Screening Value Maximum HQ	Retain?	Rationale
Zinc	20.0 - 20.0	2 / 71	476	SI-GW05-10A	81.0	2 / 71	5.88	22.6	0.28	Yes	--	--	--	NO	Consistent with background
Dissolved Inorganics (UG/L)															
Aluminum, Dissolved	200 - 200	4 / 8	2,690	SI-GW01-10A	NSV	-- / --	NSV	499	NSV	--	--	--	--	NO	No screening value
Antimony, Dissolved	10.0 - 10.0	0 / 8	--	--	NSV	-- / --	NSV	5.00	NSV	--	--	--	--	NO	Not detected
Arsenic, Dissolved	10.0 - 10.0	4 / 8	38.0	BI-GW41-10A	36.0	1 / 8	1.06	11.9	0.33	--	--	--	--	NO	Low magnitude of exceedance
Barium, Dissolved	200 - 200	3 / 8	16.6	SI-GW01-10A	NSV	-- / --	NSV	65.3	NSV	--	25,000	TCEQ, 2006	6.64E-04	NO	Supplemental HQ less than one
Beryllium, Dissolved	5.00 - 5.00	1 / 8	0.45	SI-GW01-10A	NSV	-- / --	NSV	2.24	NSV	--	--	--	--	NO	No screening value
Cadmium, Dissolved	5.00 - 5.00	0 / 8	--	--	8.80	-- / --	0.57	2.50	0.28	--	--	--	--	NO	Not detected, HQ less than one
Calcium, Dissolved [4]	-- - --	8 / 8	53,300	SI-GW01-10A	NSV	-- / --	NSV	38,438	NSV	--	--	--	--	NO	Macronutrient
Chromium, Dissolved	10.0 - 10.0	4 / 8	28.5	SI-GW01-10A	50.0	0 / 8	0.57	7.95	0.16	--	--	--	--	NO	HQ less than one
Cobalt, Dissolved	5.00 - 5.00	1 / 8	1.90	BI-GW41-10A	NSV	-- / --	NSV	2.43	NSV	--	--	--	--	NO	No screening value
Copper, Dissolved	5.00 - 5.00	1 / 8	4.10	SI-GW01-10A	3.10	1 / 8	1.32	2.70	0.87	--	--	--	--	NO	Low magnitude of exceedance
Iron, Dissolved	100 - 100	3 / 8	9,640	BI-GW41-10A	NSV	-- / --	NSV	1,483	NSV	--	--	--	--	NO	No screening value
Lead, Dissolved	3.00 - 3.00	6 / 8	4.40	BI-GW41-10A	8.10	0 / 8	0.54	2.84	0.35	--	--	--	--	NO	HQ less than one
Magnesium, Dissolved [4]	5,000 - 5,000	5 / 8	140,000	SI-GW01-10A	NSV	-- / --	NSV	22,394	NSV	--	--	--	--	NO	Macronutrient
Manganese, Dissolved	10.0 - 10.0	6 / 8	715	BI-GW41-10A	NSV	-- / --	NSV	101	NSV	--	--	--	--	NO	No screening value
Mercury, Dissolved	0.20 - 0.20	2 / 8	0.60	SI-GW01-10A	0.94	0 / 8	0.64	0.21	0.22	--	--	--	--	NO	HQ less than one
Nickel, Dissolved	5.00 - 40.0	3 / 8	4.20	BI-GW41-10A	8.20	0 / 8	0.51	11.5	1.40	--	--	--	--	NO	HQ less than one
Potassium, Dissolved [4]	-- - --	8 / 8	58,300	SI-GW01-10A	NSV	-- / --	NSV	8,299	NSV	--	--	--	--	NO	Macronutrient
Selenium, Dissolved	5.00 - 5.00	0 / 8	--	--	71.0	-- / --	0.070	2.50	0.04	--	--	--	--	NO	Not detected, HQ less than one
Silver, Dissolved	5.00 - 5.00	0 / 8	--	--	0.23	-- / --	21.7	2.50	10.9	--	--	--	--	NO	Not detected
Sodium, Dissolved [4]	5,000 - 5,000	6 / 8	1,140,000	SI-GW01-10A	NSV	-- / --	NSV	153,526	NSV	--	--	--	--	NO	Macronutrient
Thallium, Dissolved	10.0 - 10.0	0 / 8	--	--	21.3	-- / --	0.47	5.00	0.23	--	--	--	--	NO	Not detected, HQ less than one
Vanadium, Dissolved	20.0 - 20.0	4 / 8	14.1	SI-GW01-10A	NSV	-- / --	NSV	7.18	NSV	--	--	--	--	NO	No screening value
Zinc, Dissolved	20.0 - 20.0	2 / 8	7.30	SI-GW01-10A	81.0	0 / 8	0.090	8.60	0.11	--	--	--	--	NO	HQ less than one

