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Final

Background Investigation
Naval Weapons Station Yorktown
Yorktown, Virginia
Cheatham Annex Site
Williamsburg, Virginia

Prepared For

Department of the Navy
Atlantic Division
Naval Facilities Engineering Command

Norfolk, Virginia

Contract No. N62470-95-D-6007
CTO-0196

September 2003

Prepared by

CH2M HILL
Federal Group, Ltd.

Baker
Environmental, Inc.

CDM
Federal Programs Corp.

FINAL

BACKGROUND INVESTIGATION

NAVAL WEAPONS STATION YORKTOWN
CHEATHAM ANNEX SITE
WILLIAMSBURG, VIRGINIA

CONTRACT TASK ORDER 0196

September 2003

Prepared for:

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

Under the:

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LIST OF ACRONYMS AND ABBREVIATIONS

ANOVA	Analysis of Variance
AOC	Area of Concern
Baker	Baker Environmental, Inc.
bgs	Below Ground Surface
CAX	Cheatham Annex Site
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action – Navy
CLP	Contract Laboratory Program
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
CTO	Contract Task Order
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DERP	Defense Environmental Restoration Program
DOI	Department of Interior
DON	Department of the Navy
EPIC	Aerial Photographic Analysis
eV	Electron Volt
°F	Degree Fahrenheit
FISC	Fleet and Industrial Supply Center
FS	Feasibility Study
FSAP	Field Sampling and Analysis Plan
FY	Fiscal Year
GIS	Geographic Information System
GPS	Global Positioning System
HASP	Health and Safety Plan
HRS	Hazard Ranking System
IAS	Initial Assessment Study
IDW	Investigation Derived Waste
IR	Installation Restoration
LANTDIV	Naval Facilities Engineering Command, Atlantic Division
MANOVA	Multivariate Analysis of Variance
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MSL	Mean Sea Level
µmhos/cm	Micromhos per centimeter
NEESA	Naval Energy and Environmental Support Activity
NFESC	Naval Facilities Engineering Service Center
NFRAP	No Further Response Action Planned

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

NPL	National Priorities List
NPS	National Park Service
NTU	Nephelometric Turbidity Unit
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppt	parts per thousand
PVC	Polyvinyl Chloride
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RCRA	Resource, Conservation, and Recovery Act
RI	Remedial Investigation
RPD	Relative Percent Difference
RV	Recreational Vehicle
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SMP	Site Management Plan
SOP	Standard Operating Procedures
SPT	Standard Penetration Test
SU	Standard Units
SVOC	Semivolatile Organic Compounds
TAL	Target Analyte List
TCL	Target Compound List
TCRA	Time Critical Removal Action
TNT	Trinitrotoluene
TOC	Total Organic Carbon
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VADES	Virginia Department of Emergency Services
VDCR-DNH	Virginia Department of Conservation and Recreation - Division of Natural Heritage
VDEQ	Virginia Department of Environmental Quality
VOC	Volatile Organic Compound
WPNSTA	Naval Weapons Station Yorktown

EXECUTIVE SUMMARY

This document presents the results of the Background Investigation for soil and groundwater at the Naval Weapons Station Yorktown (WPNSTA) Cheatham Annex Site (CAX), Williamsburg, Virginia and the northern portions of WPNSTA. This investigation was conducted by Baker Environmental, Inc. (Baker) under contract to the Atlantic Division Naval Facilities Engineering Command (LANTDIV), under Comprehensive Long-term Environmental Action Navy (CLEAN II) Contract N62470-95-D-6007, Contract Task Order (CTO) 196.

The Background Investigation was conducted for the purposes of establishing data representative of naturally occurring or anthropogenic chemical concentrations at CAX. These data, when compared to site-specific data, can aide in the determination of whether or not contamination at a given site can be contributed to site activities. The data may also be appropriate for the establishment of clean-up levels should remedial action at a given site be warranted.

Surface soil (0 to 6 inches below ground surface [bgs]), subsurface soil (6 to 24 inches bgs), and groundwater data were collected in each of the four soil associations at CAX and northern portions of WPNSTA. The data for each medium were divided into four data sets, one for each soil association group. The statistical distribution of each data set (normal or lognormal) was determined and parameters including means, standard deviations, and 95 percent upper confidence limits were calculated. A multivariate analysis of variance (MANOVA) was conducted on the soil association data groups for each medium to determine if the data groups can be combined. The results of the MANOVA concluded that there is a significant difference between soil association data groups for surface soil and subsurface soil. Therefore, this indicates that the soil data cannot be combined and should be treated separately. For total and dissolved groundwater data, although the results indicated no significant difference between soil association data groups, given the disparity between test statistics and departures from assumptions, it is not recommended that the data groups be combined.

In addition to presenting the statistical evaluation of background data, general lithological and hydrogeological information regarding CAX and northern WPNSTA are presented based upon surface soil and monitoring well installation boring logs and on two 100-foot exploratory soil borings advanced during the Background Investigation.

1.0 INTRODUCTION

This document presents the results of the Background Investigation for soil and groundwater at the Naval Weapons Station Yorktown (WPNSTA) Cheatham Annex Site (CAX) and the northern portions of WPNSTA. This investigation was conducted by Baker Environmental, Inc. (Baker) under contract to the Atlantic Division Naval Facilities Engineering Command (LANTDIV), under Comprehensive Long-term Environmental Action Navy (CLEAN II) Contract N62470-95-D-6007, Contract Task Order (CTO) 196.

The field activities conducted as part of this investigation were performed in accordance with the Work Plans prepared by Baker for this investigation (Baker, 2001d). The samples collected as part of this study are intended to provide the basis for a compilation of data representative of the natural concentration of metals and anthropogenic compounds in soils and groundwater within the boundaries of CAX and the northern portions of WPNSTA. The Work Plan detailed the number and types of samples to be collected, the analytical methods to be used for those samples, specific sample locations, and the rationale for selecting locations and analyses. Detailed descriptions of the field procedures, sample analysis, and any deviations from planned procedures are outlined in Section 5.0 of this report.

1.1 Background Investigation Objectives

The objectives of the Background Investigation are summarized as follows:

- Determine background concentrations of inorganic, organic, and cyanide constituents in surface soil, subsurface soil, and groundwater at CAX and the northern portion of WPNSTA.

- Establish statistical distributions of the data and identify spatial trends.

- Determine subsurface lithology conditions present within the four soil association groups.

- Determine deep lithology (100 feet below groundwater surface [bgs]) within soil association Group 2 and Group 3.

- Determine hydrogeological conditions present within the four soil association groups.

- Present results, findings, and conclusions of the Background Investigation in a manner that enables them to be used as comparison criteria within current or future CAX investigations.

The background levels of inorganic and anthropogenic chemicals in soils and groundwater presented herein will establish a frame of reference or baseline of data to which these chemicals at specific sites may be compared. The need to establish background levels of inorganics in soil and groundwater is driven by the ubiquitous presence of inorganics in nature. Because these analytes occur naturally, it is necessary (during subsequent investigations) to determine if the presence of inorganics at a site are due to site activities (i.e., disposal, spills, etc.) or to natural occurrences. Anthropogenic chemicals are defined by the United States Environmental Protection Agency (USEPA) as chemicals that are present in the environment because of manmade, not site-related sources (e.g., industry, automobiles, etc.). Chemicals of anthropogenic origin may include compounds such as lead, arsenic, dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyltrichloroethane (DDT), and polycyclic aromatic hydrocarbons (PAHs). Comparing concentrations of inorganics and anthropogenic chemicals on site to background concentrations assists in the determination of what chemicals can be attributed to the site.

1.2 Report Organization

This document is comprised of text, tables and figures, and the supporting appendices. In addition to Section 1.0, the report is organized into the following sections:

- Section 2.0 – Cheatham Annex Site History
- Section 3.0 - Environmental Setting
- Section 4.0 - Background Investigation Design
- Section 5.0 - Background Field Investigation
- Section 6.0 – Physical Results of Field Investigation
- Section 7.0 – Analytical Results
- Section 8.0 – Statistical Evaluation of Background Data
- Section 9.0 - Conclusions and Recommendations
- Section 10.0 - References
- Appendix A – Chain of Custody Records

- Appendix B – Test Boring and Well Construction Records
- Appendix C – Surface Soil Data
- Appendix D – Subsurface Soil Data
- Appendix E – Groundwater Data
- Appendix F – Quality Assurance/Quality Control Data
- Appendix G – Multivariate Analysis of Variance Statistical Test Results

2.0 CHEATHAM ANNEX SITE HISTORY

This section presents the history and mission of CAX. Information presented in this section was obtained from reports of previous investigations conducted at the sites and Areas of Concern (AOCs). WPNSTA history and physical characteristics have been omitted from this section, but are provided within the WPNSTA Master Plans (Baker, 1994b).

2.1 Cheatham Annex

CAX is located in Williamsburg, Virginia, on the York-James Peninsula, which is an embayed portion of the Atlantic Coastal Plain physiographic province (Teifke, 1973). This elongated peninsula trends northwest southeast and occupies an area of approximately 1,752 square miles. The peninsula is bordered to the southwest by the James River, to the northeast by the York River, and to the southeast by the confluence of the James River and the Chesapeake Bay. At CAX, the peninsula is approximately six miles wide.

At inception, CAX occupied approximately 3,349 acres. Several portions of the original base have since been declared surplus and transferred to other government jurisdictions, including the National Park Service, the Commonwealth of Virginia, and York County. CAX is currently comprised of 1,578 acres. The Activity is divided into two separate parcels, with the larger parcel situated along the banks of the York River. Almost all of the activities at CAX (administration, training, maintenance, support, and housing) take place in this portion of the Activity. The smaller parcel is located south of the Colonial National Historic Parkway (Colonial Parkway). This area contains the Activity's water supply (Jones Pond) and is used mainly as a watershed protection area. CAX and the northern portion of WPNSTA are shown on Figure 2-1.

2.2 History and Mission of Cheatham Annex

CAX was established in June 1943 as a satellite unit of the Naval Supply Depot to provide bulk storage facilities. Prior to 1943, CAX had been the location of a large powder and shell loading facility operated by Dupont during World War I, which subsequently closed in 1918. Between 1918 and 1943, the property was used for farming or left idle until CAX was commissioned in 1943. Since 1943, CAX has been used for receiving, storing, packaging, and shipping materials to federal facilities on the East Coast and to major distribution centers in Europe.

Previously operated as an annex to Fleet and Industrial Supply Center (FISC), Norfolk, which is the world's largest navy supply center, CAX provided logistic and supply support to naval shore installations. CAX is the Navy Sea System Command's East Coast consolidated stock point for major shipboard mechanical, electronic, and some navigational equipment. In addition to receiving, storing, issuing, packing and shipping navy stock material, particularly large, bulky (often unique) shipboard equipment (e.g., submarine periscopes, ship propellers, bull gears, antennae, and sonar domes), CAX provides warehouse and distribution services for 39 Storage Authorization Programs and tenant organizations.

In July 1987, CAX was designated the Hampton Roads Navy Recreational Complex. Today the mission of CAX includes supplying Atlantic Fleet ships and providing recreational opportunities to military and civilian personnel; 55 percent of CAX is undeveloped and rich in natural resources. Outdoor recreational facilities and activities available include: 13 cabins, 19 recreational vehicle (RV) sites, camp sites, an 18-hole golf course, swimming pool, ball fields, freshwater and saltwater fishing, boating, wildlife watching and hunting (Department of the Navy [DON], 1998). CAX currently operates under WPNSTA Yorktown. The transition of CAX control from FISC to WPNSTA occurred in October 1998.

2.3 Land Use and Demographics

Figure 2-2 presents a 1999 land use map of York County. As indicated on the figure, CAX and WPNSTA Yorktown are categorized as Military Use. Uses of surrounding areas include conservation/recreation, commercial, residential, industrial, public, and agricultural.

2.4 Regulatory History

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA) established programs for the cleanup of hazardous waste disposal and spill sites. The Installation Restoration (IR) Program is a component of the Defense Environmental Restoration Program (DERP), which is one of the programs established under CERCLA/SARA by DON. CAX was placed on the CERCLA National Priorities List (NPL) effective December 1, 2000, primarily due to the facility's proximity to wetlands and the potential impact on the surrounding environment. Prior to being listed on the NPL, the CAX IR Program voluntarily followed CERCLA guidance consistent with other DON installations. The USEPA and Virginia Department of Environmental

Quality (VDEQ) have been actively involved in the IR Program at CAX since 1997. Currently, these agencies are invited to provide comments and feedback on all documents that are prepared under the IR Program. Prior to 1997, these agencies had minimal involvement with the IR Program at CAX.

2.5 Previous Investigations

The following environmental investigations/studies have been conducted to date at CAX:

- Soil Survey Report, Weapons Station Yorktown, Research Division, Agronomy Department, Virginia Polytechnic Institute and State University, 1982.

- Initial Assessment Study (IAS) of Naval Supply Center, Cheatham Annex and Yorktown Fuels Division. February 1984. Naval Energy and Environmental Support Activity (NEESA).

- Soil Survey Report, Cheatham Annex, Research Division, Agronomy Department, Virginia Polytechnic Institute and State University, 1985.

- Soil Survey of James City and York Counties and the City of Williamsburg, Virginia, United States Department of Agriculture, Soil Conservation Service, 1985.

- Confirmation Study, Step 1A (Verification), Round One, June 1986. Dames and Moore.

- Confirmation Study, Step 1A (Verification), Round Two. June 1988. Dames and Moore.

- Draft Remedial Investigation (RI) Interim Report. March 1989. Dames and Moore.

- Final Remedial Investigation (RI) Interim Report. February 1991. Dames and Moore.

- Final Site Investigation for Sites 1, 10, and 11. November 1994. Roy F. Weston.

- Final Site Screening Process Report, Sites 1, 10, and 11. September 1997. Baker.

- Aerial Photographic Analysis (EPIC). United States Naval Supply Center - Cheatham Annex, Williamsburg, Virginia. United States Environmental Protection Agency Region III. May 1998.

- Shoreline Assessment Letter Report (Site 1). August 1998. Baker

- Recommendations for Erosion Mitigation Measures Letter Report (Site 1). May 1999. Baker.

- Final Field Investigation Report Site 1 and AOC 2. September 1999. Baker.

- Final Action Memorandum - Time Critical Removal Action (TCRA) – Site 1. August 1999. Baker.

- Final Site Inspection Narrative Report, Penniman Shell Loading Plant. August 1999. Weston

- Final Data Acquisition/Summary Report, Penniman Shell Loading Plant. October 1999. Weston

- Draft Final No Further Remedial Action Planned (NFRAP) Decision Document for Site 9 - Transformer Storage Area. December 1999. Baker

- Hazard Ranking System (HRS) Documentation Record, Naval Weapons Station Yorktown (Cheatham Annex). Last revision January 12, 2000. USEPA

- Draft Removal Closeout Report, Site 11 – Bone Yard. April 2000. Baker

- Final Construction Closeout Report – Site 1 Time Critical Removal Action. June 2000. Baker

- Draft Final Remedial Investigation Report, Site 1. August 2000. Baker

- Geographic Information System (GIS) Needs Assessment and Implementation Plan. September 2000. Baker

- Final Compact Disc of Administrative Record. November 2000. Baker

- Draft Final Focused Feasibility Study (FS), Site 1. November 2000. Baker

- Final Field Investigation Report, Site 7 and AOC 2. March 2001. Baker

- Final Site Management Plan – Fiscal Year (FY) 2001. March 2001. Baker

- Final Site Inspection Report, Site 4 and Area of Concern 1. May 2001. Baker

- Final Pond Study Report. August 2001. Baker

2.5.1 Sites and Areas of Concern

The investigations and studies that have been conducted at CAX have lead to the identification of several sites and AOCs throughout CAX. These sites and AOCs are listed below and indicated on Figure 2-3. Not all of the sites or AOCs warrant investigation or actions.

- Site 1 – Landfill Near Incinerator
- Site 2 – Contaminated Food Disposal Area
- Site 3 – Submarine Dye Disposal Area
- Site 4 – Medical Supplies Disposal Area
- Site 5 – Photographic Chemicals Disposal Area
- Site 6 – Spoiled Food Disposal Area
- Site 7 – Old DuPont Disposal Area
- Site 8 – Landfill Near Building CAD 14
- Site 9 – Transformer Storage Area
- Site 10 – Decontamination Agent Disposal Area Near First Street
- Site 11 – Bone Yard
- Site 12 – Disposal Site Near Water Tower
- AOC 1 – Scrap Metal Dump

- AOC 2 – Dextrose Dump
- AOC 3 – CAD 11/12 Pond Bank
- AOC 4 – Site 4 – Medical Supplies Disposal Area
- AOC 5 – Debris Area (An Unidentified Portion of Site 1)

The areas that incorporate these sites and AOCs were not considered as potential sampling areas for the Background Investigation.

The following subsections present a brief overview of the past and current operations/activities that have taken place at CAX. More detailed information with regards to the previous investigations and studies and site histories can be found within the CAX Site Management Plan (SMP) (Baker, 2002).

2.5.2 Penniman Shell Loading Plant

Existing information indicates that the Penniman Shell Loading Plant began manufacturing trinitrotoluene (TNT) in 1916 and began loading artillery shells for the war effort 1918. From 1918 through 1925, following the end of World War I, this facility was demolished and reverted to farmland (Weston 1999a). The former Penniman Plant encompassed a large portion of the existing CAX facility and property that is currently owned by the Department of the Interior (DOI). The only exception (based on current information) is that the former Penniman Plant did not encompass the area surrounding Jones Pond.

2.5.3 Fuel Farm Area

The Fuel Farm Area is located south of Colonial National Historical Parkway and directly east of Jones Pond. The United States Navy operated this facility from 1942 until the mid-1980s. The Fuel Farm was then purchased by the Virginia Department of Emergency Services (VADES) in the mid 1980s and is currently operated by VADES (Weston, 1999a). Because this area is not located on CAX or WPNSTA property it is not being considered as a potential sampling area for the Background Investigation.

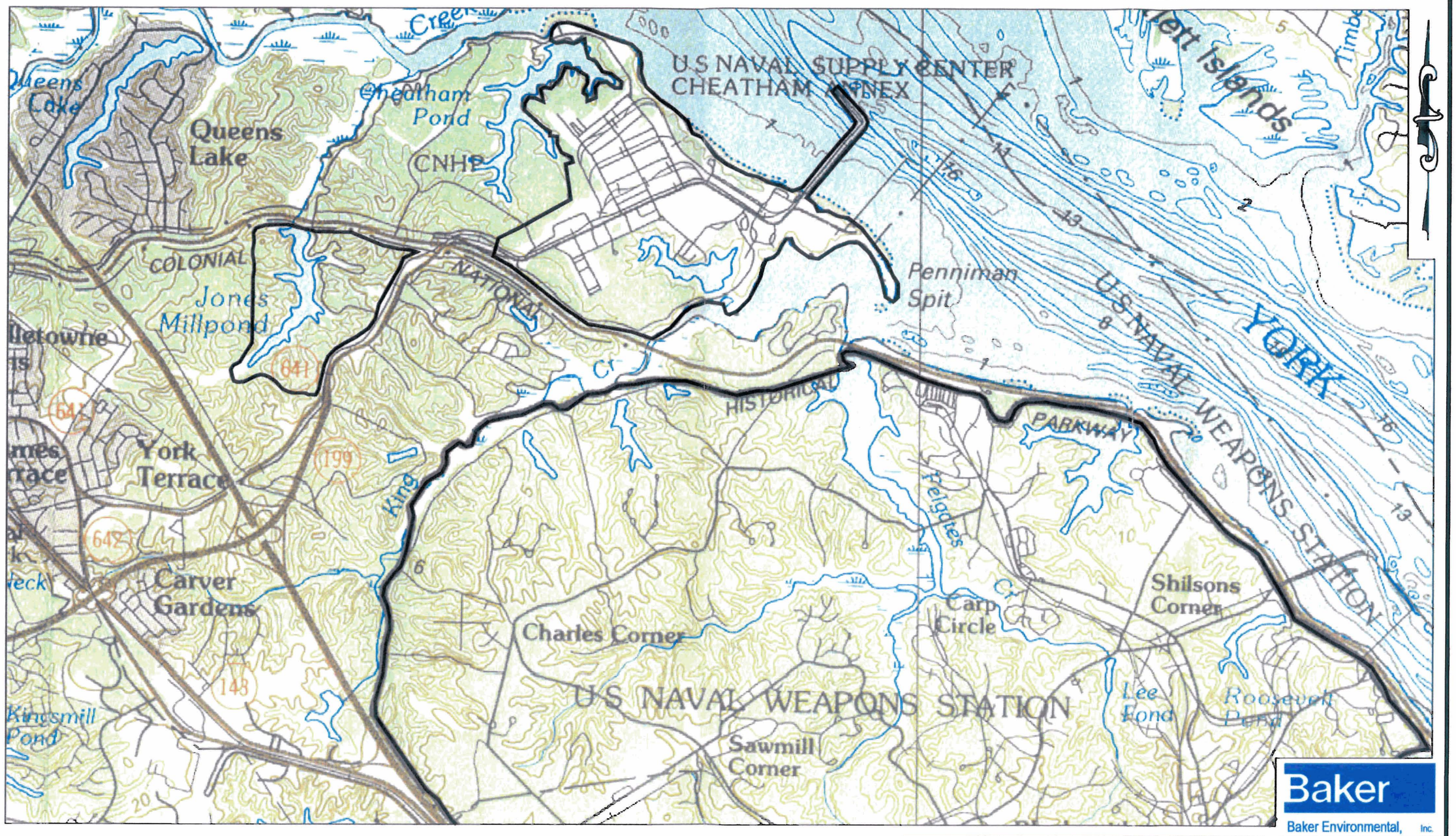
2.5.4 Department of the Interior Property

DOI property is located to the north and west of the main portion of CAX. The eastern edge of Cheatham Pond serves as the property boundary between DOI and CAX. Additionally, DOI has property that lies south of King Creek and north of WPNSTA Yorktown. Because these areas are not located on CAX/WPNSTA property, they are not being considered as potential sampling areas for the Background Investigation.

2.5.5 Limitations of the Existing Database

Currently, information on soil and groundwater background at CAX does not exist. Additionally, hydrogeologic and lithology information from a base-wide perspective does not exist.

FIGURES



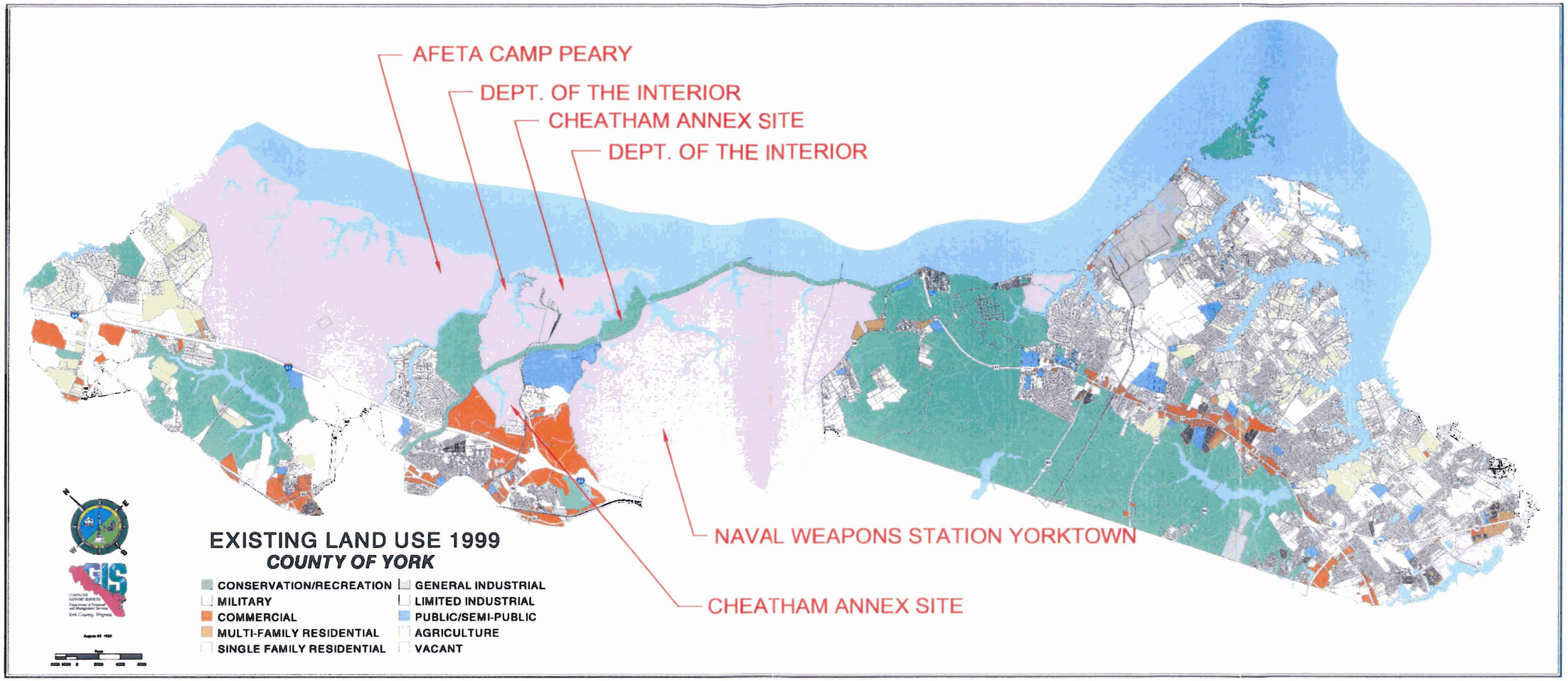
3000 0 1500 3000 6000

1 inch = 3000 ft.

SOURCE: U.S.G.S. 1:100,000–SCALE PLANIMETRIC MAP, WILLIAMSBURG, VIRGINIA, 1984.

2196700W

FIGURE 2-1
TOPOGRAPHIC FEATURES OF CHEATHAM ANNEX SITE
AND NORTHERN PORTIONS OF NAVAL
WEAPONS STATION YORKTOWN
NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE



Baker

Baker Environmental, Inc.

10000 0 5000 10000 20000

1 inch = 10000 ft.

2196701W

SOURCE: COUNTY OF YORK, 1999.

FIGURE 2-2
EXISTING LAND USE 1999, COUNTY OF YORK
CTO - 0196

NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

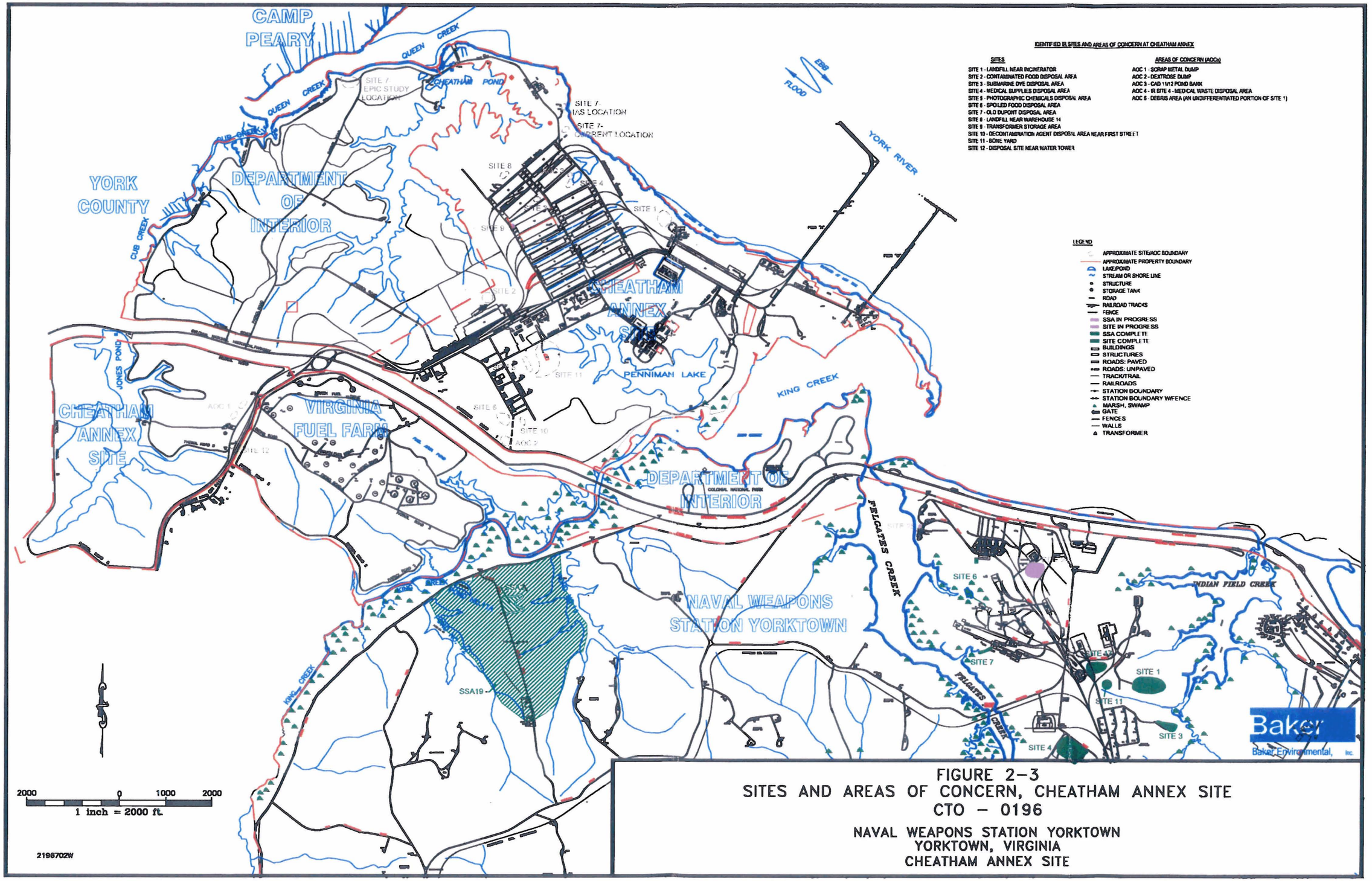


FIGURE 2-3
SITES AND AREAS OF CONCERN, CHEATHAM ANNEX SITE
CTO – 0196

NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

3.0 ENVIRONMENTAL SETTING

This section presents a discussion of the physical characteristics of CAX. The discussion details the topography and surface features, hydrology, geology, hydrogeology, climatology, ecology, wetlands, and threatened and endangered species. This information was obtained from the available literature about CAX.

3.1 Climatology

The climate of the Virginia Peninsula is influenced by the moderating effects of the Atlantic Ocean. This results in mild winters and long, warm summers. High humidity frequently occurs along the coast and less frequently inland. Ground fog is frequent in the late summer, especially during the early morning hours. Freezing temperatures occur intermittently from October through March. Average monthly temperatures in the area range from approximately 38.8 degrees Fahrenheit (°F) in January to 77.4°F in July.

Because of its location near the coastline, York County is subject to easterly storms throughout late summer and early fall, causing high tides and flooding. Intense hurricanes occasionally sweep the coast. Winter is characterized by storms that move along the eastern seaboard. The storms from the north are associated with high winds and precipitation occasionally in the form of snow, ice pellets, or rain; however, the snow is seldom prolonged or heavy. The average annual precipitation is 44 inches, with the summer months being the wettest and the winter months being the driest.

Spring is a period of contrasting weather, particularly during March. Spring and autumn are periods of frost. Summer is warm and humid with occasional showers and afternoon thunderstorms. Autumn is a season of comfortable temperatures (average temperature 60°F to 81°F) and generally pleasant weather.

Winds are highly variable in the area of CAX. Prevailing winds are usually from the south-southwest, but north-northeasterly winds are common in some months. Onshore winds predominate during the spring and summer.

3.2 Topography and Surface Features

The topography at CAX is characterized by gently rolling terrain dissected by ravines and stream valleys trending predominantly northeastward toward the York River. Ground elevations at CAX vary from sea level along the eastern boundary, which borders the York River, to a maximum elevation of approximately 50 feet above mean sea level (MSL) on a few scattered hills in the western portion of the Activity. Valleys consisting of 40- to 60-foot ravines with steep slopes (slopes exceeding 1:1) occur along the major creeks draining CAX. Figure 2-1 presents topographic features of the region.

3.3 Surface Soil Associations

The soil survey report for CAX was prepared by the Soil Conservation Service (SCS) in 1985. Information provided in this section reflects findings from this report.

Figure 3-1 shows the soil associations of CAX and the northern portion of WPNSTA. A soil association is a landscape that exhibits a distinctive pattern based on soils, drainage and relief. These associations consist of one or more major soil types and at least one minor soil type. The association is then named for the major soil(s). A soil type from one association can exist in other associations, but commonly in a different pattern or percentage.

The two terms, loam and muck, are specifically used to describe soils. A loam is a soil that contains less than 52 percent sand, 28 to 50 percent silt, and 7 to 27 percent clay. Muck is a dark, finely layered, well decomposed, and contains organic soil material.

Four soil association groups occur at CAX. These groups are defined as follows:

1. Soil Association Group 1 – Bohicket, Johnston, and Axis Soil Association

   The soils of this association are formed on marshes and floodplains by water-deposited material that range from muck to sandy clay loams. They are mainly along King, Queen and Cub Creeks and along the York River. The soils are commonly nearly level, are waterlogged and flooded by salt tides daily or during high water. They receive seepage and runoff from higher lying areas. In the upper parts of the tributaries the marshes are brackish or fresh water.

Bohicket and Axis soils are along the tidal part of the creeks and river. Johnston soils are in the upper tributaries. Bohicket soils are mucky and have mucky silt loam mucky silty clay subsoils. Axis soils have mucky surface layers but generally have sandy loam or sandy clay loam subsoils. The Johnston complex soils are mucky in the surface layers but have stratified sand, silt and silty substrata or weakly developed subsoils.

Among the soils of minor extent are beaches and manmade land areas. Most of the marshes contain native vegetation of salt tolerant species and grasses, reeds and shrubs. This association is best suited to wildlife habitat and recreation.

2. Soil Association Group 2 – Dogue, Pamunkey, and Uchee Soil Association

These soils formed on river terraces and are deep, moderately well to well, and poorly drained soils that have clayey and loamy subsoils. This association is along the York River, and King, Queen, and Cub Creeks. It is mainly on broad to medium ridges that are not flooded and slightly concave areas that are ponded for brief periods. These soils are mostly gently sloping or nearly level. Short, steep, side slopes and escarpments are common along drainageways, small streams, and terrace breaks.

Dogue and Pamunkey soils are nearly level and gently sloping; they occur mainly on ridge points and on medium to broad ridges about a mile wide, with the back escarpment being approximately parallel with the York River. Drainageways cutting into this terrace formed dendritic drainage patterns. The slopes along these drainageways are short and very steep. The Dogue soils are moderately well drained and have clayey subsoils. The Pamunkey soils are well drained and have loamy subsoils. Chickahominy soils are poorly drained and have clayey subsoils and are on nearly level slopes and depressions.

Among minor soils and miscellaneous areas are urban soils, or Udorthents – loamy, Emporia complex soils, Uchee soils, Bojac, Munden, Slagle and Newflat soils. These soils are on broad to narrow gently sloping ridges, and Emporia complex soils are on steep to very steep side slopes. This association is used for most of the developed area of Cheatham Annex.

3. Soil Association Group 3 – Emporia, Slagle, and Craven-Uchee Complex Soils Association

These are deep, well, to moderately well drained soils that have loamy and clayey subsoils, formed on the Coastal Plan Upland with medium to narrow ridges and gentle to very steep side slopes. This association formed in loamy and clayey Coastal Plain sediments. Emporia and Slagle soils are on medium width ridges. Emporia soils commonly occupy the higher landscape position while slagle soils occupy the lower landscape position. Craven and Uchee soils are on the narrower ridge points and the sloping area between the ridges and the steep and very steep side slopes. Emporia Complex soils are on the steep and very steep side slopes. The Emporia soils are well drained with medium to low permeability. They have a clay loam or sandy clay loam subsoil, and a seasonal water table at 3 to 5 feet bgs. The Slagle soils are moderately well drained with medium to low permeability and have a seasonal water table of 1.5 feet bgs. The Craven soils are moderately well drained and have a clay silty clay subsoil, a low permeability, and a seasonal high water table at 1.5 feet bgs. The Uchee soils are well drained, have a medium to low permeability, a subsoil of sandy clay loam, clay loam and sandy clay, and a seasonal high water table at 3.5 to 5 feet bgs.

Among the soils of minor extent are Caroline, Kempsville, and Udorthents loamy. Most of this association is wooded but some areas are located around small buildings and within the fuel storage area.

4. Soil Association Group 4 – Kempsville, Emporia, Emporia Complex, and Craven-Uchee Complex Soils Association

As with Group 3, these are deep, well to moderately well drained soils that have loamy and clayey subsoils, formed on Coastal Plan uplands with medium to narrow ridges and gentle to very steep side slopes. This association formed in loamy and clayey Coastal Plain sediments. Kempsville and Emporia soils are on medium ridges. Kempsville and Emporia soils occur on the landscape. Emporia Complex soils are on the steep and very steep side slopes. Craven and Uchee soils are on narrow ridge points, and on the sloping area between the ridges and the steep and very steep side slopes.

The Kempsville soils are well drained and exhibit medium permeability. They have sandy clay loam and clay loam subsoils, and have a water table at 5 feet bgs or greater. The Emporia soils are well drained and of low permeability. They have a clay loam or sandy clay loam subsoil, and a seasonal water table of 3 to 5 feet bgs. The Craven soils are moderately well drained with a clayey subsoil, exhibit low permeability with a seasonal high water table at 1.5 feet bgs. The Uchee soils are well drained and have a medium permeability, a sandy clay loam, and sandy clay subsoil, and a seasonal high water table of 3.5 to 5 feet bgs.

Among the soils of minor extent are Caroline, Slagle, Dogue, Johnston Complex, and Udorthents-loamy. Most of this area is wooded but some areas are located within the fuel storage area.

3.4 Subsurface Geology

The Atlantic Coastal Plain physiographic province is underlain by unconsolidated sediments of Quaternary, Tertiary, and Cretaceous ages that dip gently to the southeast and have a combined thickness of approximately 1,900 feet in the vicinity of CAX (Teifke, 1973).

Most of the surficial unconsolidated sediment at CAX has been mapped as the Shirley Formation of the Pleistocene series (Mixon et. al., 1989). This formation is composed of gravel, sand, silt, clay, and peat deposited in river and estuarine environments. Its thickness is estimated to vary from 0- to 80-feet. The Chuckatuck Formation of Pleistocene age underlies the Shirley Formation and is described as sand, silt, and clay with minor amounts of peat deposited in bay environments. The Chuckatuck Formation rests on the top of the Windsor Formation, also of Pleistocene age. The Windsor Formation is comprised of marine and lagoonal sand, silt, and clay, with minor gravel deposits.

The Bacons Castle Formation of Pliocene age underlies the Windsor Formation and is described as a clayey silt and silty fine-grained sand. The Bacons Castle Formation rests unconformably on the weathered top of the Upper Yorktown Formation, also of Pliocene age. The presence of calcite-cemented shells and shell fragments is characteristic of the upper portion of the Yorktown Formation.

The stratigraphy encountered during the background investigation is discussed in Section 6.0 of this report.

3.5 Hydrogeology

The Atlantic Coastal Plain sediments are the most important source of potable water in the region. Recharge to the groundwater system is derived from precipitation. Approximately 50 percent of the precipitation is lost to evapotranspiration. The remaining 50 percent either results in surface runoff, or infiltrates and is introduced into the groundwater regime. Recharge of aquifers may occur at the surface near outcrop zones, or from downward migration from overlying strata (Baker 1994).

The shallow aquifer system in York County is comprised of the following six units: (1) the Columbia aquifer, (2) the Cornwallis Cave confining unit, (3) the Cornwallis Cave aquifer, (4) the Yorktown confining unit, (5) the Yorktown-Eastover aquifer, and (6) the Eastover-Calvert confining unit (Brockman and Richardson 1992, Brockman et. al., 1997). Hydrogeologic units are recognized only where they are saturated (for aquifers) or confining (for confining units). For example, although the strata that typically comprise a given aquifer (when saturated) are present, the hydrogeologic unit does not exist in areas where the unit is not saturated. Vertical migration of groundwater is impeded in areas wherever the confining units are present.

3.6 Surface Water Hydrology

CAX is bound on the west by Cheatham Pond, on the north by the mouth of Queen Creek, on the east by the York River, and on the south by King Creek. In 1943, dams were constructed to create the 108-acre Cheatham Pond from the tidal Queen Creek, as well as the 43-acre Penniman Lake from King Creek tidal influence. Jones Pond, a 69-acre freshwater nontidal pond, was formed by damming a portion of the Cub Creek watershed. It is located in the northwestern section of CAX and is enclosed by several wooded ravines. Numerous small creeks flow through wooded ravines throughout CAX, and drain into tidal creeks that join the York River. In most areas, forests extend to the marsh and lake margins. The tributaries of CAX all drain into the York River. The Walt Feurer Youth Pond (2 acres) and the Cat Fish Pond (1 acre) are shallow, warm water, man-made ponds (DON, 1998).

3.7 Ecological Characteristics

Characterization of the terrestrial and wetland/aquatic biology of CAX has been adapted from the IAS (NEESA, 1984) and from the Environmental Assessment for Recreational Cabins at CAX (DON, 1998).

3.7.1 Terrestrial Ecology

Terrestrial flora of CAX are predominantly woodland species. Three types of forest are present: pine stands composed primarily of loblolly and Virginia pines, mixed pine and hardwood stands, and hardwood stands. Elevated level areas are the predominant locations of pine stands, while hardwood stands are found on slopes and ravines. These wooded areas are important in reducing soil erosion and providing wildlife habitat. Native tree species found at CAX include beech, black cherry, red maple, sweet gum, various pines, white ash, and white oak.

The woodland's understory is composed of various seedling trees and vine species, such as Virginia creeper, briars, and honeysuckle. Ferns are found in many moist, shaded areas. Ornamental trees and shrubs have been planted in the improved areas and along major roadways. None of the plant species that thrive at CAX are listed on the federal or Commonwealth endangered lists.

3.7.2 Wildlife

Nearly 300 bird species, including more than 100 breeding species, have been observed on the installation. Migratory and resident Canadian geese and mute swans occur in nuisance population numbers and breed on CAX.

Forty-four mammal species have been found on or near CAX. State hunting and trapping regulations apply to 12 species on CAX. All other species are considered non-game species. There are 29 amphibian species and 43 reptile species that could occur at CAX. The most common mammals include:

- White-tailed deer (*Odocoileus virginiana*)
- Gray squirrel (*Sciurus carolinensis*)
- Eastern cottontail rabbit (*Sylvilagus floridana*)

- Beaver (*Castor canadensis*)
- Muskrat (*Ondatra zibethica*)
- Red fox (*Vulpes vulpes*)
- Gray fox (*Urocyon cinereoargenteus*)
- Raccoon (*Procyon lotor*)
- Mink (*Mustela vinson*)
- Nutria (*Myocastor coypus*)

King and Queen creeks provide important nursery grounds for many estuarine fishes. Freshwater species include largemouth bass, bluegill, redear sunfish, crappie, and channel catfish. Forage species include gizzard shad, threadfin shad, and Tidewater silversides.

Cheatham Pond is owned by the National Park Service (NPS). However, through a cooperative agreement with the NPS, CAX is permitted to use the pond for recreational fishing. Furthermore, the agreement requires that the Navy manage Cheatham Pond in accordance with NPS natural resource management practices. Game fish species found in Cheatham Pond include largemouth bass, bluegill, redear sunfish, and black crappie (DON, 1998).

3.8 Wetlands

At CAX, wetlands are mainly found along principal tributaries to the York River and along the York River shoreline. Four major marsh types exist in the vicinity:

- Type I: Salt-marsh cordgrass community.
- Type V: Big cordgrass community.
- Type VI: Cattail community.
- Type XII: Brackish water mixed community.

The wetlands are grouped into classifications based on their estimated environmental value per acre. Group One marshes, of which Type I and Type XII are a part, have the highest productivity and use by wildfowl and wildlife, as well as a close association with fish spawning and nursery areas. They are also important to the shellfish industry and as shoreline erosion inhibitors. These wetlands merit the highest order of protection. The majority of wetlands on CAX are of this type. Type V and Type VI marshes are in Group Two and are only slightly less important than the

Group One marshes. Because these marshes are found at higher elevations, there is less opportunity for detritus (loose soil or organic particles) to be washed into nearby waterways by the tides. This group of marshes is also valuable as flood buffers and should be preserved. CAX wetlands and adjacent creeks provide nursery areas for striped bass, white perch, and other species. These wetlands are also prime habitats for migrating waterfowl.

The habitat of aquatic floral species is generally determined by water salinity and bottom types. In this area of the York River, the following species are associated with certain salinity ranges:

- Hornwort: Freshwater only.
- Water-celery: Freshwater only.
- Pondweed: Fresh to 5 parts per thousand (ppt).
- Horned pondweed: Fresh to 5 ppt.
- Water milfoil: Fresh to 10 ppt.
- Eelgrass: 10 to 35 ppt.
- Widgeon grass: 5 to 40 ppt.

These species are commonly found growing at depths of three to nine feet in soft bottom muds. Due to increased nutrient loading, waterweed and water milfoil have been plant pests at times. Eelgrass is most often found growing in soft mud. Widgeon grass is sensitive to both increased water temperature and turbidity. (NEESA, 1984)

3.9 Threatened and Endangered Species

The Virginia Department of Agriculture and Consumer Service, Division of Consumer Protection, Office of Plant and Pest Services (in a letter dated November 20, 1998) reported that there were no endangered or threatened insect species found on CAX.

Prior to 1998, the Virginia Department of Game and Inland Fisheries had discovered a breeding bald eagle (*Haliaetus leucocephalus*) near Penniman Lake. The bald eagle is a federally threatened species. No bald eagles nested at CAX in 1998. (DON, 1998) However, based on recent United States Fish and Wildlife Service (USFWS) surveys, a bald eagle nest was discovered on the east side of Jones Millpond in 2002 that was active and produced two chicks.

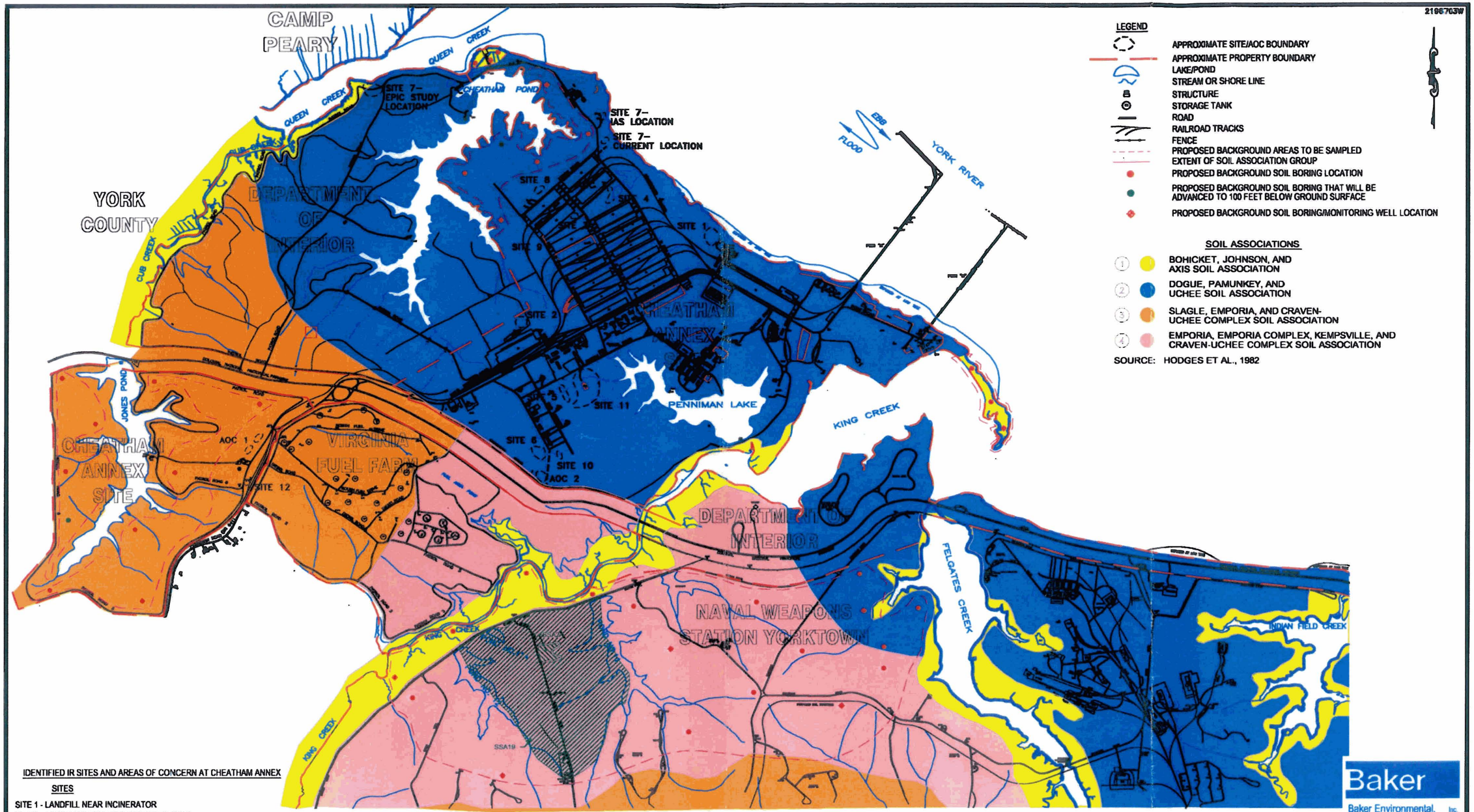
In 1989, the Virginia Department of Conservation and Recreation – Division of Natural Heritage (VDCR-DNH) surveyed CAX for rare vertebrate and plant species. The survey discovered 23 species of rare amphibians, though none merited legal status. The marl ravines around Cheatham Lake were identified by VDCR-DNH as prime-habitat for certain rare plants: Loesel's twayblade (*Liparis loeselii*), sweet pinesap (*Monotropsis odorata*), shadow witch (*Ponthieva racemosa*), mountain camellia (*Stewartia ovata*), and southern cattail (*Typha domingensis*). In the 1989 survey, Loesel's twayblade, an orchid, was found in three marl ravines around Cheatham Pond. None of these plants, however, have legal status.

The USFWS (November 1998) has indicated that seven plant species of concern might be found in appropriate habitats in York County: large-leaf peatmoss (*Sphagnum macrophyllum*, variety *macrophyllum*), Cuthbert turtlehead *(Chelone cuthbertii*), Harper's fimbristylis (Fimbristylis perpusilla), New Jersey rush (*Juncus caesariensis*), pondspice (*Litsea aestivalis*), sweet pine sap (*Monotropsis odorata*), and Virginia least trillium (*Trillium pusillum*, variety *virginianum*). The tidewater interstitial amphipod (*Stygobromus araeus*), an invertebrate, is also listed as a species of concern in York County.

A pair of peregrine falcons (*Falco peregrinus anatum*), an endangered species, nested on a crane on the abandoned pier at CAX in 1998. The preferred habitat of peregrines is cliff ledges, but some peregrines accept man-made structures such as skyscraper ledges, tall towers, and bridges as breeding habitat. (DON, 1998)

FIGURES

2196703W



IDENTIFIED IR SITES AND AREAS OF CONCERN AT CHEATHAM ANNEX

SITES

SITE 1 - LANDFILL NEAR INCINERATOR
SITE 2 - CONTAMINATED FOOD DISPOSAL AREA
SITE 3 - SUBMARINE DYE DISPOSAL AREA
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE 5 - PHOTOGRAPHIC CHEMICALS DISPOSAL AREA
SITE 6 - SPOILED FOOD DISPOSAL AREA
SITE 7 - OLD DUPONT DISPOSAL AREA
SITE 8 - LANDFILL NEAR WAREHOUSE 14
SITE 9 - TRANSFORMER STORAGE AREA
SITE 10 - DECONTAMINATION AGENT DISPOSAL AREA NEAR FIRST STREET
SITE 11 - BONE YARD
SITE 12 - DISPOSAL SITE NEAR WATER TOWER

AREAS OF CONCERN (AOCs)

AOC 1 - SCRAP METAL DUMP
AOC 2 - DEXTROSE DUMP
AOC 3 - CAD 11/12 POND BANK
AOC 4 - IR SITE 4 - MEDICAL WASTE DISPOSAL AREA
AOC 5 - DEBRIS AREA (AN UNDIFFERENTIATED PORTION OF SITE 1)

SOURCE: LANTDIV, 1992 AND WESTON, 1998.

Baker
Baker Environmental, Inc.