NOTES

* Freshwater screening values

1 - Marine screening values

2 - Count of detected samples exceeding or equaling Screening Value

3 - Total metals data in site and background samples were evaluted using statistical analysis (Gehan or Wilcoxon Ranks Sum) to determine if site data were significantly different than background data

4 - Macronutrient - Not considered to be a COPC

HQ - Hazard Quotient

NSV - No Screening Value

UG/L - Micrograms per liter

Generated by: Sara Kent

Checked by: Jon Weir

Table K-6

Off-Base SDZ Pore Water Screen

Off Base SDZs MRA

PA/SI Report

MCB Camp Lej, 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	Arithmetic Mean	Arithmetic Mean Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Supplemental Screening Value	Supplemental Screening Value Source	Supplemental Screening Value Maximum HQ	Retain?	Rationale
Semivolatile Organic Compounds (UG/L)																
2,4-Dinitrotoluene	2.50 - 2.50	0 / 22	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	--	NO	Not detected
2,6-Dinitrotoluene	2.50 - 2.50	0 / 22	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	--	NO	Not detected
Nitrobenzene	2.50 - 2.50	0 / 22	--	--	66.8	-- / --	0.037	1.25	0.019	--	--	--	--	--	NO	Not detected, HQ less than one
Explosives (UG/L)																
1,3,5-Trinitrobenzene	2.50 - 2.50	0 / 22	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	--	NO	Not detected
1,3-Dinitrobenzene	2.50 - 2.50	0 / 22	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	--	NO	Not detected
2,4,6-Trinitrotoluene	2.50 - 2.50	0 / 22	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	--	NO	Not detected
2-Amino-4,6-dinitrotoluene	5.00 - 5.00	0 / 22	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	--	NO	Not detected
2-Nitrotoluene	5.00 - 5.00	0 / 22	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	--	NO	Not detected
3-Nitrotoluene	5.00 - 5.00	0 / 22	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	--	NO	Not detected
4-Amino-2,6-dinitrotoluene	5.00 - 5.00	0 / 22	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	--	NO	Not detected
4-Nitrotoluene	5.00 - 5.00	0 / 22	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	--	NO	Not detected
HMX	2.50 - 2.50	0 / 22	--	--	NSV	-- / --	NSV	1.25	NSV	--	--	--	--	--	NO	Not detected
Nitroglycerin	16.0 - 16.0	0 / 22	--	--	NSV	-- / --	NSV	8.00	NSV	--	--	--	--	--	NO	Not detected
Perchlorate	0.20 - 0.20	0 / 22	--	--	NSV	-- / --	NSV	0.10	NSV	--	--	--	--	--	NO	Not detected
PETN	10.0 - 10.0	0 / 22	--	--	NSV	-- / --	NSV	5.00	NSV	--	--	--	--	--	NO	Not detected
RDX	4.00 - 4.00	0 / 22	--	--	NSV	-- / --	NSV	2.00	NSV	--	--	--	--	--	NO	Not detected
Tetryl	5.00 - 5.00	0 / 22	--	--	NSV	-- / --	NSV	2.50	NSV	--	--	--	--	--	NO	Not detected
Inorganics (UG/L)																
Aluminum	200 - 200	17 / 22	8,630	SDZ-WN10-10B	NSV	-- / --	NSV	1,001	NSV	442	Yes	--	--	--	NO	Not detected in the filtered sample
Antimony	5.00 - 10.0	7 / 22	4.40	SDZ-WN02-10B	NSV	-- / --	NSV	4.48	NSV	7.1	No	160	TCEQ, 2006*	0.03	NO	Consistent with background, supplemental HQ less than one
Arsenic	10.0 - 10.0	13 / 22	39.6	SDZ-WN24-10B	36.0	1 / 22	1.10	9.26	0.257	13.5	Yes	--	--	--	NO	Low frequency and magnitude of exceedance
Barium	200 - 200	7 / 22	19.9	SDZ-WN10-10B	NSV	-- / --	NSV	73.7	NSV	200	No	25,000	TCEQ, 2006	7.96E-04	NO	Supplemental HQ less than one
Beryllium	5.00 - 5.00	5 / 22	2.90	SDZ-WN24-10B	NSV	-- / --	NSV	2.37	NSV	4.3	No	--	--	--	NO	Consistent with background, not detected in the filtered sample
Cadmium	5.00 - 5.00	21 / 22	10.2	SDZ-WN15-10B	8.80	10 / 22	1.16	8.19	0.930	16.0	No	--	--	--	NO	Consistent with background, low magnitude of exceedance
Calcium [3]	5,000 - 5,000	21 / 22	556,000	SDZ-WN15-10B	NSV	-- / --	NSV	401,886	NSV	832667	No	--	--	--	NO	Consistent with background, macronutrient
Chromium	10.0 - 10.0	2 / 22	22.6	SDZ-WN10-10B	50.0	0 / 22	0.45	6.35	0.127	7.2	Yes	--	--	--	NO	HQ less than one
Cobalt	5.00 - 5.00	21 / 22	37.1	SDZ-WN15-10B	NSV	-- / --	NSV	29.7	NSV	58.4	No	1,500	TCEQ, 2006*	0.02	NO	Consistent with background, supplemental HQ less than one
Copper	5.00 - 5.00	2 / 22	1.70	SDZ-WN10-10B	3.10	0 / 22	0.55	2.41	0.777	5.0	No	--	--	--	NO	Consistent with background, HQ less than one
Iron	-- - --	22 / 22	9,030	SDZ-WN24-10B	NSV	-- / --	NSV	2,368	NSV	2536	Yes	1,000	TCEQ, 2006*	9.03	NO	See text for discussion
Lead	3.00 - 3.00	2 / 22	4.60	SDZ-WN10-10B	8.10	0 / 22	0.57	1.74	0.215	3.0	Yes	--	--	--	NO	HQ less than one, not detected in filtered samples
Magnesium [3]	5,000 - 5,000	21 / 22	1,430,000	SDZ-WN15-10B	NSV	-- / --	NSV	1,226,932	NSV	2413333	No	--	--	--	NO	Consistent with background, macronutrient
Manganese	10.0 - 10.0	12 / 22	175	SDZ-WN22-10B	NSV	-- / --	NSV	45.5	NSV	66.9	Yes	120	TCEQ, 2006*	1.46	NO	Low magnitude of exceedance
Mercury	0.20 - 0.20	1 / 22	0.091	SDZ-WN13-10B	0.94	0 / 22	0.097	0.100	0.106	0.20	No	--	--	--	NO	HQ less than one, mot detected in filtered sample
Nickel	5.00 - 5.00	4 / 22	9.90	SDZ-WN06-10B	8.20	2 / 22	1.21	3.18	0.387	5.0	Yes	--	--	--	NO	Low magnitude of exceedance, HQ less than one in filtered sample
Potassium [3]	5,000 - 5,000	21 / 22	656,000	SDZ-WN15-10B	NSV	-- / --	NSV	513,250	NSV	1058667	No	--	--	--	NO	Consistent with background, macronutrient
Selenium	5.00 - 5.00	3 / 22	3.10	SDZ-WN11-10B	71.0	0 / 22	0.044	2.52	0.036	5.00	No	--	--	--	NO	Consistent with background, HQ less than one
Silver	5.00 - 5.00	1 / 22	0.68	SDZ-WN22-10B	0.23	1 / 22	2.96	2.42	10.510	5.00	No	--	--	--	NO	Consistent with background, not detected in filtered sample
Sodium [3]	5,000 - 5,000	21 / 22	11,400,000	SDZ-WN15-10B	NSV	-- / --	NSV	9,609,205	NSV	19580000	No	--	--	--	NO	Consistent with background, macronutrient
Thallium	10.0 - 10.0	1 / 22	5.00	SDZ-WN24-10B	21.3	0 / 22	0.23	5.00	0.235	10.0	No	--	--	--	NO	Consistent with background, HQ less than one
Vanadium	20.0 - 20.0	16 / 22	22.0	SDZ-WN10-10B	NSV	-- / --	NSV	6.43	NSV	14.1	Yes	20	TCEQ, 2006*	1.10	NO	Low frequency and magnitude of exceedance
Zinc	20.0 - 20.0	15 / 22	22.9	SDZ-WN02-10B	81.0	0 / 22	0.28	10.2	0.126	18.7	Yes	--	--	--	NO	HQ less than one
Dissolved Inorganics (UG/L)																
Aluminum, Dissolved	200 - 200	0 / 22	--	--	NSV	-- / --	NSV	100	NSV	200	Yes	--	--	--	NO	Not detected
Antimony, Dissolved	10.0 - 10.0	14 / 22	7.40	SDZ-WN02-10B	NSV	-- / --	NSV	4.71	NSV	10.5	No	160	TCEQ, 2006*	0.05	NO	Consistent with background, supplemental HQ less than one
Arsenic, Dissolved	10.0 - 10.0	9 / 22	36.5	SDZ-WN24-10B	36.0	1 / 22	1.01	8.59	0.239	14.7	Yes	--	--	--	NO	Low frequency and magnitude of exceedance
Barium, Dissolved	200 - 200	1 / 22	15.3	SDZ-WN15-10B	NSV	-- / --	NSV	96.2	NSV	200	No	25,000	TCEQ, 2006	6.12E-04	NO	Consistent with background, supplemental HQ less than one
Beryllium, Dissolved	5.00 - 5.00	0 / 22	--	--	NSV	-- / --	NSV	2.50	NSV	5.0	Yes	--	--	--	NO	Not detected
Cadmium, Dissolved	5.00 - 5.00	21 / 22	9.50	SDZ-WN19-10B	8.80	7 / 22	1.08	8.15	0.926	15.9	No	--	--	--	NO	Consistent with background, low magnitude of exceedance