FIGURE 3–1
SOIL ASSOCIATION MAP
CTO – 0196

NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

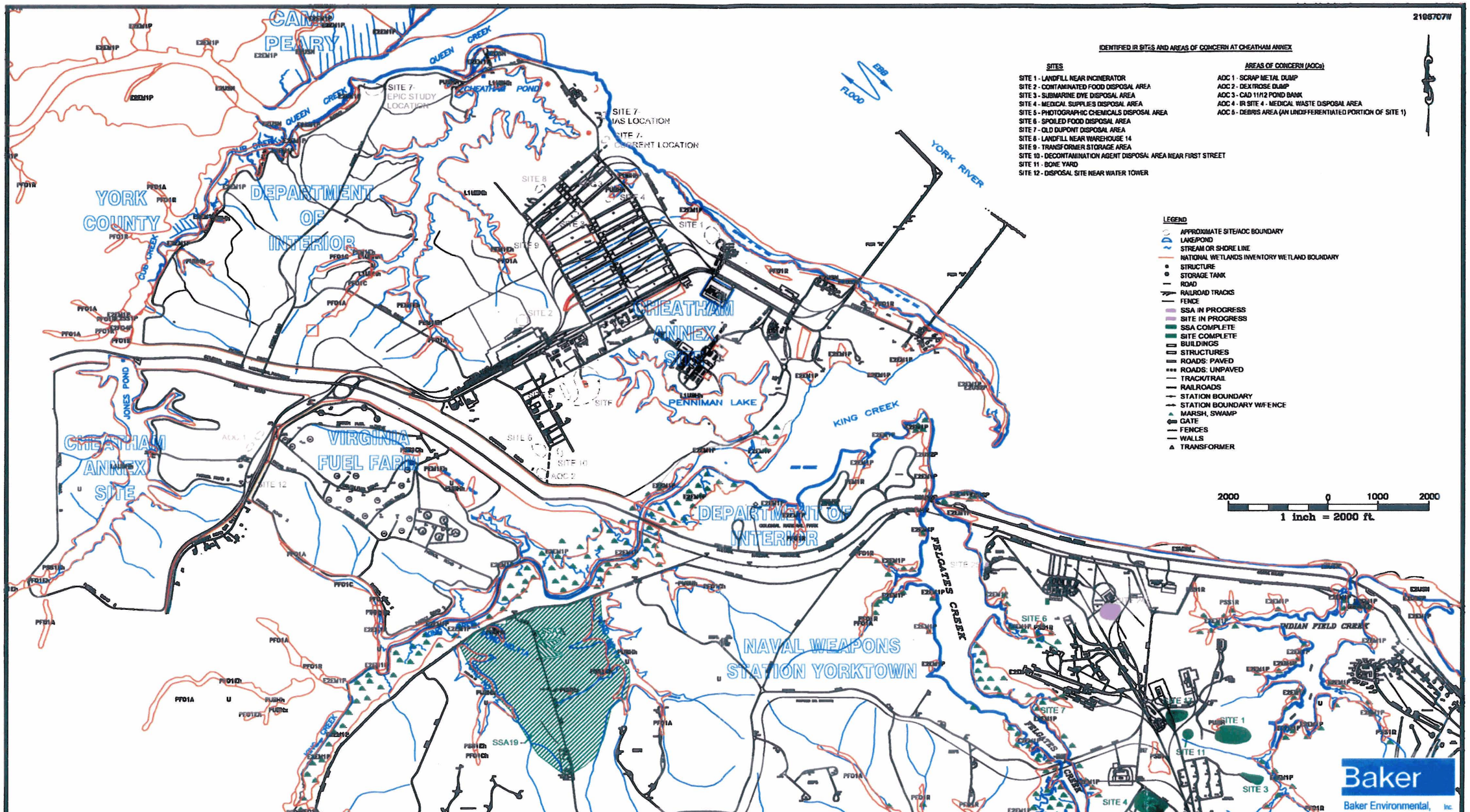


FIGURE 3-2
NATIONAL WETLANDS INVENTORY BOUNDARY
CTO - 0196

NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

4.0 BACKGROUND INVESTIGATION DESIGN

This study was designed to establish background concentrations of inorganic and organic chemicals in surface soils, subsurface soils, and groundwater throughout the Activity. This section explains the rationale for selecting the number of background surface and subsurface soil and groundwater samples and discusses any deviations from the approved scope of work as a result of field conditions. Specific locations of background samples will be provided in Section 5.0 of this report.

4.1 Overall Investigation Design

Because CAX is represented by four separate and distinct soil association groups, (see Section 3.3), these groups defined the boundaries of the Background Investigation. The spatial boundaries of the investigation were located throughout CAX and the northern portion of WPNSTA. The boundaries were in areas that, based on historical evidence, have not been impacted from past or current base operations. As discussed in Section 2.5, several investigations and studies have been conducted at CAX since 1984. The areas that incorporate identified sites and AOCs were not considered as potential sampling areas for the Background Investigation. The sample locations presented herein were chosen based upon knowledge of previous investigations, site conditions, and professional judgment.

Elements such as metals and metaloids occur naturally in soils and groundwater, and distinguishing background levels from site-activity related concentrations often requires statistical analysis. Therefore, the number of background samples obtained to determine naturally occurring concentrations of inorganics was selected to support the performance of various statistical tests. As dictated in the Field Sampling and Analysis Plan (FSAP) for the Background Investigation (Baker, 2001d), each of the four soil association groups were investigated with 10 soil borings and three groundwater monitoring wells. Section 5.0 provides details of the sampling procedures employed for this investigation.

Surface and subsurface soil samples were collected at each of the soil sampling locations. It was anticipated during the design of the sampling program that each of the four soil groups discussed in Section 3.3 would be sampled and represented in the database. Therefore, the database could be segregated by depth (surface versus subsurface), lithologies, and location. Groundwater was collected from each monitoring well. The following paragraphs provide a discussion of the sampling rationale for the background sampling effort.

4.2 Surface Soil Investigation

There are four major soil association within the boundaries of CAX. Forty soil borings were advanced throughout the Base and were distributed among the four soil associations as follows:

- Soil Association 1 – Bohicket, Johnston, and Axis Soil Association 10 borings
- Soil Association 2 – Dogue, Pamunkey, and Uchee Soil Association 10 borings
- Soil Association 3 – Emporia, Slagle, and Craven-Uchee Complex Soil Association 10 borings
- Soil Association 4 – Kempsville, Emporia, Emporia Complex, and Craven-Uchee Complex Soils Association 10 borings

A single surface soil sample was collected from each of the forty soil borings advanced throughout the Activity. These samples were collected from a depth of 0 to 6 inches bgs. Surface soil samples were divided in to four separate data bases based on soil association groups. A separate database was created that includes all forty surface soil samples combined into a single data set.

The combined data set should only be used if the origin of the sample to be compared to background cannot be determined. Different soil types have properties that effect ion attraction and retention. Therefore, it is anticipated that the arithmetic mean for the combined data set will be higher than the arithmetic mean for sands and lower than the arithmetic mean for clayey soils. The result of this difference in arithmetic means may result in the listing of a sample result as a contaminant of potential concern instead of indicative of background concentrations, or vice versa. The combination of sample results into this combined data set will dilute the range of inorganics naturally occurring in clays at CAX.

4.3 Subsurface Soil Investigation

As for surface soil, a single subsurface soil sample was collected from each of the forty soil borings advanced throughout the Activity. These samples were collected from a depth of 6 to 24 inches bgs. As for surface soils, the subsurface samples were divided into four data sets of 10

samples each based on the soil association group to which they belonged. A separate database was created that includes all forty subsurface soil samples combined into a single data set. However, for the reasons discussed in the preceding section, this combined data set should only be used if the origin of the sample to be compared to background can not be determined.

4.4 Groundwater Investigation

Groundwater was collected from twelve monitoring wells installed throughout the Activity. Groundwater data were separated in to four data sets of three samples each based on the soil association group in which wells were located. Those wells screened within Soil Association 1 are identified using the prefix "CXBG1." Those wells screened within Soil Association 2 are identified using the prefix "CXBG2." Those wells screened within Soil Association 3 are identified using the prefix "CXBG3." Those wells screened within Soil Association 4 are identified using the prefix "CXBG4."

5.0 BACKGROUND FIELD INVESTIGATION

The field investigation began on July 23, 2001 and was completed on August 24, 2001. Sampling was conducted in accordance with the approved Project Plans (Baker, 2001d) and USEPA Region III Standard Operating Procedures (SOP). Activities conducted during the field program consisted of a soil investigation, including sampling and exploratory drilling; and a groundwater investigation, including monitoring well installation, development, and sampling. All field activities were conducted using Level D personal protection. The following sections discuss these investigative activities as well as the Quality Assurance/Quality Control (QA/QC) samples collected, the decontamination procedures employed, and management of investigation derived waste (IDW) generated during the field program.

5.1 Sample Designation

In order to identify and accurately track the various samples, all samples collected during this Background Investigation, including QA/QC samples, were designated with a unique number. The number serves to identify the investigation, soil association group, sample media, sampling location, depth (soil) or round (groundwater) of sample, and any QA/QC sample types.

The sample designation format follows:

> Investigation Identification – Soil Association - Media – Location - Depth/Round – Duplicate/Filtered Sample Indicator

An explanation of each of these identifiers is given below.

> Investigation Identification
>
> All samples discussed in this report were collected for the Background Investigation and were identified by the letters "BG" (soil samples) or "CXBG" (groundwater and QA/QC samples).
>
> Soil Association
>
> Soil and groundwater samples were identified by the number of the soil association group from which they were collected.

1	=	Soil Association 1
2	=	Soil Association 2
3	=	Soil Association 3
4	=	Soil Association 4

Media

The following media were collected:

SB	=	Subsurface Soil Sample
SS	=	Surface Soil Sample
GW	=	Groundwater Sample
FB	=	Field Blank (QA/QC sample)
RS	=	Equipment Rinsate (QA/QC sample)

Location

Location numbers identify the sampling location and include soil locations or monitoring well numbers.

Depth/Round

Depth indicators are used for soil samples. The number refers to the sample interval.

00	=	0 to 6 inches bgs (all surface soil samples)
01	=	6 to 24 inches bgs (all subsurface soil samples)

Duplicate/Filtered Sample Indicator

Duplicate samples were indicated with a D at the end of the sample number designation.

Filtered (dissolved) aqueous samples were designated with an F at the end of the sample number designation.

Using this sample designation format, the example sample number BG01-SB02-01D refers to:

BG1-SB02-01D	Background Investigation
BG1-SB02-01D	Soil Association Group #1
BG1-SB02-01D	Subsurface Soil Sample
BG1-SB02-01D	Sample Location #2
BG1-SB02-01D	Depth of sample is from 6 to 24 inches bgs
BG1-SB02-01D	Duplicate sample

Using this sample designation format, sample CXBG2-GW01DF refers to:

CXBG2-GW01DF	Background Investigation
CXBG2-GW01DF	Soil Associaiton Group #2
CXBG2-GW01DF	Groundwater Sample
CXBG2-GW01DF	Monitoring Well #01
CXBG2-GW01DF	Duplicate Sample
CXBG2-GW01DF	Filtered Sample

The sample format described above has been modified somewhat from that reported in the FSAP (Baker, 2001d) for this project. This sample format was followed throughout the project. Tables 5-1 and 5-2 list all samples collected for the Background Investigation and the analytical parameters for which they were analyzed.

5.2 General Field Operations and Pre-Sampling Activities

General field operations were conducted from Building 116 on CAX and Baker's Field Trailer located on WPNSTA Yorktown near Building 1806. Both locations are equipped with electricity and a telephone. The field office was where the field team met at the beginning and end of each day and the site manager coordinated all investigative operations. Further details of project management are described in Section 6.0 of the Background Investigation Work Plan (Baker, 2001d).

Before initiation of the background field investigation, a site visit was conducted by Baker personnel, at which time proposed sampling locations were marked. To prevent damage to existing utilities, all proposed sampling locations were cleared by both WPNSTA Public Works and local utility personnel contacted via Miss Utility (the Virginia state required contact line). If necessary, sampling locations were off-set from proposed locations based upon site conditions and professional judgement, or to obtain utility clearance.

5.3 Soil Investigation

Soil sampling for the background investigation commenced July 23, 2001 and continued through August 24, 2001. Surface and subsurface soil samples were collected from each of forty soil sample locations. Ten sample locations were in each of the four soil associations in areas that had no known history of activity that could increase naturally occurring concentrations of inorganics

or anthropogenic chemicals in surface and subsurface soils. One duplicate sample from each depth was collected in each soil association. Figure 5-1 depicts the background soil sample locations. In general, the field procedures and sampling methods employed for the soil investigation included sample collection, handling and preservation, documentation, and chain-of-custody procedures. Specific sampling procedures are outlined in Section 5 of the FSAP.

All soil samples were collected using a stainless steel hand auger. Augers were decontaminated prior to and following sample collection. Equipment decontamination was conducted in accordance with the Final Background Investigation Project Plans (Baker, 2001d). Surface soil samples were collected from 0 to 6 inches bgs. If present, the upper heavily rooted layer of topsoil and matted roots were removed (approximately the top half-inch of material). Subsurface soil samples were collected from 6 to 24 inches bgs. The type, color, and other significant characteristics of the soils were noted in the field logbooks. Each soil boring was back-filled with soil cuttings.

Each of the surface soil samples was analyzed for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), Target Analyte List (TAL) inorganics (including cyanide). Each of the subsurface soil samples was analyzed for TCL Volatile Organic Compounds (VOCs), SVOCs, pesticides, PCBs, and TAL metals (including cyanide), and Total Organic Carbon (TOC). Table 5-1 summarizes the samples collected and the analytical parameters for these samples.

Soil samples submitted for laboratory analysis were prepared according to USEPA Region III SOPs. Samples for VOCs were placed directly in to sampling containers. All other samples were thoroughly homogenized before being placed in to the appropriate laboratory container. All samples were labeled and temporarily stored in an ice filled cooler. Sample identification number, collection date and time, analytical parameters, and sampler were recorded on the sample label and the chain-of-custody form. The samples were appropriately grouped and packed in an ice filled cooler and sent by Federal Express overnight service to CompuChem Environmental Laboratories in Cary, North Carolina for analysis. All appropriate chain-of-custody procedures were followed. Copies of the chains-of-custody forms are provided in Appendix A.

5.4 Drilling Procedures

Drilling activities for the Background Investigation occurred from August 7, 2001 to August 22, 2001. Parratt Wolff, Inc, of Hillsboro, North Carolina was the drilling contractor. During the drilling program, two 100-foot exploratory soil borings were advanced to provide lithologic information and 11 soil borings were advanced in the process of installing shallow groundwater monitoring wells. Each of the borings provided information regarding hydrogeologic conditions. Exploratory soil borings are discussed in Section 5.5. Monitoring well installation is discussed in Section 5.6.1. Figure 5-1 shows the location of monitoring wells and the exploratory borings.

5.5 Exploratory Soil Borings

Two 100-foot exploratory soil borings were advanced for lithologic content. One of these borings was located within Soil Association 2, offset from CXBG-MW-03 by approximately 20-feet. The other boring was located within Soil Association 3, offset from CXBG-MW01 by approximately 20-feet. These locations are indicated on Figure 5-1. Both of the exploratory borings were advanced via hollow stem auger (4.25 inch inner diameter, 5 feet in length) and were continuously sampled via split spoons (1.375 inch inner diameter, 2 feet in length) at 2-foot intervals the entire length of the boring. Each split-spoon sample was classified visually by the site geologist using a modified Unified Soils Classification. The classification included characterization of soil type, color, moisture content, relative density, plasticity, and other pertinent information such as evidence of contamination. No environmental samples were collected from either boring. Lithological descriptions are provided on the Test Boring and Well Construction Records in Appendix B. Exploratory soil borings were filled with a bentonite/cement grout from the bottom of the boring to the ground surface.

5.6 Groundwater Investigation

The groundwater sampling program developed for the background investigation was designed to obtain an understanding of naturally occurring concentrations of inorganic and organic constituents at CAX and the northern portions of WPNSTA. The following sections describe monitoring well installation, well development, and groundwater sampling procedures.

5.6.1 Monitoring Well Installation Procedures

As part of the background investigation, eleven monitoring wells were installed for the collection of groundwater samples. The newly installed monitoring wells were number according to the following scheme:

CXBG1-MW01

where: CX = Cheatham Annex
BG = Background Investigation
1 = Soil Association Group Number
MW = Monitoring Well
01 = Well Identification Number

The subsections below describe the wells installed within each soil association group. The wells themselves were constructed of 2-inch diameter polyvinyl chloride (PVC) with a 5-foot 0.01-inch slot screen. A volume of No. 1 silica sand was placed within the borehole around the screen so that a minimum of 2 feet of sand settled above the screen around the riser (the non-slotted PVC that is connected to the screen and rises above ground surface). A minimum of 2 feet of bentonite was placed above the sand pack and hydrated to seal off the screen. The remaining portion of the borehole was grouted to the surface with a mixture of bentonite and cement grout. A typical monitoring well construction diagram is provided as Figure 5-2. Additional information pertaining to the procedures for monitoring well installation and completion are described in the FSAP (Baker, 2001d).

Each split-spoon or hand auger sample generated during the well installation process was classified visually by the site geologist. The classification included characterization of soil type, color, moisture content, relative density, plasticity, and other pertinent information such as evidence of contamination. Lithological descriptions are provided on the Test Boring and Well Construction Records in Appendix B. A summary of construction data for monitoring wells installed for the Background Investigation is presented on Table 5-3.

5.6.1.1 Soil Association 1 (Bohicket, Johnson, and Axis Soil Association)

Three monitoring wells were installed within Soil Association 1 (refer to Figure 5-1), one along King Creek between WPNSTA and the Virginia Fuel Farm (CXBG1-MW01), one on the spit

between King Creek and the York River (CXBG1-MW02) and one in the marsh along Queen Creek and slightly northwest of Cheatham Pond (CXBG1-MW03). These well locations did not allow for drill rig access; therefore, each soil boring was advanced via a hand auger.

5.6.1.2 Soil Association 2 (Dogue, Pamunkey, and Uchee Soil Association)

Three monitoring wells were installed within Soil Association 2 (refer to Figure 5-1), one off of Ringfield Road (toward Felgates Creek) in the northern part of the Restricted Area on WPNSTA (CXBG2-MW01), one off of Chase Road (toward Cheatham Pond) on CAX (CXBG2-MW02), and one off of B Street (toward Cheatham Pond) on CAX (CXBG2-MW03). These well locations were accessible with a drill rig; therefore, each soil boring was advanced via hollow stem augers.

5.6.1.3 Soil Association 3 (Slagle, Emporia, and Craven-Uchee Complex Soil Association)

Three monitoring wells were installed within Soil Association 3 (refer to Figure 5-1). These wells triangulate Jones Pond and are located off Patrol Road 5, one on the southern end of Jones Pond (CXBG3-MW01), one to the northeast (CXBG3-MW02) and one to the northwest (CXBG3-MW03). These well locations were accessible with a drill rig; therefore, each soil boring was advanced via hollow stem augers.

5.6.1.4 Soil Association 4 (Emporia, Emporia Complex, Kempsville, and Craven-Uchee Complex Soil Association)

Three monitoring wells were proposed for the portion of Soil Association 4 that is located in the northern part of the Restricted Area on WPNSTA. One of the proposed well locations was located off of Felgates Road, approximately 1,600 feet east of the Ringfeld Road/Felgates Road intersection. However, field reconnaissance revealed the existence of monitoring well BGGW01, which had been installed as part of the 1994 background investigation for WPNSTA. This well was located relatively close to the new well's proposed location (approximately 1,400 feet east). Therefore, it was decided that it would substitute for CXBG4-MW03.

Consequently, two monitoring wells were installed within Soil Association 4, one approximately 200 feet north of Building 163 inside the adjacent woods (CXBG4-MW01) and one off of the dirt road that connects Felgates Road with Burma Road, west of Magazine Group 22 (CXBG4-

MW02) (refer to Figure 5-1). Well CXBG4-MW01's location did not allow for drill rig access; therefore, the soil boring was advanced with a hand auger. Well CXBG4-MW02's location was accessible with a drill rig; therefore, its soil boring was advanced via hollow stem auger.

5.6.2 Well Development Procedures

Prior to groundwater sampling, the eleven newly installed wells and one existing well were developed by removing from each well a minimum of five well volumes of groundwater, plus the volume of any water added during the drilling or installation process. The wells were developed with a Wattera™ pump, which agitates the water inside a well in order to put silt/particulates into suspension for their removal as the well water is pumped off. Development water was discharged into a 5-gallon bucket to measure the amount of water removed, then it was dumped on-site, directly onto the ground (see Section 5.11, Investigation Derived Waste Management). Monitoring well development was performed only after the grout used to construct the new monitoring wells was allowed to adequately set (i.e., greater than 24 hours). This method helped ensure that no grout was introduced into the screened interval during well development. Additional details for monitoring well development are found in the FSAP (Baker, 2001d).

Development was complete when five consecutive field measurements for pH, specific conductance, and temperature were considered stable (i.e., readings within 10 percent of each other). Development information, including water clarity, pH, specific conductivity, salinity, temperature, and comments was recorded in a field logbook. Appendix A, Section 201 of the Master Project Plans presents the SOPs for "On-Site Water Quality Testing" (Baker, 1994b).

5.6.3 Groundwater Sampling Procedures

One round of groundwater samples was collected from the eleven newly installed wells and the one existing well. Prior to groundwater sampling, static water levels were measured and used to calculate well volumes. Three to five well volumes of groundwater were purged from each monitoring well to ensure representative groundwater from the aquifer was sampled. A low-flow purge was desired to keep water turbidity low (i.e., less than 5 nephelometric turbidity units [NTUs], if practical). Therefore, either a Grunfos Redi-flow submersible pump (for wells deeper than 30 feet) or a peristaltic pump (for wells less than 30 feet deep) was used to purge and sample the wells.

Field measurements of turbidity, pH, specific conductivity, and temperature were taken after each well volume. Purging was considered complete when three successive field measurements of each parameter were within 10 percent of each other and turbidity stabilized (i.e., was less than 5 NTUs, if practical). Monitoring well purging and groundwater sampling procedures are detailed in the FSAP (Baker, 2001d).

Groundwater samples were analyzed for TCL Organics (VOC, SVOC, Pesticides, PCB) and TAL Inorganics (metals – total and dissolved and cyanide). Table 5-1 summarizes the environmental groundwater samples that were collected and the analytical parameters for these samples.

5.7 Quality Assurance/Quality Control Samples

Six types of QA/QC samples were collected and analyzed including field duplicate samples, equipment rinsate blanks, field blanks, trip blanks, temperature blanks, and matrix spike/ matrix spike duplicate (MS/MSD) samples. A description of each of these types of QA/QC samples is provided in Section 5.7 of the FSAP (Baker, 2001d).

Field duplicate samples were collected from both the soil and groundwater samples at a rate of one duplicate per ten samples. Equipment rinsate blanks were collected from decontaminated or unused disposable sampling equipment with laboratory-grade deionized water. Three field blanks were collected, one from each water source that could have an effect on sample analytic results. These water sources were (1) store-bought distilled water that was used to decontaminate reusable sampling equipment, such as stainless steel spoons and hand auger heads, (2) laboratory-grade deionized water that was used to collect equipment rinsate blanks, and (3) non-potable water stored in the drill rig support truck tank that was used during monitoring well installation. In addition, trip blanks accompanied all VOC samples during their shipment to the laboratory, and temperature blanks were placed in each sample cooler prior to shipment. MS/MSD samples were collected from both the soil and groundwater samples at a rate of one MS and one MSD per twenty samples.

Table 5-2 summarizes all of the QA/QC samples collected as part of the Background Investigation.

5.8 Sample Handling and Analysis

The following sections present information regarding sample preservation and handling, and chain-of-custody procedures.

5.8.1 Sample Preservation and Handling

Analytical methods, data quality level, laboratory turnaround times, preservation requirements, bottle requirements, and holding times are presented in the Quality Assurance Project Plan (QAPP) submitted as part of the Final Project Plans (Baker, 2001d). Field activities were conducted according to USEPA protocol.

5.8.2 Chain-of-Custody Forms

Chain-of-custody procedures were followed throughout the field program to ensure a documented, traceable link between analytical results and the sample/parameter that they represent. These procedures are intended to provide a legally acceptable record of sample collection, identification, preparation, storage, shipping, and analysis.

A chain-of-custody form was completed for each container (shipping cooler) in which the samples were shipped. After the samples were properly packaged, the coolers were sealed and prepared for shipment. Custody seals were placed on the outside of the coolers to ensure that the samples were not disturbed prior to reaching the laboratory. Chain-of-custody forms are presented in Appendix A.

5.8.3 Sample Analysis

Samples sent for TCL Organics and TAL inorganics analysis were subject to Contract Laboratory Program (CLP) methods with Level D QA/QC. These analytical methods, their contract required detection limits or practical quantitation limits, and QA/QC procedures are described in Section 6.0 of the QAPP (Baker, 2001d).

5.8.4 Data Validation

Data validation was performed by an independent data validator for all samples collected, using Level D guidelines. The procedures for validation followed the appropriate Level D guidelines listed in the NEESA guidance document (NEESA 20.2-047B). Further details concerning data validation are found in Section 7.0 of the QAPP (Baker, 2001d). Data that are evaluated and do not pass the validation standards are reported but flagged with qualifiers (see Section 7.1).

5.9 Field Screening and Air Monitoring

Air monitoring and field screening procedures were implemented during soil sampling and drilling activities for health and safety and initial contaminant monitoring. Each soil sample was monitored with a photoionization detector (PID). Compounds with an ionization potential less than or equal to the electron volt (eV) capacity of the lamp (11.7 eV for the instrument used during this investigation) can be detected by the PID. Data obtained in the field were recorded in a field logbook. Prior to daily monitoring, the instruments were calibrated, with pertinent documentation recorded in field logbooks and/or on calibration forms. Specific screening and monitoring requirements are outlined in the project Health and Safety Plan (HASP) (Baker, 2001d).

5.10 Decontamination Procedures

Equipment decontamination was conducted in accordance with the Final Background Investigation Project Plans (Baker, 2001d). Specific procedures are discussed in Section 7 of the HASP and Section 5 of the FSAP.

5.11 Investigation Derived Waste Management

IDW generated during the field investigation included soil from the subsurface borings (cuttings), groundwater (from developing and purging wells), decontamination fluids (steam cleaning water and decontamination chemicals) and miscellaneous items such as gloves, Tyvek™, and other used personal protective equipment (PPE).

IDW management (soil and groundwater) was conducted in accordance with guidance from USEPA's Guide to Management of Investigation-Derived Wastes (USEPA, 1992). This

document states that "most IDW (with the exception of non-indigenous IDW) generated during the course of the investigation are intrinsic elements of the site and should be managed with other wastes from the site, consistent with final remedy." The IDW management procedures are described below.

5.11.1 Soil

Soil cuttings derived from the monitoring well installation and hand augering activities were used to fill the sample hole or were spread on the ground surface near the well location.

5.11.2 Liquid

Liquid IDW generated during field activities included development and purge water (groundwater) from monitoring wells, decontamination water from steam cleaning activities, and decontamination water, solvents and acids used to clean small, reusable sampling equipment. These liquids were segregated and stored as noted below.

Development and purge water generated from monitoring wells at the sites and decontamination water (generated by steam cleaning and decontamination of PPE) from the sites was discharged on the ground near its source.

Decontamination water containing acids and solvents used for cleaning small, reusable sampling equipment was placed into a 30-gallon drum that is labeled and stored on a pallet at a secure location at Baker's staging area at WPNSTA, Yorktown. This drum contains liquid IDW both from the Background Investigation and from three field programs conducted prior to the Background Investigation, and is currently just over one-third full. This liquid IDW will be sent to an independent off-site disposal company following analytical requirements, as specified by the disposal company. Typical analysis includes TCL organics, nitramine compounds (if applicable), TAL inorganics, and Resource, Conservation, and Recovery Act (RCRA) hazardous characteristics (including reactive cyanide, reactive sulfide, ignitability, and corrosivity [pH]). IDW sampling procedures are described in FSAP (Baker, 2001d).

5.11.3 Personal Protective Equipment

Items of PPE, such as disposable gloves and Tyvek™, were double-bagged in plastic garbage bags and placed in the trash dumpster at Baker's Field Trailer.

5.12 Global Positioning System Survey

Monitoring wells and soil sample locations were surveyed using Global Positioning System (GPS) techniques. The GPS Pathfinder Pro XR is a mapping and GIS data capture system that integrates the use of off-shore beacons with satellites to enhance its accuracy. After postprocessing differential correction, the data system provides a horizontal accuracy between the range of 75 centimeters to 10 cm (with 20-minute occupation at the location) and a vertical accuracy range of 1.5 meter to 20 cm (with 20-minute occupation at the location). Local environmental conditions (e.g. ionosphereic, obstructions of the sky by buildings, and heavy tree canopy) may degrade the accuracy by interfering with signal reception. Optimal accuracy is obtained by collecting data in an environment that is devoid of large reflective surfaces and also has a clear view of the sky. The majority of sample locations were surveyed with the GPS unit; however, some sample locations were not compatible with the GPS unit due to satellite blockage. At these locations conventional surveying was used to locate the sampling points. GPS and conventional surveying data were also used to determine elevations of monitoring wells.

TABLES

TABLE 5-1

SUMMARY GROUNDWATER AND SOIL SAMPLES AND ANALYSES
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE
WILLIAMSBURG, VIRGINIA

MEDIUM	SAMPLE IDENTIFICATION	DATE COLLECTED	REQUESTED ANALYSES			COMMENTS
			TCL Organics[1]	TAL Inorganics	CN	
Groundwater Samples	CXBG1-GW01	8/21/01	X	X	X	
	CXBG1-GW02	8/15/01	X	X	X	
	CXBG1-GW03	8/20/01	X	X	X	
	CXBG2-GW01	8/23/01	X	X	X	
	CXBG2-GW02	8/14/01	X	X	X	
	CXBG2-GW03	8/14/01	X	X	X	
	CXBG3-GW01	8/20/01	X	X	X	
	CXBG3-GW02	8/21/01	X	X	X	
	CXBG3-GW03	8/15/01	X	X	X	
	CXBG4-GW01	8/24/01	X	X	X	
	CXBG4-GW02	8/24/01	X	X	X	
	CXBG4-GW03	8/23/01	X	X	X	

[1] TCL organics include volatile organic compounds, semivolatile organic compounds, pesticides, and PCBs.

TCL = Target Compound List
TAL = Target Analyte List

TABLE 5-1
(Continued)
SUMMARY GROUNDWATER AND SOIL SAMPLES AND ANALYSES
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE
WILLIAMSBURG, VIRGINIA

MEDIUM	SAMPLE IDENTIFICATION	DATE COLLECTED	SAMPLE DEPTH	REQUESTED ANALYSES			COMMENTS
				TCL Organics[2]	TAL Inorganics	CN	
Surface Soil Samples	CXBG1-SS01-00	8/06/01	0-6 inches	X	X	X	
	CXBG1-SS02-00	7/25/01	0-6 inches	X	X	X	
	CXBG1-SS03-00	7/25/01	0-6 inches	X	X	X	
	CXBG1-SS04-00	8/06/01	0-6 inches	X	X	X	
	CXBG1-SS05-00	8/06/01	0-6 inches	X	X	X	
	CXBG1-SS06-00	8/06/01	0-6 inches	X	X	X	
	CXBG1-SS07-00	7/25/01	0-6 inches	X	X	X	
	CXBG1-SS08-00	7/25/01	0-6 inches	X	X	X	
	CXBG1-SS09-00	7/25/01	0-6 inches	X	X	X	
	CXBG1-SS10-00	7/25/01	0-6 inches	X	X	X	
	CXBG2-SS01-00	7/27/01	0-6 inches	X	X	X	
	CXBG2-SS02-00	7/24/01	0-6 inches	X	X	X	
	CXBG2-SS03-00	7/25/01	0-6 inches	X	X	X	
	CXBG2-SS04-00	7/26/01	0-6 inches	X	X	X	
	CXBG2-SS05-00	7/26/01	0-6 inches	X	X	X	
	CXBG2-SS06-00	7/27/01	0-6 inches	X	X	X	
	CXBG2-SS07-00	7/24/01	0-6 inches	X	X	X	
	CXBG2-SS08-00	7/24/01	0-6 inches	X	X	X	
	CXBG2-SS09-00	7/24/01	0-6 inches	X	X	X	
	CXBG2-SS10-00	7/25/01	0-6 inches	X	X	X	

[2] TCL organics include semivolatile organic compounds, pesticides, and PCBs.

TCL - Target Compound List
TAL - Target Analyte List

TABLE 5-1
(Continued)
SUMMARY GROUNDWATER AND SOIL SAMPLES AND ANALYSES
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE
WILLIAMSBURG, VIRGINIA

MEDIUM	SAMPLE IDENTIFICATION	DATE COLLECTED	SAMPLE DEPTH	REQUESTED ANALYSES			COMMENTS
				TCL Organics[2]	TAL Inorganics	CN	
Surface Soil Samples	CXBG3-SS01-00	7/23/01	0-6 inches	X	X	X	
	CXBG3-SS02-00	7/24/01	0-6 inches	X	X	X	
	CXBG3-SS03-00	7/24/01	0-6 inches	X	X	X	
	CXBG3-SS04-00	7/23/01	0-6 inches	X	X	X	
	CXBG3-SS05-00	7/24/01	0-6 inches	X	X	X	
	CXBG3-SS06-00	7/24/01	0-6 inches	X	X	X	
	CXBG3-SS07-00	7/24/01	0-6 inches	X	X	X	
	CXBG3-SS08-00	7/24/01	0-6 inches	X	X	X	
	CXBG3-SS09-00	7/23/01	0-6 inches	X	X	X	
	CXBG3-SS10-00	7/23/01	0-6 inches	X	X	X	
	CXBG4-SS01-00	7/26/01	0-6 inches	X	X	X	
	CXBG4-SS02-00	7/27/01	0-6 inches	X	X	X	
	CXBG4-SS03-00	7/26/01	0-6 inches	X	X	X	
	CXBG4-SS04-00	7/26/01	0-6 inches	X	X	X	
	CXBG4-SS05-00	7/26/01	0-6 inches	X	X	X	
	CXBG4-SS06-00	7/26/01	0-6 inches	X	X	X	
	CXBG4-SS07-00	7/27/01	0-6 inches	X	X	X	
	CXBG4-SS08-00	7/27/01	0-6 inches	X	X	X	
	CXBG4-SS09-00	7/27/01	0-6 inches	X	X	X	
	CXBG4-SS10-00	7/26/01	0-6 inches	X	X	X	

[2] TCL organics include semivolatile organic compounds, pesticides, and PCBs.

TCL = Target Compound List
TAL = Target Analyte List

TABLE 5-1
(Continued)
SUMMARY GROUNDWATER AND SOIL SAMPLES AND ANALYSES
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE
WILLIAMSBURG, VIRGINIA

MEDIUM	SAMPLE IDENTIFICATION	DATE COLLECTED	SAMPLE DEPTH	REQUESTED ANALYSES			COMMENTS
				TCL Organics[3]	TAL Inorganics	CN & TOC	
Subsurface Soil Samples	CXBG1-SB01-01	8/06/01	6-24 inches	X	X	X	
	CXBG1-SB02-01	7/25/01	6-24 inches	X	X	X	
	CXBG1-SB03-01	7/25/01	6-24 inches	X	X	X	
	CXBG1-SB04-01	8/06/01	6-24 inches	X	X	X	
	CXBG1-SB05-01	8/06/01	6-24 inches	X	X	X	
	CXBG1-SB06-01	8/06/01	6-24 inches	X	X	X	
	CXBG1-SB07-01	7/25/01	6-24 inches	X	X	X	
	CXBG1-SB08-01	7/25/01	6-24 inches	X	X	X	
	CXBG1-SB09-01	7/25/01	6-24 inches	X	X	X	
	CXBG1-SB10-01	7/25/01	6-24 inches	X	X	X	
	CXBG2-SB01-00	7/27/01	6-24 inches	X	X	X	
	CXBG2-SB02-00	7/24/01	6-24 inches	X	X	X	
	CXBG2-SB03-00	7/25/01	6-24 inches	X	X	X	
	CXBG2-SB04-00	7/26/01	6-24 inches	X	X	X	
	CXBG2-SB05-00	7/26/01	6-24 inches	X	X	X	
	CXBG2-SB06-00	7/27/01	6-24 inches	X	X	X	
	CXBG2-SB07-00	7/24/01	6-24 inches	X	X	X	
	CXBG2-SB08-00	7/24/01	6-24 inches	X	X	X	
	CXBG2-SB09-00	7/24/01	6-24 inches	X	X	X	
	CXBG2-SB10-00	7/25/01	6-24 inches	X	X	X	

[3] TCL organics include volatile organic compounds, semivolatile organic compounds, pesticides, and PCBs.

TCL = Target Compound List
TAL = Target Analyte List
TOC = Total Organic Carbon

TABLE 5-1
(Continued)
SUMMARY GROUNDWATER AND SOIL SAMPLES AND ANALYSES
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE
WILLIAMSBURG, VIRGINIA

MEDIUM	SAMPLE IDENTIFICATION	DATE COLLECTED	SAMPLE DEPTH	REQUESTED ANALYSES			COMMENTS
				TCL Organics[3]	TAL Inorganics	CN & TOC	
Subsurface Soil Samples	CXBG3-SB01-01	7/23/01	6-24 inches	X	X	X	
	CXBG3-SB02-01	7/24/01	6-24 inches	X	X	X	
	CXBG3-SB03-01	7/24/01	6-24 inches	X	X	X	
	CXBG3-SB04-01	7/23/01	6-24 inches	X	X	X	
	CXBG3-SB05-01	7/24/01	6-24 inches	X	X	X	
	CXBG3-SB06-01	7/24/01	6-24 inches	X	X	X	
	CXBG3-SB07-01	7/24/01	6-24 inches	X	X	X	
	CXBG3-SB08-01	7/24/01	6-24 inches	X	X	X	
	CXBG3-SB09-01	7/23/01	6-24 inches	X	X	X	
	CXBG3-SB10-01	7/23/01	6-24 inches	X	X	X	
	CXBG4-SB01-01	7/26/01	6-24 inches	X	X	X	
	CXBG4-SB02-01	7/27/01	6-24 inches	X	X	X	
	CXBG4-SB03-01	7/26/01	6-24 inches	X	X	X	
	CXBG4-SB04-01	7/26/01	6-24 inches	X	X	X	
	CXBG4-SB05-01	7/26/01	6-24 inches	X	X	X	
	CXBG4-SB06-01	7/26/01	6-24 inches	X	X	X	
	CXBG4-SB07-01	7/27/01	6-24 inches	X	X	X	
	CXBG4-SB08-01	7/27/01	6-24 inches	X	X	X	
	CXBG4-SB09-01	7/27/01	6-24 inches	X	X	X	
	CXBG4-SB10-01	7/26/01	6-24 inches	X	X	X	

[3] TCL organics include volatile organic compounds, semivolatile organic compounds, pesticides, and PCBs.

TCL = Target Compound List
TAL = Target Analyte List
TOC = Total Organic Carbon

TABLE 5-2

SUMMARY QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) SAMPLES AND ANALYSES
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE
WILLIAMSBURG, VIRGINIA

QA/QC TYPE (MEDIUM)	SAMPLE IDENTIFICATION	DATE COLLECTED	REQUESTED ANALYSES			COMMENTS
			TCL Organics[1]	TAL Inorganics	CN	
Field Blanks (Aqueous)	CXBG-FB01	7/30/01	X	X	X	Distilled Water for Equipment Decon
	CXBG-FB02	7/30/01	X	X	X	Deionized Water for Rinsate Blanks
	CXBG-FB03	8/08/01	X	X + filtered	X	Tank Water from Rig Support Truck
Rinsate Blanks (Aqueous)	CXBG-RS01	7/24/01	X	X	X	Disposable Pie Pan Rinsed
	CXBG-RS02	7/24/01	X	X	X	Hand Auger Bucket Rinsed
	CXBG-RS03	7/25/01	X	X	X	Stainless Steel Spoon Rinsed
	CXBG-RS04	7/30/01	X	X	X	Disposable Pie Pan Rinsed
	CXBG-RS05	8/08/01	X	X	X	Disposable Pie Pan Rinsed
	CXBG-RS06	8/14/01	X	X + filtered	X	Rigid & Flex Tubing Rinsed
	CXBG-RS07	8/20/01	X	X + filtered	X	¾" Black Tubing Rinsed
	CXBG-RS08	8/24/01	X	X + filtered	X	Flex Tubing Rinsed
Trip Blanks (Aqueous)	CXBG-TB01	7/25/01	X			VOC analysis only
	CXBG-TB02	7/27/01	X			"
	CXBG-TB03	7/30/01	X			"
	CXBG-TB04	8/06/01	X			"
	CXBG-TB05	8/15/01	X			"
	CXBG-TB06	8/21/01	X			"
	CXBG-TB07	8/24/01	X			"

(1) TCL organics include volatile organic compounds (VOC), semivolatile organic compounds, pesticides, and PCBs.

TCL = Target Compound List
TAL = Target Analyte List

TABLE 5-2
(Continued)
SUMMARY QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) SAMPLES AND ANALYSES
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE
WILLIAMSBURG, VIRGINIA

QA/QC TYPE (MEDIUM)	SAMPLE IDENTIFICATION	DATE COLLECTED	SAMPLE DEPTH	REQUESTED ANALYSES			COMMENTS
				TCL Organics[1]	TAL Inorganics	CN	
Matrix Spike/ Matrix Spike Duplicate (Aqueous)	CXBG3-GW01	8/20/01	NA	X	X	X	MS and MSD
Duplicates (Aqueous)	CXBG1-GW03D	8/20/01	NA	X	X	X	
	CXBG3-GW01D	8/20/01	NA	X	X	X	
Matrix Spike/ Matrix Spike Duplicate (Soil)	CXBG1-SS05-00	8/06/01	0-6 inches	X	X	X	MS & MSD, No VOC analysis
	CXBG1-SB05-01	8/06/01	6-24 inches	X	X	X	MS & MSD, plus TOC analysis
	CXBG2-SS01-00	7/27/01	0-6 inches	X	X	X	MS & MSD, No VOC analysis
	CXBG2-SB01-01	7/27/01	6-24 inches	X	X	X	MS & MSD, plus TOC analysis
	CXBG4-SS01-00	7/26/01	0-6 inches	X	X	X	MS & MSD, No VOC analysis
	CXBG4-SB01-01	7/26/01	6-24 inches	X	X	X	MS & MSD, plus TOC analysis
Duplicates (Soil)	CXBG1-SS05-00D	8/06/01	0-6 inches	X	X	X	MS & MSD, No VOC analysis
	CXBG1-SB05-01D	8/06/01	6-24 inches	X	X	X	MS & MSD, plus TOC analysis
	CXBG2-SS01-00D	7/27/01	0-6 inches	X	X	X	MS & MSD, No VOC analysis
	CXBG2-SB01-01D	7/27/01	6-24 inches	X	X	X	MS & MSD, plus TOC analysis
	CXBG3-SS01-00D	7/23/01	0-6 inches	X	X	X	MS & MSD, No VOC analysis
	CXBG3-SB06-01D	7/23/01	6-24 inches	X	X	X	MS & MSD, plus TOC analysis
	CXBG4-SS01-00D	7/26/01	0-6 inches	X	X	X	MS & MSD, No VOC analysis
	CXBG4-SB01-01D	7/26/01	6-24 inches	X	X	X	MS & MSD, plus TOC analysis

[1] TCL organics include volatile organic compounds (VOC), semivolatile organic compounds, pesticides, and PCBs.

NA = Not Applicable
TCL=Target Compound List
TAL=Target Analyte List
TOC = Total Organic Carbon

TABLE 5-3

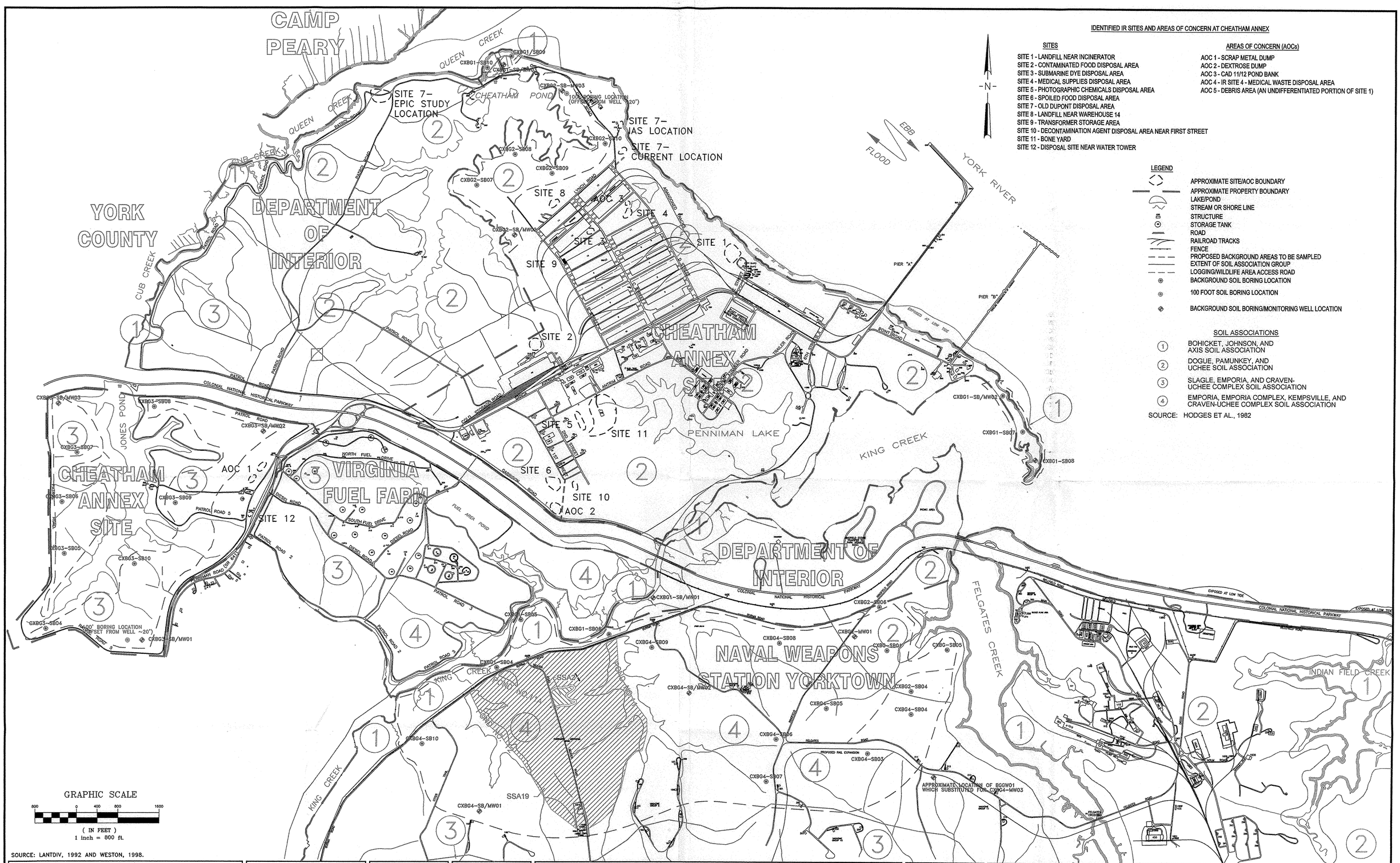
SUMMARY OF WELL CONSTRUCTION DETAILS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE
WILLIAMSBURG, VIRGINIA

Monitoring Well	Date Installed	Boring Depth (feet bgs)	Well Depth (feet bgs)	Screen Interval (feet)	Sand Pack Interval (feet)	Bentonite Interval (feet)
CXBG1-MW01	8/12/2001	10.0	10.0	5.0 - 10.0	3.0 - 10.0	1.0 - 3.0
CXBG1-MW02	8/12/2001	10.0	10.0	3.0 - 10.0	2.0 - 10.0	1.0 - 2.0
CXBG1-MW03	8/12/2001	7.0	7.0	2.0 - 7.0	1.5 - 7.0	0.5 - 1.5
CXBG2-MW01	8/21/2001	16.0	16.0	6.0 - 16.0	4.0 - 16.0	2.0 - 4.0
CXBG2-MW02	8/9/2001	19.0	19.0	9.0 - 19.0	7.0 - 19.0	5.0 - 7.0
CXBG2-MW03	8/9/2001	26.0	26.0	16.0 - 26.0	14.0 - 26.0	12.0 - 14.0
CXBG3-MW01	8/8/2001	38.0	38.0	23.0 - 38.0	21.0 - 38.0	19.0 - 21.0
CXBG3-MW02	8/7/2001	38.0	38.0	23.0 - 38.0	21.0 - 38.0	19.0 - 21.0
CXBG3-MW03	8/8/2001	32.0	32.0	22.0 - 32.0	20.0 - 32.0	18.0 - 20.0
CXBG4-MW01	8/22/2001	9.0	9.0	4.0 - 9.0	2.0 - 9.0	0.5 - 2.0
CXBG4-MW02	8/22/2001	44.0	44.0	34.0 - 44.0	32.0 - 44.0	30.0 - 32.0

Notes:

bgs = Below ground surface

FIGURES



IDENTIFIED IR SITES AND AREAS OF CONCERN AT CHEATHAM ANNEX

SITES

- SITE 1 - LANDFILL NEAR INCINERATOR
- SITE 2 - CONTAMINATED FOOD DISPOSAL AREA
- SITE 3 - SUBMARINE DYE DISPOSAL AREA
- SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
- SITE 5 - PHOTOGRAPHIC CHEMICALS DISPOSAL AREA
- SITE 6 - SPOILED FOOD DISPOSAL AREA
- SITE 7 - OLD DUPONT DISPOSAL AREA
- SITE 8 - LANDFILL NEAR WAREHOUSE 14
- SITE 9 - TRANSFORMER STORAGE AREA
- SITE 10 - DECONTAMINATION AGENT DISPOSAL AREA NEAR FIRST STREET
- SITE 11 - BONE YARD
- SITE 12 - DISPOSAL SITE NEAR WATER TOWER

AREAS OF CONCERN (AOCs)

- AOC 1 - SCRAP METAL DUMP
- AOC 2 - DEXTROSE DUMP
- AOC 3 - CAD 11/12 POND BANK
- AOC 4 - IR SITE 4 - MEDICAL WASTE DISPOSAL AREA
- AOC 5 - DEBRIS AREA (AN UNDIFFERENTIATED PORTION OF SITE 1)

LEGEND

- APPROXIMATE SITE/AOC BOUNDARY
- APPROXIMATE PROPERTY BOUNDARY
- LAKE/POND
- STREAM OR SHORE LINE
- STRUCTURE
- STORAGE TANK
- ROAD
- RAILROAD TRACKS
- FENCE
- PROPOSED BACKGROUND AREAS TO BE SAMPLED
- EXTENT OF SOIL ASSOCIATION GROUP
- LOGGING/WILDLIFE AREA ACCESS ROAD
- BACKGROUND SOIL BORING LOCATION
- 100 FOOT SOIL BORING LOCATION
- BACKGROUND SOIL BORING/MONITORING WELL LOCATION

SOIL ASSOCIATIONS

1. BOHICKET, JOHNSON, AND AXIS SOIL ASSOCIATION
2. DOGUE, PAMUNKEY, AND UCHEE SOIL ASSOCIATION
3. SLAGLE, EMPORIA, AND CRAVEN-UCHEE COMPLEX SOIL ASSOCIATION
4. EMPORIA, EMPORIA COMPLEX, KEMPSVILLE, AND CRAVEN-UCHEE COMPLEX SOIL ASSOCIATION

SOURCE: HODGES ET AL., 1982

SOURCE: LANTDIV, 1992 AND WESTON, 1998.

REVISIONS	
1	
2	
3	
4	
5	
6	
7	
8	

DSN/DWN:	HGW/WJH
CHK:	HGW
S.O. NO.:	26007-196
FILE:	2196705W

NORTH

N

NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

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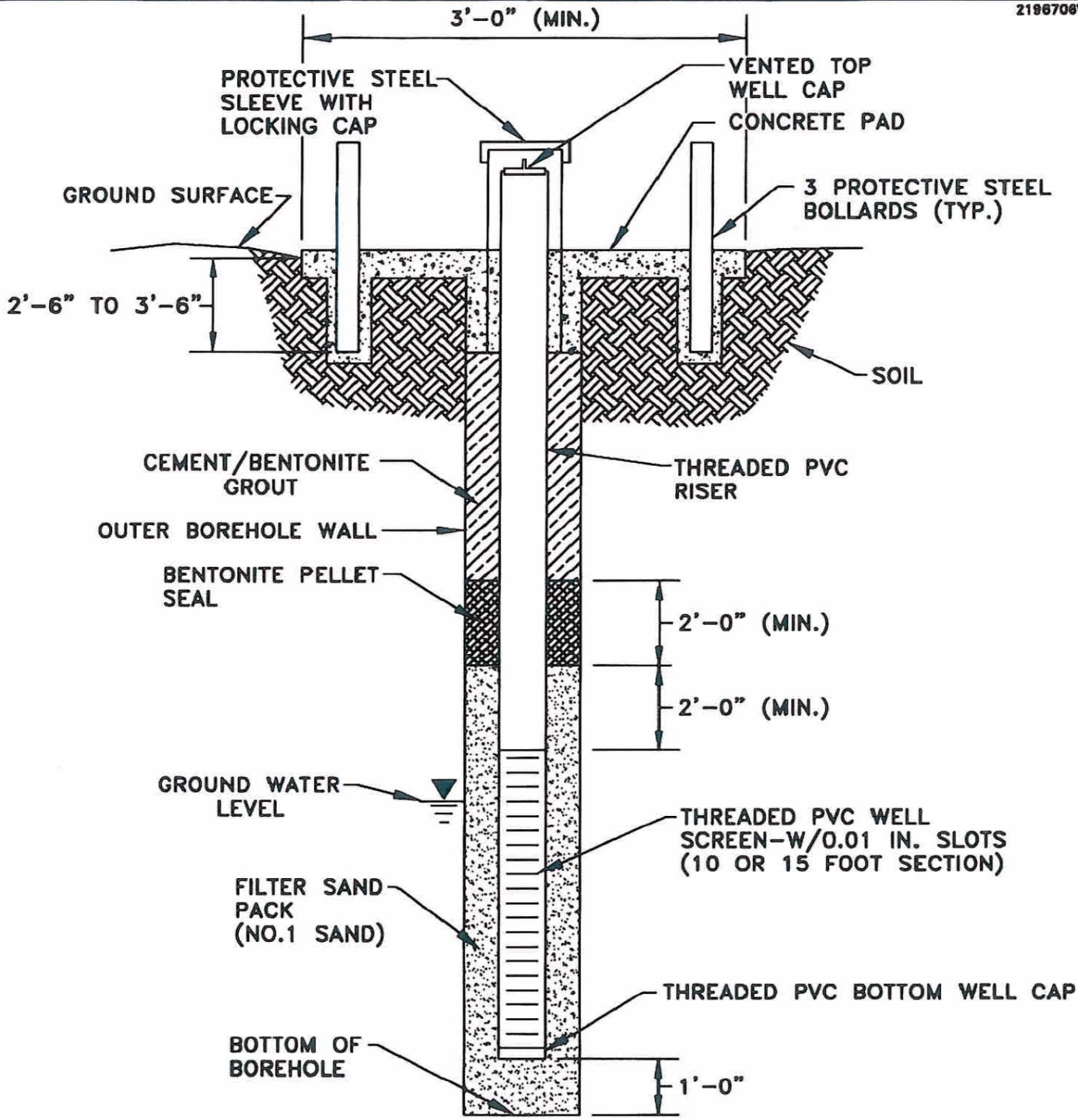
SURFACE SOIL, SUBSURFACE SOIL, AND GROUNDWATER SAMPLE LOCATION MAP
CTO - 0196

SCALE: 1" = 800'

DATE: JULY 2002

FIGURE NO.

5-1



N.T.S.

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FIGURE 5-2
TYPICAL MONITORING
WELL CONSTRUCTION DIAGRAM
CTO - 0196

NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

6.0 PHYSICAL RESULTS OF FIELD INVESTIGATION

The following subsections present results of the investigation and information pertaining to the physiography, geologic and hydrogeologic conditions, and field measurements.

The geologic and hydrogeologic conditions at CAX and the northern portions of WPNSTA were investigated through the classification of two 100-foot exploratory soil borings and eleven borings made in conjunction with monitoring well installation. Records of the subsurface lithology, well completion details, geotechnical characteristics (Standard Penetration Test [SPT] values and other physical features such as color, grain size, moisture content, etc.,) are recorded on Test Boring/Well Construction Records, which are presented in Appendix B.

6.1 General Physiography

CAX is located in the southeast portion of Virginia on the York-James Peninsula. The annex is located in northern portion of York County and is adjacent to James City County. CAX is situated in the Atlantic Coastal Plain Physiographic Province. This province extends from the Atlantic Ocean westward for 75 to 90 miles where it borders the Piedmont Physiographic Province. The Coastal Plain consists of unconsolidated sediments, with its topography split into a number of terraces of different elevations each bounded by scarp (cut out) features. The fluctuating levels of the sea and subsequent shoreline erosion process formed these terraces and scarps over geologic history (Brockman et al, 1997).

The Coastal Province is comprised of four terraces. The terraces from highest to lowest are: Lackey Plain, Croaker Flat, Huntington Flat, and Grafton Plain. Three scarps are also found within this province; the Kingsmill, the Lee Hall, and the Camp Peary. The terraces and scarps at CAX parallel the York River. They are identified from west to east as the Lackey Plain and Croaker Flat terraces, and the Camp Peary scarp (Brockman et al, 1997).

6.2 Geologic and Hydrogeologic Conditions

The following subsections present descriptions of the geologic and hydrogeologic settings at CAX and are based on the findings of this investigation.

6.2.1 Geologic Setting

The Atlantic Coastal Plain physiographic province is underlain by unconsolidated sediments of Quaternary, Tertiary, and Cretaceous ages that dip gently to the southeast and have a combined thickness of approximately 1,900 ft in the vicinity of CAX (Teifke, 1973).

Most of the surficial unconsolidated sediment at CAX has been mapped as the Shirley Formation of the Pleistocene series (Mixon et. al., 1989). This formation is composed of gravel, sand, silt, clay, and peat deposited in river and estuarine environments. Its thickness is estimated to vary from 0- to 80-ft. The Chuckatuck Formation of Pleistocene age underlies the Shirley Formation and is described as sand, silt, and clay with minor amounts of peat deposited in bay environments. The Chuckatuck Formation rests on the top of the Windsor Formation, also of Pleistocene age. This formation is composed of a series of sand and silt deposited in marine and estuarine environments. Its thickness is estimated to vary from 0- to 40-ft.

The Bacons Castle Formation of Pliocene age underlies the Windsor Formation and is described as a clayey silt and silty fine-grained sand. The Bacons Castle Formation rests unconformably on the weathered top of the Upper Yorktown Formation, also of Pliocene age. Identification of the Yorktown Formation has been well established with the presence of calcite-cemented shells and shell fragments, which are common characteristics of the upper portion of the formation. This type of lithology was encountered during this field investigation. Figure 6-1 provides a relationship between age, geologic unit and hydrogeological unit of formations mentioned above.

The strata encountered at the background monitoring well locations consist of layers of sand, silt, clay, shell/shell fragments, and combinations thereof. Gravel-sized oxidation nodules (ferricrete) and quartzitic fragments were also encountered (but are not wide spread).

Two cross-sections were generated from the soil boring and monitoring well lithologic logs. Figure 6-2 presents the location of Cross-section A to A' in the northeast to southwest traverse and Cross-section B to B' in the north to south traverse. Figures 6-3 and 6-4 present Cross-sections A- to A' and B- to B'. The strata encountered at the background monitoring well locations consist of layers of sand, silt, clay, shell/shell fragments, and combinations thereof. Gravel-sized oxidation nodules (ferricrete) and quartzitic fragments were also encountered (but are not wide spread). Refer to the boring logs in Appendix B for detailed descriptions of the strata encountered at each monitoring well location.

6.3 CAX Hydrogeology

The Atlantic Coastal Plain sediments are the most important source of potable water in the region. Recharge to the groundwater system is derived from precipitation. Approximately 50 percent of the precipitation is lost to evapotranspiration. The remaining 50 percent either results in surface runoff or infiltrates and is introduced into the groundwater regime. Recharge of aquifers may occur at the surface near outcrop zones, or from downward migration from overlying strata.

The hydrogeology of the York County shallow aquifer system at CAX Yorktown is comprised of the following five units: (1) the Columbia aquifer, (2) the Cornwallis Cave confining unit, (3) the Cornwallis Cave aquifer, (4) the Yorktown confining unit, and (5) the Yorktown-Eastover aquifer. Below this shallow aquifer system is the Eastover-Calvert confining unit (Brockman et al, 1997). These hydrogeologic units are discussed below and their relation to the geologic units are listed in Figure 6-1.

The undivided York County shallow aquifer system exists where one or more of the confining units commonly present in other areas of the county is absent (typically adjacent to the York River), and two or more aquifers form one hydraulic unit. The Columbia aquifer consists of sandy deposits, which exist under unconfined (water table) conditions. This surficial aquifer was not identified during this investigation. Clayey or silty sediments typically comprise the Cornwallis Cave confining unit, which underlie the Columbia aquifer. Most of York County is underlain by the Columbia aquifer and Cornwallis Cave confining unit, but the units are missing in areas of western and west-central York County and at CAX Yorktown along the York River in an area referred to as the Camp Peary scarp.

The Cornwallis Cave aquifer consists of sandy and shelly sediments and is defined by the water table (where unconfined). This aquifer is usually distinguished by the discontinuous shell hash deposits of the Yorktown Formation but for the most part this aquifer is comprised of silt, clay, with minor amounts of fine grained sand. During this field investigation the Cornwallis Cave aquifer was encountered.

The Yorktown confining unit, which underlies the Cornwallis Cave aquifer, is comprised of clay and silt and is usually distinguishable by its dark greenish gray color.

The Yorktown-Eastover aquifer underlies the Yorktown confining unit, which is comprised of sandy and shelly sediments that is typically confined, but locally may be unconfined (e.g., adjacent to the York River).

The basal unit within York County is the Eastover-Calvert confining unit, which consists of silt and clay.

6.4 Field Measurements

Field measurements recorded during the background investigation include groundwater level measurements and water quality parameters associated with purging.

6.4.1 Water Quality Parameters

Specific conductance, temperature, pH, and turbidity, were recorded in association with monitoring well purging prior to groundwater sample collection as discussed in Section 5.6.3. Monitoring well purge data are presented on Table 6-1.

6.4.1.1 Specific Conductance

Specific conductance is defined as the tendency of fluid to transmit an electrical current and is related to the concentration and charge of ions present. Specific conductance values ranged from approximately 53 to 810 micromhos per centimeter (μmhos/cm). Values of specific conductance were greater than 200 μmhos/cm except for the groundwater sample collected from monitoring well CXBG3-MW01 (approximately 53 μmhos/cm).

6.41.2 Groundwater Temperature

Groundwater temperatures varied from approximately 16 to 23 degrees Celsius. The majority of the wells sampled had groundwater temperatures below 19 degrees Celsius except CXBG1-MW02, CXBG1-MW03, CXBG3-MW03, and CXBG4-MW02. These wells had average temperature the ranged from 20.1 degrees Celsius (CXBG4-MW02) and 22.6 degrees Celsius (CXBG1-MW03).

6.4.1.3 pH

The water quality parameter pH is defined as the negative logarithm (base 10) of hydrogen ion activity. Water is acidic if the pH is less than 7, neutral if the pH is equal to 7, and alkaline if the pH is greater than 7. In most groundwater, pH ranges from 6 to 8.5 (Driscoll, 1986). The pH values for the groundwater sample collected from the background monitoring wells ranged from approximately 4.64 (CXBG3-MW01) to 7.3 (CXBG4-MW03).

Twelve monitoring wells were sampled as part of the background study. According to Table 6-1, samples from only two of the 12 wells exhibited a pH outside the 6 to 8.5 standard units (SU) range. Thus, low pH appears to be isolated and localized in the background.

The pH of groundwater is naturally controlled by geochemistry and biology. It is recognized that pH values below 6.0 SU can occur naturally. While there is no direct evidence for naturally occurring low pH values, there are examples from literature and professional experience. For example, low pH values can be a result of the oxidation of sulfur species and ferrous iron (Hem, 1992). The pH can also be impacted by the presence of naturally occurring organic acids (e.g., humic acid) generated from the presence of accumulated organic matter such as peat. Well CXBG1-MW03 is located in a wetland area, an environment suitable for the accumulation of organic matter.

TABLES

TABLE 6-1

GROUNDWATER FIELD PARAMETERS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE
WILLIAMSBURG, VIRGINIA

Well Number Sample Date	Measuring Time	Well Volumes	Field Parameters			
			Temperature (°C)	pH (S.U.)	Specific Conductance (umhos/cm)	Turbidity (N.T.U.)
CXBG1-MW01 8/21/01	1510	1.0	18.9	6.67	809	141
	1517	2.0	18.3	6.70	805	35.6
	1525	3.0	18.3	6.70	804	19.4
	1533	4.0	18.4	6.71	810	5.1
CXBG1-MW02 8/15/01	1335	1.0	23.5	6.45	210	7.4
	1341	2.0	22.3	6.51	203	5.74
	1350	3.0	22.1	6.57	203	10
	1402	4.0	--	--	--	3.3
CXBG1-MW03 8/20/01	1135	1.0	22.9	5.20	259	9.75
	1155	2.0	22.1	5.10	252	5.83
	1210	3.0	22.3	5.10	247	1.8
CXBG2-MW01 8/23/01	1240	1.0	17.7	6.90	640	5.21
	1253	2.0	17.5	6.82	638	0.9
	1303	3.0	17.9	6.80	631	0.2
CXBG2-MW02 8/14/01	1624	1.0	16.7	6.80	673	13
	1628	2.0	17.5	6.40	693	43
	1638	3.0	17.0	6.90	697	18
	1645	4.0	16.6	6.96	697	90
	1652	5.0	--	--	--	40
	1722	11.0	--	--	--	5.9
CXBG2-MW03 8/14/01	1515	1.0	16.7	6.51	635	310
	1520	2.0	16.3	6.47	645	22
	1529	3.0	16.0	6.58	650	6.3
	1536	4.0	--	--	--	4.3

Notes:

°C = Degrees Centigrade
S.U. = Standard Units
umhos/cm = Micro ohms per centimeter
mg/L = Milligrams per liter
N.T.U. = Nephlometric Turbidity Units
NA = Not Available
-- = Water quality readings stable, additional readings not taken

TABLE 6-1(continued)

GROUNDWATER FIELD PARAMETERS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE
WILLIAMSBURG, VIRGINIA

Well Number Sample Date	Measuring Time	Well Volumes	Field Parameters			
			Temperature (°C)	pH (S.U.)	Specific Conductance (umhos/cm)	Turbidity (N.T.U.)
CXBG3-MW01 8/20/01	1414	1.0	17.6	4.69	70.6	>999
	1423	2.0	17.8	4.64	52.8	>999
	1434	3.0	18.3	4.83	65.4	174
	1442	4.0	19.0	4.90	65.1	48.3
	1448	5.0	18.7	4.97	65.4	16.1
	1500	6.0	18.5	5.00	64.4	7.48
	15.09	7.0	--	--	--	4.99
CXBG3-MW02 8/15/01	0912	1.0	16.1	7.07	663	>999
	0939	2.0	16.6	7.11	518	970
	1001	3.0	17.2	7.12	500	189
	1027	4.0	17.1	7.14	495	26.8
	1039	5.0	--	--	--	12.6
	1044	6.0	--	--	--	10.4
	1051	7.0	--	--	--	7.8
	1109	8.0	--	--	--	4.72
CXBG3-MW03 8/15/01 (1)	1020	1.0	--	--	--	--
	1026	2.0	21.4	7.18	570	1100
	1044	3.0	22.5	7.08	578	1100
	1105	4.0	20.4	7.11	574	1059
CXBG4-MW01 8/23/01	1240	1.0	17.7	6.90	640	5.21
	1253	2.0	17.5	6.82	638	0.9
	1303	3.0	17.9	6.80	631	0.2
CXBG4-MW02 8/24/01	1200	1.0	20.1	6.80	685	303
	1212	2.0	20.1	6.40	674	125
	1226	3.0	20.1	6.90	679	20.6
	1321	8.0	--	--	--	10.3
CXBG4-MW03 8/14/01	1350	1.0	17.5	7.30	404	391
	1355	2.0	17.3	7.19	420	268
	1405	3.0	18.2	7.25	411	115
	1440	8.0	--	--	--	5.02

Notes:

°C	= Degrees Centigrade
S.U.	= Standard Units
umhos/cm	= Micro ohms per centimeter
mg/L	= Milligrams per liter
N.T.U.	= Nephlometric Turbidity Units
NA	= Not Available
--	= Water quality readings stable, additional readings not taken
(1)	Well pumped dry and allowed to recharge three times before sampling.

FIGURES

SYSTEM	SERIES	GEOLOGIC UNIT			HYDROGEOLOGIC UNIT IN THIS REPORT		HYDROGEOLOGIC UNITS OF MENG AND HARSH (1988)
QUATERNARY	HOLOCENE	ALLUVIAL AND MARSH DEPOSITS			YORK COUNTY SHALLOW AQUIFER SYSTEM	COLUMBIA AQUIFER (WHERE UNCONFINED) / CORNWALLIS CAVE CONFINING UNIT	COLUMBIA AQUIFER (CONFINED OR UNCONFINED)
	PLEISTOCENE	TABB FORMATION					
		SHIRLEY FORMATION					
		CHUCKATUCK FORMATION					
TERTIARY	PLIOCENE	WINDSOR FORMATION					
		BACONS CASTLE FORMATION				CORNWALLIS CAVE AQUIFER (WHERE CONFINED)	YORKTOWN CONFINING UNIT / YORKTOWN-EASTOVER UNIT
		CHESAPEAKE GROUP	YORKTOWN FORMATION	MOORE HOUSE MEMBER			
				MORGARTS BEACH MEMBER		YORKTOWN CONFINING UNIT	
				RUSHMERE MEMBER		YORKTOWN-EASTOVER AQUIFER	
				SUNKEN MEADOW MEMBER			
	MIOCENE		EASTOVER FORMATION	COBHAM BAY MEMBER			
				CLAREMONT MANOR MEMBER	EASTOVER-CALVERT CONFINING UNIT		ST. MARYS CONFINING UNIT
			ST. MARYS FORMATION				
			CALVERT FORMATION				CALVERT CONFINING UNIT

SOURCE: BROCKMAN, A.R. AND RICHARDSON, D.L. 1992
HYDROGEOLOGIC FRAMEWORK OF THE SHALLOW AQUIFER SYSTEM OF YORK COUNTY, VIRGINIA:
U.S. GEOLOGICAL SURVEY WATER-RESOURCES INVESTIGATIONS REPORT 92-4111.

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FIGURE 6-1
HYDROGEOLOGIC UNITS
IN YORK COUNTY

CHEATHAM ANNEX
WILLIAMSBURG, VIRGINIA

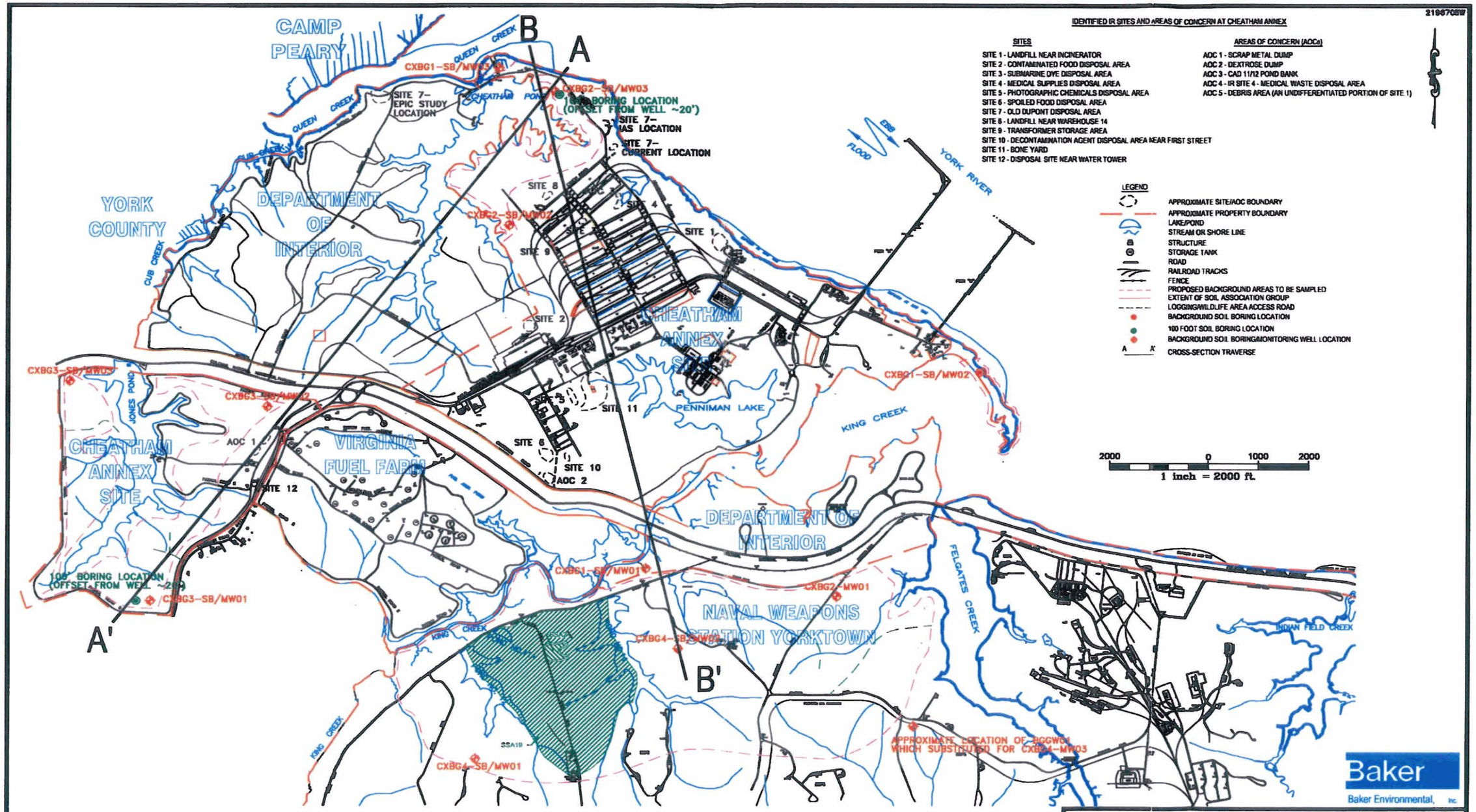

FIGURE 6-2
CROSS-SECTION LOCATION MAP
CTO - 0196

NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

SOURCE: LANTDIV, 1992 AND WESTON, 1998.

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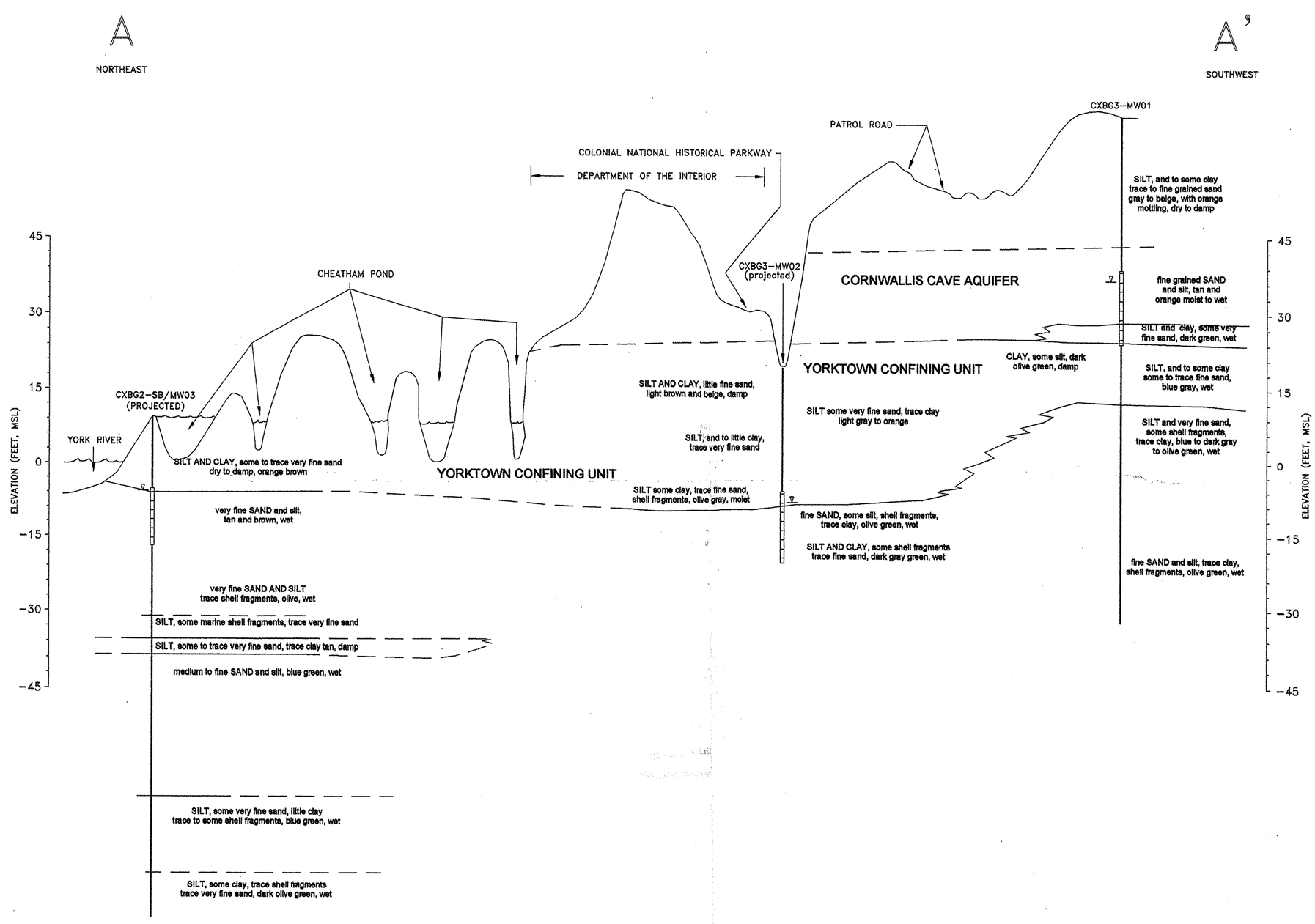

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1000 0 500 1000 2000
Horizontal Scale: 1 inch =1000 ft.
15 0 7.5 15 30
Vertical Scale: 1 inch = 15 ft.

LEGEND
GROUNDWATER ENCOUNTERED DURING DRILLING
SOIL BORING
WELL SCREEN
ESTIMATED CONTACT — — — PROJECT CONTACT
VERTICAL EXAGGERATION EQUALS 66.6X.

FIGURE 6-3
CROSS SECTION A-A'
CHEATHAM ANNEX, CTO - 0196
NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

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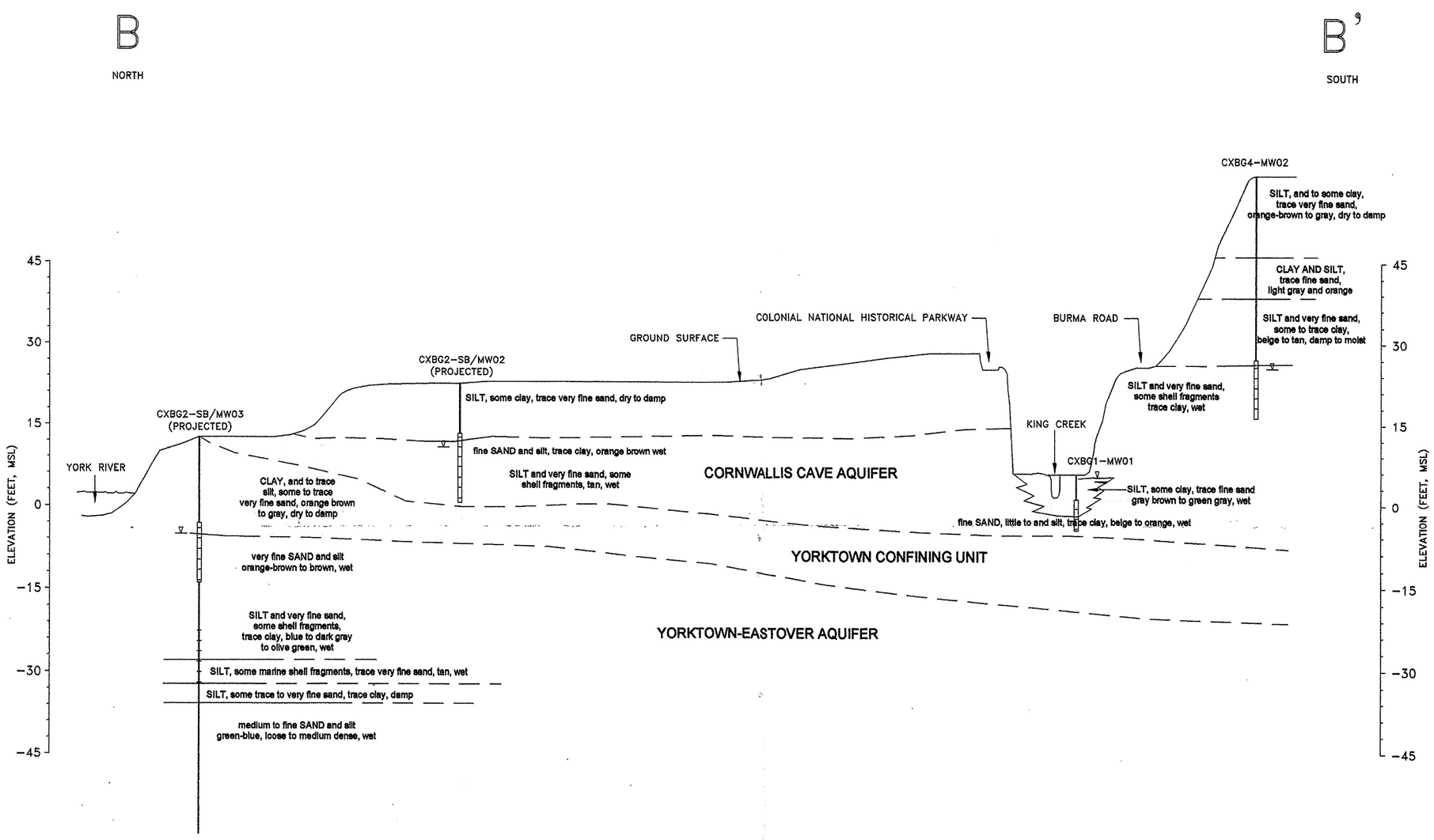

1000 0 500 1000 2000
Horizontal Scale: 1 inch = 1000 ft.

15 0 7.5 15 30
Vertical Scale: 1 inch = 15 ft.

LEGEND

- GROUNDWATER ENCOUNTERED DURING DRILLING
- SOIL BORING
- WELL SCREEN
- ESTIMATED CONTACT
- PROJECT CONTACT

VERTICAL EXAGGERATION EQUALS 66.6X.

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FIGURE 6-4
CROSS SECTION B-B'
CHEATHAM ANNEX, CTO - 0196

NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

7.0 ANALYTICAL RESULTS

This section presents the quantitative findings of the background investigation, performed from July through August 2001. Surface soil, subsurface soil, and groundwater samples collected as part of the background investigation were analyzed for characterization purposes to identify ambient levels of inorganic and organic constituents at CAX. Background locations were chosen in areas that were, based on historical evidence, unimpacted by past operations at CAX. These data will provide a basis for evaluating the naturally occurring or anthropogenic concentrations of inorganic and organic constituents against concentrations associated with site-related contamination. Positive detections from each media are presented on Tables 7-1 through 7-3. Complete data and statistical summary tables are presented in Appendices C through E.

7.1 Data Quality

The quality of the data collected as part of this investigation has been assessed for its accuracy and precision with respect to prescribed requirements or specifications. To make these determinations, data quality evaluations were conducted by Environmental Data Service, Inc., an independent, third-party, data validator. Data were evaluated in accordance with the criteria established by USEPA guidelines, Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (USEPA, 1988), specific method requirements in OLM02.1, USEPA Region III modifications, Level D data requirements, and professional judgement. Validation of the analytical data serves to reduce the inherent uncertainties with its usability.

Analytical data were evaluated to determine the usability of the results as well as contractual compliance relative to deliverables and the previously cited requirements. Data validation also provided an interpretation of the reported quality control results. At a minimum, ten percent of all laboratory calculations were verified as part of this validation. In addition, all instrument output (e.g., spectra, chromatograms) for each sample was carefully reviewed. Data quality was evaluated based on, but not limited to the following analyses:

- Data completeness
- Holding times
- Calibrations
- Blanks
- Surrogate recoveries

- Laboratory control samples
- Laboratory and field duplicates
- MS/MSD samples
- Internal standard performance
- Compound identification
- Compound quantitation

Based upon the results of this evaluation, some analytical results have been "qualified" with regard to usability. Qualified data are typically flagged with a letter qualifier, representing an associated explanatory note needed to clarify the corresponding analytical results. Many qualifiers, such as "J," "K," "L," and "P" indicate that the value reported is estimated. Estimated results within a data set are common and considered to be usable by the USEPA (USEPA, 1989). Data may be qualified as estimated for several reasons including an exceedance of holding times, high or low surrogate recovery, or intra-sample variability. In addition, values may be assigned and estimated qualifier if the reported value is below the Contract Required Detection Limit (CRDL) or the Contract Required Quantitation Limit (CRQL). Data qualified with the letter "U" or "B" were considered to be non-detects. Data assigned a rejected, "R" qualifier, were excluded from the usable data set. Other qualified data were retained in the usable data set.

The qualifiers appearing in the analytical tables include the following:

B – Not detected substantially above the level reported in laboratory or field blanks

E – Analyte present. Concentration exceeded upper level of calibration range of instrument.

J – Analyte present. Reported value may not be accurate or precise.

K – Analyte present. Reported value may be biased high. Actual value is expected to be lower.

L – Analyte present. Reported value may be biased low. Actual value is expected to be higher.

N – Analyte presumed to be present. Tentatively identified compound.

P – Analyte present. Pesticide or Aroclor target analyte with greater than 25 percent difference for detected concentrations between two gas chromatograph columns.

R – Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. Data are excluded from usable data set.

U – Not detected. The associated number indicated approximate sample concentration necessary to be detected. When used in conjunction with another qualifier, "U" indicates that the compound is not detected and that the quantitation limit is estimated.

NA – Not analyzed/Not applicable. Compound was either not analyzed for or, in the case of statistical summaries, value could not be calculated or does not apply.

7.2 Data Management and Tracking

The management and tracking of samples and subsequent data from the time of field collection to receipt of the validated electronic analytical results is of primary importance for the overall quality of the analytical results. Field samples and their corresponding analytical tests were recorded on the chain-of-custody forms, included as Appendix A. The chain-of-custody forms were checked against the Final FSAP (Baker, 2001d) to determine if all designated samples were collected for the appropriate parameters. Upon receipt of the laboratory results, a comparison of the field information was made to determine if each sample received by the laboratory was analyzed for the correct parameters. Similarly, the validated information was compared to laboratory information as a final check. In summary, the tracking information was used to identify the following items:

- Identify sample discrepancies between the analysis plan and the field investigation;
- Verify that the laboratory received all samples, and analyzed for the correct parameters;
- Verify that the data validator received a complete data set; and
- Ensure that a complete data set was available for each media of concern prior to entering results into the databases.

7.3 QA/QC Sample Results

As part of the requirements for field quality control under the Naval Facilities Engineering Service Center (NFESC), three types of QA/QC blanks were evaluated: field blanks, equipment rinsate blanks, and trip blanks. Laboratory QC samples (extra volume collected for MS/MSD) were collected in the field. In addition, laboratory and field duplicate sample results were

evaluated during validation based on relative percent difference (RPD) to assess variabilities of the measurement process and sampling techniques, respectively.

This section discusses the results of field blanks, equipment rinsate blanks, and trip blanks. MS/MSD sample results and laboratory duplicate sample results are not presented in this section because they represent laboratory quality control checks that are evaluated by the data validator. Analytical results for field duplicates are presented with media-specific data on Tables 7-1 through 7-3. The analytical results for organic and inorganic parameters for field blanks, equipment rinsate blanks, and trip blanks are provided on Tables 7-4 through 7-6. The following subsections discuss the results for each set of blanks.

7.3.1 Field Blanks

Three field blanks were collected as part of the Background Investigation. CXBG-FB01 was collected from distilled water used for equipment decontamination, CXBG-FB02 was collected from deionized water used for equipment rinsate blanks, and CXBG-FB03 was collected from tank water from the drill rig support truck. Table 7-4 summarizes compounds detected in one or more field blanks. The field blanks were analyzed for TCL organics and TAL inorganics (unfiltered) and cyanide. CXBG-FB03 was also analyzed for filtered fractions of TAL inorganics.

No chemicals were detected in CXBG-FB01.

The inorganics potassium and sodium were detected in CXBG-FB02. Potassium and sodium are essential nutrients that are commonly present in low concentrations in water supplies. The pesticide alpha-chlordane was also detected in CXBG-FB02 at an estimated concentration of 0.015 ug/L. This is a low-level detection and is qualified as estimated because it is below the method reporting limit. It is noted that although CXBG-FB02 was a sample of the water used for equipment rinsates, alpha-chlordane was not detected in any of the equipment rinsate samples.

The organics dibromodichloromethane, chloroform, dibromochloromethane, and bis(2-ethylhexyl)phthalate were detected in CXBG-FB03. A number of inorganics were also detected in CXBG-FB03 including barium calcium, copper (filtered only), iron, magnesium, manganese, nickel, potassium, sodium, and zinc (filtered only). These constituents occur naturally in groundwater and surface water and are commonly present at low concentrations in water supplies.

7.3.2 Equipment Rinsate Blanks

Eight equipment rinsate blanks were collected as part of the Background Investigation. Table 5-2 provides information regarding the source of each rinsate blank. Each sample was analyzed for TCL organics and TAL inorganics (unfiltered) and cyanide. CXBG-RS06, CXGB-RS7, and CXBG-RS08 were also analyzed for filtered fractions of TAL inorganics. Table 7-5 summarizes compounds detected in one or more equipment rinsate blanks.

The volatile organic compounds acetone, methylene chloride, di-n-butylphthalate, and bis(2-ethylhexyl)phthalate were detected in multiple rinsate blanks. These compounds are common laboratory contaminants. The pesticide aldrin was detected in CXBG-RS06 and the pesticide heptachlor epoxide was detected in CXBG-RS02 and CXBG-RS06 at low levels. Low levels of inorganic constituents (total fraction) were detected in all equipment rinsate blanks except CXBG-RS03, CXBG-RS06, and CXBG-RS07. These inorganics included antimony, barium, chromium, cobalt, nickel, selenium, sodium, and vanadium. Dissolved fractions of chromium and silver were detected in CXBG-RS07. Inorganic constituents occur naturally in soil and groundwater and are commonly present at low concentrations in water supplies.

7.3.3 Trip Blanks

Seven trip blanks were collected during the Background Investigation and were analyzed for VOCs. Table 7-6 summarizes compounds detected in one or more trip blanks. Methylene chloride was detected in two of the seven samples at low levels. Methylene chloride is a common laboratory contaminant.

7.4 Background Surface Soil Sample Results

Forty-four surface soil samples (including four duplicate samples) were collected and analyzed for TCL Organics (SVOCs, pesticides, and PCBs), TAL Inorganics, and cyanide. Thirteen SVOCs, 17 pesticides, and 22 inorganic compounds were detected in surface soils.

Table 7-7 presents the range and frequency of detections for each soil association data set. Inorganics were detected in all 44 surface soil samples. Cadmium and cyanide were not detected in any of the surface soil samples. The SVOC bis(2-ethylhexyl)phthalate, a common laboratory contaminant, was detected in 22 of the 44 surface soil samples. No other SVOC was detected more than once in a given soil association. One or more pesticides were detected in 25 of the surface soil samples.

Surface soil samples were collected from within all four of the soil associations present at CAX and northern WPNSTA. These soil associations include: 1) Bohicket, Johnston, and Axis Soil Association – found on marshes and floodplains in water-deposited material; 2) Dogue, Pamunkey, and Uchee Soil Association - formed on river terraces; 3) Emporia, Slagle, and Craven-Uchee Complex Soils Association – formed on coastal plain uplands; and 4) Kempsville, Emporia, Emporia Complex, and Craven-Uchee Complex Soils Association – as with Group 3, formed on coastal plain uplands (see Section 3). Positive detections in surface soils from each soil association are presented on Table 7-7.

The following constituents were detected at least once in each of the soil associations: acetophenone, bis(2-ethylhexyl)phthalate, 4,4'-DDE, alpha-chlordane, gamma-chlordane, aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, vanadium, and zinc.

Soil Association 1 contains the most maximum detected concentrations of the TAL inorganics analyzed. The majority (68 percent) of the maximum detected concentrations of inorganics was detected in Soil Association 1. Those inorganics with maximum concentrations in Soil Association 1 include aluminum, antimony, beryllium, calcium, chromium, copper, lead, magnesium, mercury, nickel, potassium, selenium sodium, vanadium, and zinc. Soils in this association are located on marshes and floodplains in water-deposited material. They are commonly nearly level, waterlogged, and often flooded. These soils typically receive seepage and runoff from higher lying areas. Soils such as these can serve as sources, sinks, or transformers of chemicals depending on the soil type and hydrologic conditions. Soils such as these have been shown, under favorable conditions, to remove organic and inorganic constituents (and toxic materials) from water that flows across them (Mitsch, 1986). This removal can be attributed to many factors including, but not limited to: a reduction in velocity as water enters these areas causing some chemicals to "drop into" the soils; a variety of anaerobic and aerobic processes such as chemical precipitation, that remove certain chemicals from the water; and, a high contact rate between water and soils leading to a significant exchange of nutrients. In addition, as marshes and low terraces are typically zones of low energy (i.e., low velocity transport mechanism), the particle size is typically smaller than those soils deposited in higher energy environments. The mineralogy of the fine-grained soils (silts and clays) may differ from the coarser grained soils (sands and gravels).

Maximum concentrations of silver were found in Soil Association 2, on the terrace of the York River. Maximum concentrations of barium were found in Soil Association 3 and maximum

concentrations of arsenic, cobalt, iron, manganese, and thallium were found in Soil Association 4. Soil Associations 3 and 4 are located in upland habitat.

7.5 Background Subsurface Soil Sample Results

Forty-four subsurface soil samples (including four duplicate samples) were collected and analyzed for TCL Organics (VOCs, SVOCs, pesticides, and PCBs), TAL Inorganics and cyanide, and TOC. Eight VOCs, three SVOCs, 11 pesticides, 18 inorganic compounds, and cyanide were detected in subsurface soils.

Table 7-8 presents the range and frequency of detections for each soil association data set. Inorganics were detected in all 44 surface soil samples. Antimony, beryllium, cadmium, silver, and thallium were not detected in any of the surface soil samples. The SVOC bis(2-ethylhexyl)phthalate, a common laboratory contaminant, was detected in 17 of the 44 subsurface soil samples. One or more pesticides were detected in 13 of the subsurface soil samples.

Like surface soils, subsurface soil samples were collected from within all four of the soil associations present at CAX and northern WPNSTA. Frequency of detection and the range of positive detections from each soil association are presented on Table 7-8. The following constituents were detected in subsurface soils at least once in each of the soil associations: alpha-chlordane, aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, vanadium, and zinc.

As for surface soil samples, the majority (63 percent) of the maximum detected concentrations of inorganics in subsurface soils were detected in Soil Association 1. Those inorganics with maximum concentrations in Soil Association 1 include aluminum, chromium, copper, cyanide, lead, magnesium, nickel, potassium, selenium, sodium, vanadium, and zinc. Maximum concentrations of calcium were found in Soil Association 2, maximum concentrations of cobalt and manganese were found in Soil Association 3, and maximum concentrations of arsenic, barium, iron, and mercury were found in Soil Association 4.

7.6 Background Groundwater Sample Results

Fourteen groundwater samples (including four duplicate samples) were collected and analyzed for TCL Organics (VOCs, SVOCs, pesticides, and PCBs), TAL Inorganics (filtered and

unfiltered), and cyanide. Three VOCs, 16 inorganic compounds (total fraction), and 12 inorganic compounds (filtered fraction) were detected in groundwater.

Table 7-9 presents the range and frequency of detections for groundwater data sets collected from each soil association. Inorganics were detected in all 14 groundwater samples. In unfiltered water, beryllium, cadmium, lead, mercury, nickel, selenium, silver, and cyanide were not detected. In filtered water, aluminum, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc were not detected.

The VOC carbon disulfide was detected in 4 groundwater samples, all collected from monitoring wells in Soil Association 1. Methylene chloride, a common laboratory contaminant, was detected in groundwater from Soil Associations 1 and 3. Toluene, another common laboratory contaminant, was detected in groundwater from Soil Associations 1 and 4.

Total fractions of antimony and chromium and dissolved fractions of potassium were detected at least once from groundwater in each soil association. Fifty-six percent of maximum detected concentrations of total (unfiltered) inorganics were detected in groundwater from monitoring wells in Soil Association 1. These total inorganics include calcium, copper, iron, magnesium, manganese, potassium, sodium, thallium, and vanadium. Maximum detected concentrations of cobalt and zinc were found in groundwater from Soil Association 3. Maximum detections of antimony were found in groundwater from Soil Associations 3 and 4. Maximum detections of aluminum, arsenic, barium, and chromium were found in groundwater from Soil Association 4.

Seventy-five percent of maximum detected concentrations of dissolved (filtered) inorganics were detected in groundwater from Soil Association 1. These dissolved inorganics include calcium, iron, magnesium, manganese, potassium, silver, sodium, thallium, and vanadium. Maximum dissolved concentrations of cobalt were detected in groundwater from Soil Association 3. Maximum dissolved concentrations of antimony and arsenic were detected in groundwater from Soil Association 4.

As discussed in Section 5.6.3, low-flow purging and sampling procedures were employed in order to decrease the quantity of suspended particulates in groundwater samples. For the Background Investigation, the detected concentrations of analytes in filtered groundwater samples are only slightly lower than those for unfiltered samples. Silver was detected in one filtered groundwater

sample but not in any of the non-filtered samples. Aluminum, barium, chromium, copper, and zinc were detected in unfiltered but not filtered groundwater samples.

TABLES

TABLE 7-1

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SS01-00	BG1-SS02-00	BG1-SS03-00	BG1-SS04-00	BG1-SS05-00	BG1-SS05-00D	BG1-SS06-00	BG1-SS07-00	BG1-SS08-00
SAMPLE DATE	08-06-2001	07-25-2001	07-25-2001	08-06-2001	08-06-2001	08-06-2001	08-06-2001	07-25-2001	07-25-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Semivolatiles (ug/kg)									
Acetophenone	410 U	350 U	1600 U	570 U	630 U	610 U	95 J	340 U	350 U
Benzaldehyde	410 U	350 U	1600 U	100 J	630 U	610 U	920 U	340 U	350 U
Benzo(a)anthracene	410 U	350 U	220 J	570 U	630 U	610 U	920 U	340 U	350 U
Benzo(a)pyrene	410 U	350 U	340 J	570 U	630 U	610 U	920 U	340 U	350 U
Benzo(b)fluoranthene	410 U	350 U	650 J	570 U	630 U	610 U	920 U	340 U	350 U
Benzo(g,h,i)perylene	410 U	350 U	350 J	570 U	630 U	610 U	920 U	340 U	350 U
Benzo(k)fluoranthene	410 U	350 U	260 J	570 U	630 U	610 U	920 U	340 U	350 U
Chrysene	410 U	350 U	480 J	570 U	630 U	610 U	920 U	340 U	350 U
Di-n-octylphthalate	410 U	350 U	1600 U	570 U	630 U	610 U	920 U	340 U	350 U
Fluoranthene	410 U	350 U	270 J	570 U	630 U	610 U	920 U	340 U	350 U
Indeno(1,2,3-cd)pyrene	410 U	350 U	340 J	570 U	630 U	610 U	920 U	340 U	350 U
Pyrene	410 U	350 U	330 J	570 U	630 U	610 U	920 U	340 U	350 U
bis(2-Ethylhexyl)phthalate	410 U	59 J	280 J	68 B	630 U	610 U	120 B	120 J	38 J
4,4'-DDD	4.1 U	3.5 U	11 J	5.3 J	6.3 U	6.1 U	12	3.4 U	3.5 U
4,4'-DDE	4.1 U	3.5 U	23	5.7 U	6.3 U	6.1 U	4.9 J	3.4 U	3.5 U
4,4'-DDT	4.1 U	3.5 U	10 J	5.7 U	6.3 U	6.1 U	9.2 U	3.4 U	3.5 U
Dieldrin	3.7 J	3.5 U	16 U	5.7 U	6.3 U	6.1 U	9.2 U	3.4 U	3.5 U
Endosulfan I	2.1 U	1.8 U	8.1 U	1.1 J	3.3 U	2.1 J	2.1 J	1.8 U	1.8 U
Endosulfan II	4.1 U	3.5 U	16 U	5.7 U	6.3 U	2.1 J	9.2 U	3.4 U	3.5 U
Endosulfan sulfate	4.1 U	3.5 U	16 U	2.1 J	6.3 U	2.9 J	3.7 J	3.4 U	3.5 U
Endrin	3.5 J	3.5 U	16 U	5.7 U	6.3 U	6.1 U	9.2 U	3.4 U	3.5 U
Endrin aldehyde	4.1 U	3.5 U	16 U	1.8 J	3.1 J	12	8.9 J	3.4 U	3.5 U
Endrin ketone	4.1 U	3.5 U	16 U	5.7 U	1.9 J	4.5 J	3.4 J	3.4 U	3.5 U
Heptachlor epoxide	2.1 U	1.8 U	8.1 U	2.9 U	3.3 U	3.1 U	4.7 U	1.8 U	1.8 U
alpha-BHC	1.6 J	1.8 U	8.1 U	1.1 J	3.3 U	0.72 J	1.2 J	1.8 U	1.8 U
alpha-Chlordane	2.1 U	1.8 U	4.7 J	1.1 B	3.3 U	3.4 B	4.7 U	1.8 U	1.8 U
beta-BHC	14 J	1.8 U	8.1 U	2.9 U	5.3 J	3.1 U	4.7 U	1.8 U	1.8 U
delta-BHC	2.1 U	1.8 U	8.1 U	5 P	3.3 U	3.1 U	4.7 U	1.8 U	1.8 U
gamma-BHC (Lindane)	3.3	1.8 U	8.1 U	1.4 J	3.3 U	3.1 U	4.7 U	1.8 U	1.8 U
gamma-Chlordane	2.1 U	1.8 U	7 J	2.9 U	0.92 J	0.74 J	1.9 J	1.8 U	1.8 U

TABLE 7-1

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SS01-00	BG1-SS02-00	BG1-SS03-00	BG1-SS04-00	BG1-SS05-00	BG1-SS05-00D	BG1-SS06-00	BG1-SS07-00	BG1-SS08-00
SAMPLE DATE	08-06-2001	07-25-2001	07-25-2001	08-06-2001	08-06-2001	08-06-2001	08-06-2001	07-25-2001	07-25-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Inorganics (mg/kg)									
Aluminum	3700	265	16500	5640	3120	2800	3570	235	476
Antimony	0.42 UL	0.36 UL	1.4 UL	0.58 UL	0.66 UL	1 L	0.93 UL	0.33 UL	0.36 UL
Arsenic	2.6 B	0.25 U	9.9	4.7	3.1 B	2.6 B	8.3	0.23 U	0.25 U
Barium	21 J	0.75 J	31.6 J	9.1 J	13.4 J	11.5 J	25.8 J	5.1 J	2.2 J
Beryllium	0.38 J	0.085 U	1.1 J	0.39 J	0.41 J	0.31 J	0.34 J	0.082 B	0.11 B
Calcium	867 J	1380	2300 J	2950	4220	3500	33500	149 J	1640
Chromium	8	1.8 J	43.2	13.5	9.4	8.2	9.9	7.7	3.7
Cobalt	1.6 J	0.15 U	3.8 J	1.4 J	1.6 J	1.5 J	2.2 J	0.13 U	0.2 J
Copper	1.7 J	0.41 J	22.1	4 J	2.6 J	2.7 J	8.8 J	0.43 J	1.5 J
Iron	12300	1520	18300	13500	8280	8680	17400	1470	3220
Lead	6.2 J	1.1	136	12.2 J	7.2 J	8.9 J	15.6 J	14.4	3.2
Magnesium	396 J	160 J	6770	2050	1190 J	1200 J	1160 J	92.1 B	195 J
Manganese	26 J	6.9	108	47.6 J	43.2 J	46.3 J	90.3 J	10.3	15.8
Mercury	0.052 J	0.04 U	0.24 J	0.14 J	0.11 J	0.1 J	0.15 J	0.046 U	0.05 U
Nickel	2.4 J	0.37 J	14.2 J	4.1 J	3.5 J	3 J	5.6 J	0.4 J	1.1 J
Potassium	359 J	170 B	4560	1420 J	1020 J	909 J	911 J	97.6 B	220 B
Selenium	0.7 UL	0.59 UL	2.2 UL	1.5 J	1.1 UL	1.2 J	2.7 J	0.54 UL	0.59 UL
Silver	0.12 U	0.11 U	0.4 U	0.17 U	0.19 U	0.18 U	0.27 U	0.096 U	0.11 U
Sodium	437 B	568 B	21300	2610	1400 B	1960	2970	187 B	408 B
Thallium	1 UL	0.87 UL	3.3 UL	1.4 UL	1.6 UL	1.5 UL	2.2 UL	0.79 UL	0.87 UL
Vanadium	13.5	2.4 J	50.3	20.5	11.7 J	10.8 J	19.5 J	4.3 J	3.2 J
Zinc	7.9 L	4.2 J	113	18.1	11.9 L	13.3 L	30	16.1	41.2

TABLE 7-1

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SS09-00	BG1-SS10-00	BG2-SS01-00	BG2-SS01-00D	BG2-SS02-00	BG2-SS03-00	BG2-SS04-00	BG2-SS05-00	BG2-SS06-00
SAMPLE DATE	07-25-2001	07-25-2001	07-27-2001	07-27-2001	07-24-2001	07-25-2001	07-26-2001	07-26-2001	07-27-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Semivolatiles (ug/kg)									
Acetophenone	1300 U	450 U	390 U	380 U	350 U	350 U	360 U	380 U	41 J
Benzaldehyde	1300 U	450 U	390 U	380 U	350 U	350 U	360 U	380 U	400 U
Benzo(a)anthracene	1300 U	450 U	390 U	380 U	350 U	350 U	360 U	380 U	400 U
Benzo(a)pyrene	1300 U	450 U	390 U	380 U	350 U	350 U	360 U	380 U	400 U
Benzo(b)fluoranthene	1300 U	450 U	390 U	380 U	350 U	350 U	360 U	380 U	400 U
Benzo(g,h,i)perylene	1300 U	450 U	390 U	380 U	350 U	350 U	360 U	380 U	400 U
Benzo(k)fluoranthene	1300 U	450 U	390 U	380 U	350 U	350 U	360 U	380 U	400 U
Chrysene	1300 U	450 U	390 U	380 U	350 U	350 U	360 U	380 U	400 U
Di-n-octylphthalate	1300 U	450 U	390 U	380 U	350 U	350 U	360 U	380 U	66 J
Fluoranthene	1300 U	450 U	390 U	380 U	350 U	350 U	360 U	380 U	400 U
Indeno(1,2,3-cd)pyrene	1300 U	450 U	390 U	380 U	350 U	350 U	360 U	380 U	400 U
Pyrene	1300 U	450 U	390 U	380 U	350 U	350 U	360 U	380 U	400 U
bis(2-Ethylhexyl)phthalate	380 J	66 J	140 B	110 B	240 J	46 J	250 B	2000	2100
4,4'-DDD	13 U	4.5 U	3.9 U	3.8 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U
4,4'-DDE	4.6 J	4.5 U	3.9 U	3.8 U	1.1 J	3.6 U	3.6 U	3.8 U	4 U
4,4'-DDT	13 U	4.5 U	3.9 U	3.8 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U
Dieldrin	13 U	4.5 U	3.9 U	3.8 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U
Endosulfan I	6.5 U	2.3 U	2 U	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U
Endosulfan II	13 U	4.5 U	3.9 U	3.8 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U
Endosulfan sulfate	13 U	4.5 U	3.9 U	3.8 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U
Endrin	13 U	4.5 U	3.9 U	3.8 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U
Endrin aldehyde	13 U	4.5 U	3.9 U	3.8 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U
Endrin ketone	13 U	4.5 U	3.9 U	3.8 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U
Heptachlor epoxide	6.5 U	2.3 U	2 U	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U
alpha-BHC	6.5 U	2.3 U	2 U	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U
alpha-Chlordane	6.5 U	2.3 U	2 U	2 U	1.1 J	1.8 U	1.8 U	2 U	2.1 U
beta-BHC	6.5 U	2.3 U	2 U	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U
delta-BHC	6.5 U	2.3 U	2 U	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U
gamma-BHC (Lindane)	6.5 U	2.3 U	2 U	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U
gamma-Chlordane	6.5 U	2.3 U	2 U	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U