Table K-6

Off-Base SDZ Pore Water Screen

Off Base SDZs MRA

PA/SI Report

MCB Camp Lej, 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	Arithmetic Mean	Arithmetic Mean Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Supplemental Screening Value	Supplemental Screening Value Source	Supplemental Screening Value Maximum HQ	Retain?	Rationale
Calcium, Dissolved [3]	-- - --	22 / 22	488,000	SDZ-WN15-10B	NSV	-- / --	NSV	385,009	NSV	863333	No	--	--	--	NO	Consistent with background, macronutrient
Chromium, Dissolved	10.0 - 10.0	1 / 22	0.81	SDZ-WN15-10B	50.0	0 / 22	0.016	4.81	0.096	8.0	No	--	--	--	NO	Consistent with background, HQ less than one
Cobalt, Dissolved	5.00 - 5.00	21 / 22	35.1	SDZ-WN19-10B	NSV	-- / --	NSV	29.1	NSV	58.5	No	1,500	TCEQ, 2006*	0.02	NO	Consistent with background, supplemental HQ less than one
Copper, Dissolved	5.00 - 5.00	0 / 22	--	--	3.10	-- / --	1.61	2.50	0.806	5.0	Yes	--	--	--	NO	Not detected
Iron, Dissolved	100 - 100	21 / 22	7,490	SDZ-WN24-10B	NSV	-- / --	NSV	1,401	NSV	2119	Yes	1,000	TCEQ, 2006*	7.49	NO	See text for discussion
Lead, Dissolved	3.00 - 3.00	0 / 22	--	--	8.10	-- / --	0.37	1.50	0.185	3.0	Yes	--	--	--	NO	Not detected, HQ less than one
Magnesium, Dissolved [3]	-- - --	22 / 22	1,360,000	SDZ-WN27-10B	NSV	-- / --	NSV	1,183,200	NSV	2400000	No	--	--	--	NO	Consistent with background, macronutrient
Manganese, Dissolved	10.0 - 10.0	11 / 22	149	SDZ-WN22-10B	NSV	-- / --	NSV	39.4	NSV	64.9	Yes	120	TCEQ, 2006*	1.24	NO	Low magnitude of exceedance
Mercury, Dissolved	0.20 - 0.20	0 / 22	--	--	0.94	-- / --	0.21	0.10	0.106	0.20	Yes	--	--	--	NO	Not detected, HQ less than one
Nickel, Dissolved	5.00 - 5.00	4 / 22	1.40	SDZ-WN19-10B	8.20	0 / 22	0.17	2.25	0.274	5.0	No	--	--	--	NO	Consistent with background, HQ less than one
Potassium, Dissolved [3]	-- - --	22 / 22	602,000	SDZ-WN19-10B	NSV	-- / --	NSV	500,141	NSV	980000	No	--	--	--	NO	Consistent with background, macronutrient
Selenium, Dissolved	5.00 - 5.00	4 / 22	4.50	SDZ-WN10-10B	71.0	0 / 22	0.063	2.57	0.036	5.0	No	--	--	--	NO	Consistent with background, HQ less than one
Silver, Dissolved	5.00 - 5.00	0 / 22	--	--	0.23	-- / --	21.7	2.50	10.870	5.0	Yes	--	--	--	NO	Not detected
Sodium, Dissolved [3]	-- - --	22 / 22	10,500,000	SDZ-WN19-10B	NSV	-- / --	NSV	9,234,045	NSV	18580000	No	--	--	--	NO	Consistent with background, macronutrient
Thallium, Dissolved	10.0 - 10.0	0 / 22	--	--	21.3	-- / --	0.47	5.00	0.235	10.0	Yes	--	--	--	NO	Not detected, HQ less than one
Vanadium, Dissolved	20.0 - 20.0	11 / 22	7.90	SDZ-WN03-10B	NSV	-- / --	NSV	6.36	NSV	13.0	No	20	TCEQ, 2006*	0.40	NO	Consistent with background, supplemental HQ less than one
Zinc, Dissolved	20.0 - 20.0	10 / 22	19.6	SDZ-WN20-10B	81.0	0 / 22	0.24	8.93	0.110	15.5	Yes	--	--	--	NO	HQ less than one

NOTES

* Freshwater screening values

1 - Marine screening value

2 - Count of detected samples exceeding or equaling Screening Value

3 - Macronutrient - Not considered to be a COPC

HQ - Hazard Quotient

NSV - No Screening Value

UG/L - Micrograms per liter

Generated by: Sara Kent

Checked by: Jon Weir