TABLE 7-1

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SS09-00	BG1-SS10-00	BG2-SS01-00	BG2-SS01-00D	BG2-SS02-00	BG2-SS03-00	BG2-SS04-00	BG2-SS05-00	BG2-SS06-00
SAMPLE DATE	07-25-2001	07-25-2001	07-27-2001	07-27-2001	07-24-2001	07-25-2001	07-26-2001	07-26-2001	07-27-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Inorganics (mg/kg)									
Aluminum	12400	2320	2230	2330	2930	3640	2370	2830	4420
Antimony	1.2 UL	0.54 UL	0.41 B	0.37 U	0.35 UL	0.37 UL	0.35 U	0.37 U	0.4 U
Arsenic	6 J	4.2	0.28 U	0.56 B	0.63 J	0.8 J	0.61 B	1.2 B	4.1
Barium	21.5 J	7.1 J	28.3 J	27.9 J	24.6 J	28.5 J	12.2 J	25 J	27.4 J
Beryllium	0.72 J	0.22 B	0.42 B	0.33 B	0.38 B	0.4 B	0.13 B	0.31 B	0.42 B
Calcium	2280 J	470 J	830 J	746 B	598 J	321 J	112 J	1210	3320
Chromium	26.8	8.9	2.9	3 B	5.5	3.6	2.9	4.5	12.4
Cobalt	2.4 J	0.35 J	1.3 J	1.2 B	1.2 J	2.3 J	1 J	5.3 J	1.8 J
Copper	9.8 J	4.2 J	1.6 B	1.5 B	1.4 J	1.5 J	0.83 B	2 B	4 J
Iron	16500	6410	2560	2660	5320	3540	2650	4420	12600
Lead	34.7	7.5	9.1	8.1	8.2	10.1	8.1	6.4	11
Magnesium	5290	1130 J	242 J	248 J	463 J	262 J	157 J	412 J	1020 J
Manganese	62.7	15.5	257	255	81.4	134	68	197	100
Mercury	0.16 U	0.06 U	0.059 U	0.041 U	0.048 U	0.042 U	0.052 U	0.053 U	0.058 U
Nickel	8.7 J	2.1 J	2 B	1.9 B	2.4 J	2.9 J	1.4 J	3.9 J	3.8 J
Potassium	3510	754 J	166 B	167 B	360 J	188 B	93.5 B	245 J	1210 L
Selenium	1.9 UL	0.89 UL	0.66 UL	0.6 UL	0.69 J	0.61 UL	0.58 UL	0.61 UL	0.65 UL
Silver	0.34 U	0.16 U	0.16 J	0.11 U	0.1 U	0.11 U	0.1 U	0.11 U	0.12 U
Sodium	20500	4140	356 B	320 B	154 B	171 B	305 B	264 B	321 B
Thallium	2.8 UL	1.3 UL	0.96 UL	0.88 UL	0.85 UL	0.89 UL	0.85 UL	0.9 UL	0.95 UL
Vanadium	41.2	21.2	5.7 J	5.7 J	8 J	7.8 J	6 J	7.5 J	15.2
Zinc	47.8	12.2	14.5 J	9.6 J	12.2	9.9	4.9 J	10.8 J	17.9 J

TABLE 7-1

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG2-SS07-00	BG2-SS08-00	BG2-SS09-00	BG2-SS10-00	BG3-SS01-00	BG3-SS01-00D	BG3-SS02-00	BG3-SS03-00	BG3-SS04-00
SAMPLE DATE	07-24-2001	07-24-2001	07-24-2001	07-25-2001	07-23-2001	07-23-2001	07-24-2001	07-24-2001	07-23-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Semivolatiles (ug/kg)									
Acetophenone	360 U	360 U	350 U	1100 U	370 U	370 U	390 U	370 U	370 U
Benzaldehyde	360 U	360 U	350 U	1100 U	370 U	370 U	390 U	370 U	370 U
Benzo(a)anthracene	360 U	360 U	350 U	1100 U	370 U	370 U	390 U	370 U	370 U
Benzo(a)pyrene	360 U	360 U	350 U	1100 U	370 U	370 U	390 U	370 U	370 U
Benzo(b)fluoranthene	360 U	360 U	350 U	1100 U	370 U	370 U	390 U	370 U	370 U
Benzo(g,h,i)perylene	360 U	360 U	350 U	1100 U	370 U	370 U	390 U	370 U	370 U
Benzo(k)fluoranthene	360 U	360 U	350 U	1100 U	370 U	370 U	390 U	370 U	370 U
Chrysene	360 U	360 U	350 U	1100 U	370 U	370 U	390 U	370 U	370 U
Di-n-octylphthalate	360 U	360 U	350 U	1100 U	370 U	370 U	390 U	370 U	370 U
Fluoranthene	360 U	360 U	350 U	1100 U	370 U	370 U	390 U	370 U	370 U
Indeno(1,2,3-cd)pyrene	360 U	360 U	350 U	1100 U	370 U	370 U	390 U	370 U	370 U
Pyrene	360 U	360 U	350 U	1100 U	370 U	370 U	390 U	370 U	370 U
bis(2-Ethylhexyl)phthalate	140 J	670 B	200 B	5000	370 U	190 J	600	450	290 J
4,4'-DDD	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.7 U	3.9 U	3.7 U	3.7 U
4,4'-DDE	3.6 U	3.6 U	3.5 U	3.6 U	1.3 J	3.7 U	3.9 U	3.7 U	3.7 U
4,4'-DDT	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.7 U	3.9 U	3.7 U	3.7 U
Dieldrin	3.6 U	3.6 U	3.5 U	3.6 U	3.3 J	3.7 U	4.4 J	3.7 U	3.7 U
Endosulfan I	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	2 U	1.9 U	1.9 U
Endosulfan II	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.7 U	3.9 U	3.7 U	3.7 U
Endosulfan sulfate	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.7 U	3.9 U	3.7 U	2.3 J
Endrin	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.7 U	3.9 U	3.7 U	3.7 U
Endrin aldehyde	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.7 U	3.9 U	3.7 U	3.7 U
Endrin ketone	3.6 U	3.6 U	3.5 U	3.6 U	1.8 J	3.7 U	3.9 U	3.7 U	3.7 U
Heptachlor epoxide	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	2 U	1.9 U	1.9 U
alpha-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	2 U	1.9 U	1.9 U
alpha-Chlordane	1.1 J	0.83 B	0.59 B	2.5	1.9 U	1 J	2 U	0.94 J	0.89 J
beta-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	2 U	1.9 U	1.9 U
delta-BHC	0.65 J	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	2 U	1.9 U	1.9 U
gamma-BHC (Lindane)	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	2 U	1.9 U	1.9 U
gamma-Chlordane	0.55 J	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U	2 U	1.9 U	1.9 U

TABLE 7-1

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG2-SS07-00	BG2-SS08-00	BG2-SS09-00	BG2-SS10-00	BG3-SS01-00	BG3-SS01-00D	BG3-SS02-00	BG3-SS03-00	BG3-SS04-00
SAMPLE DATE	07-24-2001	07-24-2001	07-24-2001	07-25-2001	07-23-2001	07-23-2001	07-24-2001	07-24-2001	07-23-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Inorganics (mg/kg)									
Aluminum	3820	4570	2660	4290	4710	5160	4460	3850	3110
Antimony	0.36 UL	0.36 U	0.36 U	0.37 U	0.38 UL	0.38 UL	0.4 UL	0.36 UL	0.37 UL
Arsenic	1.5 J	1.6 J	0.66 B	1.2 B	0.75 J	0.7 J	0.5 J	0.094 J	1.7 J
Barium	26.9 J	29.4 J	22.3 J	32.7 B	18.2 J	16.7 J	22.7 J	46.4	16.3 J
Beryllium	0.42 B	0.52 B	0.37 B	0.36 B	0.16 B	0.21 B	0.24 B	0.34 B	0.28 B
Calcium	373 J	345 J	536 J	319 B	49.5 J	45.8 J	47.4 J	406 J	365 J
Chromium	6.1	5.5	3.4	3.8	5.4	6.4	2.7	4.9	6.2
Cobalt	3.1 J	2.7 J	1.8 B	2.3 B	0.43 B	0.4 B	0.56 J	4.3 J	2.4 J
Copper	1.5 J	0.99 B	1.2 B	1.5 B	1.6 J	1.6 J	1.2 J	1.7 J	1.6 J
Iron	6740	5480	3420	3770	5850	6850	2420	3480	4970
Lead	8.9	6.8	6.6	9.8	12	10.9	10.9	7.8	7.2
Magnesium	510 J	401 J	271 BE	292 BE	137 J	143 J	166 J	218 J	237 J
Manganese	169	112	62.7	101	48.1	36.3	44.3	138	30.4
Mercury	0.054 U	0.048 U	0.05 U	0.05 U	0.048 U	0.055 U	0.049 U	0.051 U	0.053 U
Nickel	3.4 J	2.9 J	2 J	2.8 J	1.4 B	1.4 B	1.7 J	3.1 J	2.8 J
Potassium	356 J	231 B	200 B	161 B	139 B	156 B	86.8 B	160 B	207 B
Selenium	0.59 UL	0.59 UL	0.59 UL	0.6 UL	0.62 UL	0.65 J	0.65 UL	0.59 UL	0.6 UL
Silver	0.1 U	0.1 U	0.1 U	0.11 U	0.11 U	0.11 U	0.12 U	0.1 U	0.11 U
Sodium	194 B	293 B	308 B	250 B	172 B	171 B	142 B	152 B	172 B
Thallium	0.86 UL	0.86 UL	0.86 UL	0.88 UL	0.91 UL	0.91 UL	0.96 UL	0.87 UL	0.88 UL
Vanadium	11.6	9.4 J	6.1 J	7.6 J	13.6	15.5	6.1 J	6.5 J	10.9
Zinc	11.3	8.2 J	5.4 J	8.5 J	5.5	5.6	6.4	10.9	7.4

TABLE 7-1

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG3-SS05-00	BG3-SS06-00	BG3-SS07-00	BG3-SS08-00	BG3-SS09-00	BG3-SS10-00	BG4-SS01-00	BG4-SS01-00D	BG4-SS02-00
SAMPLE DATE	07-24-2001	07-24-2001	07-24-2001	07-24-2001	07-23-2001	07-23-2001	07-26-2001	07-26-2001	07-27-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Semivolatiles (ug/kg)									
Acetophenone	410 U	360 U	370 U	110 J	370 U	360 U	400 U	420 U	360 U
Benzaldehyde	410 U	360 U	370 U	360 U	370 U	360 U	400 U	420 U	360 U
Benzo(a)anthracene	410 U	360 U	370 U	360 U	370 U	360 U	400 U	420 U	360 U
Benzo(a)pyrene	410 U	360 U	370 U	360 U	370 U	360 U	400 U	420 U	360 U
Benzo(b)fluoranthene	410 U	360 U	370 U	360 U	370 U	360 U	400 U	420 U	360 U
Benzo(g,h,i)perylene	410 U	360 U	370 U	360 U	370 U	360 U	400 U	420 U	360 U
Benzo(k)fluoranthene	410 U	360 U	370 U	360 U	370 U	360 U	400 U	420 U	360 U
Chrysene	410 U	360 U	370 U	360 U	370 U	360 U	400 U	420 U	360 U
Di-n-octylphthalate	410 U	360 U	370 U	360 U	370 U	360 U	400 U	420 U	360 U
Fluoranthene	410 U	360 U	370 U	360 U	370 U	360 U	400 U	420 U	360 U
Indeno(1,2,3-cd)pyrene	410 U	360 U	370 U	360 U	370 U	360 U	400 U	420 U	360 U
Pyrene	410 U	360 U	370 U	360 U	370 U	360 U	400 U	420 U	360 U
bis(2-Ethylhexyl)phthalate	340 J	140 J	370 U	130 J	370 U	360 U	170 J	200 J	240 B
4,4'-DDD	4.1 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U	1.3 J	4.2 U	3.6 U
4,4'-DDE	4.1 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U	1.3 J	2.5 J	3.6 U
4,4'-DDT	4.1 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U	4 U	4.2 U	3.6 U
Dieldrin	4.1 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U	4 U	4.2 U	3.6 U
Endosulfan I	2.1 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.2 U	1.8 U
Endosulfan II	4.1 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U	4 U	4.2 U	3.6 U
Endosulfan sulfate	2.4 J	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U	4 U	4.2 U	3.6 U
Endrin	4.1 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U	4 U	4.2 U	3.6 U
Endrin aldehyde	2.7 J	3.6 U	3.7 U	1.2 J	3.7 U	3.6 U	4 U	4.2 U	3.6 U
Endrin ketone	2.1 J	3.6 U	3.7 U	1.2 J	3.7 U	3.6 U	4 U	4.2 U	3.6 U
Heptachlor epoxide	1.8 J	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.2 U	1.8 U
alpha-BHC	2.1 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.2 U	1.8 U
alpha-Chlordane	1.4 J	0.65 J	1.9 U	1.7 J	0.83 J	1.8 U	1.7 J	0.75 J	1.8 U
beta-BHC	2.1 U	1.8 U	1.9 U	0.94 J	1.9 U	1.8 U	2.1 U	2.2 U	1.8 U
delta-BHC	2.1 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.2 U	1.8 U
gamma-BHC (Lindane)	2.1 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.2 U	1.8 U
gamma-Chlordane	0.65 J	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.2 U	1.8 U

TABLE 7-1

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG3-SS05-00	BG3-SS06-00	BG3-SS07-00	BG3-SS08-00	BG3-SS09-00	BG3-SS10-00	BG4-SS01-00	BG4-SS01-00D	BG4-SS02-00
SAMPLE DATE	07-24-2001	07-24-2001	07-24-2001	07-24-2001	07-23-2001	07-23-2001	07-26-2001	07-26-2001	07-27-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Inorganics (mg/kg)									
Aluminum	5230	3880	3220	4040	4110	6160	5130	4970	2560
Antimony	0.38 UL	0.35 UL	0.37 UL	0.36 UL	0.36 UL	0.36 UL	0.6 B	0.41 UL	0.35 U
Arsenic	0.82 J	1.3 J	0.9 J	1.2 J	1.1 J	0.72 J	12.6	11.7	0.7 B
Barium	6 J	34.9 J	38.3 J	21.7 J	33.1 J	30.6 J	19.6 J	18.7 J	20 J
Beryllium	0.088 U	0.53 B	0.31 B	0.32 B	0.63 B	0.36 B	0.74 B	0.67 B	0.21 B
Calcium	316 J	367 J	925 J	157 J	208 J	76.8 J	2860	2680	244 J
Chromium	9	2.7	3.1	3.6	3.5	3.6	16.9	17.3	2.8 B
Cobalt	0.15 U	3.2 J	1.8 J	1.2 J	5.3 J	0.94 B	3.2 J	3.2 J	1 J
Copper	1.2 J	1.6 J	1.3 J	1 J	1.4 J	0.9 J	2.7 B	2.7 B	1.4 B
Iron	8240	2150	2910	3340	3660	3560	20700	20300	2510
Lead	7	10	7.1	12.2	6.7	9.8	14.6	13.4	6.2
Magnesium	154 J	164 J	197 B	184 J	212 J	228 J	782 J	762 J	169 J
Manganese	19.2	234	111	94.8	278	129	85.7	80.7	150
Mercury	0.051 U	0.097 J	0.041 U	0.052 U	0.048 U	0.05 U	0.062 UL	0.059 UL	0.046 U
Nickel	1 B	3.3 J	2 J	1.9 J	4.4 J	3.1 J	5.8 J	5.9 J	1.4 B
Potassium	307 J	118 B	114 B	137 B	136 B	133 B	841 J	827 J	143 B
Selenium	0.62 UL	0.57 UL	0.62 UL	0.6 UL	0.6 UL	0.59 UL	0.7 UL	1.4 L	0.58 UL
Silver	0.11 U	0.1 U	0.11 U	0.11 U	0.11 U	0.1 U	0.12 U	0.12 U	0.1 U
Sodium	197 B	134 B	150 B	163 B	114 B	143 B	374 B	362 B	239 B
Thallium	0.91 UL	0.84 UL	0.9 UL	0.87 UL	0.88 UL	0.86 UL	1 UL	0.99 UL	0.85 UL
Vanadium	22.1	5 J	5.4 J	7.3 J	6 J	7.3 J	26.1	25.2	5.1 J
Zinc	3.6 J	8.8	7.6	7.5	12.2	5.9	26.7	26.6	5.9 J

TABLE 7-1

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG4-SS03-00	BG4-SS04-00	BG4-SS05-00	BG4-SS06-00	BG4-SS07-00	BG4-SS08-00	BG4-SS09-00	BG4-SS10-00
SAMPLE DATE	07-26-2001	07-26-2001	07-26-2001	07-26-2001	07-27-2001	07-27-2001	07-27-2001	07-26-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Semivolatiles (ug/kg)								
Acetophenone	360 U	350 U	61 L	350 U	360 U	360 U	380 U	390 U
Benzaldehyde	360 U	350 U		350 U	360 U	360 U	380 U	390 U
Benzo(a)anthracene	360 U	350 U		350 U	360 U	360 U	380 U	390 U
Benzo(a)pyrene	360 U	350 U		350 U	360 U	360 U	380 U	390 U
Benzo(b)fluoranthene	360 U	350 U		350 U	360 U	360 U	380 U	390 U
Benzo(g,h,i)perylene	360 U	350 U		350 U	360 U	360 U	380 U	390 U
Benzo(k)fluoranthene	360 U	350 U		350 U	360 U	360 U	380 U	390 U
Chrysene	360 U	350 U		350 U	360 U	360 U	380 U	390 U
Di-n-octylphthalate	360 U	350 U		350 U	360 U	360 U	380 U	390 U
Fluoranthene	360 U	350 U		350 U	360 U	360 U	380 U	390 U
Indeno(1,2,3-cd)pyrene	360 U	350 U		350 U	360 U	360 U	380 U	390 U
Pyrene	360 U	350 U		350 U	360 U	360 U	380 U	390 U
bis(2-Ethylhexyl)phthalate	230 B	54 B	340 B	200 B	750 B	2300	71 B	95 B
4,4'-DDD	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
4,4'-DDE	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
4,4'-DDT	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
Dieldrin	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	2.6 J	2.4 J
Endosulfan I	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
Endosulfan II	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
Endosulfan sulfate	3.6 U	3.5 U	3.4 U	1.6 J	3.6 U	3.6 U	3.8 U	3.9 U
Endrin	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
Endrin aldehyde	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
Endrin ketone	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
Heptachlor epoxide	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
alpha-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
alpha-Chlordane	1.3 B	1.5 J	1.8 U	2.2	0.65 B	0.84 B	1.9 U	2.3 J
beta-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
delta-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
gamma-BHC (Lindane)	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
gamma-Chlordane	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	0.65 J	2 U

TABLE 7-1

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG4-SS03-00	BG4-SS04-00	BG4-SS05-00	BG4-SS06-00	BG4-SS07-00	BG4-SS08-00	BG4-SS09-00	BG4-SS10-00
SAMPLE DATE	07-26-2001	07-26-2001	07-26-2001	07-26-2001	07-27-2001	07-27-2001	07-27-2001	07-26-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Inorganics (mg/kg)								
Aluminum	3330	2410	1760	3930	2150	3090	3300	5100
Antimony	0.37 U	0.35 U	0.34 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
Arsenic	0.83 B	0.61 B	0.47 B	0.66 B	0.26 U	1.5 J	1.4 B	5.2
Barium	18.6 J	16.1 B	9.6 J	19.7 B	18.8 J	13.4 J	36.6 J	41.5 J
Beryllium	0.089 B	0.083 U	0.079 U	0.082 U	0.086 U	0.084 U	0.32 B	0.79 J
Calcium	175 J	84.4 J	95.7 J	251 J	308 J	258 B	762 J	619 J
Chromium	3.1	2.4	2.2	3.8	2.3	5.5	4	12.4
Cobalt	1.2 B	1 J	0.84 J	0.96 J	0.68 J	1.2 J	3.4 J	6.7 J
Copper	2 B	2.9 B	2.5 B	3 B	2.6 B	3.5 B	4 J	2.2 J
Iron	2810	2490	1950	3540	1720	5800	3770	10400
Lead	16	5.8	6.1	9.1	8.1	7.2	11.2	11.5
Magnesium	179 J	164 J	112 J	194 J	132 J	241 J	245 J	329 J
Manganese	43.7	60.4	81.9	61	60.2	40.1	304	435
Mercury	0.045 U	0.037 U	0.047 U	0.046 U	0.051 J	0.042 U	0.042 U	0.051 U
Nickel	1.7 J	1.4 B	1.1 J	1.4 J	1 B	1.8 B	2.2 B	4.1 J
Potassium	105 B	97.1 B	87 B	112 B	92.6 B	207 B	159 B	274 B
Selenium	0.61 UL	0.58 UL	0.55 UL	0.57 UL	0.6 UL	0.59 U	0.62 UL	1.2 K
Silver	0.11 U	0.1 U	0.1 U	0.1 U	0.11 U	0.11 U	0.11 U	0.11 U
Sodium	294 B	255 B	240 B	242 B	309 B	265 B	246 B	73.6 U
Thallium	0.89 UL	0.85 UN	0.81 UL	0.84 UL	0.88 UL	0.87 UL	0.9 UL	0.9 UL
Vanadium	7.1 J	4.7 J	4 J	8.1 J	4.6 J	11.1	7.7 J	14
Zinc	4.7 J	8.7 J	6.4 J	6.5 J	6.7 J	7 J	14.6 J	22.5 J

TABLE 7-2

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SUBSURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SB01-01	BG1-SB02-01	BG1-SB03-01	BG1-SB04-01	BG1-SB05-01	BG1-SB05-01D	BG1-SB06-01	BG1-SB07-01	BG1-SB08-01
SAMPLE DATE	08-06-2001	07-23-2001	07-23-2001	08-06-2001	08-06-2001	08-06-2001	08-06-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Volatiles (ug/kg)									
1,1,2,2-Tetrachloroethane	2 J	13 U	29 U	4 J	15 U	13 U	15 U	12 U	3 J
2-Butanone	13 U	13 U	29 U	5 J	15 U	13 U	4 J	12 U	14 U
Acetone	12 B	5 J	42	14 B	16 B	9 B	15 B	12 U	14 U
Carbon Disulfide	13 U	13 U	14 J	15 U	15 U	13 U	15 U	12 U	14 U
Isopropylbenzene	13 U	13 U	29 U	15 U	15 U	13 U	15 U	12 U	14 U
Methylene Chloride	8 B	13 U	29 U	26 B	13 B	3 B	4 B	12 U	14 U
Styrene	13 U	13 U	29 U	15 U	15 U	13 U	15 U	12 U	14 U
Toluene	8 B	13 U	29 U	11 B	16 B	7 B	2 B	12 U	3 B
Benzaldehyde	430 U	410 UL	940 U	100 J	510 U	440 U	53 J	380 U	450 U
Phenol	430 U	410 UL	940 U	510 U	510 U	440 U	490 U	380 U	450 U
bis(2-Ethylhexyl)phthalate	120 B	180 B	350 B	160 B	120 B	54 B	160 B	57 B	72 B
4,4'-DDD	4.3 U	4.1 U	9.4 U	5.1 U	5.1 U	4.4 U	4.9 U	3.8 U	4.5 U
4,4'-DDE	4.3 U	4.1 U	3.9 J	1.7 J	5.1 U	4.4 U	4.9 U	3.8 U	4.5 U
Dieldrin	4.3 U	4.1 U	9.4 U	5.1 U	5.1 U	2.5 J	4.9 U	3.8 U	4.5 U
Endosulfan I	2.2 U	2.1 U	2.3 J	2.6 U	1.2 J	1.2 J	0.96 J	2 U	2.3 U
Endosulfan sulfate	4.3 U	4.1 U	3.4 J	5.1 U	2.7 J	4.4 U	4.9 U	3.8 U	4.5 U
Endrin aldehyde	4.3 U	4.1 U	9.4 U	5.1 U	5.1 U	4.4 U	4.9 U	3.8 U	4.5 U
Endrin ketone	4.3 U	4.1 U	9.4 U	5.1 U	2.5 J	4.4 U	4.9 U	3.8 U	4.5 U
alpha-BHC	1.3 J	2.1 U	4.8 U	2.6 U	0.81 J	0.6 J	2.5 U	2 U	2.3 U
alpha-Chlordane	2.2 U	2.1 U	4.8 U	2.6 U	1.5 J	0.98 J	1.4 J	2 U	2.3 U
beta-BHC	2.2 U	2.1 U	4.8 U	2.6 U	2.6 U	2.3 U	2.5 U	2 U	2.3 U
delta-BHC	0.8 J	2.1 U	4.8 U	2.6 U	2.6 U	2.3 U	2.5 U	2 U	2.3 U
Total Organic Carbon	28660	2310	133000	34600	40740		52360	3030	10100

TABLE 7-2

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SUBSURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SB01-01	BG1-SB02-01	BG1-SB03-01	BG1-SB04-01	BG1-SB05-01	BG1-SB05-01D	BG1-SB06-01	BG1-SB07-01	BG1-SB08-01
SAMPLE DATE	08-06-2001	07-23-2001	07-23-2001	08-06-2001	08-06-2001	08-06-2001	08-06-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Inorganics (mg/kg)									
Aluminum	3640	238	18400	5190	3670	3620	4570	307	1510
Arsenic	4.5	0.29 U	10.4	5.5	3 J	3.4	3.2	0.28 U	1.7 B
Barium	21.7 J	0.9 J	28.5 J	6.6 J	11.8 J	12 J	14.2 J	3.8 J	3.5 J
Calcium	1120 J	307 J	1420 J	1590	3390	1770	32200	145 J	880 J
Chromium	8.2	2.4	37.5	17.1	12.1	11.1	15.3	4.5	5.7
Cobalt	1.3 B	0.17 U	3.7 J	1.4 B	2 J	1.8 J	1.6 J	0.2 J	0.57 J
Copper	1.4 J	0.86 J	9.6 J	2.9 J	2.6 J	1.7 J	3 J	0.79 J	2.3 J
Cyanide	0.05 U	0.046 U	2.7	0.058 U	0.061 U	0.051 U	0.06 U	0.045 U	0.055 U
Iron	7610	1280	22400	14000	9910	9510	9780	1820	4510
Lead	6.4	2.6	23.3	4.8	5.7	4.5	5.8	6	83.7
Magnesium	318 J	214 J	4630	1810	1040 J	928 J	1350 J	213 J	710 J
Manganese	16	2.9 J	86.2	14.6	15.2	11	17.2	6.7	13.4
Mercury	0.054 U	0.052 UL	0.11 UL	0.07 U	0.077 U	0.067 J	0.068 U	0.054 UL	0.059 UL
Nickel	2 J	0.51 J	11 J	3.2 J	3.1 J	3.1 J	3.6 J	0.57 J	2 J
Potassium	281 J	147 B	4240	2370 J	1210 J	1190 J	1970 J	182 B	542 J
Selenium	1.6 B	0.68 UL	1.5 UL	1.8 B	1.9 L	0.75 B	1.3 B	0.65 UL	0.77 UL
Sodium	467 B	1280	9810	1560	629 B	492 B	2560	973 B	1700
Vanadium	12.2 J	2.1 J	53.8	19.4	12.9 J	12.2 J	17.7	3.1 J	7.8 J
Zinc	6.7 J	20.9	52.9	14.2 J	12.4 J	11.3 J	14.7 J	7.1 L	17.3

TABLE 7-2

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SUBSURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SB09-01	BG1-SB10-01	BG2-SB01-01	BG2-SB01-01D	BG2-SB02-01	BG2-SB03-01	BG2-SB04-01	BG2-SB05-01	BG2-SB06-01
SAMPLE DATE	07-23-2001	07-23-2001	07-27-2001	07-27-2001	07-23-2001	07-23-2001	07-26-2001	07-26-2001	07-27-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Volatiles (ug/kg)									
1,1,2,2-Tetrachloroethane	12 U	15 U	11 U	13 U	11 U	11 U	12 U	11 U	13 U
2-Butanone	12 U	15 U	11 U	13 U	11 U	11 U	12 U	11 U	13 U
Acetone	9 J	15 U	11 U	6 J	11 U	11 U	12 U	11 U	4 J
Carbon Disulfide	2 J	15 U	11 U	13 U	11 U	11 U	12 U	11 U	13 U
Isopropylbenzene	12 U	15 U	11 U	13 U	11 U	1 J	12 U	11 U	13 U
Methylene Chloride	12 U	15 U	11 U	13 U	11 U	11 U	12 U	11 U	13 U
Styrene	12 U	15 U	11 U	13 U	11 U	11 U	12 U	11 U	13 U
Toluene	3 J	2 B	1 B	13 U	11 U	2 B	12 U	1 B	1 B
Benzaldehyde	970 U	490 U	350 U	420 U	380 U	350 U	390 U	360 U	420 U
Phenol	970 U	490 U	350 U	420 U	380 U	350 U	390 U	360 U	420 U
bis(2-Ethylhexyl)phthalate	970 U	75 B	670	70 J	380 U	610	160 B	67 B	120 J
4,4'-DDD	9.7 U	4.8 U	3.5 U	4.2 U	3.8 U	3.5 U	3.9 U	3.6 U	4.2 U
4,4'-DDE	2.7 J	4.8 U	3.5 U	4.2 U	3.8 U	3.5 U	3.9 U	3.6 U	4.2 U
Dieldrin	9.7 U	4.8 U	3.5 U	4.2 U	3.8 U	1.9 J	3.9 U	3.6 U	4.2 U
Endosulfan I	5 U	2.5 U	1.8 U	2.2 U	2 U	1.8 U	2 U	1.8 U	2.2 U
Endosulfan sulfate	9.7 U	4.8 U	3.5 U	4.2 U	3.8 U	3.5 U	3.9 U	3.6 U	4.2 U
Endrin aldehyde	9.7 U	4.8 U	3.5 U	4.2 U	3.8 U	2.7 J	3.9 U	3.6 U	4.2 U
Endrin ketone	9.7 U	4.8 U	3.5 U	4.2 U	3.8 U	3.5 U	3.9 U	3.6 U	4.2 U
alpha-BHC	5 U	2.5 U	1.8 U	2.2 U	2 U	1.8 U	2 U	1.8 U	2.2 U
alpha-Chlordane	5 U	2.5 U	1.8 U	2.2 U	2 U	1.8 U	2 U	1.8 U	2.2 U
beta-BHC	5 U	2.5 U	1.8 U	2.2 U	2 U	1.8 U	0.74 J	1.8 U	0.79 J
delta-BHC	5 U	2.5 U	1.8 U	2.2 U	2 U	1.8 U	2 U	1.8 U	2.2 U
Total Organic Carbon	55100	10600	4338		5010	6030	5971	6795	9307

TABLE 7-2

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SUBSURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SB09-01	BG1-SB10-01	BG2-SB01-01	BG2-SB01-01D	BG2-SB02-01	BG2-SB03-01	BG2-SB04-01	BG2-SB05-01	BG2-SB06-01
SAMPLE DATE	07-23-2001	07-23-2001	07-27-2001	07-27-2001	07-23-2001	07-23-2001	07-26-2001	07-26-2001	07-27-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Inorganics (mg/kg)									
Aluminum	11600	2700	1710	6960	11400	4590	12600	4820	8350
Arsenic	12.5	2.5 B	0.26 U	15.9	3.8	1.3 B	4.2	1.6 B	6.8
Barium	19.8 J	5.1 J	21.4 J	14.2 J	38.7 J	36.2 J	32.4 J	32.2 J	48.5
Calcium	1310 J	351 J	136 J	1810	1060	412 J	479 J	231 J	162000
Chromium	25	7.5	2.5	25.3	26.4	5.3	15.2	7.2	24.5
Cobalt	2.7 J	1.1 J	1.7 J	4.4 J	2.4 J	4.2 J	3.1 J	7.3 J	4 J
Copper	9 J	2.9 B	0.71 B	2.2 B	2.5 B	1 B	3.9 B	0.61 B	5 J
Cyanide	0.096 U	0.056 U	0.12 B	0.05 U	0.043 U	0.043 U	0.057 B	0.044 U	0.11 B
Iron	19300	5360	1870	30000	21700	5140	18300	7320	20900
Lead	35.3	5.4	2	7.1	7.7	7.7	8.1	4.1	6.9 L
Magnesium	3340	862 J	176 J	765 J	1420	357 J	667 J	563 J	3340
Manganese	53.8	14	131	34.6	44.2	82.5	101	135	104
Mercury	0.083 UL	0.05 UL	0.053 U	0.11 B	0.045 UL	0.043 UL	0.11 B	0.082 B	0.12 B
Nickel	7.8 J	2.8 J	1.5 B	8.2 J	5.5 J	3.4 J	6.8 J	5.3 J	9.1 J
Potassium	2790	611 J	100 J	889 J	1140	210 B	459 J	373 J	2100
Selenium	1.3 UL	0.78 UL	0.6 UL	1.2 J	0.59 UL	0.57 UL	0.64 UL	0.57 UL	0.65 UL
Sodium	10400	2360	285 B	321 B	206 B	175 B	305 B	268 B	815 B
Vanadium	37.8	14.1	2.2 J	33.2	32	9.1 J	28.5	10.7	20.6
Zinc	34.3	15.2	3 B	29.5	19.9	7.4 L	18.4	10.6	30.8

TABLE 7-2

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SUBSURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG2-SB07-01	BG2-SB08-01	BG2-SB09-01	BG2-SB10-01	BG3-SB01-01	BG3-SB01-01D	BG3-SB02-01	BG3-SB03-01	BG3-SB04-01
SAMPLE DATE	07-23-2001	07-24-2001	07-24-2001	07-25-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Volatiles (ug/kg)									
1,1,2,2-Tetrachloroethane	11 U	11 U	11 U	14 U	11 U	11 U	11 U	11 U	11 U
2-Butanone	11 U	11 U	11 U	14 U	11 U	11 U	11 U	11 U	11 U
Acetone	11 U	11 U	11 U	14 U	9 B	5 B	11 U	11 U	11 U
Carbon Disulfide	11 U	11 U	11 U	14 U	11 U	11 U	11 U	11 U	11 U
Isopropylbenzene	11 U	11 U	11 U	14 U	11 U	11 U	11 U	11 U	11 U
Methylene Chloride	11 U	11 U	11 U	14 U	11 U	11 U	1 J	11 U	11 U
Styrene	11 U	11 U	11 U	14 U	4 J	4 J	11 U	11 U	11 U
Toluene	11 U	1 B	11 U	14 U	11 U	11 U	11 U	11 U	11 U
Benzaldehyde	370 U	370 U	360 U	460 U	380 U	370 U	370 U	360 U	350 U
Phenol	370 U	370 U	360 U	460 U	380 U	370 U	370 U	360 U	350 U
bis(2-Ethylhexyl)phthalate	180 J	58 J	73 J	660	380 U	370 U	370 U	360 U	37 B
4,4'-DDD	30 U	3.7 U	3.6 U	4.6 U	3.8 U	3.7 U	3.1 J	3.6 U	3.6 U
4,4'-DDE	30 U	3.7 U	3.6 U	4.6 U	3.8 U	3.7 U	3.7 U	3.6 U	3.6 U
Dieldrin	30 U	3.7 U	3.6 U	4.6 U	3.8 U	3.7 U	2.3 J	3.6 U	3.6 U
Endosulfan I	15 U	1.9 U	1.9 U	2.4 U	1.9 U	1.9 U	1.9 U	1.8 U	1.8 U
Endosulfan sulfate	30 U	3.7 U	3.6 U	4.6 U	3.8 U	3.7 U	3.7 U	3.6 U	3.6 U
Endrin aldehyde	30 U	3.7 U	3.6 U	4.6 U	3.8 U	3.7 U	3.7 U	3.6 U	3.6 U
Endrin ketone	30 U	3.7 U	3.6 U	4.6 U	3.8 U	3.7 U	3.7 U	3.6 U	3.6 U
alpha-BHC	15 U	1.9 U	1.9 U	2.4 U	1.9 U	1.9 U	1.9 U	1.8 U	1.8 U
alpha-Chlordane	15 U	1.9 U	1.9	2.4 U	1.9 U	1.9 U	1.9 U	1.8 U	1.8 U
beta-BHC	15 U	1.9 U	0.99 J	2.4 U	1.9 U	1.9 U	1.9 U	1.8 U	1.8 U
delta-BHC	15 U	1.9 U	1.9 U	2.4 U	1.9 U	1.9 U	1.9 U	1.8 U	1.8 U
Total Organic Carbon	5530	4584	6682	8982	7050		3760	4680	3360

TABLE 7-2

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SUBSURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG2-SB07-01	BG2-SB08-01	BG2-SB09-01	BG2-SB10-01	BG3-SB01-01	BG3-SB01-01D	BG3-SB02-01	BG3-SB03-01	BG3-SB04-01
SAMPLE DATE	07-23-2001	07-24-2001	07-24-2001	07-25-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Inorganics (mg/kg)									
Aluminum	9770	8040	6310	9990	6830	6320	4970	3620	3290
Arsenic	5	3	2.4	4.2	0.86 B	0.65 B	0.87 B	1.1 B	2.1
Barium	37.1 J	35.2 J	33.7 J	42 J	18.3 J	17.4 J	38.3 J	28 J	21.7 J
Calcium	474 J	363 J	546 J	819 J	76.8 J	42.3 B	112 J	234 J	102 J
Chromium	15.2	11.4	9.8	15.1	7.8	7.3	4.7	5.1	7.6
Cobalt	2.1 J	2.4 J	1.7 J	2.2 J	0.39 B	0.4 B	1.3 J	2.8 J	4 J
Copper	2.4 B	0.92 B	0.75 B	1.4 B	1.2 J	1.1 J	0.71 J	0.93 J	0.59 B
Cyanide	0.1 B	0.044 U	0.042 U	0.056 U	0.043 U	0.1 B	0.066 B	0.063 B	0.041 U
Iron	18200	12800	11200	19500	8390	7680	4790	3940	4790
Lead	6.1	6	6.6	8.3	5.5	5.6	6.1	3.6	5
Magnesium	819 J	649 J	455 J	550 J	175 J	172 J	206 J	241 J	251 J
Manganese	60.8	31.8	26.1	37.6	8.4	13.5	30.4	51.1	40
Mercury	0.046 UL	0.082 B	0.076 B	0.1 B	0.049 UL	0.056 UL	0.056 UL	0.044 UL	0.054 UL
Nickel	5 J	4 J	2.9 J	3.5 J	1.1 B	1.1 B	1.8 J	2.4 J	3.8 J
Potassium	563 J	409 J	298 J	389 J	179 B	167 B	131 B	167 B	177 B
Selenium	0.61 UL	0.87 J	0.61 UL	0.77 UL	0.6 UL	0.62 UL	0.61 UL	0.61 UL	0.58 UL
Sodium	152 B	297 B	299 B	371 B	191 B	205 B	214 B	170 B	162 B
Vanadium	26	19.8	16.5	28	17.6	16.3	10 J	7.9 J	7.5 J
Zinc	16	9.8	7.5 L	10.2	5 L	5 L	5.2 L	5.7 L	6.6 L

TABLE 7-2

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SUBSURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG3-SB05-01	BG3-SB06-01	BG3-SB07-01	BG3-SB08-01	BG3-SB09-01	BG3-SB10-01	BG4-SB01-01	BG4-SB01-01D	BG4-SB02-01
SAMPLE DATE	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-26-2001	07-26-2001	07-27-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Volatiles (ug/kg)									
1,1,2,2-Tetrachloroethane	12 U	11 U	11 U	11 U	11 U	11 U	13 U	11 U	11 U
2-Butanone	12 U	11 U	11 U	11 U	11 U	11 U	13 U	11 U	11 U
Acetone	12 U	11 U	11 U	7 B	11 U	11 U	9 B	6 B	11 U
Carbon Disulfide	12 U	11 U	11 U	11 U	11 U	11 U	13 U	11 U	11 U
Isopropylbenzene	12 U	11 U	11 U	11 U	11 U	11 U	13 U	11 U	11 U
Methylene Chloride	12 U	11 U	11 U	11 U	11 U	11 U	2 B	11 U	11 U
Styrene	12 U	11 U	11 U	11 U	11 U	11 U	13 U	11 U	11 U
Toluene	12 U	11 U	11 U	11 U	11 U	11 U	13 U	11 U	11 U
Benzaldehyde	390 U	350 U	350 U	370 U	370 U	370 U	420 U	350 U	370 U
Phenol	390 U	350 U	350 U	370 U	370 U	370 U	420 U	350 U	370 U
bis(2-Ethylhexyl)phthalate	58 J	350 U	140 J	41 J	370 U	160 B	470	350 U	130 J
4,4'-DDD	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U	4.2 U	3.5 U	3.7 U
4,4'-DDE	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U	4.2 U	3.5 U	3.7 U
Dieldrin	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U	4.2 U	3.5 U	3.7 U
Endosulfan I	2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	2.2 U	1.8 U	1.9 U
Endosulfan sulfate	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U	4.2 U	3.5 U	3.7 U
Endrin aldehyde	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U	4.2 U	3.5 U	3.7 U
Endrin ketone	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U	4.2 U	3.5 U	3.7 U
alpha-BHC	2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	2.2 U	1.8 U	1.9 U
alpha-Chlordane	2 U	1.8 U	1.8 U	2.4 J	1.9 U	4.7	2.2 U	1.8 U	1.9 U
beta-BHC	2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	2.2 U	1.8 U	1.9 U
delta-BHC	2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	2.2 U	1.8 U	1.9 U
Total Organic Carbon	4490	6200	4730	6680	5200	8060	7332		3019

TABLE 7-2

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SUBSURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG3-SB05-01	BG3-SB06-01	BG3-SB07-01	BG3-SB08-01	BG3-SB09-01	BG3-SB10-01	BG4-SB01-01	BG4-SB01-01D	BG4-SB02-01
SAMPLE DATE	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-26-2001	07-26-2001	07-27-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Inorganics (mg/kg)									
Aluminum	9110	1920	3610	5800	6280	10900	7380	2120	5540
Arsenic	1.2 B	0.4 B	1.2 B	1.2 B	1.3 B	1.5 B	18.6	0.24 U	1.1 B
Barium	8.2 J	19.4 J	28.7 J	18.8 J	47.8	26.1 J	15.3 J	27.4 J	41 J
Calcium	304 J	96.4 J	242 J	56.4 J	151 J	111 J	2080	203 J	261 J
Chromium	15.6	2.9	5.3	7.2	4.6	11.9	25.6	2.6	6.1
Cobalt	0.16 U	2.4 J	1.5 J	0.84 J	8.1 J	0.92 B	4.4 J	1.9 J	2.6 J
Copper	2.2 J	0.95 J	1.5 J	1.1 J	1.3 J	2.4 J	3.2 J	1.5 B	1.2 B
Cyanide	0.047 U	0.04 B	0.21 B	0.045 U	0.44 B	0.045 U	0.042 U	0.041 U	0.044 U
Iron	12500	1740	5520	6780	5070	12500	31700	2080	6700
Lead	6.7	3.2	4.5	5.3	5.5	6.6	7.8	2.8	6.8
Magnesium	218 J	115 J	300 J	202 J	324 J	392 J	754 J	203 J	371 J
Manganese	5.4	49.3	38.3	14.4	208	16.4	42	195	86.1
Mercury	0.044 UL	0.036 UL	0.038 UL	0.048 UL	0.048 UL	0.039 UL	0.053 UL	0.042 UL	0.084 B
Nickel	0.99 B	2 J	2 J	1.9 J	6.4 J	2.6 J	8.5	1.8 J	4.9 J
Potassium	278 J	78.8 B	193 B	173 B	168 B	253 B	764 J	109 B	259 B
Selenium	0.63 UL	0.58 UL	0.59 UL	0.61 UL	0.58 UL	0.62 UL	0.59 UL	0.55 UL	0.62 UL
Sodium	210 B	177 B	217 B	208 B	135 B	199 B	299 B	314 B	303 B
Vanadium	36	3.4 J	9.6 J	12.7	7.2 J	22.3	35.1	2.5 J	11.9
Zinc	5 L	4 B	5.8 L	6.9 L	13.8	12.3	32	3.8 B	7.1 L

TABLE 7-2

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SUBSURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG4-SB03-01	BG4-SB04-01	BG4-SB05-01	BG4-SB06-01	BG4-SB07-01	BG4-SB08-01	BG4-SB09-01	BG4-SB10-01
SAMPLE DATE	07-26-2001	07-26-2001	07-26-2001	07-26-2001	07-27-2001	07-27-2001	07-27-2001	07-26-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Volatiles (ug/kg)								
1,1,2,2-Tetrachloroethane	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
2-Butanone	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Acetone	11 U	11 U	11 U	3 B	3 B	11 U	11 U	11 U
Carbon Disulfide	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Isopropylbenzene	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Methylene Chloride	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Styrene	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Toluene	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Benzaldehyde	380 U	370 U	350 U	380 U	360 U	370 U	51 J	360 U
Phenol	380 U	370 U	340 J	53 J	360 U	370 U	360 U	360 U
bis(2-Ethylhexyl)phthalate	380 U	410	100 B	55 B	130 J	580	57 J	85 B
4,4'-DDD	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
4,4'-DDE	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
Dieldrin	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
Endosulfan I	2 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U
Endosulfan sulfate	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
Endrin aldehyde	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
Endrin ketone	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
alpha-BHC	2 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U
alpha-Chlordane	2 U	0.86 B	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U	1.5 J
beta-BHC	2 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U
delta-BHC	2 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U
Total Organic Carbon	3537	4282	3013	2967	2324	2665	4088	4010

TABLE 7-2

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN SUBSURFACE SOIL
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG4-SB03-01	BG4-SB04-01	BG4-SB05-01	BG4-SB06-01	BG4-SB07-01	BG4-SB08-01	BG4-SB09-01	BG4-SB10-01
SAMPLE DATE	07-26-2001	07-26-2001	07-26-2001	07-26-2001	07-27-2001	07-27-2001	07-27-2001	07-26-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Inorganics (mg/kg)								
Aluminum	10700	8460	2310	11000	6870	6680	4740	7900
Arsenic	2 J	3	0.46 B	1.4 B	1.3 B	2.4	1.2 B	13.8
Barium	33.5 J	58	20.4 J	10.8 J	19.4 J	21.1 J	48.2	46
Calcium	345 J	362 J	87.2 J	300 J	138 J	481 J	123 J	493 J
Chromium	12	10.2	2.8	10.8	7.8	8.3	3.5 B	18.4
Cobalt	1.1 J	2.3 J	1.2 J	0.5 J	1.1 J	2 J	7 J	6 J
Copper	1.8 B	2.8 B	0.43 B	1.5 B	1.7 B	3.1 J	0.68 B	2.9 J
Cyanide	0.045 U	0.11 B	0.043 U	0.045 U	0.041 U	0.075 B	0.1 B	0.046 B
Iron	12800	12400	2310	10200	7560	11000	3870	23600
Lead	5.8	5.5	3.8	6.2	5.1	5.4	6.1	8.1
Magnesium	414 J	471 J	193 J	273 J	318 J	322 J	178 J	447 J
Manganese	27.7	67.8	39	7.4	21.6	62.2	154	137
Mercury	0.14	0.12 B	0.075 B	0.093 B	0.1 B	0.11 B	0.066 B	0.092 B
Nickel	3 J	4.9 J	1.5 J	1.8 J	2.4 J	3.3 J	2.5 J	6.3 J
Potassium	276 J	367 J	102 B	191 B	197 B	287 J	117 B	471 J
Selenium	0.62 UL	0.58 UL	0.6 UL	0.61 UL	0.6 UL	0.63 UL	0.59 UL	0.64 J
Sodium	337 B	294 B	300 B	332 B	373 B	332 B	222 B	292 B
Vanadium	22	18.9	4.7 J	30	14.6	17.8	5.8 J	30.8
Zinc	10.1	10.3	2.5 B	3.8 B	6.3 L	8.2 L	4.5 L	19.9

TABLE 7-3

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN GROUNDWATER
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG1-GW01	CXBG1-GW02	CXBG1-GW03	CXBG1-GW03D	CXBG2-GW01	CXBG2-GW02	CXBG2-GW03
SAMPLE DATE	08-21-2001	08-15-2001	08-20-2001	08-20-2001	08-23-2001	08-14-2001	08-14-2001
Volatiles (ug/L)							
Carbon Disulfide	1 J	9 J	3 J	2 J	10 U	10 U	10 U
Methylene Chloride	3 B	2 B	2 J	3 J	10 U	2 B	1 B
Toluene	1 J	10 U	10 U	0.9 J	10 U	0.9 B	10 U
Inorganics (total) (ug/L)							
Aluminum	69.1 J	43.6 U	43.6 U	70.9 B	43.6 U	43.6 U	43.6 U
Antimony	1.7 U	2 J	1.7 U	1.7 U	1.7 U	1.7 U	1.7 J
Arsenic	4.6 B	4.5 B	6.9 B	4.7 B	1.2 U	3.3 B	2.6 B
Barium	37.8 B	49.7 B	66.9 B	58.5 B	45.3 B	59.8 B	45.5 B
Calcium	158000 B	213000	257000	226000	131000 B	135000 B	100000 B
Chromium	1 U	2.8 J	3.3 J	3 J	1 U	1.5 J	1 U
Cobalt	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Copper	1.6 U	1.6 U	2.7 B	2 J	1.6 U	1.6 U	1.6 U
Iron	166 B	11400 J	2520 J	2210 J	10.6 U	49.9 B	53.5 B
Magnesium	1800 B	480000	658000	632000	1920 B	2870 B	5940 B
Manganese	10.8 B	760	538	482	12 B	26 B	29.5 B
Potassium	481 B	293000	370000	332000	604 B	1320 B	1420 B
Sodium	9640 B	3660000	4990000	4790000	5930 B	8680 B	21700 B
Thallium	4.1 U	4.1 U	4.1 U	7.5 J	4.1 U	4.1 U	4.1 U
Vanadium	1.5 B	6.1 B	14.5 J	14.2 J	0.74 B	0.6 U	0.6 U
Zinc	0.7 UL	0.7 U	0.7 U	0.7 UL	0.7 UL	0.7 UE	2.6 B
Inorganics (dissolved)(ug/L)							
Antimony	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Arsenic	1.2 UL	1.2 UL	1.2 UL	1.5 J	1.2 UL	1.2 UL	1.2 UL
Calcium	153000 B	196000 B	233000	224000	118000 B	128000 B	98700 B
Cobalt	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	1.2 J
Iron	68.2 B	10700	2530	2410	10.6 U	26.4 B	10.6 U
Magnesium	1860 B	464000	641000	637000	1770 B	2840 B	5840 B
Manganese	13.3 B	730	509	489	10.8 B	25.1 B	32.4 B
Potassium	495 J	287000	360000	350000	547 J	1260 J	1440 J
Silver	0.5 U	0.5 U	0.5 U	0.71 J	0.5 U	0.5 U	0.5 U
Sodium	11400 B	3850000	4890000	4810000	5360 B	8800 B	22300 B
Thallium	4.1 U	8 J	4.1 U	6.3 J	4.1 U	4.1 U	4.1 U
Vanadium	1.1 B	5.2 J	14.6 J	14.3 J	0.73 B	0.86 B	0.6 B

TABLE 7-3

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN GROUNDWATER
COMBINED DATA SET
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG3-GW01	CXBG3-GW01D	CXBG3-GW02	CXBG3-GW03	CXBG4-GW01	CXBG4-GW02	CXBG4-GW03
SAMPLE DATE	08-20-2001	08-20-2001	08-21-2001	08-15-2001	08-24-2001	08-24-2001	08-23-2001
Volatiles (ug/L)							
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	2 J	2 J	2 B	2 B	10 U	10 U	2 B
Toluene	10 U	10 U	10 U	0.9 B	10 U	10 U	0.8 J
Inorganics (total) (ug/L)							
Aluminum	43.6 U	43.6 U	43.6 U	43.6 U	85.9 J	43.6 U	43.6 U
Antimony	3.3 J	1.7 U	1.7 U	1.7 U	1.7 U	3.3 J	1.8 J
Arsenic	3.9 B	2.8 B	5.4 B	1.8 B	12.6	4.8 B	1.2 U
Barium	55.7 B	53.6 B	68.2 B	61.2 B	52.7 B	102 J	25.1 B
Calcium	3900 B	4170 B	93400 B	117000 B	126000 B	121000 B	82600 B
Chromium	3.1 J	3.4 J	1.4 J	1 U	1 U	26.5	24.2
Cobalt	11.1 J	9.2 J	0.81 B	0.7 U	0.7 U	0.7 U	0.7 U
Copper	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	3.9 B	3.4 B
Iron	1290 J	1360 J	1730 J	10.6 U	8260 J	89.9 B	85.8 B
Magnesium	601 B	615 B	2380 B	2690 B	2140 B	1500 B	943 B
Manganese	76.4	81.7	79.2	81	91.1	21.5 B	2.2 B
Potassium	639 B	687 B	1590 B	1460 B	975 B	1820 B	684 B
Sodium	3530 B	3410 B	10900 B	7470 B	7540 B	6200 B	4170 B
Thallium	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U
Vanadium	0.6 U	0.6 U	0.6 U	0.6 U	1.1 B	0.6 U	0.97 B
Zinc	36 J	38.2 J	8.5 B	0.7 U	1.2 B	6.5 B	4.6 B
Inorganics (dissolved)(ug/L)							
Antimony	1.7 U	1.7 U	1.7 U	1.7 U	3.8 J	1.7 U	1.7 U
Arsenic	1.2 UL	1.2 UL	1.2 UL	1.2 UL	9.8 J	1.2 UL	1.2 UL
Calcium	3570 B	3690 B	87600 B	104000 B	120000 B	116000 B	79200 B
Cobalt	9.8 J	11.1 J	1 J	0.7 U	0.7 U	0.7 U	0.7 U
Iron	1160	1190	968 B	10.6 U	7960	10.6 U	10.6 U
Magnesium	618 B	594 B	2330 B	2360 B	2080 B	1440 B	917 B
Manganese	72.2	74	76.7	59.5	88.9	17.1 B	0.34 B
Potassium	630 J	631 J	1510 J	1260 J	936 J	1760 J	652 J
Silver	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Sodium	4060 B	3720 B	10400 B	6590 B	7150 B	6030 B	3750 B
Thallium	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.6 J	4.1 U
Vanadium	0.6 U	1.5 B	0.6 U	0.7 B	0.6 U	0.7 B	0.96 B

TABLE 7-4

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN FIELD BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-FB01	CXBG-FB02	CXBG-FB03
SAMPLE DATE	07-30-2001	07-30-2001	08-08-2001
Volatiles (ug/L)			
Bromodichloromethane	10 U	10 U	11
Chloroform	10 U	10 U	44
Dibromochloromethane	10 U	10 U	2 J
bis(2-Ethylhexyl)phthalate	10 U	10 U	7 J
alpha-Chlordane	0.05 U	0.015 J	0.05 U
Inorganic (total)(ug/L)			
Barium	0.2 U	0.22 B	14.9 J
Calcium	16.6 U	16.6 U	38400
Iron	24 B	10.6 U	120
Magnesium	14.6 B	21.7 B	1540 J
Manganese	0.35 B	0.22 B	7.8 J
Nickel	1.4 U	1.4 U	7.1 J
Potassium	36.2 U	235 J	721 J
Sodium	334 U	1040 J	16400
Inorganic (dissolved)(ug/L)			
Barium	NA	NA	20.7 J
Calcium	NA	NA	40700
Copper	NA	NA	8.8 J
Iron	NA	NA	229
Magnesium	NA	NA	1700 J
Manganese	NA	NA	8.6 J
Nickel	NA	NA	22 J
Potassium	NA	NA	813 J
Sodium	NA	NA	17200
Zinc	NA	NA	37.8 L

TABLE 7-5

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN EQUIPMENT RINSATE BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-RS01	CXBG-RS02	CXBG-RS03	CXBG-RS04	CXBG-RS05	CXBG-RS06	CXBG-RS07	CXBG-RS08
SAMPLE DATE	07-24-2001	07-24-2001	07-24-2001	07-30-2001	08-08-2001	08-14-2001	08-20-2001	08-24-2001
Volatiles (ug/L)								
Acetone	7 J	8 J	10 U	10 U	10 U	10 U	10 U	21 J
Methylene Chloride	10 U	10 U	10 U	10 U	10 U	2 B	3 J	2 J
Di-n-butylphthalate	3 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	1 J	10 U	1 J	10 U	2 J	10 U	10 U	10 U
Aldrin	0.056 U	0.05 U	0.05 U	0.05 U	0.05 U	0.024 J	0.05 U	0.05 U
Heptachlor epoxide	0.056 U	0.02 J	0.05 U	0.05 U	0.05 U	0.012 J	0.05 U	0.05 U
Inorganic (total)(ug/L)								
Antimony	2.1 J	1.7 U	1.7 U	2.3 J	1.7 U	1.7 U	1.7 U	1.7 U
Barium	5.1 J	2.3 J	1.5 B	0.6 B	1.8 J	0.2 U	0.2 U	0.2 U
Chromium	1 U	1 U	1 U	3.5 J	1 U	1 U	1 U	2.1 J
Cobalt	1.2 J	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Nickel	1.9 J	1.5 J	1.4 U	2.1 J	1.4 U	1.4 U	1.4 U	1.4 U
Selenium	2.8 UL	2.8 UL	2.8 UL	2.8 UL	2.8 U	2.8 UL	2.8 UL	5 K
Sodium	334 U	334 U	334 U	334 U	368 J	334 U	334 U	334 U
Vanadium	1.3 J	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Inorganic (dissolved)(ug/L)								
Chromium	NA	NA	NA	NA	NA	1 U	1 J	1 U
Silver	NA	NA	NA	NA	NA	0.5 U	0.5 K	0.5 U

TABLE 7-6

SUMMARY OF ANALYTICAL CONSTITUENTS DETECTED IN TRIP BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-TB01	CXBG-TB02	CXBG-TB03	CXBG-TB04	CXBG-TB05	CXBG-TB06	CXBG-TB07
SAMPLE DATE	07-25-2001	07-27-2001	07-30-2001	08-06-2001	08-15-2001	08-21-2001	08-24-2001
Volatiles (ug/L)							
Methylene Chloride	10 U	3 J	10 U	10 U	2 B	2 J	10 U

TABLE 7-7

FREQUENCY AND RANGE OF CONSTITUENTS DETECTED IN SURFACE SOIL
ALL SOIL ASSOCIATIONS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

Analyte	Soil Association # 1			Soil Association # 2			Soil Association # 3			Soil Association # 4		
	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection
Semivolatiles (ug/kg)												
Acetophenone	95 J	95 J	1/10	41 J	41 J	1/10	110 J	110 J	1/10	61 L	61 L	1/10
Benzaldehyde	100 J	100 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/9
Benzo(a)anthracene	220 J	220 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/9
Benzo(a)pyrene	340 J	340 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/9
Benzo(b)fluoranthene	650 J	650 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/9
Benzo(g,h,i)perylene	350 J	350 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/9
Benzo(k)fluoranthene	260 J	260 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/9
Chrysene	480 J	480 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/9
Di-n-octylphthalate	NA	NA	0/10	66 J	66 J	1/10	NA	NA	0/10	NA	NA	0/9
Fluoranthene	270 J	270 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/9
Indeno(1,2,3-cd)pyrene	340 J	340 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/9
Pyrene	330 J	330 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/9
bis(2-Ethylhexyl)phthalate	38 J	380 J	6/10	46 J	5000	6/10	130 J	600	7/10	200 J	2300	2/10
Pesticides (ug/kg)												
4,4'-DDD	5.3 J	12	3/10	NA	NA	0/10	NA	NA	0/10	1.3 J	1.3 J	1/10
4,4'-DDE	4.6 J	23	3/10	1.1 J	1.1 J	1/10	1.3 J	1.3 J	1/10	2.5 J	2.5 J	1/10
4,4'-DDT	10 J	10 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Dieldrin	3.7 J	3.7 J	1/10	NA	NA	0/10	3.3 J	4.4 J	2/10	2.4 J	2.6 J	2/10
Endosulfan I	1.1 J	2.1 J	3/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Endosulfan II	2.1 J	2.1 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Endosulfan sulfate	2.1 J	3.7 J	3/10	NA	NA	0/10	2.3 J	2.4 J	2/10	1.6 J	1.6 J	1/10
Endrin	3.5 J	3.5 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Endrin aldehyde	1.8 J	12	3/10	NA	NA	0/10	1.2 J	2.7 J	2/10	NA	NA	0/10
Endrin ketone	3.4 J	4.5 J	2/10	NA	NA	0/10	1.2 J	2.1 J	3/10	NA	NA	0/10
Heptachlor epoxide	NA	NA	0/10	NA	NA	0/10	1.8 J	1.8 J	1/10	NA	NA	0/10
alpha-BHC	0.72 J	1.6 J	4/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
alpha-Chlordane	4.7 J	4.7 J	1/10	1.1 J	2.5	3/10	0.65 J	1.7 J	7/10	1.5 J	2.3 J	4/10
beta-BHC	5.3 J	14 J	2/10	NA	NA	0/10	0.94 J	0.94 J	1/10	NA	NA	0/10
delta-BHC	5 P	5 P	1/10	0.65 J	0.65 J	1/10	NA	NA	0/10	NA	NA	0/10
gamma-BHC (Lindane)	1.4 J	3.3	2/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
gamma-Chlordane	0.92 J	7 J	3/10	0.55 J	0.55 J	1/10	0.65 J	0.65 J	1/10	0.65 J	0.65 J	1/10

TABLE 7-7 (Continued)

FREQUENCY AND RANGE OF CONSTITUENTS DETECTED IN SURFACE SOIL
ALL SOIL ASSOCIATIONS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

Analyte	Soil Association # 1			Soil Association # 2			Soil Association # 3			Soil Association # 4		
	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection
Inorganics (mg/kg)												
Aluminum	2330	4570	10/10	2330	4570	10/10	3110	6160	10/10	1760	5130	10/10
Antimony	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Arsenic	0.63 J	4.1	5/10	0.63 J	4.1	5/10	0.094 J	1.7 J	10/10	1.5 J	12.6	3/10
Barium	12.2 J	29.4 J	9/10	12.2 J	29.4 J	9/10	6 J	46.4	10/10	9.6 J	41.5 J	8/10
Beryllium	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10	0.79 J	0.79 J	1/10
Calcium	112 J	3320	9/10	112 J	3320	9/10	47.4 J	925 J	10/10	84.4 J	2860	9/10
Chromium	2.9	12.4	10/10	2.9	12.4	10/10	2.7	9	10/10	2.2	17.3	9/10
Cobalt	1 J	5.3 J	8/10	1 J	5.3 J	8/10	0.56 J	5.3 J	7/10	0.68 J	6.7 J	9/10
Copper	1.4 J	4 J	4/10	1.4 J	4 J	4/10	0.9 J	1.7 J	10/10	2.2 J	4 J	2/10
Iron	2650	12600	10/10	2650	12600	10/10	2150	8240	10/10	1720	20700	10/10
Lead	6.4	11	10/10	6.4	11	10/10	6.7	12.2	10/10	5.8	16	10/10
Magnesium	157 J	1020 J	10/10	157 J	1020 J	10/10	143 J	237 J	9/10	112 J	782 J	10/10
Manganese	62.7	257	10/10	62.7	257	10/10	19.2	278	10/10	40.1	435	10/10
Mercury	NA	NA	0/10	NA	NA	0/10	0.097 J	0.097 J	1/10	0.051 J	0.051 J	1/10
Nickel	1.4 J	3.9 J	9/10	1.4 J	3.9 J	9/10	1.7 J	4.4 J	8/10	1.1 J	5.9 J	5/10
Potassium	245 J	1210 L	4/10	245 J	1210 L	4/10	307 J	307 J	1/10	841 J	841 J	1/10
Selenium	0.69 J	0.69 J	1/10	0.69 J	0.69 J	1/10	0.65 J	0.65 J	1/10	1.2 K	1.4 L	2/10
Silver	0.16 J	0.16 J	1/10	0.16 J	0.16 J	1/10	NA	NA	0/10	NA	NA	0/10
Sodium	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Thallium	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10	0.85 UN	0.85 UN	1/10
Vanadium	5.7 J	15.2	10/10	5.7 J	15.2	10/10	5 J	22.1	10/10	4 J	26.1	10/10
Zinc	4.9 J	17.9 J	10/10	4.9 J	17.9 J	10/10	3.6 J	12.2	10/10	4.7 J	26.7	10/10

TABLE 7-8

FREQUENCY AND RANGE OF CONSTITUENTS DETECTED IN SUBSURFACE SOIL
ALL SOIL ASSOCIATIONS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

Analyte	Soil Association # 1			Soil Association # 2			Soil Association # 3			Soil Association # 4		
	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection
Volatiles (ug/kg)												
1,1,2,2-Tetrachloroethane	2 J	4 J	3/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
2-Butanone	4 J	5 J	2/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Acetone	5 J	42	3/10	4 J	6 J	2/10	NA	NA	0/10	NA	NA	0/10
Carbon Disulfide	2 J	14 J	2/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Isopropylbenzene	NA	NA	0/10	1 J	1 J	1/10	NA	NA	0/10	NA	NA	0/10
Methylene Chloride	NA	NA	0/10	NA	NA	0/10	1 J	1 J	1/10	NA	NA	0/10
Styrene	NA	NA	0/10	NA	NA	0/10	4 J	4 J	1/10	NA	NA	0/10
Toluene	3 J	3 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Semivolatiles (ug/kg)												
Benzaldehyde	53 J	100 J	2/10	NA	NA	0/10	NA	NA	0/10	51 J	51 J	1/10
Phenol	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10	53 J	340 J	2/10
bis(2-Ethylhexyl)phthalate	NA	NA	0/10	58 J	670	7/10	41 J	140 J	3/10	57 J	580	6/10
Pesticides (ug/kg)												
4,4'-DDD	NA	NA	0/10	NA	NA	0/10	3.1 J	3.1 J	1/10	NA	NA	0/10
4,4'-DDE	1.7 J	3.9 J	3/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Dieldrin	2.5 J	2.5 J	1/10	1.9 J	1.9 J	1/10	2.3 J	2.3 J	1/10	NA	NA	0/10
Endosulfan I	0.96 J	2.3 J	3/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Endosulfan sulfate	2.7 J	3.4 J	2/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Endrin aldehyde	NA	NA	0/10	2.7 J	2.7 J	1/10	NA	NA	0/10	NA	NA	0/10
Endrin ketone	2.5 J	2.5 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
alpha-BHC	0.81 J	1.3 J	2/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
alpha-Chlordane	1.4 J	1.5 J	2/10	1.9	1.9	1/10	2.4 J	4.7	2/10	1.5 J	1.5 J	1/10
beta-BHC	NA	NA	0/10	0.74 J	0.99 J	3/10	NA	NA	0/10	NA	NA	0/10
delta-BHC	0.8 J	0.8 J	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Total Organic Carbon (ug/kg)												
Total Organic Carbon	2310	133000	10/10	4338	9307	10/10	3360	8060	10/10	2324	7332	10/10

TABLE 7-8 (Continued)

FREQUENCY AND RANGE OF CONSTITUENTS DETECTED IN SUBSURFACE SOIL
ALL SOIL ASSOCIATIONS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

Analyte	Soil Association # 1			Soil Association # 2			Soil Association # 3			Soil Association # 4		
	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection
Inorganics (mg/kg)												
Aluminum	238	18400	10/10	4590	12600	10/10	1920	10900	10/10	2310	11000	10/10
Arsenic	3.2	12.5	6/10	2.4	15.9	8/10	2.1	2.1	1/10	2 J	18.6	5/10
Barium	0.9 J	28.5 J	10/10	21.4 J	48.5	10/10	8.2 J	47.8	10/10	10.8 J	58	10/10
Calcium	145 J	32200	10/10	231 J	162000	10/10	56.4 J	304 J	10/10	87.2 J	2080	10/10
Chromium	2.4	37.5	10/10	5.3	26.4	10/10	2.9	15.6	10/10	2.8	25.6	9/10
Cobalt	0.2 J	3.7 J	7/10	1.7 J	7.3 J	10/10	0.84 J	8.1 J	7/10	0.5 J	7 J	10/10
Copper	0.79 J	9.6 J	9/10	5 J	5 J	1/10	0.71 J	2.4 J	9/10	2.9 J	3.2 J	3/10
Cyanide	2.7	2.7	1/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Iron	1280	22400	10/10	5140	30000	10/10	1740	12500	10/10	2310	31700	10/10
Lead	2.6	83.7	10/10	4.1	8.3	10/10	3.2	6.7	10/10	3.8	8.1	10/10
Magnesium	213 J	4630	10/10	357 J	3340	10/10	115 J	392 J	10/10	178 J	754 J	10/10
Manganese	2.9 J	86.2	10/10	26.1	135	10/10	5.4	208	10/10	7.4	195	10/10
Mercury	0.067 J	0.067 J	1/10	NA	NA	0/10	NA	NA	0/10	0.14	0.14	1/10
Nickel	0.51 J	11 J	10/10	2.9 J	9.1 J	10/10	1.8 J	6.4 J	8/10	1.5 J	8.5	10/10
Potassium	281 J	4240	8/10	298 J	2100	9/10	278 J	278 J	1/10	276 J	764 J	5/10
Selenium	1.9 L	1.9 L	1/10	0.87 J	1.2 J	2/10	NA	NA	0/10	0.64 J	0.64 J	1/10
Sodium	1280	10400	7/10	NA	NA	0/10	NA	NA	0/10	NA	NA	0/10
Vanadium	2.1 J	53.8	10/10	9.1 J	33.2	10/10	3.4 J	36	10/10	4.7 J	35.1	10/10
Zinc	6.7 J	52.9	10/10	7.4 L	30.8	10/10	5 L	13.8	9/10	4.5 L	32	8/10

TABLE 7-9

FREQUENCY AND RANGE OF CONSTITUENTS DETECTED IN GROUNDWATER
ALL SOIL ASSOCIATIONS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

Analyte	Groundwater from Soil Association #1			Groundwater from Soil Association #2			Groundwater from Soil Association #3			Groundwater from Soil Association #4		
	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection
Volatiles (ug/l)												
Carbon Disulfide	1 J	9 J	3/3	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3
Methylene Chloride	3 J	3 J	1/3	NA	NA	0/3	2 J	2 J	1/3	NA	NA	0/3
Toluene	0.9 J	1 J	2/3	NA	NA	0/3	NA	NA	0/3	0.8 J	0.8 J	1/3
Inorganics (total) (ug/l)												
Aluminum	69.1 J	69.1 J	1/3	NA	NA	0/3	NA	NA	0/3	85.9 J	85.9 J	1/3
Antimony	2 J	2 J	1/3	1.7 J	1.7 J	1/3	3.3 J	3.3 J	1/3	1.8 J	3.3 J	2/3
Arsenic	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3	12.6	12.6	1/3
Barium	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3	102 J	102 J	1/3
Calcium	213000	257000	2/3	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3
Chromium	2.8 J	3.3 J	2/3	1.5 J	1.5 J	1/3	1.4 J	3.4 J	2/3	24.2	26.5	2/3
Cobalt	NA	NA	0/3	NA	NA	0/3	11.1 J	11.1 J	1/3	NA	NA	0/3
Copper	2 J	2 J	1/3	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3
Iron	2520 J	11400 J	2/3	NA	NA	0/3	1360 J	1730 J	2/3	8260 J	8260 J	1/3
Magnesium	480000	658000	2/3	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3
Manganese	538	760	2/3	NA	NA	0/3	79.2	81.7	3/3	91.1	91.1	1/3
Potassium	293000	370000	2/3	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3
Sodium	3660000	4990000	2/3	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3
Thallium	7.5 J	7.5 J	1/3	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3
Vanadium	14.5 J	14.5 J	1/3	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3
Zinc	NA	NA	0/3	NA	NA	0/3	38.2 J	38.2 J	1/3	NA	NA	0/3

TABLE 7-9 (Continued)

FREQUENCY AND RANGE OF CONSTITUENTS DETECTED IN GROUNDWATER
ALL SOIL ASSOCIATIONS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

Analyte	Groundwater from Soil Association #1			Groundwater from Soil Association #2			Groundwater from Soil Association #3			Groundwater from Soil Association #4		
	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Frequency of Detection
Inorganics (dissolved)(ug/l)												
Antimony	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3	3.8 J	3.8 J	1/3
Arsenic	1.5 J	1.5 J	1/3	NA	NA	0/3	NA	NA	0/3	9.8 J	9.8 J	1/3
Calcium	233000	233000	1/3	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3
Cobalt	NA	NA	0/3	1.2 J	1.2 J	1/3	1 J	11.1 J	2/3	NA	NA	0/3
Iron	2530	10700	2/3	NA	NA	0/3	1190	1190	1/3	7960	7960	1/3
Magnesium	464000	641000	2/3	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3
Manganese	509	730	2/3	NA	NA	0/3	59.5	76.7	3/3	88.9	88.9	1/3
Potassium	495 J	360000	3/3	547 J	1440 J	3/3	631 J	1510 J	3/3	652 J	1760 J	3/3
Silver	0.71 J	0.71 J	1/3	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3
Sodium	3850000	4890000	2/3	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3
Thallium	6.3 J	8 J	2/3	NA	NA	0/3	NA	NA	0/3	4.6 J	4.6 J	1/3
Vanadium	5.2 J	14.6 J	2/3	NA	NA	0/3	NA	NA	0/3	NA	NA	0/3

8.0 STATISTICAL EVALUATION OF BACKGROUND DATA

This section presents a quantitative statistical evaluation of the background analytical data presented in Section 7. Descriptive statistics presented in this section include the normal and log arithmetic means, the normal and log standard deviations, the upper 95 percent confidence values for the arithmetic mean, and the upper 95 percent confidence values for log-transformed data. The W-test was performed on the data sets to assess whether the data had been drawn from an underlying normal or lognormal distribution. Furthermore, a Multivariate Analysis of Variance (MANOVA) was used to determine if the soil association data sets could be combined for surface soil, subsurface soil, and groundwater.

8.1 Statistical Methods Used to Evaluate Background Data

Many statistical procedures were developed for data sets presumed to have been drawn from a population having a symmetric, bell-shaped, Gaussian or "normal" distribution. It is often the case, however, that environmental data sets are asymmetrical and skewed to the right, or in other words, with a "long tail towards high concentrations"(Gilbert, 1987). A right-skewed distribution can be transformed to become approximately Gaussian, by using a logarithmic transformation, so that the procedures for normally distributed data can be applied to the transformed data.

The W-test was performed for all data sets to aid in the determination of the underlying distribution. The W-test is considered to be an effective method for determining whether a data set can be described as "normally" distributed. Conducting this test on the logarithms of the data is also an effective method of determining whether a data set can be described as being "lognormally" distributed. The W-test evaluates the null hypothesis (i.e., the data set is described by a normal/lognormal distribution versus the data set is not described by a normal/lognormal distribution) and is valid for data sets containing up to fifty samples. For the purposes of this project, data sets were considered to have a normal distribution if the W-test indicated that the data fit a normal distribution (W-test on non-transformed data was "true"), or if the W-test was false for both normal and lognormal distribution tests. Data were considered to have a lognormal distribution only if the W-test for the normal distribution was false and the W-test for the lognormal distribution was true.

Arithmetic means, rather than geometric means, were calculated for all data sets in the Background Study. The normal and lognormal standard deviations were also calculated for all data sets. The standard deviation is the distance from the mean to either of the two inflection points of the distribution curve and is used as a descriptive measure of the spread of the values

comprising the population. Means and standard deviation were used to calculate the normal and lognormal upper 95 percent confidence limits for the data sets.

The 95 percent upper confidence limit of a mean is defined as a value that, when calculated repeatedly for randomly drawn subsets of a data set, equals or exceeds the true mean 95 percent of the time. Statistical confidence limits are used as a tool for addressing uncertainties of a distribution average. The 95 percent upper confidence limit accounts for uncertainties related to limited sampling data obtained from sites.

Sometimes a set of data will have one or more items with unusually large or unusually small values. Extreme values such as these are called outliers. Experienced statisticians take steps to identify outliers and then review each one carefully. An outlier may be an item for which the data has been incorrectly recorded, an item that was incorrectly added to the data set, or it may be an unusual item that has been recorded correctly and does belong in the data set. In the first two cases, the outlier should be removed from the data set and analysis of the data set should be rerun. In the case where the outlier has been recorded correctly and does belong in the data set, the outlier should remain.

In general, the presence of one or more outliers in a data set tends to increase the value of the standard error of the estimate. The procedures for identifying outliers and influential observations provide warnings about the potential effects some observations may have on regression results. Each outlier and influential observation warrants careful examination. If data errors are found, the errors can be corrected and the regression analysis repeated. Outliers and influential observations should not be removed from the data set unless clear evidence shows that they are not based on elements of the population being studies and should not have been included in the original data set.

For the purposes of this project, there is potential for outliers to exist in the data sets. However, outliers were not individually identified and no data were excluded from the data sets prior to any statistical analyses.

The results of the statistical analyses are presented in Appendices C through E and are summarized on the tables noted in the following sections. Summary tables present the constituent, arithmetic mean, standard deviation, upper 95% confidence level, log arithmetic mean half non-detects, log standard deviation, log upper 95% confidence level, and results of the

W-test to determine the data distribution. Average concentrations were calculated using half of the detection limit for non-detected values.

For surface and subsurface soils, a MANOVA was used to determine if the data within each soil association group could be combined (i.e., there is more not more variation among soil groups than between soil groups). MANOVA tests use statistics based on a matrix of individual Analysis of Variance (ANOVA) results and takes into account each degree of freedom in the model.

Censoring of the groundwater data precluded use of parametric statistics. Following Zar (1999) and Conover (1999), a MANOVA was performed on ranked values in each groundwater (total recoverable and dissolved) data set. Detections, detections below the contract reporting limit (B-flagged values), and non-detections (U-flagged values) were treated equally during the ranking procedure. Only those variables (inorganics) detected in more than one soil group were included in the model in order to gain power and achieve meaningful results.

The individual ANOVA p values are listed in summary tables for each media and are presented in Appendix G. Details on assumptions and data manipulation used in the MANOVA tests, as well as box plot figures to illustrate the results, are also presented in Appendix G.

8.2 Soil Data

This section presents the statistical results for inorganic and organic constituents detected in surface and subsurface soil.

8.2.1 Surface Soil

Surface soil samples were obtained from each of the four soil associations at CAX and northern WPNSTA. Forty samples were collected from discrete surface soil sampling locations, ten in each soil association. Four duplicates were collected to determine if the analytical techniques accurately measured chemical concentrations in the sample. The duplicate samples were combined with corresponding environmental samples and the higher result was used. Statistics were run with the combined duplicates. Tables 8-1 through 8-4 present the statistical summaries for individual soil associations.

Table 8-5 presents a comparison of arithmetic mean concentrations for the surface soils. With the exception of bis(2-ethylhexyl)phthalate, the greatest average concentrations of all organic constituents were found in Soil Association 1. Average concentrations of aluminum, antimony, arsenic, beryllium, calcium, chromium, copper, iron, lead, magnesium, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc were also found in Soil Association 1. Average concentrations of manganese were greatest in Soil Association 2, average concentrations of barium were greatest in Soil Association 3, and average concentrations of cobalt were greatest in Soil Association 4.

The surface soil data were subjected to a W-test to evaluate the underlying distribution of the constituents in the surface soil. Results of the W-test are presented in the last two columns of each statistical summary table.

Each of the four multivariate test statistics (presented in Appendix G) agree at $p<0.05$ that there is a significant difference between soil associations for surface soil. This would mean that data cannot be combined and should be treated separately (based on inorganics in surface soil only, no TOC data available from surface horizons). Box plots demonstrate the much larger variability in Soil Association 1 (those collected from marshy areas) for almost all of the inorganics. Tests were also run on the data from Soil Associations 2, 3, and 4 only to determine if the variability in Soil Association 1 may be driving the difference, but the same results were obtained. The results of the MANOVA concluded that there is a significant difference between soil association data groups for surface soil. Therefore, this indicates that the surface soil data from Soil Associations 1, 2, 3, and 4 cannot be combined and should be treated separately.

8.2.2 Subsurface Soil

Like surface soil, subsurface soil samples were obtained from each of the four soil associations at CAX and northern WPNSTA. Forty samples were collected from discrete sampling locations, ten in each soil association. Four duplicates were collected to determine if the analytical techniques accurately measured chemical concentrations in the sample. The duplicate samples were combined with corresponding environmental samples and the higher result was used. Statistics were run with the combined duplicates. Tables 8-6 through 8-9 present the statistical summaries for individual soil associations.

Table 8-10 presents a comparison of arithmetic mean concentrations for the subsurface soils. With the exception of toluene and bis(2-ethylhexyl)phthalate, the greatest average concentrations of VOCs and SVOCs were found in Soil Association 1. The greatest average concentrations of pesticides were found in Soil Association 2. Average concentrations of copper, cyanide, lead, magnesium, potassium, selenium, sodium, and zinc were highest in Soil Association 1. Average concentrations of aluminum, arsenic, barium, calcium, chromium, cobalt, iron, mercury, nickel, and vanadium were highest in Soil Association 2. Average concentrations of manganese were greatest in Soil Association 4.

The subsurface soil data were subjected to a W-test to evaluate the underlying distribution of the constituents. Results of the W-test are presented in the last two columns of each statistical summary table.

Each of the four multivariate test statistics (presented in Appendix G) agree at $p<0.05$ that there is a significant difference between soil associations for subsurface soil. This would mean that data cannot be combined and should be treated separately (based on inorganics and TOC data). The results of the MANOVA concluded that there is a significant difference between soil association data groups for subsurface soil. Therefore, this indicates that the subsurface soil data from Soil Associations 1, 2, 3, and 4 cannot be combined and should be treated separately.

8.3 Groundwater Data

Groundwater samples were obtained from three monitoring wells in each of the four soil associations at CAX and northern WPNSTA. Four duplicates were collected to determine if the analytical techniques accurately measured chemical concentrations in the sample. The duplicate samples were combined with corresponding environmental samples and the higher result was used. Statistics were run with the combined duplicates. Tables 8-11 through 8-14 present the statistical summaries for groundwater from monitoring wells in individual soil associations.

Table 8-15 presents a comparison of arithmetic mean concentrations for groundwater. Due to the low frequency of detection of most analytes in groundwater (see Table 7-7), many of the average concentrations listed represent half of the detection limit for a given analyte. Due to the transitory nature of groundwater, chemical concentrations detected change frequently over time. Therefore, actual concentrations of analytes in groundwater are likely to be highly variable.

Like soil data, groundwater data were subjected to a W-test to evaluate the underlying distribution of the constituents. Results of the W-test are presented in the last two columns of each statistical summary table.

For groundwater, only those total recoverable inorganic chemicals detected in more than one soil group were included in the MANOVA model (aluminum, antimony, chromium, iron, manganese). Data were ranked prior to analysis. Three of the four multivariate test statistics (presented in Appendix G) agree at $p<0.05$, that there is no significant difference between soil groups and that the data can be combined (based on inorganic data only). However, groundwater data points per soil group were limited in that there were fewer observations per factor category (i.e., soil association group) than there were dependent variables (inorganic data points), which seriously impact the power of the test. This is being reflected in the disparity between test statistics and strongly indicates that the statistics are not meaningful given all the departures from assumptions. Therefore, to be conservative, it is not recommended that the data sets be combined.

Similarly, for dissolved inorganics in groundwater, only those inorganic chemicals detected in more than one soil group were included in the MANOVA model (arsenic, cobalt, iron, manganese, potassium, thallium). Data were ranked prior to analysis. Three of the four multivariate test statistics (presented in Appendix G) agree at $p<0.05$, that there is no significant difference between soil groups and that the data can be combined (based on inorganic data only). Again, groundwater data points per soil association group were limited in that there were fewer observations per factor category (soil association group) than there were dependent variables (inorganic data points). This is being reflected in the disparity between test statistics and strongly indicates that the statistics are not meaningful given all the departures from assumptions. Therefore, to be conservative, it is not recommended that the data sets be combined.

TABLES

TABLE 8-1

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN SURFACE SOIL
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Semivolatiles (ug/kg)								
Acetophenone	310	230	443	5.53	0.64	535	**TRUE**	FALSE
Benzaldehyde	328	234	463	5.59	0.66	580	**TRUE**	FALSE
Benzo(a)anthracene	288	155	378	5.56	0.45	401	**TRUE**	FALSE
Benzo(a)pyrene	300	154	389	5.6	0.45	420	**TRUE**	FALSE
Benzo(b)fluoranthene	331	190	441	5.67	0.53	505	**TRUE**	FALSE
Benzo(g,h,i)perylene	301	154	390	5.61	0.45	422	**TRUE**	FALSE
Benzo(k)fluoranthene	292	154	381	5.58	0.44	406	**TRUE**	FALSE
Chrysene	314	164	409	5.64	0.48	452	**TRUE**	**TRUE**
Fluoranthene	293	153	382	5.58	0.44	407	**TRUE**	FALSE
Indeno(1,2,3-cd)pyrene	300	154	389	5.6	0.45	420	**TRUE**	FALSE
Pyrene	299	154	388	5.6	0.45	418	**TRUE**	FALSE
bis(2-Ethylhexyl)phthalate	156	129	231	4.7	0.91	424	**TRUE**	**TRUE**
Pesticides/PCBs (ug/kg)								
4,4'-DDD	4.75	3.92	7.02	1.27	0.77	9.67	**TRUE**	FALSE
4,4'-DDE	4.80	6.50	8.57	1.16	0.79	8.97	FALSE	FALSE
4,4'-DDT	3.66	2.70	5.23	1.11	0.61	6.11	**TRUE**	FALSE
Dieldrin	3.63	2.16	4.87	1.14	0.55	5.66	**TRUE**	**TRUE**
Endosulfan I	1.75	1.12	2.40	0.4	0.57	2.75	FALSE	FALSE
Endosulfan II	3.36	2.25	4.66	1.04	0.57	5.28	FALSE	FALSE
Endosulfan sulfate	3.27	2.21	4.55	1.02	0.56	5.06	FALSE	FALSE
Endrin	3.61	2.16	4.85	1.14	0.55	5.62	**TRUE**	**TRUE**
Endrin aldehyde	4.67	3.84	6.90	1.24	0.81	10.43	FALSE	FALSE
Endrin ketone	3.48	2.20	4.75	1.09	0.57	5.45	**TRUE**	FALSE
alpha-BHC	1.58	1.13	2.23	0.28	0.57	2.46	FALSE	FALSE
alpha-Chlordane	1.75	1.32	2.51	0.34	0.67	3.10	**TRUE**	FALSE
beta-BHC	3.43	4.02	5.75	0.79	0.93	8.85	**TRUE**	FALSE
delta-BHC	2.12	1.50	2.99	0.54	0.67	3.79	**TRUE**	FALSE
gamma-BHC (Lindane)	1.99	1.17	2.67	0.53	0.59	3.21	**TRUE**	**TRUE**
gamma-Chlordane	1.94	1.92	3.06	0.39	0.69	3.35	FALSE	FALSE

TABLE 8-1 (Continued)

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN SURFACE SOIL
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Inorganics (mg/kg)								
Aluminum	3,386	865	3,887	8.1	0.26	4,032	**TRUE**	**TRUE**
Arsenic	1.07	1.16	1.75	-0.3	0.85	2.43	**TRUE**	FALSE
Barium	24	6	27	3.15	0.29	29	FALSE	FALSE
Calcium	780	950	1,331	6.19	0.98	2,173	**TRUE**	FALSE
Chromium	5.06	2.82	6.69	1.52	0.44	6.98	**TRUE**	FALSE
Cobalt	2.08	1.36	2.87	0.57	0.58	3.28	**TRUE**	FALSE
Copper	1.25	1.05	1.85	-0.01	0.67	2.18	**TRUE**	FALSE
Iron	5,060	2,954	6,773	8.42	0.47	7,163	**TRUE**	FALSE
Lead	8.50	1.57	9.41	2.12	0.19	10	**TRUE**	**TRUE**
Magnesium	404	243	544	5.87	0.51	606	**TRUE**	FALSE
Manganese	128	62	164	4.76	0.46	182	**TRUE**	**TRUE**
Nickel	2.65	0.96	3.21	0.9	0.44	3.75	**TRUE**	**TRUE**
Potassium	269	350	472	5.09	0.98	720	**TRUE**	FALSE
Selenium	0.34	0.12	0.41	-1.11	0.26	0.41	FALSE	FALSE
Silver	0.06	0.03	0.08	-2.83	0.36	0.08	FALSE	FALSE
Vanadium	8.49	2.94	10.19	2.09	0.31	10.54	**TRUE**	FALSE
Zinc	10.36	3.96	12.66	2.27	0.41	14.15	**TRUE**	**TRUE**

TABLE 8-2

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN SURFACE SOIL
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Semivolatiles (ug/kg)								
Acetophenone	204	129	279	5.16	0.62	356	FALSE	FALSE
Di-n-octylphthalate	207	126	280	5.21	0.5	308	FALSE	FALSE
bis(2-Ethylhexyl)phthalate	1,016	1,610	1,949	5.75	1.62	15,414	**TRUE**	FALSE
Pesticides/PCBs (ug/kg)								
4,4'-DDE	1.77	0.25	1.91	0.56	0.17	1.97	FALSE	FALSE
alpha-Chlordane	1.03	0.59	1.37	-0.12	0.58	1.66	**TRUE**	FALSE
delta-BHC	0.91	0.11	0.97	-0.1	0.13	0.99	FALSE	FALSE
gamma-Chlordane	0.91	0.14	0.98	-0.11	0.18	1.02	FALSE	FALSE
Inorganics (mg/kg)								
Aluminum	3,386	865	3,887	8.1	0.26	4,032	**TRUE**	**TRUE**
Arsenic	1.07	1.16	1.75	-0.3	0.85	2.43	**TRUE**	FALSE
Barium	24.10	5.67	27.38	3.15	0.29	29	FALSE	FALSE
Calcium	780	950	1,331	6.19	0.98	2,173	**TRUE**	FALSE
Chromium	5.06	2.82	6.69	1.52	0.44	6.98	**TRUE**	FALSE
Cobalt	2.08	1.36	2.87	0.57	0.58	3.28	**TRUE**	FALSE
Copper	1.25	1.05	1.85	-0.01	0.67	2.18	**TRUE**	FALSE
Iron	5,060	2,954	6,773	8.42	0.47	7,163	**TRUE**	FALSE
Lead	8.50	1.57	9.41	2.12	0.19	10	**TRUE**	**TRUE**
Magnesium	404	243	544	5.87	0.51	606	**TRUE**	FALSE
Manganese	128	62	164	4.76	0.46	182	**TRUE**	**TRUE**
Nickel	2.65	0.96	3.21	0.9	0.44	3.75	**TRUE**	**TRUE**
Potassium	269	350	472	5.09	0.98	720	**TRUE**	FALSE
Selenium	0.34	0.12	0.41	-1.11	0.26	0.41	FALSE	FALSE
Silver	0.06	0.03	0.08	-2.83	0.36	0.08	FALSE	FALSE
Vanadium	8.49	2.94	10.19	2.09	0.31	10.54	**TRUE**	FALSE
Zinc	10	3.96	13	2.27	0.41	14	**TRUE**	**TRUE**

TABLE 8-3

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN SURFACE SOIL
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Semivolatiles (ug/kg)								
Acetophenone	180	26	194	5.18	0.17	201	FALSE	FALSE
bis(2-Ethylhexyl)phthalate	269	153	358	5.47	0.51	404	**TRUE**	FALSE
Pesticides/PCBs (ug/kg)								
4,4'-DDE	1.81	0.20	1.92	0.59	0.12	1.96	FALSE	FALSE
Dieldrin	2.26	0.88	2.77	0.76	0.31	2.80	FALSE	FALSE
Endosulfan sulfate	1.95	0.22	2.07	0.66	0.11	2.08	FALSE	FALSE
Endrin aldehyde	1.87	0.36	2.08	0.61	0.19	2.11	FALSE	FALSE
Endrin ketone	1.81	0.23	1.94	0.58	0.15	1.98	FALSE	FALSE
Heptachlor epoxide	1.03	0.27	1.19	0.01	0.21	1.18	FALSE	FALSE
alpha-Chlordane	1.03	0.30	1.20	-0.01	0.27	1.23	**TRUE**	FALSE
beta-BHC	0.95	0.04	0.98	-0.05	0.05	0.98	**TRUE**	FALSE
gamma-Chlordane	0.92	0.10	0.97	-0.09	0.12	0.99	FALSE	FALSE
Inorganics (mg/kg)								
Aluminum	4,322	952	4,874	8.35	0.22	4,991	**TRUE**	**TRUE**
Arsenic	0.91	0.45	1.17	-0.29	0.81	2.26	FALSE	**TRUE**
Barium	27	12	34	3.16	0.59	45	**TRUE**	**TRUE**
Calcium	292	262	443	5.29	0.99	897	**TRUE**	FALSE
Chromium	4.57	2.05	5.76	1.44	0.41	6.20	**TRUE**	**TRUE**
Cobalt	1.95	1.82	3.01	0.05	1.39	19.29	**TRUE**	**TRUE**
Copper	1.35	0.28	1.51	0.28	0.22	1.56	**TRUE**	**TRUE**
Iron	4,158	1,970	5,300	8.25	0.43	5,730	**TRUE**	**TRUE**
Lead	9.07	2.16	10.32	2.18	0.24	11	**TRUE**	**TRUE**
Magnesium	180	44	206	5.17	0.27	216	**TRUE**	**TRUE**
Manganese	113	87	163	4.42	0.88	285	**TRUE**	**TRUE**
Mercury	0.03	0.02	0.05	-3.56	0.44	0.04	FALSE	FALSE
Nickel	2.35	1.22	3.06	0.68	0.7	4.74	**TRUE**	**TRUE**
Potassium	93	77	138	4.36	0.53	138	FALSE	FALSE
Selenium	0.34	0.11	0.40	-1.12	0.25	0.39	FALSE	FALSE
Vanadium	9.21	5.53	12.42	2.1	0.49	13.18	**TRUE**	FALSE
Zinc	7.59	2.54	9.06	1.97	0.35	9.76	**TRUE**	**TRUE**

TABLE 8-4

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN SURFACE SOIL
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Semivolatiles (ug/kg)								
Acetophenone	173	41	196	5.11	0.35	225	FALSE	FALSE
bis(2-Ethylhexyl)phthalate	349	693	751	4.9	1.29	1,857	**TRUE**	FALSE
Pesticides/PCBs (ug/kg)								
4,4'-DDD	1.76	0.18	1.86	0.56	0.11	1.88	FALSE	FALSE
4,4'-DDE	1.88	0.23	2.01	0.62	0.11	2.01	FALSE	FALSE
Dieldrin	1.95	0.31	2.13	0.66	0.15	2.14	FALSE	FALSE
Endosulfan sulfate	1.82	0.14	1.90	0.6	0.07	1.90	**TRUE**	**TRUE**
alpha-Chlordane	1.18	0.70	1.59	-0.01	0.67	2.16	**TRUE**	**TRUE**
gamma-Chlordane	0.91	0.11	0.97	-0.11	0.13	0.98	FALSE	FALSE
Inorganics (mg/kg)								
Aluminum	3,276	1,158	3,947	8.04	0.35	4,216	**TRUE**	**TRUE**
Arsenic	2.18	3.97	4.48	-0.35	1.45	16	**TRUE**	FALSE
Barium	20	11	26	2.84	0.55	31	**TRUE**	**TRUE**
Beryllium	0.17	0.24	0.31	-2.44	1.08	0.59	FALSE	FALSE
Calcium	553	841	1,040	5.68	1.08	1,937	**TRUE**	FALSE
Chromium	5.44	5.22	8.47	1.38	0.79	11	**TRUE**	FALSE
Cobalt	1.96	1.95	3.09	0.34	0.8	4.21	**TRUE**	FALSE
Copper	1.65	0.92	2.18	0.39	0.46	2.33	**TRUE**	FALSE
Iron	5,569	5,907	8,993	8.29	0.79	11,015	**TRUE**	FALSE
Lead	10	4	12	2.2	0.37	12	**TRUE**	**TRUE**
Magnesium	255	196	368	5.37	0.55	387	**TRUE**	FALSE
Manganese	132	132	209	4.54	0.81	284	**TRUE**	FALSE
Mercury	0.03	0.01	0.03	-3.69	0.29	0.03	FALSE	FALSE
Nickel	1.81	1.77	2.84	0.27	0.79	3.64	**TRUE**	FALSE
Potassium	148	245	290	4.44	0.89	297	FALSE	FALSE
Selenium	0.50	0.43	0.74	-0.93	0.63	0.82	FALSE	FALSE
Thallium	0.48	0.13	0.56	-0.75	0.22	0.55	FALSE	FALSE
Vanadium	9.25	6.71	13.14	2.05	0.59	15	**TRUE**	FALSE
Zinc	10.97	7.74	15.45	2.21	0.6	18	**TRUE**	FALSE

TABLE 8-5

AVERAGE CONCENTRATIONS OF CONSTITUENTS DETECTED IN SURFACE SOIL
ALL SOIL ASSOCIATIONS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

Analyte	Soil Association # 1 Arithmetic Mean Half Non-Detects	Soil Association # 2 Arithmetic Mean Half Non-Detects	Soil Association # 3 Arithmetic Mean Half Non-Detects	Soil Association # 4 Arithmetic Mean Half Non-Detects
Semivolatiles (ug/kg)				
Acetophenone	310	204	180	173
Benzaldehyde	328	220	187	185
Benzo(a)anthracene	288	220	187	185
Benzo(a)pyrene	300	220	187	185
Benzo(b)fluoranthene	331	220	187	185
Benzo(g,h,i)perylene	301	220	187	185
Benzo(k)fluoranthene	292	220	187	185
Chrysene	314	220	187	185
Di-n-octylphthalate	346	207	187	185
Fluoranthene	293	220	187	185
Indeno(1,2,3-cd)pyrene	300	220	187	185
Pyrene	299	220	187	185
bis(2-Ethylhexyl)phthalate	156	1016	269	349
Pesticides (ug/kg)				
4,4'-DDD	4.75	1.84	1.87	1.76
4,4'-DDE	4.80	1.77	1.81	1.88
4,4'-DDT	3.66	1.84	1.87	1.84
Dieldrin	3.63	1.84	2.26	1.95
Endosulfan I	1.75	0.94	0.96	0.94
Endosulfan II	3.36	1.84	1.87	1.84
Endosulfan sulfate	3.27	1.84	1.95	1.82
Endrin	3.61	1.84	1.87	1.84
Endrin aldehyde	4.67	1.84	1.87	1.84
Endrin ketone	3.48	1.84	1.81	1.84
Heptachlor epoxide	1.77	0.94	1.03	0.94
alpha-BHC	1.58	0.94	0.96	0.94
alpha-Chlordane	1.75	1.03	1.03	1.18
beta-BHC	3.43	0.94	0.95	0.94
delta-BHC	2.12	0.91	0.96	0.94
gamma-BHC (Lindane)	1.99	0.94	0.96	0.94
gamma-Chlordane	1.94	0.91	0.92	0.91

TABLE 8-5 (Continued)

AVERAGE CONCENTRATIONS OF CONSTITUENTS DETECTED IN SURFACE SOIL
ALL SOIL ASSOCIATIONS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

Analyte	Soil Association # 1 Arithmetic Mean Half Non-Detects	Soil Association # 2 Arithmetic Mean Half Non-Detects	Soil Association # 3 Arithmetic Mean Half Non-Detects	Soil Association # 4 Arithmetic Mean Half Non-Detects
Inorganics (mg/kg)				
Aluminum	3,386	3,386	4,322	3,276
Antimony	0.19	0.19	0.18	0.19
Arsenic	1.07	1.07	0.91	2.18
Barium	24	24	27	20
Beryllium	0.19	0.19	0.17	0.17
Calcium	780	780	292	553
Chromium	5.06	5.06	4.57	5.44
Cobalt	2.08	2.08	1.95	1.96
Copper	1.25	1.25	1.35	1.65
Iron	5,060	5,060	4,158	5,569
Lead	8.50	8.50	9.07	9.58
Magnesium	404	404	180	255
Manganese	128	128	113	132
Mercury	0.03	0.03	0.03	0.03
Nickel	2.65	2.65	2.35	1.81
Potassium	269	269	93	148
Selenium	0.34	0.34	0.34	0.50
Silver	0.06	0.06	0.05	0.05
Sodium	131	131	77	127
Thallium	0.44	0.44	0.44	0.48
Vanadium	8.49	8.49	9.21	9.25
Zinc	10.4	10.4	7.59	11.0

TABLE 8-6

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN SUBSURFACE SOIL
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Volatiles (ug/kg)								
1,1,2,2-Tetrachloroethane	6.45	3.44	8.44	1.74	0.55	10.23	**TRUE**	**TRUE**
2-Butanone	7.05	2.83	8.69	1.9	0.33	8.89	**TRUE**	FALSE
Acetone	10.50	11.13	16.95	2.11	0.59	15.79	FALSE	FALSE
Carbon Disulfide	7.20	2.91	8.89	1.89	0.48	10.56	FALSE	FALSE
Toluene	5.10	4.11	7.48	1.3	0.91	14.25	**TRUE**	**TRUE**
Semivolatiles (ug/kg)								
Benzaldehyde	244	138	324	5.33	0.66	446	**TRUE**	**TRUE**
Pesticides/PCBs (ug/kg)								
4,4'-DDE	2.41	0.61	2.76	0.85	0.23	2.80	**TRUE**	**TRUE**
Dieldrin	2.78	1.07	3.40	0.97	0.33	3.49	FALSE	FALSE
Endosulfan I	1.38	0.55	1.70	0.27	0.34	1.74	FALSE	FALSE
Endosulfan sulfate	2.67	0.87	3.18	0.94	0.28	3.20	**TRUE**	FALSE
Endrin ketone	2.78	1.07	3.40	0.97	0.33	3.49	FALSE	FALSE
alpha-BHC	1.40	0.57	1.73	0.27	0.36	1.80	**TRUE**	FALSE
alpha-Chlordane	1.47	0.54	1.78	0.33	0.32	1.84	FALSE	FALSE
delta-BHC	1.40	0.58	1.73	0.27	0.36	1.80	**TRUE**	FALSE
Conventional (mg/kg)								
Total Organic Carbon	37,050	38,940	59,623	9.92	1.32	304,165	**TRUE**	FALSE

TABLE 8-6 (Continued)

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN SUBSURFACE SOIL
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Metals (mg/kg)								
Aluminum	5,183	5,665	8,466	7.9	1.4	51,227	**TRUE**	FALSE
Arsenic	4.19	4.26	6.66	0.66	1.6	91	**TRUE**	**TRUE**
Barium	11.61	9.25	16.97	2.06	1.06	50	**TRUE**	**TRUE**
Calcium	4,271	9,857	9,985	7.07	1.49	28,686	**TRUE**	FALSE
Chromium	14	11	20	2.31	0.83	31.88	**TRUE**	**TRUE**
Cobalt	1.33	1.17	2.01	-0.19	1.17	6.83	**TRUE**	**TRUE**
Copper	3.39	3.22	5.25	0.87	0.86	7.91	**TRUE**	FALSE
Cyanide	0.30	0.84	0.79	-3.1	1.45	1.00	FALSE	FALSE
Iron	9,597	7,110	13,719	8.84	0.95	28,834	**TRUE**	**TRUE**
Lead	18	25	33	2.25	1.09	63.74	FALSE	FALSE
Magnesium	1,449	1,462	2,296	6.8	1.07	5,878	**TRUE**	FALSE
Manganese	24	26	39	2.77	0.95	66	**TRUE**	FALSE
Mercury	0.04	0.01	0.04	-3.36	0.34	0.05	**TRUE**	FALSE
Nickel	3.66	3.29	5.56	0.92	0.98	11.07	**TRUE**	FALSE
Potassium	1,418	1,390	2,223	6.59	1.42	14,624	**TRUE**	**TRUE**
Selenium	0.71	0.47	0.98	-0.49	0.55	1.10	**TRUE**	FALSE
Sodium	3,070	3,795	5,270	7.34	1.29	21,578	**TRUE**	FALSE
Vanadium	18	16	27	2.51	1	68	**TRUE**	**TRUE**
Zinc	20	14	28	2.78	0.63	34	**TRUE**	FALSE

TABLE 8-7

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN SUBSURFACE SOIL
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Volatiles (ug/kg)								
Acetone	5.60	0.74	6.03	1.71	0.14	6.12	FALSE	FALSE
Isopropylbenzene	5.45	1.66	6.41	1.6	0.57	9.14	FALSE	FALSE
Semivolatiles (ug/kg)								
bis(2-Ethylhexyl)phthalate	267	267	422	5.09	1.08	1,083	**TRUE**	FALSE
Pesticides/PCBs (ug/kg)								
Dieldrin	3.27	4.12	5.66	0.88	0.65	5.12	FALSE	FALSE
Endrin aldehyde	3.35	4.10	5.73	0.91	0.64	5.27	FALSE	FALSE
alpha-Chlordane	1.76	2.04	2.94	0.28	0.65	2.81	FALSE	FALSE
beta-BHC	1.61	2.08	2.81	0.15	0.67	2.56	FALSE	FALSE
Conventional (mg/kg)								
Total Organic Carbon	6,323	1,695	7,305	8.72	0.26	7,508	**TRUE**	**TRUE**
Metals (mg/kg)								
Aluminum	8,283	2,684	9,839	8.97	0.34	10,606	**TRUE**	**TRUE**
Arsenic	4.68	4.36	7.20	1.18	0.95	13.58	**TRUE**	FALSE
Barium	35.74	7.04	39.82	3.56	0.21	41.29	**TRUE**	**TRUE**
Calcium	16,819	51,013	46,391	6.92	1.88	171,733	FALSE	FALSE
Chromium	15.54	7.59	19.94	2.62	0.54	24.42	**TRUE**	**TRUE**
Cobalt	3.38	1.68	4.35	1.12	0.44	4.71	**TRUE**	**TRUE**
Copper	1.28	1.40	2.10	-0.12	0.85	2.91	**TRUE**	FALSE
Iron	16,506	7,445	20,822	9.6	0.54	26,137	**TRUE**	**TRUE**
Lead	6.86	1.25	7.59	1.91	0.21	7.89	**TRUE**	**TRUE**
Magnesium	959	886	1,472	6.63	0.64	1,596	**TRUE**	FALSE
Manganese	75	41	99	4.17	0.6	129	**TRUE**	**TRUE**
Nickel	5.37	2.09	6.58	1.61	0.38	7.07	**TRUE**	**TRUE**
Potassium	673	583	1,011	6.22	0.82	1,541	**TRUE**	FALSE
Selenium	0.46	0.32	0.64	-0.93	0.51	0.68	FALSE	FALSE
Vanadium	22.44	8.49	27.36	3.03	0.45	31.96	**TRUE**	**TRUE**
Zinc	16.01	8.63	21.01	2.65	0.53	24.56	**TRUE**	**TRUE**

TABLE 8-8

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN SUBSURFACE SOIL
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Volatiles (ug/kg)								
Methylene Chloride	5.10	1.45	5.94	1.54	0.54	8.32	FALSE	FALSE
Styrene	5.40	0.52	5.70	1.68	0.11	5.78	FALSE	FALSE
Semivolatiles (ug/kg)								
bis(2-Ethylhexyl)phthalate	125	68	165	4.61	0.81	305	FALSE	FALSE
Pesticides/PCBs (ug/kg)								
4,4'-DDD	1.96	0.40	2.19	0.66	0.17	2.18	FALSE	FALSE
Dieldrin	1.88	0.16	1.97	0.63	0.08	1.97	FALSE	FALSE
alpha-Chlordane	1.46	1.23	2.17	0.18	0.56	2.20	FALSE	FALSE
Conventional (mg/kg)								
Total Organic Carbon	5,421	1,519	6,301	8.56	0.28	6,556	**TRUE**	**TRUE**
Metals (mg/kg)								
Aluminum	5,633	2,780	7,245	8.52	0.52	8,669	**TRUE**	**TRUE**
Arsenic	0.69	0.52	0.99	-0.54	0.58	1.09	**TRUE**	FALSE
Barium	26	11	32	3.15	0.48	37	**TRUE**	**TRUE**
Calcium	149	83	196	4.87	0.54	231	**TRUE**	**TRUE**
Chromium	7.27	3.84	9.50	1.87	0.49	10.55	**TRUE**	**TRUE**
Cobalt	2.17	2.43	3.58	0.1	1.41	21.44	**TRUE**	FALSE
Copper	1.26	0.64	1.63	0.09	0.6	2.10	**TRUE**	**TRUE**
Iron	6,602	3,553	8,662	8.66	0.58	10,749	**TRUE**	**TRUE**
Lead	5.21	1.17	5.89	1.63	0.25	6.15	**TRUE**	**TRUE**
Magnesium	242	79	288	5.44	0.34	311	**TRUE**	**TRUE**
Manganese	47	59	81	3.37	0.99	133	**TRUE**	FALSE
Nickel	2.39	1.70	3.38	0.63	0.78	5.16	**TRUE**	**TRUE**
Potassium	104	65	141	4.52	0.49	149	**TRUE**	FALSE
Vanadium	13.42	9.65	19.01	2.39	0.67	23.99	**TRUE**	FALSE
Zinc	6.83	3.55	8.89	1.8	0.53	10.60	**TRUE**	FALSE

TABLE 8-9

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN SUBSURFACE SOIL
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Semivolatiles (ug/kg)								
Benzaldehyde	173	44	199	5.1	0.41	242	FALSE	FALSE
Phenol	189	68	228	5.16	0.46	274	FALSE	FALSE
bis(2-Ethylhexyl)phthalate	209	202	326	4.85	1.09	862	**TRUE**	FALSE
Pesticides/PCBs (ug/kg)								
alpha-Chlordane	0.96	0.26	1.11	-0.08	0.31	1.21	FALSE	FALSE
Conventional (mg/kg)								
Total Organic Carbon	3,724	1,423	4,549	8.17	0.32	4,666	**TRUE**	FALSE
Metals (mg/kg)								
Aluminum	7,158	2,622	8,678	8.8	0.45	10,254	**TRUE**	**TRUE**
Arsenic	4.25	6.46	8.00	0.48	1.44	34	**TRUE**	FALSE
Barium	33	15	41	3.37	0.52	50	**TRUE**	**TRUE**
Calcium	467	584	806	5.72	0.9	1,085	**TRUE**	FALSE
Chromium	10.38	7.15	14.52	2.09	0.81	24	**TRUE**	**TRUE**
Cobalt	2.82	2.24	4.12	0.74	0.84	6.72	**TRUE**	**TRUE**
Copper	1.43	1.18	2.11	0	0.93	4.04	**TRUE**	FALSE
Iron	12,214	9,037	17,453	9.16	0.78	25,980	**TRUE**	**TRUE**
Lead	6.06	1.27	6.80	1.78	0.22	7.02	**TRUE**	**TRUE**
Magnesium	374	166	470	5.84	0.43	518	**TRUE**	**TRUE**
Manganese	79.78	63	116	4.01	1.01	315	**TRUE**	**TRUE**
Mercury	0.05	0.03	0.07	-3.03	0.45	0.07	**TRUE**	FALSE
Nickel	3.91	2.22	5.20	1.22	0.56	6.16	**TRUE**	**TRUE**
Potassium	260	227	392	5.2	0.92	719	**TRUE**	**TRUE**
Selenium	0.34	0.11	0.40	-1.12	0.24	0.39	FALSE	FALSE
Vanadium	19.2	10.4	25.2	2.78	0.68	36.1	**TRUE**	**TRUE**
Zinc	10.2	9.31	15.6	1.94	0.98	30.7	**TRUE**	FALSE

TABLE 8-10

AVERAGE CONCENTRATIONS OF CONSTITUENTS DETECTED IN SUBSURFACE SOIL
ALL SOIL ASSOCIATIONS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

Analyte	Soil Association # 1 Arithmetic Mean Half Non-Detects	Soil Association # 2 Arithmetic Mean Half Non-Detects	Soil Association # 3 Arithmetic Mean Half Non-Detects	Soil Association # 4 Arithmetic Mean Half Non-Detects
Volatiles (ug/kg)				
1,1,2,2-Tetrachloroethane	6.45	5.90	5.55	5.60
2-Butanone	7.05	5.90	5.55	5.60
Acetone	10.50	5.60	5.25	4.60
Carbon Disulfide	7.20	5.90	5.55	5.60
Isopropylbenzene	7.65	5.45	5.55	5.60
Methylene Chloride	7.30	5.90	5.10	5.05
Styrene	7.65	5.90	5.40	5.60
Toluene	5.10	3.25	5.55	5.60
Semivolatiles (ug/kg)				
Benzaldehyde	244	194	183	173
Phenol	279	194	183	189
bis(2-Ethylhexyl)phthalate	113	267	125	209
Pesticides (ug/kg)				
4,4'-DDD	2.79	3.26	1.96	1.86
4,4'-DDE	2.41	3.26	1.84	1.86
Dieldrin	2.78	3.27	1.88	1.86
Endosulfan I	1.38	1.66	0.94	0.95
Endosulfan sulfate	2.67	3.26	1.84	1.86
Endrin aldehyde	2.79	3.35	1.84	1.86
Endrin ketone	2.78	3.26	1.84	1.86
alpha-BHC	1.40	1.66	0.94	0.95
alpha-Chlordane	1.47	1.76	1.46	0.96
beta-BHC	1.43	1.61	0.94	0.95
delta-BHC	1.40	1.66	0.94	0.95
Total Organic Carbon (ug/kg)				
Total Organic Carbon	37,050	6,323	5,421	3,724

TABLE 8-10 (Continued)

AVERAGE CONCENTRATIONS OF CONSTITUENTS DETECTED IN SUBSURFACE SOIL
ALL SOIL ASSOCIATIONS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

Analyte	Soil Association # 1 Arithmetic Mean Half Non-Detects	Soil Association # 2 Arithmetic Mean Half Non-Detects	Soil Association # 3 Arithmetic Mean Half Non-Detects	Soil Association # 4 Arithmetic Mean Half Non-Detects
Inorganics (mg/kg)				
Aluminum	5,183	8,283	5,633	7,158
Arsenic	4.19	4.68	0.69	4.25
Barium	12	36	26	33
Calcium	4,271	16,819	149	467
Chromium	14	16	7.27	10
Cobalt	1.33	3.38	2.17	2.82
Copper	3.39	1.28	1.26	1.43
Cyanide	0.30	0.03	0.05	0.03
Iron	9,597	16,506	6,602	12,214
Lead	18	6.86	5.21	6.06
Magnesium	1,449	959	242	374
Manganese	24	75	47	80
Mercury	0.04	0.04	0.02	0.05
Nickel	3.66	5.37	2.39	3.91
Potassium	1,418	673	104	260
Selenium	0.71	0.46	0.30	0.34
Sodium	3,070	160	95	155
Vanadium	18	22	13	19
Zinc	20	16	6.83	10

TABLE 8-11

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Volatiles (ug/l)								
Carbon Disulfide	4.33	4.16	11.35	1.1	1.1	1772061.676	**TRUE**	**TRUE**
Methylene Chloride	1.83	1.04	3.59	0.5	0.56	41.3579	**TRUE**	**TRUE**
Toluene	2.30	2.34	6.24	0.5	0.96	18620.9185	**TRUE**	**TRUE**
Dissolved Inorganics (ug/l)								
Arsenic	1	1	2	-0.21	0.53	17.371	FALSE	FALSE
Calcium	135,833	84,833	278,849	11.7	0.58	3606380.834	**TRUE**	**TRUE**
Iron	4,421	5,579	13,826	6.88	2.99	9.18345E+40	**TRUE**	**TRUE**
Magnesium	368,643	330,518	925,849	11.08	3.68	8.58588E+66	**TRUE**	**TRUE**
Manganese	415	371	1,040	4.91	2.61	1.30844E+35	**TRUE**	**TRUE**
Potassium	215,832	190,025	536,187	10.52	3.74	4.97728E+67	**TRUE**	**TRUE**
Silver	0.40	0.27	0.85	-1.04	0.6	20.6811	FALSE	FALSE
Sodium	2,915,233	2,572,827	7,252,648	13.07	3.83	2.70196E+70	**TRUE**	**TRUE**
Thallium	5.45	3.06	10.62	1.55	0.73	1302.2899	**TRUE**	**TRUE**
Vanadium	6.78	7.16	18.85	1.24	1.68	8.413E+12	**TRUE**	**TRUE**
Total Inorganics (ug/l)								
Aluminum	42.12	24.34	83.16	3.63	0.58	1089.6828	**TRUE**	**TRUE**
Antimony	1.23	0.66	2.35	0.12	0.49	12.348	FALSE	FALSE
Calcium	183,000	92,715	339,303	12	0.63	11865071.03	**TRUE**	**TRUE**
Chromium	2.20	1.49	4.72	0.51	1.05	502103.3812	**TRUE**	**TRUE**
Copper	1.20	0.69	2.37	0.08	0.53	23.1618	FALSE	FALSE
Iron	4,668	5,956	14,709	7.2	2.52	7.74073E+34	**TRUE**	**TRUE**
Magnesium	379,633	339,853	952,577	11.09	3.72	3.76428E+67	**TRUE**	**TRUE**
Manganese	434	388	1,088	4.87	2.76	1.10417E+37	**TRUE**	**TRUE**
Potassium	221,080	195,089	549,973	10.3	4.17	4.30301E+83	**TRUE**	**TRUE**
Sodium	2,884,940	2,581,384	7,236,780	13.01	3.92	9.72518E+71	**TRUE**	**TRUE**
Thallium	3.87	3.15	9.17	1.15	0.75	1047.1796	FALSE	FALSE
Vanadium	6.10	7.37	18.52	1.17	1.48	7967986455	**TRUE**	**TRUE**

TABLE 8-12

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Dissolved Inorganics (ug/l)								
Cobalt	0.63	0.49	1.46	-0.64	0.71	129.1027	FALSE	FALSE
Potassium	1,082	472	1,879	6.91	0.52	20718.7696	**TRUE**	**TRUE**
Total Inorganics (ug/l)								
Antimony	1.13	0.49	1.96	0.07	0.4	7.2904	FALSE	FALSE
Chromium	0.83	0.58	1.81	-0.33	0.63	52.7071	FALSE	FALSE

TABLE 8-13

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Volatiles (ug/l)								
Methylene Chloride	1.33	0.58	2.31	0.23	0.4	8.5768	FALSE	FALSE
Dissolved Inorganics (ug/l)								
Cobalt	4.15	6.03	14.31	0.45	1.77	1.27241E+15	**TRUE**	**TRUE**
Iron	560	596	1,564	4.98	2.9	8.72465E+38	**TRUE**	**TRUE**
Manganese	70	9	86	4.24	0.14	96.8216	**TRUE**	**TRUE**
Potassium	1,134	453	1,897	6.97	0.46	9795.216	**TRUE**	**TRUE**
Total Inorganics (ug/l)								
Antimony	1.67	1.41	4.05	0.29	0.78	585.0412	FALSE	FALSE
Chromium	1.77	1.48	4.27	0.29	0.96	14784.0264	**TRUE**	**TRUE**
Cobalt	3.95	6.19	14.39	0.15	1.96	3.88267E+16	**TRUE**	FALSE
Iron	1,032	908	2,563	5.45	3.27	5.23332E+50	**TRUE**	**TRUE**
Manganese	80.63	1.29	82.81	4.39	0.02	83.1828	**TRUE**	**TRUE**
Zinc	14.27	20.82	49.36	1.35	2.35	2.2496E+25	**TRUE**	**TRUE**

TABLE 8-14

STATISTICAL SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level	Lognormal Distribution	Normal Distribution
Volatiles (ug/l)								
Toluene	3.60	2.42	7.69	1.00	1.06	960361.3064	FALSE	FALSE
Dissolved Inorganics (ug/l)								
Antimony	1.83	1.70	4.70	0.34	0.86	2664.8048	FALSE	FALSE
Arsenic	3.67	5.31	12.62	0.42	1.61	1.1846E+12	FALSE	FALSE
Iron	2,657	4,593	10,399	4.11	4.22	9.45042E+81	FALSE	FALSE
Manganese	33	49	115	1.62	3.16	2.12822E+47	**TRUE**	**TRUE**
Potassium	1,116	576	2,086	6.93	0.5	18628.4953	**TRUE**	**TRUE**
Thallium	2.90	1.47	5.38	0.99	0.47	25.508	FALSE	FALSE
Total Inorganics (ug/l)								
Aluminum	43	37	106	3.54	0.79	16175.9346	FALSE	FALSE
Antimony	1.98	1.24	4.07	0.54	0.68	172.8681	**TRUE**	**TRUE**
Arsenic	5.20	6.47	16.11	0.97	1.52	4.26173E+11	**TRUE**	**TRUE**
Barium	47	48	128	3.48	1.06	12083322.69	**TRUE**	**TRUE**
Chromium	17	14	41	1.92	2.27	5.05735E+24	**TRUE**	**TRUE**
Iron	2,783	4,744	10,780	5.53	3.02	7.69239E+46	FALSE	FALSE
Manganese	34	49	118	2.33	2.21	1.74953E+24	**TRUE**	**TRUE**

TABLE 8-15

AVERAGE CONCENTRATIONS OF CONSTITUENTS DETECTED IN GROUNDWATER
ALL SOIL ASSOCIATIONS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

Analyte	Groundwater from Soil Association #1	Groundwater from Soil Association #2	Groundwater from Soil Association #3	Groundwater from Soil Association #4
	Arithmetic Mean Half Non-Detects	Arithmetic Mean Half Non-Detects	Arithmetic Mean Half Non-Detects	Arithmetic Mean Half Non-Detects
Volatiles (ug/l)				
Carbon Disulfide	4.33	5.00	5.00	5.00
Methylene Chloride	1.83	2.17	1.33	3.67
Toluene	2.30	3.48	3.48	3.60
Inorganics (total) (ug/l)				
Aluminum	42	22	22	43
Antimony	1.23	1.13	1.67	1.98
Arsenic	2.67	1.18	1.85	5.20
Barium	26	25	31	47
Calcium	183,000	61,000	35,762	54,933
Chromium	2.20	0.83	1.77	17.07
Cobalt	0.35	0.35	3.95	0.35
Copper	1.20	0.80	0.80	1.48
Iron	4,668	19	1,032	2,783
Magnesium	379,633	1,788	948	764
Manganese	434	11	81	34
Potassium	221,080	557	623	580
Sodium	2,884,940	6,052	3,650	2,985
Thallium	3.87	2.05	2.05	2.05
Vanadium	6.10	0.32	0.30	0.45
Zinc	0.35	0.67	14.27	2.05

TABLE 8-15 (Continued)

AVERAGE CONCENTRATIONS OF CONSTITUENTS DETECTED IN GROUNDWATER
ALL SOIL ASSOCIATIONS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

Analyte	Groundwater from Soil Association #1 Arithmetic Mean Half Non-Detects	Groundwater from Soil Association #2 Arithmetic Mean Half Non-Detects	Groundwater from Soil Association #3 Arithmetic Mean Half Non-Detects	Groundwater from Soil Association #4 Arithmetic Mean Half Non-Detects
Inorganics (dissolved)(ug/l)				
Antimony	0.85	0.85	0.85	1.83
Arsenic	0.90	0.60	0.60	3.67
Calcium	135,833	57,450	32,548	52,533
Cobalt	0.35	0.63	4.15	0.35
Iron	4,421	8	560	2,657
Magnesium	368,643	1,742	885	740
Manganese	415	11	70	33
Potassium	215,832	1,082	1,134	1,116
Silver	0.40	0.25	0.25	0.25
Sodium	2,915,233	6,077	3,508	2,822
Thallium	5.45	2.05	2.05	2.90
Vanadium	6.78	0.37	0.47	0.38

9.0 CONCLUSIONS

This report presents Background Investigation findings including lithological and hydrogeological characteristics of CAX and the northern portions of WPNSTA and statistical evaluations of surface soil, subsurface soil, and groundwater data.

Lithological information from each of the four soil association groups in the study area was discussed in detail in Section 6.0 of this report. This information increases our understanding of the surface and subsurface conditions at CAX and northern WPNSTA. In addition, this information may be useful in the determination of the soil association to which future study areas belong, especially if that determination cannot be made with certainty strictly using the soil association map.

Sections 7.0 and 8.0 detail the analytical findings and statistical evaluation of data. These data represent levels of naturally occurring or anthropogenic chemical concentrations at CAX and northern WPNSTA and should be used in future reports to aide in the determination of whether or not contamination at a given site can be contributed to site activities. The data may also be appropriate for the establishment of clean-up levels should remedial action at a given site be warranted.

The statistical distribution of the data sets was established to facilitate comparison of site-specific data to background data. For comparative purposes, the background data presented in this report are considered normally distributed if the W-test for the normal distribution was true, or if the W-test was inclusive for both the normal and lognormal distributions (false in both cases). Data were considered to be lognormally distributed only if the W-test for the normal distribution was false and the W-test for the lognormal distribution was true. Statistical parameters of background data to be compared to site-specific data should correspond to the most appropriate distribution.

A MANOVA was conducted on the soil association data groups for each medium to determine if the data groups can be combined. The results of the MANOVA concluded that there is a significant difference between soil association data groups for surface soil and subsurface soil. Therefore, this indicates that the soil data cannot be combined and should be treated separately. For total and dissolved groundwater data, although the results indicated no significant difference between soil association data groups, given the disparity between test statistics and departures from assumptions, it is not recommended that the data groups be combined.

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APPENDIX A – CHAIN-OF-CUSTODY RECORDS

(1)

CompuChem
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501 Madison Avenue
Cary, NC 27513
1-800-833-5097

CHAIN-OF-CUSTODY RECORD

No. 057175

Project Name: CAX CTO 1916
Carrier: FEDEX
Airbill No.: 8185441814 04
Sampler Name: MARLENE IVESTER

Client Address: BAKER
420 ROUSER RD
CORAOPOLIS PA 15108
(AOP BLDG 3)
Sampler Signature: M. Ivester

Point-of-Contact: DAVE MARTIN
Telephone No.: (412) 269-2641
Sampling complete? Y or N (see Note 1)
Project-specific (PS) or Batch (B) QC? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	S. SW-846
3. Leachate	C. NaOH + Ice		L. Low	W. CWA 600-series
4. Rinsate	D. H2SO4 + Ice			O. Other____
5. Soil / Sediment / Sludge	E. Unpreserved			T. TCLP
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date: Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG-RS01	07/25	1610	4	B,F				6			X	X	X		X	X							
CXBG3-SS01-00	07/23	1415	5	—				1			X	X	X		X	X							
CXBG3-SB01-01	07/23	1450	5	—				2			X	X	X		X	X	X						
CXBG3-SS02-00	07/24	1020	5	—				1			X	X	X		X	X							
CXBG3-SB02-01	07/24	1030	5	—				2			X	X	X		X	X	X						
CXBG2-SS03-00	07/24	0950	5	—				1			X	X	X		X	X							
CXBG3-SB03-01	07/24	0955	5	—				2			X	X	X		X	X	X						
CXBG3-SS01-00	07/23	1415	5	—				1	X		X	X	X		X	X							DUP
CXBG3-SB01-01	07/23	1450	5	—				2	X		X	X	X		X	X	X						DUP
																							MS

Clients Special Instructions: TAKE CYANIDE FOR SOIL FROM RS02 JAR

Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) M. Ivester	Date: 7/25/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

(2)

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CHAIN-OF-CUSTODY RECORD

No. 057176

Project Name: CAX CTO 1916	Client Address: LAKER 420 ROGER RD AOP BLDG 3 CORAOPOLIS PA 15108	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No. (412) 269-2041
Airbill No.: 8185 4418 1404		Sampling complete? Y or N (see Note 1)
Sampler Name: MARLENE IVESTER	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC ? ____

BOX #1	1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil / Sediment / Sludge	6. Trip Blank 7. Oil 8. Waste 9. Other____	BOX #2 A. HCl + Ice B. HNO3 + Ice C. NaOH + Ice D. H2SO4 + Ice E. Unpreserved	F. Ice Only G. Other____ H. NaHSO4 + Ice I. ZnAc+NaOH + Ice	BOX #3 F. Filtered U. Unfiltered	Box #4 H. High M. Medium L. Low
Box #5	C. CLP 3/90 S. SW-846 W. CWA 600-series O. Other____	T. TCLP				

Sample ID (9 characters maximum)	Date: Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG3-SB04-00	07/23	1517	S	—				1			X	X	X		X	X	~~X~~						NO TOC
CXBG3-SB04-01	07/23	1525	S	—				2			X	X	X		X	X	X						
CXBG3-SB05-00	07/24	0830	S	—				1			X	X	X		X	X							
CXBG3-SB05-01	07/24	0845	S	—				2			X	X	X		X	X	X						
CXBG3-SB06-00	07/24	0900	S	—				1			X	X	X		X	X							
CXBG3-SB06-01	07/24	0910	S	—				2			X	X	X		X	X	X						
CXBG3-SB07-00	07/24	0925	S	—				1			X	X	X		X	X							
CXBG3-SB07-01	07/24	0935	S	—				2			X	X	X		X	X	X						
CXBG3-SB08-00	07/24	1050	S	—				1			X	X	X		X	X							
CXBG3-SB08-01	07/24	1055	S	—				2			X	X	X		X	X	X						

Clients Special Instructions: TAKE CYANIDE FROM BOTTLE

Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) [signature]	Date 7/25/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: LAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch si- and minimizing QC ratio; if "Y" lab will begin processing batches now.
No' Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years

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CHAIN-OF-CUSTODY RECORD

No. 057177 (3)

Project Name: CAX CTO 196	Client Address: BAKER 420 ROUSER RD	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX	400 BLDG 3	Telephone No.: (412) 269-2041
Airbill No.: 818544181404	CORAOPOLIS PA 15108	Sampling complete? Y or N (see Note 1)
Sampler Name: MARLENE JESTEL	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other____
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date: Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC/TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG1-SB09-00	07/23	1325	S	—				1			X	X	X		X	X							
CXBG1-SB09-01	07/23	1344	S	—				2			X	X	X		X	X	X						
CXBG1-SB10-00	07/23	1425	S	—				1			X	X	X		X	X							
CXBG1-SB10-01	07/23	1428	S	—				2			X	X	X		X	X	X						
CXBG1-SB02-00	07/25	0840	S	—				1			X	X	X		X	X							
CXBG1-SB02-01	07/25	0843	S	—				2			X	X	X		X	X	X						
CXBG1-SB03-00	07/25	1040	S	—				1			X	X	X		X	X							
CXBG1-SB03-01	07/25	1050	S	—				2			X	X	X		X	X	X						
CXBG1-SB07-01	07/25	0855	S	—				1			X	X	X		X	X							
CXBG1-SB07-01	07/25	0900	S	—				2			X	X	X		X	X	X						

Clients Special Instructions: TAKE ON ICE SOIL FROM 8 OZ JAR

Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) [signature] Date: 7/25/01	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1800	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) Date:	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time:	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

(4)

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CHAIN-OF-CUSTODY RECORD

No. 057178

Project Name: CAX CTO1916	Client Address: BAKER 420 ROUSER RD FOP BLDG 3 CORAOPOLIS PA 5108	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No.: (412) 269-2041
Airbill No.: 8185 4418 1404		Sampling complete? Y or N (see Note 1)
Sampler Name: MARLENE JIESTEL	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC?

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other_____
6. Trip Blank	F. Ice Only			
7. Oil	G. Other_____			
8. Waste	H. NaHSO4 + Ice			
9. Other_____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date:Year: 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
SCAN →																							
CXBG1-SB	07/25	0915	S	—				1			X	X	X		X	X							
CXBG1-SBC8-01	07/25	0920	S	—				2			X	X	X		X	X	X						
CXBG1-SS07-00	07/25	1025	S	—				1			X	X	X		X	X							
CXBG1-SB07-01	07/25	1030	S	—				2			X	X	X		X	X	X						
CXBG1-SS10-00	07/25	1010	S	—				1			X	X	X		X	X							
CXBG1-SB10-01	07/25	1015	S	—				2			X	X	X		X	X	X						
	/	:																					
	/	:																					
	/	:																					
	/	:																					MLR

Clients Special Instructions: TAKE ON FOR SOIL FM. 8 OZ JAR

Temperature _____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature] Date: 7/25/01	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1800	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) Date:	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time:	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057179 (5)

Project Name: CAX CTO 196	Client Address: BAKER 420 ROUSER RD AOP BLDG 3 CORAOPOLIS PA 15108	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No.:
Airbill No.: 8185 4418 1404		Sampling complete? Y or N (see Note 1)
Sampler Name: M. WESTER	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC ?

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other_____

BOX #2: A. HCl + Ice, B. HNO3 + Ice, C. NaOH + Ice, D. H2SO4 + Ice, E. Unpreserved, F. Ice Only, G. Other_____, H. NaHSO4 + Ice, I. ZnAc+NaOH.+ Ice

BOX #3: F. Filtered, U. Unfiltered

Box #4: H. High, M. Medium, L. Low

Box #5: C. CLP 3/90, S. SW-846, W. CWA 600-series, O. Other_____, T. TCLP

Sample ID (9 characters maximum)	Date:Year: 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG2-SB02-00	07/24	1350	S	—				1			X	X	X		X	X							
CXBG2-SB02-01	07/24	1400	S	—				23		X	X	X	X		X	X	X						
CXBG2-SB03-00	07/25	1340	S	—				1			X	X	X		X	X							
CXBG2-SB03-01	07/25	1345	S	—				23		X	X	X	X		X	X	X						
CXBG2-SB07-00	07/24	1430	S	—				1			X	X	X		X	X							
CXBG2-SB07-01	07/24	1435	S	—				23		X	X	X	X		X	X	X						
CXBG2-SB08-00	07/24	1441	S	—				1			X	X	X		X	X							
CXBG2-SB08-01	07/24	1446	S	—				23		X	X	X	X		X	X	X						
CXBG2-SB09-00	07/24	1537	S	—				1			X	X	X		X	X							
CXBG2-SB09-01	07/24	1540	S	—				23		X	X	X	X		X	X	X						

Clients Special Instructions: TAKE ON FM 8 OZ JAR

Temperature _____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature]	Date: 7/25/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057180 (6)

Project Name: CAX CTO196	Client Address:	Point-of-Contact: DALE MARTIN
Carrier:		Telephone No. (412) 269-2041
Airbill No.:		Sampling complete? Y or N (see Note 1)
Sampler Name:	Sampler Signature:	Project-specific (PS) or Batch (B) QC? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	S. SW-846
3. Leachate	C. NaOH + Ice		L. Low	W. CWA 600-series
4. Rinsate	D. H2SO4 + Ice			O. Other____
5. Soil / Sediment / Sludge	E. Unpreserved			
6. Trip Blank	F. Ice Only			T. TCLP
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date:Year: 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH						Remarks / Comments (see Notes 2 & 3)
CXBG2-SB10-00	07/25	1355	S	—				1			Y	X	X		X	X								
CXBG2-SB10-01	07/25	1400	S	—				23		X	Y	X	X		X	X	X							
CXBG1-SB02-01	07/25	0842	S	—				1		X														
CXBG1-SB03-01	07/25	1050	S	—				1		X														
CXBG1-SB07-01	07/25	0800	S	—				1		X														
CXBG1-SB08-01	07/25	0920	S	—				1		X														
CXBG1-SB09-01	07/25	1030	S	—				1		X														
CXBG1-SB10-01	07/25	1015	S	—				1		X														
CXBG3-SB01-01	07/23	1450	S	—				1		X														
CXBG3-SB01-01D	07/23	1450	S	—				1	X	X														DUP

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) [signature]	Date: 7/25/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch si[illegible] and minimizing QC ratio; if "Y" lab will begin processing batches now.
No[illegible] Samples stored 60 days after date report mailed at no extra charge [illegible] Note (3): All lab copies of data destroyed after three years

(7)

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CHAIN-OF-CUSTODY RECORD

No. 057181

Project Name: CAX CTO 196	Client Address:	Point-of-Contact: DAVE MARTIN
Carrier:		Telephone No.: (412) 269-2041
Airbill No.:		Sampling complete? Y or N (see Note 1)
Sampler Name:	Sampler Signature:	Project-specific (PS) or Batch (B) QC ? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F, Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	S. SW-846
3. Leachate	C. NaOH + Ice		L. Low	W. CWA 600-series
4. Rinsate	D. H2SO4 + Ice			O. Other____
5. Soil / Sediment / Sludge	E. Unpreserved			T. TCLP
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date:Year: 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG3-SB02-01	07/24	1030	5	—				1		X													
CXBG3-SB03-01	07/24	0955						1		X													
CXBG3-SB04-01	07/23	1525						1		X													
CXBG3-SB05-01	07/24	0845						1		X													
CXBG3-SB06-01	07/24	0910						1		X													
CXBG3-SB07-01	07/24	0935						1		X													
CXBG3-SB08-01	07/24	1055						1		X													
CXBG3-SB09-01	07/23	1344						1		X													
CXBG3-SB10-01	07/23	1428	↓	↓				1		X													
CXBG-RS01	07/24	1610	4	A				3		X													

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) [signature] Date: 7/25/01	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1800	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) Date:	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time:	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057182 (8)

Project Name: CAX CTO 196	Client Address:	Point-of-Contact: DAVE MARTIN
Carrier:		Telephone No.: (412) 269-2041
Airbill No.:		Sampling complete? Y or N (see Note 1)
Sampler Name:	Sampler Signature:	Project-specific (PS) or Batch (B) QC ? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other____
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date: Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG-RS02	07/24	1020	4	A				3		X													
CXBG-RS03	07/25	1500	4	A				3		X													
CXBG-TB01	07/25	—	6	A				3		X													
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig)	Date: 7/25/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch si[illegible]d minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057183

Project Name: CAX CTO196	Client Address: BAKER 420 ROUSER RD AOP BLDG3 COraopolis PA 15108	Point-of-Contact: DAVE MARTIN
Carrier: ~~AL~~ FEDEX		Telephone No.: (412) 269-2041
Airbill No.: 8185 4418 1404		Sampling complete? Y or N (see Note 1)
Sampler Name: MIVESTER	Sampler Signature: [illegible]	Project-specific (PS) or Batch (B) QC? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other____
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date: Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXB5-RS02	07/24	1620	4	B,C				6			X	X	X		X	X							
CXB4-RS03	07/25	1500	4	B,C				6			X	X	X		X	X							
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
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Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [illegible]	Date: 7/25/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057184 (10)

Project Name: CAX CTO 1916	Client Address: BAKER 420 ROUSER RD	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX	AOP BLDG 3	Telephone No. (412)269-2041
Airbill No.: 8185 4418 1448	CORAOPOLIS PA	Sampling complete? Y or N (see Note 1)
Sampler Name: M. IVESTER	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC? ____

BOX #1	1. Surface Water	6. Trip Blank	BOX #2	A. HCl + Ice	F. Ice Only	BOX #3	F. Filtered
	2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other____		U. Unfiltered
	3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice	Box #4	H. High
	4. Rinsate	9. Other____		D. H2SO4 + Ice	I. ZnAc+NaOH + Ice		M. Medium
	5. Soil / Sediment / Sludge			E. Unpreserved			L. Low

Box #5		
C. CLP 3/90	T. TCLP	
S. SW-846		
W. CWA 600-series		
O. Other____		

Sample ID (9 characters maximum)	Date: Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG2-SS01-00	07/27	0840	S	F				1			X	X	X		X	X							
CXBG2-SS01-00D	7/27	0840	S	F				1	X		X	X	X		X	X							DUP
CXBG2-SS01-00	07/27	0840	S	F				2	X		X	X	X		X	X							MS AND MSD
CXBG2-SB01-01	07/27	0850	S	F				2			X	X	X		X	X	X						
CXBG2-SS04-00	07/26	1225	S	F				1			X	X	X		X	X							
CXBG2-SB04-01	07/26	1230	S	F				2			X	X	X		X	X	X						
CXBG2-SS05-00	07/26	1203	S	F				1			X	X	X		X	X							
CXBG2-SB05-01	07/26	1208	S	F				2			X	X	X		X	X	X						
CXBG2-SS06-00	07/27	0815	S	F				1			X	X	X		X	X							
CXBG2-SB06-01	07/27	0820	S	F				2			X	X	X		X	X	X						

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) [signature]	Date: 7/27/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1600	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch si- nd minimizing QC ratio; if "Y" lab will begin processing batches now.
Not Samples stored 60 days after date report mailed at no extra charge. lote (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057185 (11)

Project Name: CAX CTO196	Client Address: BAKER	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX	420 ROUSER RD	Telephone No.: (412)269-2041
Airbill No.: 8185 4418 1448	CORAOPOLIS, PA 15108	Sampling complete? Y or N (see Note 1)
Sampler Name: M. IVESTER	Sampler Signature: MI	Project-specific (PS) or Batch (B) QC? ____

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other____

BOX #2: A. HCl + Ice, B. HNO3 + Ice, C. NaOH + Ice, D. H2SO4 + Ice, E. Unpreserved, F. Ice Only, G. Other____, H. NaHSO4 + Ice, I. ZnAc+NaOH + Ice

BOX #3: F. Filtered, U. Unfiltered

Box #4: H. High, M. Medium, L. Low

Box #5: C. CLP 3/90, S. SW-846, W. CWA 600-series, O. Other____, T. TCLP

Sample ID (9 characters maximum)	Date:Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / ~~TOX~~	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
CXBG4-SS01-00	07/26	0935	S	F				1			X	X	X		X	X			
CXBG4-SB01-01	07/26	0945	S	F				2			X	X	X		X	X	X		
CXBG4-SS01-00D	07/26	0935	S	F				1	X		X	X	X		X	X			DUP
CXBG4-SS01-00	07/26	0935	S	F				2	X		X	X	X		X	X			MS AND MSD
CXBG4-SB01-01D	07/26	0945	S	F				2	X		X	X	X		X	X	X		DUP
CXBG4-SB01-01	07/26	0945	S	F				~~2~~ 4	X		X	X	X		X	X	X		MS AND MSD
CXBG2-SB01-01D	07/27	0850	S	F				2	X		X	X	X		X	X	X		DUP
CXBG2-SB01-01	07/27	0850	S	F				4	X		X	X	X		X	X	X		MS AND MSD
CXBG4-SS02-00	07/27	0940	S	F				1			X	X	X		X	X			
CXBG4-SB02-01	07/27	0945	S	F				2			X	X	X		X	X	X		

Clients Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, If any:** Temperature ____ °C

#1 Relinquished By: (Sig) [signature]	Date: 7/27/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1600	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057186 (12)

Project Name: CAX CTO 916	Client Address: BAKER 420 ROUSER RD ACP BLDG 3 CORAOPOLIS PA	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No.: (412) 269-2041
Airbill No.: 8185 4418 1448		Sampling complete? Y or N (see Note 1)
Sampler Name: N. IVESTER	Sampler Signature:	Project-specific (PS) or Batch (B) QC?

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other_____
6. Trip Blank	F. Ice Only			
7. Oil	G. Other_____			
8. Waste	H. NaHSO4 + Ice			
9. Other_____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date:Year: 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG4-5503-00	07/26	1245	S	F				1			Y	Y	Y		Y	Y							
CXBG4-5503-01	07/26	1250	S	F				3		X	X	X	X		X	X	X						
CXBG4-5504-00	07/26	1305	S	F				1		*	X	X	X		X	X							
CXBG4-5504-01	07/26	1310	S	F				3		X	X	X	X		X	X	X						
CXBG4-5505-00	07/26	1400	S	F				1			X	X	X		X	X							
CXBG4-5505-01	07/26	1405	S	F				3		X	X	X	X		X	X	X						
CXBG4-5506-00	07/26	1340	S	F				1			X	X	X		X	X							
CXBG4-5506-01	07/26	1345	S	F				3		X	X	X	X		X	X	X						
CXBG4-5507-00	07/27	1000	S	F				1			X	X	X		X	X							
CXBG4-5507-01	07/27	1005	S	F				3		X	X	X	X		X	X	X						

Clients Special Instructions: Temperature _____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig)	Date: 7/27/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1600	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch si[illegible] and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note [illegible]: Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057187 (13)

Project Name: CAX CTO196	Client Address: BAKER 420 ROUSER RD PAP BLDG 3 CORAOPOLIS, PA	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No.: (412) 269-2041
Airbill No.: 8185 4418 1448		Sampling complete? Y or N (see Note 1)
Sampler Name: M. WESTER	Sampler Signature: M. W.	Project-specific (PS) or Batch (B) QC.?

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other
6. Trip Blank	F. Ice Only			
7. Oil	G. Other			
8. Waste	H. NaHSO4 + Ice			
9. Other	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date:Year: 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / ~~TOX~~	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
CXBG4-SB08-00	07/27	0910	S	F				1			X	X	X		X	X			
CXBG4-SB08-01	07/27	0915	S	F				3		X	X	X	X		X	X	X		
CXBG4-SB09-00	07/27	0930	S	F				1			X	X	X		X	X			
CXBG4-SB09-01	07/27	0935	S	F				3		X	X	X	X		X	X	X		
CXBG4-SB10-00	07/26	0912	S	F				1			X	X	X		X	X			
CXBG4-SB10-01	07/26	0915	S	F				3		X	X	X	X		X	X	X		
CXBG2-SB01-01	07/27	0850	S	F				1		X									
CXBG2-SB01-01D	07/27	0852	S	F				1	X	X									DUP
CXBG2-SB01-01	07/27	0860	S	F				2	X	X									MS AND MSD

Clients Special Instructions:

Temperature _____ °C

Lab: Received in Good Condition? Y or N. Describe Problems, if any:

#1 Relinquished By: (Sig) [signature] Date: 7/27/01	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1600	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) Date:	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time:	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057188 (14)

Project Name: CAX CTO196	Client Address: BAKER 420 KOUSER RD, TOP BLDG 3, CRANBERRY, PA	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No. (412) 269-2041
Airbill No.: 8185441 8 1448		Sampling complete? Y or N (see Note 1)
Sampler Name: M. IUESTER	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	S. SW-846
3. Leachate	C. NaOH + Ice		L. Low	W. CWA 600-series
4. Rinsate	D. H2SO4 + Ice			O. Other____
5. Soil / Sediment / Sludge	E. Unpreserved			T. TCLP
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date: Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
CX BG4-SB01-01	07/26	0945	S	F				1		X									
CX BG4-SB01-01D	07/26	0945	S	F				1	X	X									DUP
CX BG4-SB01-01	07/26	0945	S	F				2	X	X									MS/MSD
CX BG4-SB02-01	07/27	0945	S	F				1		X									
CX BG2-SB04-01	07/26	1230	S	F				1		X									
CX BG2-SB05-01	07/26	1208	S	F				1		X									
CX BG2-SB06-01	07/27	0820	S	F				1		X									
CX BG-TB02	07/27	—	W	A/F				3		X									
	/	:																	
	/	:																	

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature] Date: 7/27/01	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1600	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) Date:	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time:	Company Name: Time:	Company Name: Time:

Note If "N" lab will hold samples to await remainder of project-maximizing batch si d minimizing QC ratio; if "Y" lab will begin processing batches now.
Note Samples stored 60 days after date report mailed at no extra charge. ote (2): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057808

Project Name: CTO 196	Client Address: BAKER ENVIRO. 420 ROSER RD. AOP BLDG. 3 CORAOPOLIS PA	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No.: (412) 269-2041
Airbill No.: 8185 4418 4415		Sampling complete? Y or (N) (see Note 1)
Sampler Name: M. NESTER	Sampler Signature: M. Nester	Project-specific (PS) or Batch (B) QC? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other____
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other FIELD BLANK	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date:Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG-RS04	07/30	0815	4	A,B				7		X	X	X	X		X	X							TOTAL METALS
CXBG-FB01	07/30	0815	9	A,B				7		X	X	X	X		X	X							TOTAL METALS
CXBG-FB01F	07/30	0815	9	B	F			1							X								DIS METALS
CXBG-FB02	07/30	0845	9	A				3		X													
CXBG-TB03	07/30	—	6	A				3		X													
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) M. Nester	Date: 7/30/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER ENVIRO.	Time: 1600	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057809

Project Name: CTO 196	Client Address: BAKER ENVIRO 420 ROUSERD AOP BLDG 3 CORAOPOLIS, PA	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No. (412) 269-2041
Airbill No.: 8185 4418 1415		Sampling complete? Y or (N) (see Note 1)
Sampler Name: M. DIESTER	Sampler Signature: M. Diester	Project-specific (PS) or Batch (B) QC.? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other____
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other FIELD BLANK	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date:Year: 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
CXBG-FB02	07/30	0845	BC	9				9/6			X	X	X		X	X			TOTAL METALS
CXBG-FB02F	07/30	0845	B	9	F			1							X				DIS METALS

Clients Special Instructions:

Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature] Date: 7/30/01	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER ENVIRO. Time: 1600	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) Date:	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time:	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch siz[illegible]nd minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 056263

Project Name: CTO 1960	Client Address: BAKER 420 ROUSER RD CORAOPOLIS PA	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No.: (412) 269-2041
Airbill No.:		Sampling complete? Y or N (see Note 1) Y
Sampler Name: M. IJESTER	Sampler Signature:	Project-specific (PS) or Batch (B) QC?

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	S. SW-846
3. Leachate	C. NaOH + Ice		L. Low	W. CWA 600-series
4. Rinsate	D. H2SO4 + Ice			O. Other
5. Soil / Sediment / Sludge	E. Unpreserved			T. TCLP
6. Trip Blank	F. Ice Only			
7. Oil	G. Other			
8. Waste	H. NaHSO4 + Ice			
9. Other	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date:Year: 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG1-SS06-00	08/06	0935	S	—				1			X	X	X		X	X							
CXBG1-SB06-01	08/06	0940	S	—				3		X	X	X	X		X	X	X						
CXBG1-SS04-00	08/06	1015	S	—				1			X	X	X		X	X							
CXBG1-SB04-01	08/06	1025	S	—				3		X	X	X	X		X	X	X						
CXBG1-SS01-00	08/06	1145	S	—				1			X	X	X		X	X							
CXBG1-SB01-01	08/06	1150	S	—				3		X	X	X	X		X	X	X						
CXBG1-SB05-01	08/06	1115	S	—				3		X	X	X	X		X	X	X						
CXBG1-SB05-01	08/06	1115	S	—				6	X	X	X	X	X		X	X	X						MS AND MSD
CXBG1-SB05-01	08/06	1115	S	—				3	X	X	X	X	X		X	X	X						DUP
CXBG1-SS05-00	08/06	1100	S	—				1			X	X	X		X	X							

Clients Special Instructions: SOIL SAMPLING COMPLETE FOR CTO1960 / TALK W/ DAVE MARTIN RE: TOC FOR QA/QC

Temperature _____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig)	Date: 06/06/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1500	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years

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CHAIN-OF-CUSTODY RECORD

No. 056264 (17)

Project Name : CTO196	Client Address :	Point-of-Contact : DAVE MARTIN
Carrier :		Telephone No. : (412) 269-2041
Airbill No. :		Sampling complete? Y or N (see Note 1) Y
Sampler Name :	Sampler Signature :	Project-specific (PS) or Batch (B) QC ?

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other_____
6. Trip Blank	F. Ice Only			
7. Oil	G. Other_____			
8. Waste	H. NaHSO4 + Ice			
9. Other_____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date:Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
CXBG1-SS05-00D	08/06	1100	S	—				1	X		X	X	X		X	X			DUP
CXBG1SS05-00	08/06	1100	S	—				2	X		X	X	X		X	X			MS/MSD
CXBG1-TB04	08/06	—	6	A				2		X									
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	

Clients Special Instructions: *SOIL SAMPLING COMPLETE FOR CTO196 / DBCK w/ DAVE MARTIN RE: TOC FOR QA/QC

Temperature _____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature] Date: 08/06/00	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: [illegible] Time: 1500	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) Date:	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time:	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Not Samples stored 60 days after date report mailed at no extra charge Note (3): All lab copies of data destroyed after three years

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CHAIN-OF-CUSTODY RECORD

No. 057977 (18)

Project Name: CTO 196
Client Address: BAKER
Point-of-Contact: DAVE MARTIN
Carrier: FEDEX
Telephone No.: (412) 269-2041
Airbill No.:
Sampling complete? Y or N (see Note 1)
Sampler Name:
Sampler Signature:
Project-specific (PS) or Batch (B) QC ? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	S. SW-846
3. Leachate	C. NaOH + Ice		L. Low	W. CWA 600-series
4. Rinsate	D. H2SO4 + Ice			O. Other____
5. Soil / Sediment / Sludge	E. Unpreserved			T. TCLP
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other FIELD BLANK	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date: Year: 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG-FB03	08/08	1245	9	A				3		X													(SENT w/ TRIP BLANK
CXBG-RS05	08/08	1230	4	A				3		X													CX01-TB01 FOR
	/	:																					CTO 172)
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					

Clients Special Instructions:

Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature]	Date: 8/8/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years

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CHAIN-OF-CUSTODY RECORD

No. 057978

Project Name: CTO 196	Client Address: BAKER	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No. (412) 269-2041
Airbill No.:		Sampling complete? Y or N (see Note 1)
Sampler Name: M. TUESTER	Sampler Signature: M Tuester	Project-specific (PS) or Batch (B) QC ?

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other FIELD BLANK

BOX #2: A. HCl + Ice, B. HNO3 + Ice, C. NaOH + Ice, D. H2SO4 + Ice, E. Unpreserved, F. Ice Only, G. Other_____, H. NaHSO4 + Ice, I. ZnAc+NaOH + Ice

BOX #3: F. Filtered, U. Unfiltered

Box #4: H. High, M. Medium, L. Low

Box #5: C. CLP 3/90, S. SW-846, W. CWA 600-series, O. Other_____, T. TCLP

Sample ID (9 characters maximum)	Date:Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
CXBG-RS05	08/08	1230	4	B,C,F				4			X	X	X		X	X			TOTAL MET
CXBG-FB03	08/08	1245	9	B,C,F				6			X	X	X		X	X			TOTAL MET
CXBG-FB03F	08/08	1245	9	F	U			1							X				* DISSOLVED METALS NEED TO FILTER AND PRESERVE
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	

Clients Special Instructions: Temperature 5 °C

Lab: Received in Good Condition? Y or N Describe Problems, if any:

#1 Relinquished By: (Sig) M. Tuester	Date: 8/8/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig) Chris Kelly	Date: 8/9/01
Company Name:	Time:	Company Name:	Time:	Company Name: CompuChem	Time: 10:00

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 056847 (70)

Project Name: CT0196	Client Address: BAKER	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No.:
Airbill No.:		Sampling complete? Y or N (see Note 1)
Sampler Name: M. IVESTER	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC ?

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil / Sediment / Sludge 6. Trip Blank 7. Oil 8. Waste 9. Other_____	A. HCl + Ice B. HNO3 + Ice C. NaOH + Ice D. H2SO4 + Ice E. Unpreserved F. Ice Only G. Other_____ H. NaHSO4 + Ice I. ZnAc+NaOH + Ice	F. Filtered U. Unfiltered	H. High M. Medium L. Low	C. CLP 3/90 S. SW-846 W. CWA 600-series O. Other_____ T. TCLP

Sample ID (9 characters maximum)	Date:Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG2-GWO3	08/14	1545	2	BC				6			X	X	X		X	X							TOT METALS
CXBG2-GWO3F	08/14	1545	2	BC	F			1							X								DIS "
CXBG1-GWO2	08/15	1410	2	BC				6			X	X	X		X	X							TOT "
CXBG2-GWO2F	08/15	1410	2	BC	F			1							X								DIS "
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					MKO
	/	:																					

Clients Special Instructions: Temperature _____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature] Date: 8/15/01	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1800	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) Date:	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time:	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 056851 (21)

Project Name: CTO196
Client Address: BAKER
Point-of-Contact: DAVE MARTIN
Carrier: FEDEX
Telephone No.: (412) 269-2041
Airbill No.:
Sampling complete? Y or N (see Note 1)
Sampler Name: M. WESTER
Sampler Signature:
Project-specific (PS) or Batch (B) QC ? ____

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other____

BOX #2: A. HCl + Ice, B. HNO3 + Ice, C. NaOH + Ice, D. H2SO4 + Ice, E. Unpreserved, F. Ice Only, G. Other____, H. NaHSO4 + Ice, I. ZnAc+NaOH + Ice

BOX #3: F. Filtered, U. Unfiltered

Box #4: H. High, M. Medium, L. Low

Box #5: C. CLP 3/90, S. SW-846, W. CWA 600-series, O. Other____, T. TCLP

Sample ID (9 characters maximum)	Date: Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG2-GW02	08/14	1710	2	B,C,F				6			V	V	X		X	X							
CXBG2-GW02F	08/14	1710	2	B	F			1							X								
CXBG1-RS06	08/14	1400	4	B,C,F				6							X								
CXBG-RS06F	08/14	1400		B	F			1							X								
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					

Clients Special Instructions:

Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig)	Date: 8/15/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Not Samples stored 60 days after date report mailed at no extra charge Note (3): All lab copies of data destroyed after three years

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CHAIN-OF-CUSTODY RECORD

No. 056851 (21)

Project Name: CTO196	Client Address: BAKER	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No.: (412) 269-2044
Airbill No.:		Sampling complete? Y or N (see Note 1)
Sampler Name: M. IVESTER	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	S. SW-846
3. Leachate	C. NaOH + Ice		L. Low	W. CWA 600-series
4. Rinsate	D. H2SO4 + Ice			O. Other____
5. Soil / Sediment / Sludge	E. Unpreserved			T. TCLP
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date: Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
CXBG2-GW02	08/14	1710	2	B,C,F				6			X	X	X		X	X			
CXBG2-GW02F	08/14	1710	2	B	F			1							X				
CXBG-RS06	08/14	1400	4	B,C,F				6			X	X	X		X	X			←
CXBG-RS06F	08/14	1400		B	F			1							X				
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	

Clients Special Instructions:

Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature]	Date: 8/15/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057913 (22)

Project Name: CTO 196
Client Address: BAKER
Point-of-Contact: DAVE MARTIN
Carrier: FED EX
Telephone No.: (412) 269-2041
Airbill No.: 828539441753
Sampling complete? Y or N (see Note 1)
Sampler Name: MINESTER
Sampler Signature: M Ster
Project-specific (PS) or Batch (B) QC ? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other____
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date:Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
CXBG3-GMW03	08/15	1130	2	A,F				7		X	X	X	X						*METALS + CN COLLECTED + WILL BE SHIPPED WEEK OF 20AUG01
CXBG1-GW02	08/15	1410	2	A				3		X									
CXBG2-GW02	08/14	1710	2	A				3		X									
CXBG2-SW03	08/14	1545	2	A				3		X									
CXBG-RS06	08/14	1400	2	A				3		X									
CXBG-TB05	08/15	—	6	A				3		X									
	/	:																	
	/	:																	
	/	:																	
	/	:																	

MD

Clients Special Instructions:

Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig)	Date: 8/15/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057914 (23)

Project Name: CTO 196	Client Address: BAKER 420 ROUSER RD APT OFC BLDG 3 CORAOPOLIS, PA 15108	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No.: (412) 269-2041
Airbill No.: 828539441742		Sampling complete? Y or (N) (see Note 1)
Sampler Name: M. INESTER	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil / Sediment / Sludge 6. Trip Blank 7. Oil 8. Waste 9. Other____	A. HCl + Ice B. HNO3 + Ice C. NaOH + Ice D. H2SO4 + Ice E. Unpreserved F. Ice Only G. Other____ H. NaHSO4 + Ice I. ZnAc+NaOH + Ice	F. Filtered U. Unfiltered	H. High M. Medium L. Low	C. CLP 3/90 S. SW-846 W. CWA 600-series O. Other____ T. TCLP

Sample ID (9 characters maximum)	Date:Year: 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
* CXBG3-GW03	08/15	1130	2	~~X~~ B C				2							X	X							TOTAL MET.
* CXBG3-GW03F	08/15	1130	2	XB	F			1							X								DIS MET.
CXBG-RS07	08/20	1730	~~2~~4	A B C				9		X	X	X	X		X	X							TOT MET
CXBG-RS07F	08/20	1730	~~2~~4	B	F			1							X								DIS MET
CXBG-TB06	08/21	—	6	A				3		X													
CXBG3-GW02	08/21	1055	2	A				3		X													
** CXBG3-GW01	08/20	1505	2	A				3		X													
** CXBG3-GW01A	08/20	1505	2	A				3	X	X													DUP
** CXBG3-GW01	08/20	1505	2	A				6	X	X													MS/MSD
CXBG1-GW03	08/20	1215	2	A				3		X													

Clients Special Instructions: * REST OF SAMPLE PREVIOUSLY SHIPPED 8/15/01 ** IGNORE "MW" ON CONTAINER LABELS, SHOULD BE "GW" PER PLS REPORT Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature] Date: 8/21/01	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1800	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) Date:	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time:	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057313 (24)

Project Name: CTO 1916	Client Address: BAKER 420 ROUSER RD APT 6FC CORAOPOLIS, PA 15108	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No. (412) 269-2041
Airbill No.: 828539441742		Sampling complete? Y or N (see Note 1)
Sampler Name: M. IVESTER	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other____
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date: Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
CXBG1-GW03D	08/20	1215	2	A				3	X	X									DUP
CXBG1-GW01	08/21	1335	2	A				3		X									
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	
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	/	:																	

MFD

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature]	Date: 8/21/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057314 (25)

Project Name: CTO 196	Client Address: BAKER 420 ROUSER RD	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No. (412) 269-2041
Airbill No.: 828539441742	CORAOPOLIS, PA 15108	Sampling complete? Y or N (see Note 1)
Sampler Name: M. IVESTER	Sampler Signature: M. Ivester	Project-specific (PS) or Batch (B) QC ? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil / Sediment / Sludge 6. Trip Blank 7. Oil 8. Waste 9. Other____	A. HCl + Ice B. HNO3 + Ice C. NaOH + Ice D. H2SO4 + Ice E. Unpreserved F. Ice Only G. Other____ H. NaHSO4 + Ice I. ZnAc+NaOH + Ice	F. Filtered U. Unfiltered	H. High M. Medium L. Low	C. CLP 3/90 S. SW-846 W. CWA 600-series O. Other____ T. TCLP

Sample ID (9 characters maximum)	Date:Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG1-GW03	08/20	12:15	2	B,C,F				6			X	X	X		X	X							TOT MET
CXBG1-GW03F	08/20	12:15	2	B	F			1							X								DIS MET
CXBG1-GW03D	08/20	12:15	2	B,C,F				6	X		X	X	X		X	X							TOT MET, DUP
CXBG1-GW03DF	08/20	12:15	2	B	F			1	X						X								DIS MET, DUP
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					

Clients Special Instructions:

Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) M. Ivester	Date: 8/21/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057315 (26)

Project Name: CTO196	Client Address: BAKER, 420 ROUSER RD, APT GC, CORAOPOLIS, PA 15108	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No.: (412) 269-2041
Airbill No.: 8285394441742		Sampling complete? Y or (N) (see Note 1)
Sampler Name: M IVESTER	Sampler Signature: M Ivester	Project-specific (PS) or Batch (B) QC? ____

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other____

BOX #2: A. HCl + Ice, B. HNO3 + Ice, C. NaOH + Ice, D. H2SO4 + Ice, E. Unpreserved, F. Ice Only, G. Other____, H. NaHSO4 + Ice, I. ZnAc+NaOH + Ice

BOX #3: F. Filtered, U. Unfiltered

Box #4: H. High, M. Medium, L. Low

Box #5: C. CLP 3/90, S. SW-846, W. CWA 600-series, O. Other____, T. TCLP

	Sample ID (9 characters maximum)	Date: Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
*	CXBG3-GW01	08/20	1505	2	B,C,F				6			X	X	X		X	X			TOT MET
*	CXBG3-GW01F	08/20	1505	2	B	F			1							X				DIS MET
*	CXBG3-GW01D	08/20	1505	2	B,C,F				6	X		X	X	X		X	X			TOT MET, DUP
*	CXBG3-GW01DF	08/20	1505	2	B	F			1	X						X				DIS MET, DUP
		/	:																	
		/	:																	
		/	:																	
		/	:																	
		/	:																	
		/	:																	

Clients Special Instructions: * IGNORE "MW" ON CONTAINER LABEL, SHOULD BE "GW", ∴ PLS REPLACE

Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) M Ivester	Date: 8/21/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057316 (27)

Project Name: CTO 196	Client Address: BAKER 420 ROUSER RD	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX	APT GC	Telephone No.: (412) 269-2041
Airbill No.: 8285394417 42	CORAOPOLIS, PA	Sampling complete? Y or N (see Note 1)
Sampler Name: W. WESTER	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC ? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	S. SW-846
3. Leachate	C. NaOH + Ice		L. Low	W. CWA 600-series
4. Rinsate	D. H2SO4 + Ice			O. Other____
5. Soil / Sediment / Sludge	E. Unpreserved			T. TCLP
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date: Year: 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
* CXBGB-GW01	08/20	1505	2	B,C,F				12	X		X	X	X		X	X			TOT MET, MS/MSD
* CXBGB-GW01F	08/20	1505	2	B	F			2	X						X				DIS MET, MS/MSD
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	

Clients Special Instructions: * KINDRE/REPLACE "MW" ON CONTAINER LABEL W/ "GW", THX. Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature]	Date: 8/21/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1500	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057317 (28)

Project Name: CTO 196	Client Address: BAKER 420 ROUSER RD.	Point-of-Contact: DALE MARTIN
Carrier: FED EX	APT OFC	Telephone No (412) 269-2041
Airbill No.: 828539441742	CORAOPOLIS PA 15108	Sampling complete? Y or N (see Note 1)
Sampler Name: M. JUESTEL	Sampler Signature: M. Juestel	Project-specific (PS) or Batch (B) QC? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	S. SW-846
3. Leachate	C. NaOH + Ice		L. Low	W. CWA 600-series
4. Rinsate	D. H2SO4 + Ice			O. Other____
5. Soil / Sediment / Sludge	E. Unpreserved			T. TCLP
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date: Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG3-GWO2	08/21	1055	2	B,C,F				6			X	X	X		X	X							TOT MET
CXBG3-GWO2F	08/21	1055	2	B	F			1							X								DIS MET
CXBG1-GWO1	08/21	1335	2	B,C,F				6			X	X	X		X	X							TOT MET
CXBG1-GWO1F	08/21	1335	2	B	F			1							X								DIS MET
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) M. Juestel	Date: 8/21/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch si[illegible] [illegible]nd minimizing QC ratio; if "Y" lab will begin processing batches now.
Note [illegible] Samples stored 60 days after date report mailed at no extra charge. [illegible]ote (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057303 (29)

Project Name: CTO 196	Client Address: BAKER 420 ROUSER RD APT OFC PK CORAOPOLIS, PA 15108	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No. (412) 269-2041
Airbill No.: 828539441731		Sampling complete? Y or N (see Note 1)
Sampler Name: M. IVESTER	Sampler Signature: M. Ivester	Project-specific (PS) or Batch (B) QC?

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other_____
6. Trip Blank	F. Ice Only			
7. Oil	G. Other_____			
8. Waste	H. NaHSO4 + Ice			
9. Other_____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date: Year: 2008	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG2-GW01	08/23	1310	2	B,C,F				6			X	X	X		X	X							TOT MET
CXBG2-GW01F	08/23	1310	2	B	F			1							X								DIS MET
CXBG4-GW01	08/24	1305	2	B,C,F				6			X	X	X		X	X							TOT MET
CXBG4-GW01F	08/24	1305	2	B	F			1							X								DIS MET
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					HCO

Clients Special Instructions:

Temperature _____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig)	Date: 8/24/08	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057304 (30)

Project Name: CTO 196	Client Address: BAKER 420 KOSSER RD APT OFC PK CRAOPOLIS PA 15108	Point-of-Contact: DAVE MARTIN
Carrier: FEDEX		Telephone No.: (412) 209-2041
Airbill No.: 828539441731		Sampling complete? Y or N (see Note 1)
Sampler Name: M. IVESTER	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC ? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other____
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date: Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
CXBG4-GW02	08/24	1055	2	BGF				6			X	X	X		X	X							TOT MET
CXBG4-GW02F	08/24	1055	2	B	F			1							X								DIS MET
CXBG4-GW03	08/23	1440	2	BGF				6			X	X	X		X	X							TOT MET
CXBG4-GW03F	08/23	1440	2	B	F			1							X								DIS MET
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature]	Date: 8/24/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 057305 (31)

Project Name: CTO 1960	Client Address: BAKER 420 HOUSER RD APT OFC PL CORAOPOLIS PA	Point-of-Contact: DAVE MARTIN
Carrier: FED EX		Telephone No.: (412) 269-2041
Airbill No.: 8285394441731		Sampling complete? (Y) or N (see Note 1)
Sampler Name: M. IVESTER	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC ? ____

BOX #1	BOX #2	BOX #3	Box #4	Box #5
1. Surface Water	A. HCl + Ice	F. Filtered	H. High	C. CLP 3/90
2. Ground Water	B. HNO3 + Ice	U. Unfiltered	M. Medium	T. TCLP
3. Leachate	C. NaOH + Ice		L. Low	S. SW-846
4. Rinsate	D. H2SO4 + Ice			W. CWA 600-series
5. Soil / Sediment / Sludge	E. Unpreserved			O. Other____
6. Trip Blank	F. Ice Only			
7. Oil	G. Other____			
8. Waste	H. NaHSO4 + Ice			
9. Other____	I. ZnAc+NaOH + Ice			

Sample ID (9 characters maximum)	Date:Year 2001	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
CXBG2-GW01	08/23	1310	2	A				3		X									
CXBG4-GW01	08/24	1305	2	A				3		X									
CXBG4-GW02	08/24	1055	2	A				3		X									
CXBG4-GW03	08/23	1410	2	A				3		X									
CXBG-RS08	08/24	1605	4	A,B,C				9		X	X	X	X		X	X			TOT MET
CXBG-RS08F	08/24	1605	4	E	U			1							X				NEEDS TO BE FILTERED AND PRESERVED
CXBG-TB07	08/24	—	6	A				3		X									
	/	:																	
	/	:																	
	/	:																	MRO

Clients Special Instructions:

Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature]	Date: 8/24/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1800	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig)	Date:	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

APPENDIX B –
TEST BORING AND WELL CONSTRUCTION RECORDS

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG1-SB/MW01

COORDINATES: EAST: NORTH:

ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Truck	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)			3.0"		8/12/2001	0.0 - 10.0	Sunny, 90	1.0 bgs
Length			6.0"					
Type			Hand					
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample H=Hand Spoon

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40 .010 Slot Screen	2"	5.0	10.0
Sch 40 Riser	2"	+ 1.38	5.0

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
	A-1	0.5	NA			0.0' - 0.1' - organic layer.	Grout to surface	
1	A-2	1.5	NA			0.1' - 0.5' dark brown silt, trace clay, trace fine sand, moist	gw - 1.0'	
2						0.5' - 2.0' - light beige silt, some fine sand, trace clay, wet	Bent. bottom	
3	A-3	2	NA			2.0' - 4.0' - gray/brown silt, some fine sand, trace clay, wet	Sand top	
4	A-4	3	NA			4.0' - 7.0' - light green/gray silt, some clay, some fine sand, little brown streaking, wet	Screen top	
5								
6								
7	A-5	0.5	NA			7.0' - 7.5' - light beige fine sand, little silt, some clay, wet		
8	A-6	1.0	NA			7.5' - 8.5' - orange fine sand and silt, trace clay, saturated		
9	A-7	1.5	NA			8.5' - 10.0' - SAME		
10								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: SB/MW01 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG1-SB/MW02

COORDINATES: EAST: NORTH:

ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Truck	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)			3.0"		8/12/2001	0.0 - 10.0	Sunny, 90	3.0 bgs
Length			6.0"					
Type			Hand					
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample H=Hand Spoon

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40 .010 Slot Screen	2"	3.0	10.0
Sch 40 Riser	2"	+2.0	3.0

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	A-1	2.0	NA			0.0' - 2.0' - gray/olive green fine to medium sand and silt, trace shell fragments, moist	grout Bent. top	
2								
3	A-2	2.0	NA			2.0' - 4.0' - SAME, wet	Screen top 3.0' gw - 3.0'	
4								
5	A-3	2.0	NA			4.0' - 6.0' - SAME, wet		
6								
7	A-4	2.0	NA			6.0' - 8.0' - SAME, wet		
8								
9	A-5	2.0	NA			8.0' - 10.0' - SAME, wet		
10							Screen bottom	

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: SB/MW02 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG1-SB/MW03

COORDINATES: EAST: NORTH:

ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Truck	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)			3.0"		8/12/2001	0.0 - 7.2	Sunny, 90	1.0 bgs
Length			6.0"					
Type			Hand					
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample H=Hand Spoon

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40 .010 Slot Screen	2"	2.0	7.0
Sch 40 Riser	2"	+2.0	2.0

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	A-1	0.5	NA			0.0' - 0.5' - gray/olive green silt mud, some roots, trace sand, moist	Bent. top gw - 1.0'	
2	A-2	2.0	NA			0.5' - 2.0' - wet	Screen top	
3	A-3	2.0	NA			2.0' - 4.0' - SAME		
4	A-4	2.0	NA			4.0' - 6.0' - SAME		
5								
6	A-5	2.0	NA			6.0' - 8.0' - gray/olive green med. fine sand, some silt, trace shell fragments	Screen bottom	
7								
8								
9								
10								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: SB/MW03 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG2-SB/MW01

COORDINATES: EAST: NORTH:

ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Truck	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.375"		4.25"		8/21/2001	0.0 - 16.0	Sunny, 90	8.0 bgs
Length	2.0'		5.0'					
Type	STD		HSA					
Hammer Wt.	Hydraulic							
Fall	NA							

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample H=Hand Spoon

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40 .010 Slot Screen	2"	6.0	16.0
Sch 40 Riser	2"	+ 2.0	6.0

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
						0.0' - 0.1' - organic layer.	Grout to surface	
1	S-1	1.0	5 - med. stiff			0.1' - 1.5' - light brown silt, little clay, damp		
2						1.5' - 2.0' - light orange silt, some clay, damp	Bent. top	
3	S-2	1.6	14 - stiff			2.0' - 3.0' - SAME		
4						3.0' - 4.0' - light brown silt, some clay, trace fine sand, some orange mottling, damp	Sand top	
5	S-3	1.9	13 - stiff			4.0' - 6.0' - SAME, sand getting medium grain, damp		
6							Screen top	
7	S-4	1.7	13 - med. dense			6.0' - 7.75' - light gray/brown silt, little clay, little fine sand, damp to moist		
8						7.75' - 8.0' - SAME, some shell fragments, moist	gw - 8.0'	
9	S-5	0.2	woh - very loose			8.0' - 10.0' - light beige silt, some clay, some shell fragments, some medium sand, wet		
10								
						Match to Sheet 2		

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: SB/MW01 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: MW-01

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	1.8	3 - very loose			10.0' - 12.0' - SAME, saturated		
12								
13	S-7	1.9	12 - med. dense			12.0' - 14.0' - SAME		
14								
						14.0' - 15.0' - SAME		
15	S-8	1.9	6 - loose			15.0' - 16.0' - gray silt, some medium sand, little shell fragments, and clay		
16							Screen bottom	
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: SB/MW01 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG2-SB/MW02

COORDINATES: EAST: NORTH:

ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Truck	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.375"		4.25"		8/9/2001	0.0 - 19.0	Sunny, 90	11.5 bgs
Length	2.0'		5.0'					
Type	STD		HSA					
Hammer Wt.	Hydraulic							
Fall	NA							

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample H=Hand Spoon

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40 .010 Slot Screen	2"	9.0	19.0
Sch 40 Riser	2"	+ 2.0	9.0

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	0.8	10 - loose			0.0' - 0.1' - organic layer 0.1' - 1.5' - dark brown silt, dry	Grout to surface	
2						1.5' - 1.8' - light brown silt, trace very fine sand, dry		
3						1.8' - 2.0' - orange/brown silt, some clay, trace very fine sand, dry		
4	S-2	0.8	16 - very stiff			2.0' - 4.0' - SAME		
5	S-3	0.8	13 - stiff			4.0' - 6.0' - SAME, damp	Bent. top	
6								
7	S-4	0.6	18 - very stiff			6.0' - 8.0' - SAME, damp	Sand top	
8	S-5	1.0	6 - loose			8.0' - 9.1' - SAME		
9						9.1' - 10.0' - tan/light brown/ orange fine sand and silt, trace clay, damp	Screen top	
10								

Match to Sheet 2

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: MW-02 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation
CTO NO.: 26007-196 BORING NO.: CXBG2-SB/MW02

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	0.8	8 - loose			10.0' - 11.6' - SAME, wet		
12						11.6' - 12.0' - tan silt and very fine sand, some shell fragments, trace clay, wet	gw-11.5'	
13								
14	S-7	1.2	14 - med. dense			12.0' - 14.0' - SAME, wet		
15	S-8	1.0	14 - med. dense			14.0' - 16.0' - SAME, wet		
16								
17	S-9	2.0	18 - med. dense			16.0' - 17.2' - SAME, wet 17.2' - 18.0' - SAME with and shells, wet		
18								
19	S-10	2.0	26 - med. dense			18.0' - 20.0' - SAME with some shells, wet	Screen bottom	
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin
DRILLER: Layne Pech BORING NO.: MW-02 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG2-SB/MW03

COORDINATES: EAST: NORTH:

ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Truck	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.375"		4.25"		8/9/2001	0.0 - 26.0	Sunny, 90	18.5 bgs
Length	2.0'		5.0'					
Type	STD		HSA					
Hammer Wt.	Hydraulic							
Fall	NA							

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample H=Hand Spoon

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40 .010 Slot Screen	2"	16.0	26.0
Sch 40 Riser	2"	+ 2.0	16.0

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	0.1	6 - loose			0.0' - 0.1' - dark brown silt loam dry	Grout to surface	
2						0.1' - 2.0' - NO RECOVERY		
3	S-2	0.2	10 - stiff			2.0' - 4.0' - tan/orange mottled silt and clay, some very fine sand, trace light gray mottling		
4								
5	S-3	0.6	10 - stiff			4.0' - 6.0' - SAME		
6								
7	S-4	1.3	18 - very stiff			6.0' - 8.0' - light gray clay with orange mottling, some silt, trace iron staining, trace very fine sand, damp		
8								
9	S-5	1.8	11 - stiff			8.0' - 10.0' - light gray clay, trace silt, trace fine sand in laminae, trace root hair, trace mottled orange iron staining, damp		
10								
						Match to Sheet 2		

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: MW-03 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation
CTO NO.: 26007-196 BORING NO.: CXBG2-SB/MW03

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	1.2	17 - very stiff			10.0' - 11.5' - SAME 11.5' - 11.75' - bright orange/ brown silt and very fine sand, trace clay, damp	Bent. top	
12								
13						11.75' - 12.0' - tan very fine sand, dry		
14	S-7	1.0	25 - med. dense			12.0' - 14.0' - tan/beige silt and very f. sand, trace heavies, dry	Sand top	
15	S-8	1.6	10 - med. dense			14.0' - 15.0' - SAME 15.0' - 16.0' - orange/brick silt, trace very f. sand, trace clay, damp	Screen top	
16								
17	S-9	0.75	6 - loose			16.0' - 18.0' - orange/brick silt some clay, trace very fine sand, trace root hair, moist		
18								
19	S-10	1.0	1 - very loose			18.0' - 20.0' - tan/brown very fine sand and silt, some iron stain, trace heavy minerals, wet	gw-18.5'	
20								
21	S-11	1.0	1 - very loose			20.0' - 22.0' - SAME		
22								
23	S-12	1.5	7 - loose			22.0' - 24.0' - SAME with greenish hue		
24								
25	S-13	1.0	13 - med. dense			24.0' - 26.0' - SAME		
26							Screen bottom	
27								
28								
29								
30								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin
DRILLER: Layne Pech BORING NO.: MW-03 SHEET 2 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation
CTO NO.: 26007-196 BORING NO.: CXBG3-SB/MW01
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Truck	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.375"		4.25"		8/8/2001	0.0 - 38.0	Sunny, 90	28.0 bgs
Length	2.0'		5.0'					
Type	STD		HSA					
Hammer Wt.	Hydraulic							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample H=Hand Spoon

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40 .010 Slot Screen	2"	23.0	38.0
Sch 40 Riser	2"	+ 2.0	23.0

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.0	6 - loose			0.0' - 0.1' - organic layer 0.1' - 2.0' - tan/orange silt, dry	Grout to surface	
2								
3	S-2	1.0	18 - med. dense			2.0' - 4.0' - tan/beige silt, orange mottle, trace clay, dry		
4								
5	S-3	1.0	18 - stiff			4.0' - 6.0' - light gray silt, some clay, orange-red mottling, damp		
6								
7	S-4	1.8	36 - hard			6.0' - 8.0' - SAME with trace fine sand, damp		
8								
9	S-5	1.8	40 - hard			8.0' - 10.0' - light gray silt and clay, trace sand, orange mottling damp		
10								

Match to Sheet 2

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin
DRILLER: Layne Pech BORING NO.: MW-01 SHEET 1 OF 3

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG3-SB/MW01

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	1.8	14 - stiff			10.0' - 12.0' - SAME		
12	S-7	1.8	13 - stiff			12.0' - 14.0' - light gray mottled orange silt and clay, damp		
13								
14	S-8	1.8	13 - stiff			14.0' - 16.0' - light gray/beige clay and silt, trace very fine sand, damp		
15								
16	S-9	1.8	23 - very stiff			16.0' - 17.5' - SAME 17.5' - 18.0' - light gray/beige silt, trace clay with orange mottling, damp		
17								
18								
19	S-10	0.8	12 - stiff			18.0' - 20.0' - SAME	Bent. top	
20	S-11	1.9	20 - stiff			20.0' - 22.0' - SAME		
21							Sand top	
22	S-12	0.8	14 - med. dense			22.0' - 24.0' - tan/orange very fine sand, trace black mineral laminae, moist		
23							Screen top	
24	S-13	1.5	18 - med. dense			24.0' - 26.0' - tan/orange very fine sand and silt, moist		
25								
26	S-14	1.0	7 - loose			26.0' - 28.0' - SAME		
27								
28	S-15	0.5	3 - very loose			28.0' - 29.8' - SAME, wet 29.8' - 30.0' - tan/orange silt and clay	gw - 28'	
29								
30								
						Match to Sheet 3		

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: MW-01 SHEET 2 OF 3

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG3-SB/MW01

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-16	0.8	3 -very loose			30.0' - 31.4' - SAME 31.4' - 31.9' - tan/orange very fine sand and silt, trace iron, wet		
32						31.9' - 32.0' - dark gray/charcoal clay, trace silt, wet		
33	S-17	1.0	1 - very soft			32.0' - 34.0' - SAME		
34	S-18	1.8	2 - soft			34.0' - 36.0' - dark gray/green silt and clay, some very fine sand, wet		
35								
36	S-19	1.2	1 - very soft			36.0' - 37.8' - SAME 37.8 - 38.0' - dark olive green clay, some silt, damp	Screen bottom	
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: MW-01 SHEET 3 OF 3

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG3-SB/MW02

COORDINATES: EAST: NORTH:

ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Truck	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.375"		4.25"		8/7/2001	0.0 - 38.0	Sunny, 90	29.0 bgs
Length	2.0'		5.0'					
Type	STD		HSA					
Hammer Wt.	Hydraulic							
Fall	NA							

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample H=Hand Spoon

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40 .010 Slot Screen	2"	23.0	38.0
Sch 40 Riser	2"	+ 2.0	23.0

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	A-1	1.0	NA			0.0' - 0.1' - organic layer 0.1' - 0.5' - light brown silt, little to some fine sand, damp	Grout to surface	
2						0.5' - 2.0' - beige silt, little f. sand		
3	S-2	1.6	8 - med. stiff			2.0' - 4.0' - tan, mottled orange/ gray silt and clay, damp		
4								
5	S-3	1.6	13 - stiff			4.0' - 6.0' - SAME with more gray color, damp		
6								
7	S-4	1.6	33 - hard			6.0' - 7.2' - SAME, damp 7.2' - 8.0' - light gray mottled orange silt, some very fine sand, trace clay, damp		
8								
9	S-5	1.6	22 - med. dense			8.0' - 10.0' - SAME with some clay, damp		
10								
						Match to Sheet 2		

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: MW-02 SHEET 1 OF 3

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG3-SB/MW02

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	1.6	16 - very stiff			10.0' - 12.0' - light gray mottled orange silt, some very fine sand, some clay,damp		
12	S-7	1.6	17 - very stiff			12.0' - 14.0' - light gray mottled orange silt and clay, trace very fine sand, damp		
13								
14	S-8	1.8	9 - stiff			14.0' - 16.0' - SAME with less clay, damp		
15								
16	S-9	1.8	17 - very stiff			16.0' - 18.0' - orange/tan mottled silt, some clay, damp		
17								
18	S-10	1.8	4 - med. stiff			18.0' - 20.0' - SAME, with trace very fine sand, moist		
19							Bent. top	
20	S-11	1.8	5 - med. stiff			20.0' - 20.4' - SAME 20.4' - 22.0' - light gray mottled orange silt, some clay, trace very fine sand, damp		
21							Sand top	
22								
23	S-12	1.8	7 - med. stiff			22.0' - 24.0' - SAME, moist	Screen top	
24	S-13	2.0	3 - soft			24.0' - 26.0' - dark gray/olive green silt, some clay, trace very fine sand, moist		
25								
26	S-14	2.0	5 - med. stiff			26.0' - 27.5' - SAME 27.5' - 27.75' - dark gray silt, trace shell fragments, moist		
27								
28						27.75' - 28.0' - tan and gray, orange mottled fine sand and silt, some shell fragments, moist		
29	S-15	2.0	8 -loose			28.0' - 28.6' - SAME 28.6' - 30.0' - dark gray, olive	gw - 29'	
30								
						Match to Sheet 3		

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: MW-02 SHEET 2 OF 3

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG3-SB/MW02

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31						green fine sand and silt, some shell fragments, trace clay, wet		
32	S-16	1.8	10 - loose			30.0' - 32.0' - SAME without clay		
33	S-17	1.8	10 - loose			32.0' - 34.0' - SAME		
34								
35	S-18	1.8	7 - med. stiff			34.0' - 36.0' - dark gray/green silt and clay laminae, some shell fragments, trace fine sand laminae, wet		
36								
37	S-19	1.8	12 - stiff			36.0' - 38.0' - SAME		
38							Screen bottom	
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: MW-02 SHEET 3 OF 3

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation
CTO NO.: 26007-196 BORING NO.: CXBG3-SB/MW03
COORDINATES: EAST: NORTH:
ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Truck	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.375"		4.25"		8/8/2001	0.0 - 32.0	Sunny, 90	24.0 bgs
Length	2.0'		5.0'					
Type	STD		HSA					
Hammer Wt.	Hydraulic							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample H=Hand Spoon

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40 .010 Slot Screen	2"	22.0	32.0
Sch 40 Riser	2"	+ 2.0	22.0

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.5	1 - very loose			0.0' - 0.1' - organic layer 0.1' - 1.5' - dark brown silt, some very fine sand, dry	Grout to surface	
2						1.5' - 2.0' - tan/light brown mottle clay and silt, damp		
3	S-2	0.5	11- stiff			2.0' - 4.0' - orange/tan mottled clay and silt, trace fine sand,		
4						trace root hair and iron conc., damp		
5	S-3	0.6	6 - med. stiff			4.0' - 5.5' - SAME 5.5' - 6.0' - tan/orange mottle silt,		
6						some clay, trace organics, damp		
7	S-4	1.2	6 - med. stiff			6.0' - 7.5' - SAME with trace very fine sand		
8						7.5' - 8.0' - orange/tan silt, some very fine sand, some clay, trace organics (root hairs), damp		
9						clay, trace sand, orange mottling damp		
10	S-5	1.3	6 - med. stiff			8.0' - 10.0' - SAME Match to Sheet 2		

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin
DRILLER: Layne Pech BORING NO.: MW-03 SHEET 1 OF 3

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG3-SB/MW03

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	1.2	6 - med. stiff			10.0' - 11.8' - SAME 11.8' - 12.0' - tan/orange-red mottled clay, some silt, trace root hair, damp		
12								
13	S-7	1.8	12 - stiff			12.0' - 13.2' - SAME 13.2' - 13.5' - orange/tan silt and clay, trace very fine sand 13.5' - 14.0' - orange/light gray mottled clay, some silt, damp		
14								
15								
16	S-8	1.5	4 - soft			14.0' - 16.0' - SAME		
	S-9	1.8	9 - stiff			16.0' - 17.4' - SAME 17.4' - 18.0' - tan/light gray mottled clay, some silt, trace orange iron staining, damp		
17								
18							Bent. top	
	S-10	1.8	4 - soft			18.0' - 20.0' - brown/tan silt, some clay, trace iron staining, trace very fine sand, trace heavy minerals, damp		
19								
20							Sand top	
21	S-11	0.5	1 - soft			20.0' - 22.0' - SAME		
22							Screen top	
	S-12	2.0	4 - loose			22.0' - 22.8' - SAME 22.8' - 24.0' - light brown/tan greenish silt and very fine sand and shell hash, some clay, trace black heavy minerals, damp		
23								
24								gw - 24'
25	S-13	NONE	1 - very loose			24.0' - 26.0' - NO RECOVERY		
26								
27	S-14	NONE	1 - very loose			26.0' - 28.0' - NO RECOVERY		
28							gw - 28'	
29	S-15	0.5	woh - very loose			28.0' - 30.0' - SAME, 22.0' - 24.0'		
30						Match to Sheet 3		

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: MW-03 SHEET 2 OF 3

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG3-SB/MW03

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-16	1.2	14 - med. dense			30.0' - 32.0' - SAME, wet		
32							Screen bottom	
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: MW-03 SHEET 3 OF 3

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG4-SB/MW01

COORDINATES: EAST: NORTH:

ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Truck	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)			3.0"		8/22/2001	0.0 - 9.0	Sunny, 90	3.0 bgs
Length			6.0"					
Type			Hand					
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample H=Hand Spoon

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40 .010 Slot Screen	2"	4.0	9.0
Sch 40 Riser	2"	+2.0	4.0

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	A-1	2.0	NA			0.0' - 2.0' - tan silt and clay moist	Bent. top; gw - 1.0'; Screen top	
2								
3	A-2	2.0	NA			2.0' - 4.0' - olive green silt, some clay, trace fine sand, wet	gw - 3'	
4								
5	A-3	2.0	NA			4.0' - 6.0' - tan/olive green silt and very fine sand, wet		
6								
7	A-4	2.0	NA			6.0' - 8.0' - olive green silt and clay, wet		
8								
9	A-5	1.0	NA			8.0' - 8.5' - SAME 8.5' - 9.0' - tan/orange brown silt and clay, trace shell fragments, wet	Screen bottom	
10								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: SB/MW01 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG4-SB/MW02

COORDINATES: EAST: NORTH:

ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Truck	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.375"		4.25"		8/22/2001	0.0 - 44.0	Sunny, 90	36.0 bgs
Length	2.0'		5.0'					
Type	STD		HSA					
Hammer Wt.	Hydraulic							
Fall	NA							

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample H=Hand Spoon

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40 .010 Slot Screen	2"	34.0	44.0
Sch 40 Riser	2"	+ 2.0	34.0

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.0	1 - very loose			0.0' - 0.1' - organic layer 0.1' - 1.2' - dark brown silt, some trace very fine sand, trace clay, damp	Grout to surface	
2								
3	S-2	1.5	6 - med. stiff			2.0' - 4.0' - orange/tan silt and clay, trace fine sand, trace root hair, trace iron staining, damp		
4								
5	S-3	1.4	11 - med. dense			4.0' - 6.0' - mottled orange tan fine sand, some clay, trace iron staining, damp		
6								
7	S-4	1.5	12 - med. dense			6.0' - 8.0' - SAME		
8								
9	S-5	2.0	10 - stiff			8.0' - 10.0' - orange/brown silt and clay, trace fine sand, damp		
10								
						Match to Sheet 2		

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: MW-02 SHEET 1 OF 3

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG4-SB/MW02

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	2.0	5 - med. stiff			10.0' - 12.0' - SAME	Grout to surface	
12	S-7	1.6	9 - stiff			12.0' - 14.0' - SAME		
13								
14	S-8	1.8	6 - med. stiff			14.0' - 16.0' - tan/light gray orange mottled clay and silt, trace very fine sand in lenses, some iron staining, damp		
15								
16	S-9	1.9	8 - stiff			16.0' - 17.8' - SAME		
17						17.8' - 18.0' - light gray clay and silt, trace very fine sand, trace orange iron staining, damp		
18	S-10	1.8	4 - soft			18.0' - 19.6' - SAME		
19						19.6' - 20.0' - beige/light gray silt and very fine sand, some clay, trace iron staining, damp		
20								
21	S-11	1.3	2- soft			20.0' - 22.0' - SAME		
22	S-12	2.0	7 - med. stiff			22.0' - 23.2' - SAME		
23						23.2' - 24.0' - brick red/orange clay and silt, some iron staining and concretions, trace very fine sand, damp		
24								gw - 24'
25	S-13	1.8	1 - very soft			24.0' - 26.0' - tan/beige, orange mottled clay and silt, trace iron staining, trace very f. sand, trace organics, damp		
26								
27	S-14	1.8	4 - soft			26.0' - 28.0' - SAME		
28	S-15	1.3	woh-very soft			28.0' - 30.0' - tan/beige silt, some clay, some iron staining, trace very fine sand, trace heavy minerals, damp		
29								
30						Match to Sheet 3	Bent. top	

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: MW-02 SHEET 2 OF 3

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation
CTO NO.: 26007-196 BORING NO.: CXBG4-SB/MW02

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-16	0.3	woh - very soft			30.0' - 32.0' - SAME		
32	S-17	1.0	woh - very soft			32.0' - 33.5' - SAME	Sand top	
33						33.5' - 34.0' - tan/beige silt and shell fragments, some clay, trace very fine sand, damp		
34							Screen top	
35	S-18	2.0	5 - loose			34.0' - 36.0' - SAME, moist/wet		
36	S-19	1.2	9 - loose			36.0' - 38.0' - beige/tan silt and very fine to fine sand, some clay some shell fragments, trace iron staining, trace heavy minerals, wet	gw - 36'	
37								
38								
39	S-20	1.2	15 - med. dense			38.0' - 40.0' - beige/olive green med.-fine sand and silt, and shell hash, some heavy minerals in matrix, trace clay, wet		
40								
41	S-21	1.6	12 - med. dense			40.0' - 42.0' - SAME		
42								
43	S-22	1.8	10 - med. dense			42.0' - 44.0' - SAME		
44							Screen bottom	
45								
46								
47								
48								
49								
50								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin
DRILLER: Layne Pech BORING NO.: MW-02 SHEET 3 OF 3

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG3-SB01

COORDINATES: EAST: NORTH:

ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Truck	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.375"		4.25"		8/20/2001	0.0 - 100.0	Sunny, 90	28.0 bgs
Length	2.0'		5.0'					
Type	STD		HSA					
Hammer Wt.	Hydraulic							
Fall	NA							

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample H=Hand Spoon

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40 .010 Slot Screen	NA	NA	NA
Sch 40 Riser	NA	NA	NA

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.0	6 - loose			0.0' - 0.1' - organic layer 0.1' - 2.0' - tan/orange silt, dry	Grout to surface	
2 3	S-2	1.0	18 - med. dense			2.0' - 4.0' - tan/beige silt, orange mottle, trace clay, dry		
4 5	S-3	1.0	18 - stiff			4.0' - 6.0' - light gray silt, some clay, orange-red mottling, damp		
6 7	S-4	1.8	36 - hard			6.0' - 8.0' - SAME with trace fine sand, damp		
8 9 10	S-5	1.8	40 - hard			8.0' - 10.0' - light gray silt and clay, trace sand, orange mottling damp		
						Match to Sheet 2		

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: CXBG3-SB01 SHEET 1 OF 6

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG3-SB01

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	1.8	14 - stiff			10.0' - 12.0' - SAME		
12	S-7	1.8	13 - stiff			12.0' - 14.0' - light gray mottled orange silt and clay, damp		
13								
14	S-8	1.8	13 - stiff			14.0' - 16.0' - light gray/beige clay and silt, trace very fine sand, damp		
15								
16	S-9	1.8	23 - very stiff			16.0' - 17.5' - SAME		
17						17.5' - 18.0' - light gray/beige silt, trace clay with orange mottling, damp		
18								
19	S-10	0.8	12 - stiff			18.0' - 20.0' - SAME		
20	S-11	1.9	20 - stiff			20.0' - 22.0' - SAME		
21								
22	S-12	0.8	14 - med. dense			22.0' - 24.0' - tan/orange very fine sand, trace black mineral laminae, moist		
23								
24	S-13	1.5	18 - med. dense			24.0' - 26.0' - tan/orange very fine sand and silt, moist		
25								
26	S-14	1.0	7 - loose			26.0' - 28.0' - SAME		
27								
28	S-15	0.5	3 - very loose			28.0' - 29.8' - SAME, wet	gw - 28'	
29						29.8' - 30.0' - tan/orange silt and clay		
30								
						Match to Sheet 3		

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: CXBG3-SB01 SHEET 2 OF 6

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG3-SB01

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-16	0.8	3 -very loose			30.0' - 31.4' - SAME 31.4' - 31.9' - tan/orange very fine sand and silt, trace iron, wet 31.9' - 32.0' - dark gray/charcoal clay, trace silt, wet		
32								
33								
	S-17	1.0	1 - very soft			32.0' - 34.0' - SAME		
34								
	S-18	1.8	2 - soft			34.0' - 36.0' - dark gray/green silt and clay, some very fine sand, wet		
35								
36								
	S-19	1.2	1 - very soft			36.0' - 37.8' - SAME 37.8 - 38.0' - dark olive green clay, some silt, damp		
37								
38								
	S-20	1.2	2 - very soft			38.0' - 40.0' - blue/dark gray clay and silt, some fine sand, wet		
39								
40								
	S-21	1.2	5 - med. stiff			40.0' - 42.0' - blue/dark gray silt and clay, some fine sand,wet		
41								
42	S-22	2.0	5 - med. stiff			42.0' - 44.0' - blue/dark gray silt, some clay, trace very fine sand, wet		
43								
44								
	S-23	1.3	7 - loose			44.0' - 45.7' - blue/dark gray fine-medium sand, some silt, trace clay, trace black heavy minerals, wet 45.7' - 46.0' - tan/brown, medium sand, wet		
45								
46								
47								
	S-24	1.1	15 - stiff			46.0' - 47.0' - SAME 47.0 - 48.0' - blue/dark-gray clay some silt, some shell fragments, some heavy minerals, trace v.f. sand		
48								
49								
50	S-25	1.5	5 - med. stiff			SAME Match to Sheet 4		

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: CXBG3-SB01 SHEET 3 OF 6

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG3-SB01

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
51	S-26	1.0	19 - med. dense			50.0' - 52.0' - dark gray/blue silt and shell hash, and heavy minerals, trace sand, some clay		
52								
53	S-27	1.6	10 - med. dense			52.0' - 54.0' - SAME		
54								
55	S-28	0.8	10 - med. dense			54.0' - 56.0' - SAME, some fine sand, trace clay		
56								
57	S-29	1.8	11 - med. dense			56.0' - 58.0' - SAME		
58								
59	S-30	1.5	12 - med. dense			58.0' - 60.0' - SAME		
60								
61	S-31	1.0	23 - med. dense			60.0' - 62.0' - blue/dark gray/ olive green silt and very fine sand, some shell fragments, trace clay		
62								
63	S-32	1.0	25 - med. dense			62.0' - 64.0' - SAME		
64								
65	S-33	1.0	56 - very dense			64.0' - 66.0' - SAME		
66								
67	S-34	1.0	19 - med. dense			66.0' - 68.0' - SAME		
68								
69	S-35	1.0	27 - med. dense			68.0' - 70.0' - SAME		
70								

Match to Sheet 5

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: CXBG3-SB01

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG3-SB01

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
71	S-36	1.5	43 - dense			70.0' - 72.0' - SAME		
72, 73, 74	S-37	2.0	11 - stiff			72.0' - 74.0' - blue-green clay, trace silt, trace very fine sand with heavy minerals, trace white shell fragments		
75	S-38	1.4	13 - stiff			74.0' - 76.0' - SAME, some silt		
76, 77, 78	S-39	1.8	22 - med. dense			76.0' - 78.0' - blue-green silt and fine sand, some clay lenses, some shell fragments		
79, 80	S-40	1.0	16 - med. dense			78.0' - 80.0' - olive green silt and very fine-fine sand, trace clay, trace shell fragments		
81, 82	S-41	1.0	31 - dense			80.0' - 82.0' - olive green fine sand and silt, trace clay, trace shell fragments		
83, 84	S-42	1.6	22 - med. dense			82.0' - 84.0' - SAME		
85, 86	S-43	1.6	37 - dense			84.0' - 86.0' - SAME		
87, 88	S-44	1.0	29 - med. dense			86.0' - 88.0' - SAME		
89, 90	S-45	1.0	36 - dense			88.0' - 90.0' - SAME		
						Match to Sheet 6		

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: CXBG3-SB01 SHEET 5 OF 6

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG3-SB01

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
91	S-46	1.6	24 - med. dense			90.0' - 92.0' - SAME		
92	S-47	0.8	34 - dense			92.0' - 94.0' - olive green silt and very fine sand, trace shell fragments, wet		
93								
94	S-48	1.0	32 - dense			94.0' - 96.0' - olive green fine sand and silt, trace clay, trace shell fragments, wet		
95								
96	S-49	1.0	35 - dense			96.0' - 98.0' - SAME		
97								
98	S-50	1.0	35 - dense			98.0' - 100.0' - SAME		
99								
100								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: CXBG3-SB01 SHEET 6 OF 6

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG2-SB03

COORDINATES: EAST: NORTH:

ELEVATION: SURFACE: TOP OF PVC CASING:

Rig: Truck	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.375"		4.25"		8/14/2001	0.0 - 100.0	Sunny, 90	18.5 bgs
Length	2.0'		5.0'					
Type	STD		HSA					
Hammer Wt.	Hydraulic							
Fall	NA							

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample H=Hand Spoon

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40 .010 Slot Screen	NA	NA	NA
Sch 40 Riser	NA	NA	NA

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	0.1	6 - loose			0.0' - 0.1' - dark brown silt loam dry 0.1' - 2.0' - NO RECOVERY	Grout hole to surface	
2								
3	S-2	0.2	10 - stiff			2.0' - 4.0' - tan/orange mottled silt and clay, some very fine sand, trace light gray mottling		
4								
5	S-3	0.6	10 - stiff			4.0' - 6.0' - SAME		
6								
7	S-4	1.3	18 - very stiff			6.0' - 8.0' - light gray clay with orange mottling, some silt, trace iron staining, trace very fine sand, damp		
8								
9	S-5	1.8	11 - stiff			8.0' - 10.0' - light gray clay, trace silt, trace fine sand in laminae, trace root hair, trace mottled orange iron staining, damp		
10								
						Match to Sheet 2		

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: SB-03 SHEET 1 OF 6

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG2-SB03

SAMPLE TYPE	DEFINITIONS
S = Split Spoon A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Denison P = Piston N = No Sample	BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
51	S-26	0.5	59 - very dense			50.0' - 52.0' - SAME		
52	S-27	0.8	44 - 50/0.3 dense			52.0' - 54.0' - SAME		
53								
54	S-28	0.8	33-63 dense			54.0' - 55.0' - blue/gray/green fine to medium sand, some silt, trace heavy minerals		
55								
56	S-29	0.6	50/0.2 dense			56.0' - 56.7' - SAME with trace clay		
57								
58	S-30	1.0	50/0.4 dense			58.0' - 59.4' - SAME		
59								
60	S-31	1.2	52 very dense			60.0' - 62.0' - blue/green fine to medium sand, some soft white shell fragments, some silt, trace clay		
61								
62	S-32	1.0	49 dense			62.0' - 64.0' - SAME		
63								
64	S-33	1.0	7 - loose			64.0' - 66.0' - blue/green fine sand and silt, some clay, trace soft white shell fragments		
65								
66	S-34	0.5	18 - med. dense			66.0' - 68.0' - SAME		
67								
68	S-35	1.6	19 - med. dense			68.0' - 70.0' - blue/green/olive silt some very fine sand, some clay, trace soft white shells		
69								
70								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: SB-03

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation

CTO NO.: 26007-196 BORING NO.: CXBG2-SB03

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
71	S-36	1.6	16 - med. dense			70.0' - 72.0' - SAME		
72	S-37	1.6	32 - dense			72.0' - 74.0' - SAME with some soft white shell fragments		
73								
74	S-38	1.2	16 - med. dense			74.0' - 76.0' - SAME		
75								
76	S-39	1.6	31 - dense			76.0' - 78.0' - blue/olive green silt and very fine sand, trace clay, some-trace shell fragments, damp		
77								
78	S-40	1.8	9 - loose			78.0' - 80.0' - SAME		
79								
80	S-41	2.0	18 - med. dense			80.0' - 81.6' - olive green very fine sand, some silt, some shell fragments, damp		
81								
82						81.6' - 82.0' - dark olive green, silt and very fine sand, trace clay, trace shell fragments, damp		
83	S-42	2.0	6 - loose			82.0' - 84.0' - SAME		
84	S-43	2.0	21 - med. dense			84.0' - 86.0' - SAME with some shell fragments, wet		
85								
86	S-44	2.0	10 - loose			86.0' - 88.0' - dark olive green silt and very fine sand, trace clay, wet		
87								
88	S-45	2.0	12 - med. dense			88.0' - 90.0' - SAME with trace soft white shell fragments, trace gray/black fines		
89								
90								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin

DRILLER: Layne Pech BORING NO.: SB-03

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Cheatham Annex - Background Investigation
CTO NO.: 26007-196 BORING NO.: CXBG2-SB03

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source

Depth (feet)	Sample Type & No.	Sample Rec. (feet)	SPT	Lab ID	PID (ppm) BG/PS	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
91	S-46	2.0	4 - soft			90.0' - 92.0' - dark olive green silt some clay, trace shell fragments trace very fine sand		
92	S-47	2.0	8 - med. stiff			92.0' - 94.0' - SAME		
93								
94	S-48	2.0	9 - med. stiff			94.0' - 96.0' - SAME		
95								
96	S-49	2.0	18 - very stiff			96.0' - 98.0' - SAME		
97								
98	S-50	1.8	10 - stiff			98.0' - 100.0' - dark olive green silt and clay, trace shell fragments		
99								
100								

DRILLING CO.: Parrot Wolfe BAKER REP.: David Martin
DRILLER: Layne Pech BORING NO.: SB-03 SHEET 6 OF 6

APPENDIX C –
SURFACE SOIL DATA

SURFACE SOILS – SOIL ASSOCIATION 1

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SS01-00	BG1-SS02-00	BG1-SS03-00	BG1-SS04-00	BG1-SS05-00	BG1-SS06-00	BG1-SS07-00	BG1-SS08-00	BG1-SS09-00	BG1-SS10-00
SAMPLE DATE	08-06-2001	07-25-2001	07-25-2001	08-06-2001	08-06-2001	08-06-2001	07-25-2001	07-25-2001	07-25-2001	07-25-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Semivolatiles (ug/kg)										
1,1'-Biphenyl	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
2,2'-oxybis(1-Chloropropane	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
2,4,5-Trichlorophenol	1000 U	880 U	4000 U	1400 U	1600 U	2300 U	860 U	870 U	3200 U	1100 U
2,4,6-Trichlorophenol	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
2,4-Dichlorophenol	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
2,4-Dimethylphenol	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
2,4-Dinitrophenol	1000 U	880 U	4000 U	1400 U	1600 U	2300 U	860 U	870 U	3200 U	1100 U
2,4-Dinitrotoluene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
2,6-Dinitrotoluene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
2-Chloronaphthalene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
2-Chlorophenol	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
2-Methylnaphthalene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
2-Methylphenol	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
2-Nitroaniline	1000 U	880 U	4000 U	1400 U	1600 U	2300 U	860 U	870 U	3200 U	1100 U
2-Nitrophenol	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
3,3'-Dichlorobenzidine	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
3-Nitroaniline	1000 U	880 U	4000 U	1400 U	1600 U	2300 U	860 U	870 U	3200 U	1100 U
4,6-Dinitro-2-methylphenol	1000 U	880 U	4000 U	1400 U	1600 U	2300 U	860 U	870 U	3200 U	1100 U
4-Bromophenyl-phenylether	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
4-Chloro-3-methylphenol	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
4-Chloroaniline	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
4-Chlorophenyl-phenylether	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
4-Methylphenol	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
4-Nitroaniline	1000 U	880 U	4000 U	1400 U	1600 U	2300 U	860 U	870 U	3200 U	1100 U
4-Nitrophenol	1000 U	880 U	4000 U	1400 U	1600 U	2300 U	860 U	870 U	3200 U	1100 U
Acenaphthene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Acenaphthylene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Acetophenone	410 U	350 U	1600 U	570 U	630 U	95 J	340 U	350 U	1300 U	450 U
Anthracene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Atrazine	410 UJ	350 UJ	1600 U	570 UJ	630 UJ	920 UJ	340 UJ	350 UJ	1300 UJ	450 UJ
Benzaldehyde	410 U	350 U	1600 U	100 J	630 U	920 U	340 U	350 U	1300 U	450 U
Benzo(a)anthracene	410 U	350 U	220 J	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Benzo(a)pyrene	410 U	350 U	340 J	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Benzo(b)fluoranthene	410 U	350 U	650 J	570 U	630 U	920 U	340 U	350 U	1300 U	450 U

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SS01-00	BG1-SS02-00	BG1-SS03-00	BG1-SS04-00	BG1-SS05-00	BG1-SS06-00	BG1-SS07-00	BG1-SS08-00	BG1-SS09-00	BG1-SS10-00
SAMPLE DATE	08-06-2001	07-25-2001	07-25-2001	08-06-2001	08-06-2001	08-06-2001	07-25-2001	07-25-2001	07-25-2001	07-25-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Semivolatiles (ug/kg) (continued)										
Benzo(g,h,i)perylene	410 U	350 U	350 J	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Benzo(k)fluoranthene	410 U	350 U	260 J	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Butylbenzylphthalate	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Caprolactam	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Carbazole	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Chrysene	410 U	350 U	480 J	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Di-n-butylphthalate	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Di-n-octylphthalate	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Dibenzo(a,h)anthracene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Dibenzofuran	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Diethylphthalate	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Dimethylphthalate	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Fluoranthene	410 U	350 U	270 J	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Fluorene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Hexachlorobenzene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Hexachlorobutadiene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Hexachlorocyclopentadiene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Hexachloroethane	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Indeno(1,2,3-cd)pyrene	410 U	350 U	340 J	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Isophorone	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
N-Nitroso-di-n-propylamine	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
N-nitrosodiphenylamine	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Naphthalene	410 U	350 U	1600 UJ	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Nitrobenzene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Pentachlorophenol	1000 U	880 U	4000 U	1400 U	1600 U	2300 U	860 U	870 U	3200 U	1100 U
Phenanthrene	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Phenol	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
Pyrene	410 U	350 U	330 J	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
bis(2-Chloroethoxy)methane	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
bis(2-Chloroethyl)ether	410 U	350 U	1600 U	570 U	630 U	920 U	340 U	350 U	1300 U	450 U
bis(2-Ethylhexyl)phthalate	410 U	59 J	280 J	68 B	630 U	120 B	120 J	38 J	380 J	66 J

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SS01-00	BG1-SS02-00	BG1-SS03-00	BG1-SS04-00	BG1-SS05-00	BG1-SS06-00	BG1-SS07-00	BG1-SS08-00	BG1-SS09-00	BG1-SS10-00
SAMPLE DATE	08-06-2001	07-25-2001	07-25-2001	08-06-2001	08-06-2001	08-06-2001	07-25-2001	07-25-2001	07-25-2001	07-25-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Pesticides/PCBs (ug/kg)										
4,4'-DDD	4.1 U	3.5 U	11 J	5.3 J	6.3 U	12	3.4 U	3.5 U	13 U	4.5 U
4,4'-DDE	4.1 U	3.5 U	23	5.7 U	6.3 U	4.9 J	3.4 U	3.5 U	4.6 J	4.5 U
4,4'-DDT	4.1 U	3.5 U	10 J	5.7 U	6.3 U	9.2 U	3.4 U	3.5 U	13 U	4.5 U
Aldrin	2.1 U	1.8 U	8.1 U	2.9 U	3.3 U	4.7 U	1.8 U	1.8 U	6.5 U	2.3 U
Dieldrin	3.7 J	3.5 U	16 U	5.7 U	6.3 U	9.2 U	3.4 U	3.5 U	13 U	4.5 U
Endosulfan I	2.1 U	1.8 U	8.1 U	1.1 J	2.1 J	2.1 J	1.8 U	1.8 U	6.5 U	2.3 U
Endosulfan II	4.1 U	3.5 U	16 U	5.7 U	2.1 J	9.2 U	3.4 U	3.5 U	13 U	4.5 U
Endosulfan sulfate	4.1 U	3.5 U	16 U	2.1 J	2.9 J	3.7 J	3.4 U	3.5 U	13 U	4.5 U
Endrin	3.5 J	3.5 U	16 U	5.7 U	6.3 U	9.2 U	3.4 U	3.5 U	13 U	4.5 U
Endrin aldehyde	4.1 U	3.5 U	16 U	1.8 J	12	8.9 J	3.4 U	3.5 U	13 U	4.5 U
Endrin ketone	4.1 U	3.5 U	16 U	5.7 U	4.5 J	3.4 J	3.4 U	3.5 U	13 U	4.5 U
Heptachlor	2.1 U	1.8 U	8.1 U	2.9 U	3.3 U	4.7 U	1.8 U	1.8 U	6.5 U	2.3 U
Heptachlor epoxide	2.1 U	1.8 U	8.1 U	2.9 U	3.3 U	4.7 U	1.8 U	1.8 U	6.5 U	2.3 U
Methoxychlor	21 U	18 U	81 U	29 U	33 U	47 U	18 U	18 U	65 U	23 U
Toxaphene	210 U	180 U	810 U	290 U	330 U	470 U	180 U	180 U	650 U	230 U
alpha-BHC	1.6 J	1.8 U	8.1 U	1.1 J	0.72 J	1.2 J	1.8 U	1.8 U	6.5 U	2.3 U
alpha-Chlordane	2.1 U	1.8 U	4.7 J	1.1 B	3.4 B	4.7 U	1.8 U	1.8 U	6.5 U	2.3 U
beta-BHC	14 J	1.8 U	8.1 U	2.9 U	5.3 J	4.7 U	1.8 U	1.8 U	6.5 U	2.3 U
delta-BHC	2.1 U	1.8 U	8.1 U	5 P	3.3 U	4.7 U	1.8 U	1.8 U	6.5 U	2.3 U
gamma-BHC (Lindane)	3.3	1.8 U	8.1 U	1.4 J	3.3 U	4.7 U	1.8 U	1.8 U	6.5 U	2.3 U
gamma-Chlordane	2.1 U	1.8 U	7 J	2.9 U	0.92 J	1.9 J	1.8 U	1.8 U	6.5 U	2.3 U
Aroclor-1016	41 U	35 U	160 U	57 U	63 U	92 U	34 U	35 U	130 U	45 U
Aroclor-1221	84 U	71 U	320 U	120 U	130 U	190 U	69 U	71 U	260 U	90 U
Aroclor-1232	41 U	35 U	160 U	57 U	63 U	92 U	34 U	35 U	130 U	45 U
Aroclor-1242	41 U	35 U	160 U	57 U	63 U	92 U	34 U	35 U	130 U	45 U
Aroclor-1248	41 U	35 U	160 U	57 U	63 U	92 U	34 U	35 U	130 U	45 U
Aroclor-1254	41 U	35 U	160 U	57 U	63 U	92 U	34 U	35 U	130 U	45 U
Aroclor-1260	41 U	35 U	160 U	57 U	63 U	92 U	34 U	35 U	130 U	45 U

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SS01-00	BG1-SS02-00	BG1-SS03-00	BG1-SS04-00	BG1-SS05-00	BG1-SS06-00	BG1-SS07-00	BG1-SS08-00	BG1-SS09-00	BG1-SS10-00
SAMPLE DATE	08-06-2001	07-25-2001	07-25-2001	08-06-2001	08-06-2001	08-06-2001	07-25-2001	07-25-2001	07-25-2001	07-25-2001
SAMPLE DEPTH	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Inorganics (mg/kg)										
Aluminum	2330	2930	3640	2370	2830	4420	3820	4570	2660	4290
Antimony	0.41 B	0.35 UL	0.37 UL	0.35 U	0.37 U	0.4 U	0.36 UL	0.36 U	0.36 U	0.37 U
Arsenic	0.56 B	0.63 J	0.8 J	0.61 B	1.2 B	4.1	1.5 J	1.6 J	0.66 B	1.2 B
Barium	28.3 J	24.6 J	28.5 J	12.2 J	25 J	27.4 J	26.9 J	29.4 J	22.3 J	32.7 B
Beryllium	0.42 B	0.38 B	0.4 B	0.13 B	0.31 B	0.42 B	0.42 B	0.52 B	0.37 B	0.36 B
Cadmium	0.094 U	0.083 U	0.086 U	0.083 U	0.087 U	0.093 U	0.084 U	0.084 U	0.084 U	0.086 U
Calcium	830 J	598 J	321 J	112 J	1210	3320	373 J	345 J	536 J	319 B
Chromium	2.9	5.5	3.6	2.9	4.5	12.4	6.1	5.5	3.4	3.8
Cobalt	1.3 J	1.2 J	2.3 J	1 J	5.3 J	1.8 J	3.1 J	2.7 J	1.8 B	2.3 B
Copper	1.6 B	1.4 J	1.5 J	0.83 B	2 B	4 J	1.5 J	0.99 B	1.2 B	1.5 B
Cyanide	0.047 U	0.042 U	0.043 U	0.053 B	0.06 B	0.068 B	0.043 U	0.042 U	0.04 U	0.04 U
Iron	2660	5320	3540	2650	4420	12600	6740	5480	3420	3770
Lead	9.1	8.2	10.1	8.1	6.4	11	8.9	6.8	6.6	9.8
Magnesium	248 J	463 J	262 J	157 J	412 J	1020 J	510 J	401 J	271 BE	292 BE
Manganese	257	81.4	134	68	197	100	169	112	62.7	101
Mercury	0.059 U	0.048 U	0.042 U	0.052 U	0.053 U	0.058 U	0.054 U	0.048 U	0.05 U	0.05 U
Nickel	2 B	2.4 J	2.9 J	1.4 J	3.9 J	3.8 J	3.4 J	2.9 J	2 J	2.8 J
Potassium	167 B	360 J	188 B	93.5 B	245 J	1210 L	356 J	231 B	200 B	161 B
Selenium	0.66 UL	0.69 J	0.61 UL	0.58 UL	0.61 UL	0.65 UL	0.59 UL	0.59 UL	0.59 UL	0.6 UL
Silver	0.16 J	0.1 U	0.11 U	0.1 U	0.11 U	0.12 U	0.1 U	0.1 U	0.1 U	0.11 U
Sodium	356 B	154 B	171 B	305 B	264 B	321 B	194 B	293 B	308 B	250 B
Thallium	0.96 UL	0.85 UL	0.89 UL	0.85 UL	0.9 UL	0.95 UL	0.86 UL	0.86 UL	0.86 UL	0.88 UL
Vanadium	5.7 J	8 J	7.8 J	6 J	7.5 J	15.2	11.6	9.4 J	6.1 J	7.6 J
Zinc	14.5 J	12.2	9.9	4.9 J	10.8 J	17.9 J	11.3	8.2 J	5.4 J	8.5 J

APPENDIX C
ORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Semivolatiles (ug/kg)												
1,1'-Biphenyl	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
2,2'-oxybis(1-Chloropropane)	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
2,4,5-Trichlorophenol	860 U	4000 U	ND	ND	NA	0/10	860.5	551	1,180	6.6	0.57	1,349
2,4,6-Trichlorophenol	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
2,4-Dichlorophenol	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
2,4-Dimethylphenol	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
2,4-Dinitrophenol	860 U	4000 U	ND	ND	NA	0/10	860.5	551	1,180	6.6	0.57	1,349
2,4-Dinitrotoluene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
2,6-Dinitrotoluene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
2-Chloronaphthalene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
2-Chlorophenol	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
2-Methylnaphthalene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
2-Methylphenol	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
2-Nitroaniline	860 U	4000 U	ND	ND	NA	0/10	860.5	551	1,180	6.6	0.57	1,349
2-Nitrophenol	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
3,3'-Dichlorobenzidine	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
3-Nitroaniline	860 U	4000 U	ND	ND	NA	0/10	860.5	551	1,180	6.6	0.57	1,349
4,6-Dinitro-2-methylphenol	860 U	4000 U	ND	ND	NA	0/10	860.5	551	1,180	6.6	0.57	1,349
4-Bromophenyl-phenylether	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
4-Chloro-3-methylphenol	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
4-Chloroaniline	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
4-Chlorophenyl-phenylether	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
4-Methylphenol	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
4-Nitroaniline	860 U	4000 U	ND	ND	NA	0/10	860.5	551	1,180	6.6	0.57	1,349
4-Nitrophenol	860 U	4000 U	ND	ND	NA	0/10	860.5	551	1,180	6.6	0.57	1,349
Acenaphthene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Acenaphthylene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Acetophenone	340 U	1600 U	95 J	95 J	BG1-SS06-00	1/10	309.5	230	443	5.53	0.64	535
Anthracene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Atrazine	340 UJ	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Benzaldehyde	340 U	1600 U	100 J	100 J	BG1-SS04-00	1/10	327.5	234	463	5.59	0.66	580
Benzo(a)anthracene	340 U	1300 U	220 J	220 J	BG1-SS03-00	1/10	288	155	378	5.56	0.45	401
Benzo(a)pyrene	340 U	1300 U	340 J	340 J	BG1-SS03-00	1/10	300	154	389	5.6	0.45	420
Benzo(b)fluoranthene	340 U	1300 U	650 J	650 J	BG1-SS03-00	1/10	331	190	441	5.67	0.53	505
Benzo(g,h,i)perylene	340 U	1300 U	350 J	350 J	BG1-SS03-00	1/10	301	154	390	5.61	0.45	422
Benzo(k)fluoranthene	340 U	1300 U	260 J	260 J	BG1-SS03-00	1/10	292	154	381	5.58	0.44	406

APPENDIX C
ORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Semivolatiles (ug/kg) (Cont)												
Butylbenzylphthalate	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Caprolactam	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Carbazole	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Chrysene	340 U	1300 U	480 J	480 J	BG1-SS03-00	1/10	314	164	409	5.64	0.48	452
Di-n-butylphthalate	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Di-n-octylphthalate	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Dibenzo(a,h)anthracene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Dibenzofuran	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Diethylphthalate	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Dimethylphthalate	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Fluoranthene	340 U	1300 U	270 J	270 J	BG1-SS03-00	1/10	293	153	382	5.58	0.44	407
Fluorene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Hexachlorobenzene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Hexachlorobutadiene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Hexachlorocyclopentadiene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Hexachloroethane	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Indeno(1,2,3-cd)pyrene	340 U	1300 U	340 J	340 J	BG1-SS03-00	1/10	300	154	389	5.6	0.45	420
Isophorone	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
N-Nitroso-di-n-propylamine	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
N-nitrosodiphenylamine	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Naphthalene	340 U	1600 UJ	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Nitrobenzene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Pentachlorophenol	860 U	4000 U	ND	ND	NA	0/10	860.5	551	1,180	6.6	0.57	1,349
Phenanthrene	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Phenol	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
Pyrene	340 U	1300 U	330 J	330 J	BG1-SS03-00	1/10	299	154	388	5.6	0.45	418
bis(2-Chloroethoxy)methane	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
bis(2-Chloroethyl)ether	340 U	1600 U	ND	ND	NA	0/10	346	221	474	5.69	0.57	543
bis(2-Ethylhexyl)phthalate	68 B	630 U	38 J	380 J	BG1-SS09-00	6/10	155.7	129	231	4.7	0.91	424

APPENDIX C
ORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Pesticides/PCBs (ug/kg)												
4,4'-DDD	3.4 U	13 U	5.3 J	12	BG1-SS06-00	3/10	4.745	3.92	7.02	1.27	0.77	9.67
4,4'-DDE	3.4 U	6.3 U	4.6 J	23	BG1-SS03-00	3/10	4.8	6.50	8.57	1.16	0.79	8.97
4,4'-DDT	3.4 U	13 U	10 J	10 J	BG1-SS03-00	1/10	3.66	2.70	5.23	1.11	0.61	6.11
Aldrin	1.8 U	8.1 U	ND	ND	NA	0/10	1.765	1.11	2.41	0.42	0.56	2.75
Dieldrin	3.4 U	16 U	3.7 J	3.7 J	BG1-SS01-00	1/10	3.625	2.16	4.87	1.14	0.55	5.66
Endosulfan I	1.8 U	8.1 U	1.1 J	2.1 J	BG1-SS05-00,BG1-SS06-00	3/10	1.75	1.12	2.40	0.4	0.57	2.75
Endosulfan II	3.4 U	16 U	2.1 J	2.1 J	BG1-SS05-00	1/10	3.355	2.25	4.66	1.04	0.57	5.28
Endosulfan sulfate	3.4 U	16 U	2.1 J	3.7 J	BG1-SS06-00	3/10	3.27	2.21	4.55	1.02	0.56	5.06
Endrin	3.4 U	16 U	3.5 J	3.5 J	BG1-SS01-00	1/10	3.605	2.16	4.85	1.14	0.55	5.62
Endrin aldehyde	3.4 U	16 U	1.8 J	12	BG1-SS05-00	3/10	4.67	3.84	6.90	1.24	0.81	10.43
Endrin ketone	3.4 U	16 U	3.4 J	4.5 J	BG1-SS05-00	2/10	3.475	2.20	4.75	1.09	0.57	5.45
Heptachlor	1.8 U	8.1 U	ND	ND	NA	0/10	1.765	1.11	2.41	0.42	0.56	2.75
Heptachlor epoxide	1.8 U	8.1 U	ND	ND	NA	0/10	1.765	1.11	2.41	0.42	0.56	2.75
Methoxychlor	18 U	81 U	ND	ND	NA	0/10	17.65	11.1	24.1	2.72	0.56	27.5
Toxaphene	180 U	810 U	ND	ND	NA	0/10	176.5	110.6	240.6	5.02	0.56	275
alpha-BHC	1.8 U	8.1 U	0.72 J	1.6 J	BG1-SS01-00	4/10	1.577	1.13	2.23	0.28	0.57	2.46
alpha-Chlordane	1.1 B	6.5 U	4.7 J	4.7 J	BG1-SS03-00	1/10	1.745	1.32	2.51	0.34	0.67	3.10
beta-BHC	1.8 U	8.1 U	5.3 J	14 J	BG1-SS01-00	2/10	3.425	4.02	5.75	0.79	0.93	8.85
delta-BHC	1.8 U	8.1 U	5 P	5 P	BG1-SS04-00	1/10	2.12	1.50	2.99	0.54	0.67	3.79
gamma-BHC (Lindane)	1.8 U	8.1 U	1.4 J	3.3	BG1-SS01-00	2/10	1.985	1.17	2.67	0.53	0.59	3.21
gamma-Chlordane	1.8 U	6.5 U	0.92 J	7 J	BG1-SS03-00	3/10	1.942	1.92	3.06	0.39	0.69	3.35
Aroclor-1016	34 U	160 U	ND	ND	NA	0/10	34.6	22.1	47.4	3.39	0.57	54.3
Aroclor-1221	69 U	320 U	ND	ND	NA	0/10	70.25	44.1	95.8	4.1	0.56	110
Aroclor-1232	34 U	160 U	ND	ND	NA	0/10	34.6	22.1	47.4	3.39	0.57	54.3
Aroclor-1242	34 U	160 U	ND	ND	NA	0/10	34.6	22.1	47.4	3.39	0.57	54.3
Aroclor-1248	34 U	160 U	ND	ND	NA	0/10	34.6	22.1	47.4	3.39	0.57	54.3
Aroclor-1254	34 U	160 U	ND	ND	NA	0/10	34.6	22.1	47.4	3.39	0.57	54.3
Aroclor-1260	34 U	160 U	ND	ND	NA	0/10	34.6	22.1	47.4	3.39	0.57	54.3

APPENDIX C
INORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Inorganics (mg/kg)												
Aluminum	ND	ND	2330	4570	BG1-SS08-00	10/10	3386	865	3,887	8.1	0.26	4,032
Antimony	0.35 U	0.41 B	ND	ND	NA	0/10	0.185	0.01	0.19	-1.69	0.05	0.191
Arsenic	0.56 B	1.2 B	0.63 J	4.1	BG1-SS06-00	5/10	1.0745	1.16	1.75	-0.3	0.85	2.429
Barium	32.7 B	32.7 B	12.2 J	29.4 J	BG1-SS08-00	9/10	24.095	5.67	27.38	3.15	0.29	29.3
Beryllium	0.13 B	0.52 B	ND	ND	NA	0/10	0.1865	0.05	0.22	-1.73	0.38	0.248
Cadmium	0.083 U	0.094 U	ND	ND	NA	0/10	0.0432	0.00	0.04	-3.14	0.05	0.044
Calcium	319 B	319 B	112 J	3320	BG1-SS06-00	9/10	780.45	950	1,331	6.19	0.98	2,173
Chromium	ND	ND	2.9	12.4	BG1-SS06-00	10/10	5.06	2.82	6.69	1.52	0.44	6.980
Cobalt	1.8 B	2.3 B	1 J	5.3 J	BG1-SS05-00	8/10	2.075	1.36	2.87	0.57	0.58	3.284
Copper	0.83 B	2 B	1.4 J	4 J	BG1-SS06-00	4/10	1.246	1.05	1.85	-0.01	0.67	2.183
Cyanide	0.04 U	0.068 B	ND	ND	NA	0/10	0.0239	0.00	0.03	-3.75	0.18	0.027
Iron	ND	ND	2650	12600	BG1-SS06-00	10/10	5060	2,954	6,773	8.42	0.47	7,163
Lead	ND	ND	6.4	11	BG1-SS06-00	10/10	8.5	1.57	9.41	2.12	0.19	9.6
Magnesium	ND	ND	157 J	1020 J	BG1-SS06-00	10/10	403.6	243	544	5.87	0.51	606
Manganese	ND	ND	62.7	257	BG1-SS01-00	10/10	128.21	62	164	4.76	0.46	182
Mercury	0.042 U	0.059 U	ND	ND	NA	0/10	0.0257	0.00	0.03	-3.67	0.1	0.027
Nickel	2 B	2 B	1.4 J	3.9 J	BG1-SS05-00	9/10	2.65	0.96	3.21	0.9	0.44	3.750
Potassium	93.5 B	231 B	245 J	1210 L	BG1-SS06-00	4/10	269.125	350	472	5.09	0.98	720
Selenium	0.58 UL	0.66 UL	0.69 J	0.69 J	BG1-SS02-00	1/10	0.343	0.12	0.41	-1.11	0.26	0.406
Silver	0.1 U	0.12 U	0.16 J	0.16 J	BG1-SS01-00	1/10	0.0635	0.03	0.08	-2.83	0.36	0.080
Sodium	154 B	356 B	ND	ND	NA	0/10	130.8	34.14	150.59	4.84	0.29	159
Thallium	0.85 UL	0.96 UL	ND	ND	NA	0/10	0.443	0.02	0.45	-0.82	0.04	0.455
Vanadium	ND	ND	5.7 J	15.2	BG1-SS06-00	10/10	8.49	2.94	10.19	2.09	0.31	10.5
Zinc	ND	ND	4.9 J	17.9 J	BG1-SS06-00	10/10	10.36	3.96	12.66	2.27	0.41	14.2

SURFACE SOILS – SOIL ASSOCIATION 2

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIVATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG2-SS01-00	BG2-SS02-00	BG2-SS03-00	BG2-SS04-00	BG2-SS05-00	BG2-SS06-00	BG2-SS07-00	BG2-SS08-00	BG2-SS09-00	BG2-SS10-00
SAMPLE DATE	07-27-2001	07-24-2001	07-25-2001	07-26-2001	07-26-2001	07-27-2001	07-24-2001	07-24-2001	07-24-2001	07-25-2001
SAMPLE DEPTH (inches)	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"
Semivolatiles (ug/kg)										
1,1'-Biphenyl	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
2,2'-oxybis(1-Chloropropane)	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
2,4,5-Trichlorophenol	980 U	890 U	890 U	900 U	970 U	1000 U	900 U	910 U	880 U	2700 U
2,4,6-Trichlorophenol	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
2,4-Dichlorophenol	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
2,4-Dimethylphenol	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
2,4-Dinitrophenol	980 UJ	890 U	890 U	900 UJ	970 UJ	1000 U	900 U	910 UJ	880 UJ	2700 U
2,4-Dinitrotoluene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
2,6-Dinitrotoluene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
2-Chloronaphthalene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
2-Chlorophenol	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
2-Methylnaphthalene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
2-Methylphenol	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
2-Nitroaniline	980 U	890 U	890 U	900 U	970 U	1000 U	900 U	910 U	880 U	2700 U
2-Nitrophenol	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
3,3'-Dichlorobenzidine	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
3-Nitroaniline	980 U	890 U	890 U	900 U	970 U	1000 U	900 U	910 U	880 U	2700 U
4,6-Dinitro-2-methylphenol	980 U	890 U	890 U	900 U	970 U	1000 U	900 U	910 U	880 U	2700 U
4-Bromophenyl-phenylether	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
4-Chloro-3-methylphenol	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
4-Chloroaniline	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
4-Chlorophenyl-phenylether	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
4-Methylphenol	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
4-Nitroaniline	980 U	890 U	890 U	900 U	970 U	1000 U	900 U	910 U	880 U	2700 U
4-Nitrophenol	980 U	890 U	890 U	900 U	970 U	1000 U	900 U	910 U	880 U	2700 U
Acenaphthene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Acenaphthylene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Acetophenone	390 U	350 U	350 U	360 U	380 U	41 J	360 U	360 U	350 U	1100 U
Anthracene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Atrazine	390 UJ	350 UJ	350 UJ	360 UJ	380 UJ	400 UJ	360 UJ	360 UJ	350 UJ	1100 UJ
Benzaldehyde	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Benzo(a)anthracene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Benzo(a)pyrene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Benzo(b)fluoranthene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIVATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG2-SS01-00	BG2-SS02-00	BG2-SS03-00	BG2-SS04-00	BG2-SS05-00	BG2-SS06-00	BG2-SS07-00	BG2-SS08-00	BG2-SS09-00	BG2-SS10-00
SAMPLE DATE	07-27-2001	07-24-2001	07-25-2001	07-26-2001	07-26-2001	07-27-2001	07-24-2001	07-24-2001	07-24-2001	07-25-2001
SAMPLE DEPTH (inches)	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"
Semivolatiles (ug/kg) (continued)										
Benzo(g,h,i)perylene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Benzo(k)fluoranthene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Butylbenzylphthalate	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Caprolactam	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Carbazole	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Chrysene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Di-n-butylphthalate	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Di-n-octylphthalate	390 U	350 U	350 U	360 U	380 U	66 J	360 U	360 U	350 U	1100 U
Dibenzo(a,h)anthracene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Dibenzofuran	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Diethylphthalate	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Dimethylphthalate	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Fluoranthene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Fluorene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Hexachlorobenzene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Hexachlorobutadiene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Hexachlorocyclopentadiene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Hexachloroethane	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Indeno(1,2,3-cd)pyrene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Isophorone	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
N-Nitroso-di-n-propylamine	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
N-nitrosodiphenylamine	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Naphthalene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Nitrobenzene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Pentachlorophenol	980 U	890 U	890 U	900 U	970 U	1000 U	900 U	910 U	880 U	2700 U
Phenanthrene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Phenol	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
Pyrene	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
bis(2-Chloroethoxy)methane	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
bis(2-Chloroethyl)ether	390 U	350 U	350 U	360 U	380 U	400 U	360 U	360 U	350 U	1100 U
bis(2-Ethylhexyl)phthalate	140 B	240 J	46 J	250 B	2000	2100	140 J	670 B	200 B	5000

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIVATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG2-SS01-00	BG2-SS02-00	BG2-SS03-00	BG2-SS04-00	BG2-SS05-00	BG2-SS06-00	BG2-SS07-00	BG2-SS08-00	BG2-SS09-00	BG2-SS10-00
SAMPLE DATE	07-27-2001	07-24-2001	07-25-2001	07-26-2001	07-26-2001	07-27-2001	07-24-2001	07-24-2001	07-24-2001	07-25-2001
SAMPLE DEPTH (inches)	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"
Pesticides/PCBs (ug/kg)										
4,4'-DDD	3.9 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U	3.6 U	3.6 U	3.5 U	3.6 U
4,4'-DDE	3.9 U	1.1 J	3.6 U	3.6 U	3.8 U	4 U	3.6 U	3.6 U	3.5 U	3.6 U
4,4'-DDT	3.9 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U	3.6 U	3.6 U	3.5 U	3.6 U
Aldrin	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U	1.8 U	1.8 U	1.8 U	1.8 U
Dieldrin	3.9 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U	3.6 U	3.6 U	3.5 U	3.6 U
Endosulfan I	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U	1.8 U	1.8 U	1.8 U	1.8 U
Endosulfan II	3.9 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U	3.6 U	3.6 U	3.5 U	3.6 U
Endosulfan sulfate	3.9 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U	3.6 U	3.6 U	3.5 U	3.6 U
Endrin	3.9 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U	3.6 U	3.6 U	3.5 U	3.6 U
Endrin aldehyde	3.9 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U	3.6 U	3.6 U	3.5 U	3.6 U
Endrin ketone	3.9 U	3.5 U	3.6 U	3.6 U	3.8 U	4 U	3.6 U	3.6 U	3.5 U	3.6 U
Heptachlor	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U	1.8 U	1.8 U	1.8 U	1.8 U
Heptachlor epoxide	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U	1.8 U	1.8 U	1.8 U	1.8 U
Methoxychlor	20 U	18 U	18 U	18 U	20 U	21 U	18 U	18 U	18 U	18 U
Toxaphene	200 U	180 U	180 U	180 U	200 U	210 U	180 U	180 U	180 U	180 U
alpha-BHC	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U	1.8 U	1.8 U	1.8 U	1.8 U
alpha-Chlordane	2 U	1.1 J	1.8 U	1.8 U	2 U	2.1 U	1.1 J	0.83 B	0.59 B	2.5
beta-BHC	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U	1.8 U	1.8 U	1.8 U	1.8 U
delta-BHC	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U	0.65 J	1.8 U	1.8 U	1.8 U
gamma-BHC (Lindane)	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U	1.8 U	1.8 U	1.8 U	1.8 U
gamma-Chlordane	2 U	1.8 U	1.8 U	1.8 U	2 U	2.1 U	0.55 J	1.9 U	1.8 U	1.8 U
Aroclor-1016	39 U	35 U	36 U	36 U	38 U	40 U	36 U	36 U	35 U	36 U
Aroclor-1221	79 U	72 U	72 U	73 U	78 U	82 U	73 U	73 U	71 U	73 U
Aroclor-1232	39 U	35 U	36 U	36 U	38 U	40 U	36 U	36 U	35 U	36 U
Aroclor-1242	39 U	35 U	36 U	36 U	38 U	40 U	36 U	36 U	35 U	36 U
Aroclor-1248	39 U	35 U	36 U	36 U	38 U	40 U	36 U	36 U	35 U	36 U
Aroclor-1254	39 U	35 U	36 U	36 U	38 U	40 U	36 U	36 U	35 U	36 U
Aroclor-1260	39 U	35 U	36 U	36 U	38 U	40 U	36 U	36 U	35 U	36 U

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIVATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG2-SS01-00	BG2-SS02-00	BG2-SS03-00	BG2-SS04-00	BG2-SS05-00	BG2-SS06-00	BG2-SS07-00	BG2-SS08-00	BG2-SS09-00	BG2-SS10-00
SAMPLE DATE	07-27-2001	07-24-2001	07-25-2001	07-26-2001	07-26-2001	07-27-2001	07-24-2001	07-24-2001	07-24-2001	07-25-2001
SAMPLE DEPTH (inches)	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"
Inorganics (mg/kg)										
Aluminum	2330	2930	3640	2370	2830	4420	3820	4570	2660	4290
Antimony	0.41 B	0.35 UL	0.37 UL	0.35 U	0.37 U	0.4 U	0.36 UL	0.36 U	0.36 U	0.37 U
Arsenic	0.56 B	0.63 J	0.8 J	0.61 B	1.2 B	4.1	1.5 J	1.6 J	0.66 B	1.2 B
Barium	28.3 J	24.6 J	28.5 J	12.2 J	25 J	27.4 J	26.9 J	29.4 J	22.3 J	32.7 B
Beryllium	0.42 B	0.38 B	0.4 B	0.13 B	0.31 B	0.42 B	0.42 B	0.52 B	0.37 B	0.36 B
Cadmium	0.094 U	0.083 U	0.086 U	0.083 U	0.087 U	0.093 U	0.084 U	0.084 U	0.084 U	0.086 U
Calcium	830 J	598 J	321 J	112 J	1210	3320	373 J	345 J	536 J	319 B
Chromium	2.9	5.5	3.6	2.9	4.5	12.4	6.1	5.5	3.4	3.8
Cobalt	1.3 J	1.2 J	2.3 J	1 J	5.3 J	1.8 J	3.1 J	2.7 J	1.8 B	2.3 B
Copper	1.6 B	1.4 J	1.5 J	0.83 B	2 B	4 J	1.5 J	0.99 B	1.2 B	1.5 B
Cyanide	0.047 U	0.042 U	0.043 U	0.053 B	0.06 B	0.068 B	0.043 U	0.042 U	0.04 U	0.04 U
Iron	2660	5320	3540	2650	4420	12600	6740	5480	3420	3770
Lead	9.1	8.2	10.1	8.1	6.4	11	8.9	6.8	6.6	9.8
Magnesium	248 J	463 J	262 J	157 J	412 J	1020 J	510 J	401 J	271 BE	292 BE
Manganese	257	81.4	134	68	197	100	169	112	62.7	101
Mercury	0.059 U	0.048 U	0.042 U	0.052 U	0.053 U	0.058 U	0.054 U	0.048 U	0.05 U	0.05 U
Nickel	2 B	2.4 J	2.9 J	1.4 J	3.9 J	3.8 J	3.4 J	2.9 J	2 J	2.8 J
Potassium	167 B	360 J	188 B	93.5 B	245 J	1210 L	356 J	231 B	200 B	161 B
Selenium	0.66 UL	0.69 J	0.61 UL	0.58 UL	0.61 UL	0.65 UL	0.59 UL	0.59 UL	0.59 UL	0.6 UL
Silver	0.16 J	0.1 U	0.11 U	0.1 U	0.11 U	0.12 U	0.1 U	0.1 U	0.1 U	0.11 U
Sodium	356 B	154 B	171 B	305 B	264 B	321 B	194 B	293 B	308 B	250 B
Thallium	0.96 UL	0.85 UL	0.89 UL	0.85 UL	0.9 UL	0.95 UL	0.86 UL	0.86 UL	0.86 UL	0.88 UL
Vanadium	5.7 J	8 J	7.8 J	6 J	7.5 J	15.2	11.6	9.4 J	6.1 J	7.6 J
Zinc	14.5 J	12.2	9.9	4.9 J	10.8 J	17.9 J	11.3	8.2 J	5.4 J	8.5 J

APPENDIX C
ORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Semivolatiles (ug/kg)												
1,1'-Biphenyl	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
2,2'-oxybis(1-Chloropropane)	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
2,4,5-Trichlorophenol	880 U	2700 U	ND	ND	NA	0/10	551	282	714	6.24	0.34	692
2,4,6-Trichlorophenol	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
2,4-Dichlorophenol	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
2,4-Dimethylphenol	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
2,4-Dinitrophenol	880 UJ	2700 U	ND	ND	NA	0/10	551	282	714	6.24	0.34	692
2,4-Dinitrotoluene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
2,6-Dinitrotoluene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
2-Chloronaphthalene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
2-Chlorophenol	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
2-Methylnaphthalene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
2-Methylphenol	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
2-Nitroaniline	880 U	2700 U	ND	ND	NA	0/10	551	282	714	6.24	0.34	692
2-Nitrophenol	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
3,3'-Dichlorobenzidine	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
3-Nitroaniline	880 U	2700 U	ND	ND	NA	0/10	551	282	714	6.24	0.34	692
4,6-Dinitro-2-methylphenol	880 U	2700 U	ND	ND	NA	0/10	551	282	714	6.24	0.34	692
4-Bromophenyl-phenylether	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
4-Chloro-3-methylphenol	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
4-Chloroaniline	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
4-Chlorophenyl-phenylether	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
4-Methylphenol	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
4-Nitroaniline	880 U	2700 U	ND	ND	NA	0/10	551	282	714	6.24	0.34	692
4-Nitrophenol	880 U	2700 U	ND	ND	NA	0/10	551	282	714	6.24	0.34	692
Acenaphthene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Acenaphthylene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Acetophenone	350 U	1100 U	41 J	41 J	BG2-SS06-00	1/10	204.1	129	279	5.16	0.62	356
Anthracene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Atrazine	350 UJ	1100 UJ	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Benzaldehyde	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Benzo(a)anthracene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Benzo(a)pyrene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Benzo(b)fluoranthene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Benzo(g,h,i)perylene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Benzo(k)fluoranthene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278

APPENDIX C
ORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Semivolatiles (ug/kg)												
Butylbenzylphthalate	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Caprolactam	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Carbazole	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Chrysene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Di-n-butylphthalate	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Di-n-octylphthalate	350 U	1100 U	66 J	66 J	BG2-SS06-00	1/10	206.6	126	280	5.21	0.50	308
Dibenzo(a,h)anthracene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Dibenzofuran	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Diethylphthalate	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Dimethylphthalate	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Fluoranthene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Fluorene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Hexachlorobenzene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Hexachlorobutadiene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Hexachlorocyclopentadiene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Hexachloroethane	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Indeno(1,2,3-cd)pyrene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Isophorone	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
N-Nitroso-di-n-propylamine	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
N-nitrosodiphenylamine	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Naphthalene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Nitrobenzene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Pentachlorophenol	880 U	2700 U	ND	ND	NA	0/10	551	282	714	6.24	0.34	692
Phenanthrene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Phenol	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
Pyrene	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
bis(2-Chloroethoxy)methane	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
bis(2-Chloroethyl)ether	350 U	1100 U	ND	ND	NA	0/10	220	116	287	5.32	0.35	278
bis(2-Ethylhexyl)phthalate	140 B	670 B	46 J	5000	BG2-SS10-00	6/10	1015.6	1,610	1,949	5.75	1.62	15,414

APPENDIX C
ORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Pesticides/PCBs (ug/kg)												
4,4'-DDD	3.5 U	4 U	ND	ND	NA	0/10	1.84	0.085	1.884	0.61	0.05	1.886
4,4'-DDE	3.5 U	4 U	1.1 J	1.1 J	BG2-SS02-00	1/10	1.77	0.249	1.914	0.56	0.17	1.973
4,4'-DDT	3.5 U	4 U	ND	ND	NA	0/10	1.84	0.085	1.884	0.61	0.05	1.886
Aldrin	1.8 U	2.1 U	ND	ND	NA	0/10	0.94	0.058	0.969	-0.07	0.06	0.970
Dieldrin	3.5 U	4 U	ND	ND	NA	0/10	1.84	0.085	1.884	0.61	0.05	1.886
Endosulfan I	1.8 U	2.1 U	ND	ND	NA	0/10	0.94	0.058	0.969	-0.07	0.06	0.970
Endosulfan II	3.5 U	4 U	ND	ND	NA	0/10	1.84	0.085	1.884	0.61	0.05	1.886
Endosulfan sulfate	3.5 U	4 U	ND	ND	NA	0/10	1.84	0.085	1.884	0.61	0.05	1.886
Endrin	3.5 U	4 U	ND	ND	NA	0/10	1.84	0.085	1.884	0.61	0.05	1.886
Endrin aldehyde	3.5 U	4 U	ND	ND	NA	0/10	1.84	0.085	1.884	0.61	0.05	1.886
Endrin ketone	3.5 U	4 U	ND	ND	NA	0/10	1.84	0.085	1.884	0.61	0.05	1.886
Heptachlor	1.8 U	2.1 U	ND	ND	NA	0/10	0.94	0.058	0.969	-0.07	0.06	0.970
Heptachlor epoxide	1.8 U	2.1 U	ND	ND	NA	0/10	0.94	0.058	0.969	-0.07	0.06	0.970
Methoxychlor	18 U	21 U	ND	ND	NA	0/10	9.35	0.580	9.7	2.23	0.06	9.7
Toxaphene	180 U	210 U	ND	ND	NA	0/10	93.50	5.798	96.9	4.54	0.06	97.0
alpha-BHC	1.8 U	2.1 U	ND	ND	NA	0/10	0.94	0.058	0.969	-0.07	0.06	0.970
alpha-Chlordane	0.59 B	2.1 U	1.1 J	2.5	BG2-SS10-00	3/10	1.03	0.589	1.368	-0.12	0.58	1.663
beta-BHC	1.8 U	2.1 U	ND	ND	NA	0/10	0.94	0.058	0.969	-0.07	0.06	0.970
delta-BHC	1.8 U	2.1 U	0.65 J	0.65 J	BG2-SS07-00	1/10	0.91	0.108	0.972	-0.1	0.13	0.989
gamma-BHC (Lindane)	1.8 U	2.1 U	ND	ND	NA	0/10	0.94	0.058	0.969	-0.07	0.06	0.970
gamma-Chlordane	1.8 U	2.1 U	0.55 J	0.55 J	BG2-SS07-00	1/10	0.91	0.136	0.984	-0.11	0.18	1.016
Aroclor-1016	35 U	40 U	ND	ND	NA	0/10	18.35	0.852	18.844	2.91	0.05	18.9
Aroclor-1221	71 U	82 U	ND	ND	NA	0/10	37.30	1.844	38.4	3.62	0.05	38.4
Aroclor-1232	35 U	40 U	ND	ND	NA	0/10	18.4	0.852	18.8	2.91	0.05	18.9
Aroclor-1242	35 U	40 U	ND	ND	NA	0/10	18.4	0.852	18.8	2.91	0.05	18.9
Aroclor-1248	35 U	40 U	ND	ND	NA	0/10	18.4	0.852	18.8	2.91	0.05	18.9
Aroclor-1254	35 U	40 U	ND	ND	NA	0/10	18.4	0.852	18.8	2.91	0.05	18.9
Aroclor-1260	35 U	40 U	ND	ND	NA	0/10	18.4	0.852	18.8	2.91	0.05	18.9

APPENDIX C
INORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Inorganics (mg/kg)												
Aluminum	ND	ND	2330	4570	BG2-SS08-00	10/10	3386	865	3,887	8.1	0.26	4,032
Antimony	0.35 U	0.41 B	ND	ND	NA	0/10	0.185	0.010	0.191	-1.69	0.05	0.191
Arsenic	0.56 B	1.2 B	0.63 J	4.1	BG2-SS06-00	5/10	1.0745	1.160	1.747	-0.3	0.85	2.4
Barium	32.7 B	32.7 B	12.2 J	29.4 J	BG2-SS08-00	9/10	24.095	5.7	27.4	3.15	0.29	29.3
Beryllium	0.13 B	0.52 B	ND	ND	NA	0/10	0.1865	0.051	0.216	-1.73	0.38	0.248
Cadmium	0.083 U	0.094 U	ND	ND	NA	0/10	0.0432	0.002	0.044	-3.14	0.05	0.044
Calcium	319 B	319 B	112 J	3320	BG2-SS06-00	9/10	780.45	950	1,331	6.19	0.98	2,173
Chromium	ND	ND	2.9	12.4	BG2-SS06-00	10/10	5.06	2.818	6.694	1.52	0.44	7.0
Cobalt	1.8 B	2.3 B	1 J	5.3 J	BG2-SS05-00	8/10	2.075	1.363	2.865	0.57	0.58	3.284
Copper	0.83 B	2 B	1.4 J	4 J	BG2-SS06-00	4/10	1.246	1.050	1.854	-0.01	0.67	2.183
Cyanide	0.04 U	0.068 B	ND	ND	NA	0/10	0.0239	0.005	0.027	-3.75	0.18	0.027
Iron	ND	ND	2650	12600	BG2-SS06-00	10/10	5060	2,954	6,773	8.42	0.47	7,163
Lead	ND	ND	6.4	11	BG2-SS06-00	10/10	8.5	1.570	9.4	2.12	0.19	9.6
Magnesium	ND	ND	157 J	1020 J	BG2-SS06-00	10/10	403.6	243	544	5.87	0.51	606
Manganese	ND	ND	62.7	257	BG2-SS01-00	10/10	128.21	62	164	4.76	0.46	182
Mercury	0.042 U	0.059 U	ND	ND	NA	0/10	0.0257	0.003	0.027	-3.67	0.1	0.027
Nickel	2 B	2 B	1.4 J	3.9 J	BG2-SS05-00	9/10	2.65	0.964	3.209	0.9	0.44	3.750
Potassium	93.5 B	231 B	245 J	1210 L	BG2-SS06-00	4/10	269.125	350	472	5.09	0.98	720
Selenium	0.58 UL	0.66 UL	0.69 J	0.69 J	BG2-SS02-00	1/10	0.343	0.123	0.414	-1.11	0.26	0.406
Silver	0.1 U	0.12 U	0.16 J	0.16 J	BG2-SS01-00	1/10	0.0635	0.034	0.083	-2.83	0.36	0.080
Sodium	154 B	356 B	ND	ND	NA	0/10	130.8	34	151	4.84	0.29	159
Thallium	0.85 UL	0.96 UL	ND	ND	NA	0/10	0.443	0.020	0.455	-0.82	0.04	0.455
Vanadium	ND	ND	5.7 J	15.2	BG2-SS06-00	10/10	8.49	2.938	10.2	2.09	0.31	10.5
Zinc	ND	ND	4.9 J	17.9 J	BG2-SS06-00	10/10	10.36	3.961	12.7	2.27	0.41	14.2

SURFACE SOILS – SOIL ASSOCIATION 3

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG3-SS01-00	BG3-SS02-00	BG3-SS03-00	BG3-SS04-00	BG3-SS05-00	BG3-SS06-00	BG3-SS07-00	BG3-SS08-00	BG3-SS09-00	BG3-SS10-00
SAMPLE DATE	07-23-2001	07-24-2001	07-24-2001	07-23-2001	07-24-2001	07-24-2001	07-24-2001	07-24-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"
Semivolatiles (ug/kg)										
1,1'-Biphenyl	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
2,2'-oxybis(1-Chloropropane)	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
2,4,5-Trichlorophenol	920 U	990 U	930 U	920 U	1000 U	900 U	930 U	900 U	930 U	900 U
2,4,6-Trichlorophenol	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
2,4-Dichlorophenol	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
2,4-Dimethylphenol	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
2,4-Dinitrophenol	920 U	990 U	930 U	920 U	1000 U	900 U	930 U	900 U	930 U	900 U
2,4-Dinitrotoluene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
2,6-Dinitrotoluene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
2-Chloronaphthalene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
2-Chlorophenol	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
2-Methylnaphthalene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
2-Methylphenol	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
2-Nitroaniline	920 U	990 U	930 U	920 U	1000 U	900 U	930 U	900 U	930 U	900 U
2-Nitrophenol	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
3,3'-Dichlorobenzidine	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
3-Nitroaniline	920 U	990 U	930 U	920 U	1000 U	900 U	930 U	900 U	930 U	900 U
4,6-Dinitro-2-methylphenol	920 U	990 U	930 U	920 U	1000 U	900 U	930 U	900 U	930 U	900 U
4-Bromophenyl-phenylether	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
4-Chloro-3-methylphenol	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
4-Chloroaniline	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
4-Chlorophenyl-phenylether	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
4-Methylphenol	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
4-Nitroaniline	920 U	990 U	930 U	920 U	1000 U	900 U	930 U	900 U	930 U	900 U
4-Nitrophenol	920 U	990 U	930 U	920 U	1000 U	900 U	930 U	900 U	930 U	900 U
Acenaphthene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Acenaphthylene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Acetophenone	370 U	390 U	370 U	370 U	410 U	360 U	370 U	110 J	370 U	360 U
Anthracene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Atrazine	370 UJ	390 UJ	370 UJ	370 UJ	410 UJ	360 UJ	370 UJ	360 UJ	370 UJ	360 UJ
Benzaldehyde	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Benzo(a)anthracene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Benzo(a)pyrene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Benzo(b)fluoranthene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG3-SS01-00	BG3-SS02-00	BG3-SS03-00	BG3-SS04-00	BG3-SS05-00	BG3-SS06-00	BG3-SS07-00	BG3-SS08-00	BG3-SS09-00	BG3-SS10-00
SAMPLE DATE	07-23-2001	07-24-2001	07-24-2001	07-23-2001	07-24-2001	07-24-2001	07-24-2001	07-24-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"
Semivolatiles (ug/kg) (continued)										
Benzo(g,h,i)perylene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Benzo(k)fluoranthene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Butylbenzylphthalate	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Caprolactam	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Carbazole	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Chrysene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Di-n-butylphthalate	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Di-n-octylphthalate	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Dibenzo(a,h)anthracene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Dibenzofuran	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Diethylphthalate	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Dimethylphthalate	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Fluoranthene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Fluorene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Hexachlorobenzene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Hexachlorobutadiene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Hexachlorocyclopentadiene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Hexachloroethane	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Indeno(1,2,3-cd)pyrene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Isophorone	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
N-Nitroso-di-n-propylamine	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
N-nitrosodiphenylamine	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Naphthalene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Nitrobenzene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Pentachlorophenol	920 U	990 U	930 U	920 U	1000 U	900 U	930 U	900 U	930 U	900 U
Phenanthrene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Phenol	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
Pyrene	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
bis(2-Chloroethoxy)methane	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
bis(2-Chloroethyl)ether	370 U	390 U	370 U	370 U	410 U	360 U	370 U	360 U	370 U	360 U
bis(2-Ethylhexyl)phthalate	190 J	600	450	290 J	340 J	140 J	370 U	130 J	370 U	360 U

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG3-SS01-00	BG3-SS02-00	BG3-SS03-00	BG3-SS04-00	BG3-SS05-00	BG3-SS06-00	BG3-SS07-00	BG3-SS08-00	BG3-SS09-00	BG3-SS10-00
SAMPLE DATE	07-23-2001	07-24-2001	07-24-2001	07-23-2001	07-24-2001	07-24-2001	07-24-2001	07-24-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"
Pesticides/PCBs (ug/kg)										
4,4'-DDD	3.7 U	3.9 U	3.7 U	3.7 U	4.1 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
4,4'-DDE	1.3 J	3.9 U	3.7 U	3.7 U	4.1 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
4,4'-DDT	3.7 U	3.9 U	3.7 U	3.7 U	4.1 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
Aldrin	1.9 U	2 U	1.9 U	1.9 U	2.1 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U
Dieldrin	3.3 J	4.4 J	3.7 U	3.7 U	4.1 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
Endosulfan I	1.9 U	2 U	1.9 U	1.9 U	2.1 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U
Endosulfan II	3.7 U	3.9 U	3.7 U	3.7 U	4.1 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
Endosulfan sulfate	3.7 U	3.9 U	3.7 U	2.3 J	2.4 J	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
Endrin	3.7 U	3.9 U	3.7 U	3.7 U	4.1 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
Endrin aldehyde	3.7 U	3.9 U	3.7 U	3.7 U	2.7 J	3.6 U	3.7 U	1.2 J	3.7 U	3.6 U
Endrin ketone	1.8 J	3.9 U	3.7 U	3.7 U	2.1 J	3.6 U	3.7 U	1.2 J	3.7 U	3.6 U
Heptachlor	1.9 U	2 U	1.9 U	1.9 U	2.1 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U
Heptachlor epoxide	1.9 U	2 U	1.9 U	1.9 U	1.8 J	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U
Methoxychlor	19 U	20 U	19 U	19 U	21 U	18 U	19 U	19 U	19 U	18 U
Toxaphene	190 U	200 U	190 U	190 U	210 U	180 U	190 U	190 U	190 U	180 U
alpha-BHC	1.9 U	2 U	1.9 U	1.9 U	2.1 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U
alpha-Chlordane	1 J	2 U	0.94 J	0.89 J	1.4 J	0.65 J	1.9 U	1.7 J	0.83 J	1.8 U
beta-BHC	1.9 U	2 U	1.9 U	1.9 U	2.1 U	1.8 U	1.9 U	0.94 J	1.9 U	1.8 U
delta-BHC	1.9 U	2 U	1.9 U	1.9 U	2.1 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U
gamma-BHC (Lindane)	1.9 U	2 U	1.9 U	1.9 U	2.1 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U
gamma-Chlordane	1.9 U	2 U	1.9 U	1.9 U	0.65 J	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U
Aroclor-1016	37 U	39 U	37 U	37 U	41 U	36 U	37 U	36 U	37 U	36 U
Aroclor-1221	74 U	80 U	75 U	74 U	84 U	73 U	75 U	73 U	75 U	73 U
Aroclor-1232	37 U	39 U	37 U	37 U	41 U	36 U	37 U	36 U	37 U	36 U
Aroclor-1242	37 U	39 U	37 U	37 U	41 U	36 U	37 U	36 U	37 U	36 U
Aroclor-1248	37 U	39 U	37 U	37 U	41 U	36 U	37 U	36 U	37 U	36 U
Aroclor-1254	37 U	39 U	37 U	37 U	41 U	36 U	37 U	36 U	37 U	36 U
Aroclor-1260	37 U	39 U	37 U	37 U	41 U	36 U	37 U	36 U	37 U	36 U

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG3-SS01-00	BG3-SS02-00	BG3-SS03-00	BG3-SS04-00	BG3-SS05-00	BG3-SS06-00	BG3-SS07-00	BG3-SS08-00	BG3-SS09-00	BG3-SS10-00
SAMPLE DATE	07-23-2001	07-24-2001	07-24-2001	07-23-2001	07-24-2001	07-24-2001	07-24-2001	07-24-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"
Inorganics (mg/kg)										
Aluminum	5160	4460	3850	3110	5230	3880	3220	4040	4110	6160
Antimony	0.38 UL	0.4 UL	0.36 UL	0.37 UL	0.38 UL	0.35 UL	0.37 UL	0.36 UL	0.36 UL	0.36 UL
Arsenic	0.75 J	0.5 J	0.094 J	1.7 J	0.82 J	1.3 J	0.9 J	1.2 J	1.1 J	0.72 J
Barium	18.2 J	22.7 J	46.4	16.3 J	6 J	34.9 J	38.3 J	21.7 J	33.1 J	30.6 J
Beryllium	0.21 B	0.24 B	0.34 B	0.28 B	0.088 U	0.53 B	0.31 B	0.32 B	0.63 B	0.36 B
Cadmium	0.089 U	0.094 U	0.084 U	0.086 U	0.088 U	0.082 U	0.088 U	0.085 U	0.086 U	0.084 U
Calcium	49.5 J	47.4 J	406 J	365 J	316 J	367 J	925 J	157 J	208 J	76.8 J
Chromium	6.4	2.7	4.9	6.2	9	2.7	3.1	3.6	3.5	3.6
Cobalt	0.43 B	0.56 J	4.3 J	2.4 J	0.15 U	3.2 J	1.8 J	1.2 J	5.3 J	0.94 B
Copper	1.6 J	1.2 J	1.7 J	1.6 J	1.2 J	1.6 J	1.3 J	1 J	1.4 J	0.9 J
Cyanide	0.064 B	0.047 U	0.045 U	0.044 U	0.043 U	0.043 U	0.043 U	0.042 U	0.041 U	0.043 U
Iron	6850	2420	3480	4970	8240	2150	2910	3340	3660	3560
Lead	12	10.9	7.8	7.2	7	10	7.1	12.2	6.7	9.8
Magnesium	143 J	166 J	218 J	237 J	154 J	164 J	197 B	184 J	212 J	228 J
Manganese	48.1	44.3	138	30.4	19.2	234	111	94.8	278	129
Mercury	0.055 U	0.049 U	0.051 U	0.053 U	0.051 U	0.097 J	0.041 U	0.052 U	0.048 U	0.05 U
Nickel	1.4 B	1.7 J	3.1 J	2.8 J	1 B	3.3 J	2 J	1.9 J	4.4 J	3.1 J
Potassium	156 B	86.8 B	160 B	207 B	307 J	118 B	114 B	137 B	136 B	133 B
Selenium	0.65 J	0.65 UL	0.59 UL	0.6 UL	0.62 UL	0.57 UL	0.62 UL	0.6 UL	0.6 UL	0.59 UL
Silver	0.11 U	0.12 U	0.1 U	0.11 U	0.11 U	0.1 U	0.11 U	0.11 U	0.11 U	0.1 U
Sodium	172 B	142 B	152 B	172 B	197 B	134 B	150 B	163 B	114 B	143 B
Thallium	0.91 UL	0.96 UL	0.87 UL	0.88 UL	0.91 UL	0.84 UL	0.9 UL	0.87 UL	0.88 UL	0.86 UL
Vanadium	15.5	6.1 J	6.5 J	10.9	22.1	5 J	5.4 J	7.3 J	6 J	7.3 J
Zinc	5.6	6.4	10.9	7.4	3.6 J	8.8	7.6	7.5	12.2	5.9

APPENDIX C
ORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Semivolatiles (ug/kg)												
1,1'-Biphenyl	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
2,2'-oxybis(1-Chloropropane)	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
2,4,5-Trichlorophenol	900 U	1000 U	ND	ND	NA	0/10	466	17.76	476	6.14	0.04	477
2,4,6-Trichlorophenol	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
2,4-Dichlorophenol	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
2,4-Dimethylphenol	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
2,4-Dinitrophenol	900 U	1000 U	ND	ND	NA	0/10	466	17.76	476	6.14	0.04	477
2,4-Dinitrotoluene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
2,6-Dinitrotoluene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
2-Chloronaphthalene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
2-Chlorophenol	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
2-Methylnaphthalene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
2-Methylphenol	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
2-Nitroaniline	900 U	1000 U	ND	ND	NA	0/10	466	17.76	476	6.14	0.04	477
2-Nitrophenol	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
3,3'-Dichlorobenzidine	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
3-Nitroaniline	900 U	1000 U	ND	ND	NA	0/10	466	17.76	476	6.14	0.04	477
4,6-Dinitro-2-methylphenol	900 U	1000 U	ND	ND	NA	0/10	466	17.76	476	6.14	0.04	477
4-Bromophenyl-phenylether	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
4-Chloro-3-methylphenol	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
4-Chloroaniline	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
4-Chlorophenyl-phenylether	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
4-Methylphenol	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
4-Nitroaniline	900 U	1000 U	ND	ND	NA	0/10	466	17.76	476	6.14	0.04	477
4-Nitrophenol	900 U	1000 U	ND	ND	NA	0/10	466	17.76	476	6.14	0.04	477
Acenaphthene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Acenaphthylene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Acetophenone	360 U	410 U	110 J	110 J	BG3-SS08-00	1/10	180	25.54	194	5.18	0.17	201
Anthracene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Atrazine	360 UJ	410 UJ	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Benzaldehyde	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Benzo(a)anthracene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Benzo(a)pyrene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Benzo(b)fluoranthene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Benzo(g,h,i)perylene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Benzo(k)fluoranthene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191

APPENDIX C
ORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Semivolatiles (ug/kg)												
Butylbenzylphthalate	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Caprolactam	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Carbazole	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Chrysene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Di-n-butylphthalate	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Di-n-octylphthalate	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Dibenzo(a,h)anthracene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Dibenzofuran	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Diethylphthalate	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Dimethylphthalate	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Fluoranthene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Fluorene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Hexachlorobenzene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Hexachlorobutadiene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Hexachlorocyclopentadiene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Hexachloroethane	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Indeno(1,2,3-cd)pyrene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Isophorone	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
N-Nitroso-di-n-propylamine	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
N-nitrosodiphenylamine	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Naphthalene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Nitrobenzene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Pentachlorophenol	900 U	1000 U	ND	ND	NA	0/10	466	17.76	476	6.14	0.04	477
Phenanthrene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Phenol	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
Pyrene	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
bis(2-Chloroethoxy)methane	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
bis(2-Chloroethyl)ether	360 U	410 U	ND	ND	NA	0/10	187	7.84	191	5.23	0.04	191
bis(2-Ethylhexyl)phthalate	360 U	370 U	130 J	600	BG3-SS02-00	7/10	269	153.5	358	5.47	0.51	404

APPENDIX C
ORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Pesticides/PCBs (ug/kg)												
4,4'-DDD	3.6 U	4.1 U	ND	ND	NA	0/10	1.865	0.078	1.910	0.62	0.04	1.912
4,4'-DDE	3.6 U	4.1 U	1.3 J	1.3 J	BG3-SS01-00	1/10	1.81	0.196	1.923	0.59	0.12	1.955
4,4'-DDT	3.6 U	4.1 U	ND	ND	NA	0/10	1.865	0.078	1.910	0.62	0.04	1.912
Aldrin	1.8 U	2.1 U	ND	ND	NA	0/10	0.955	0.044	0.980	-0.05	0.05	0.981
Dieldrin	3.6 U	4.1 U	3.3 J	4.4 J	BG3-SS02-00	2/10	2.255	0.883	2.767	0.76	0.31	2.798
Endosulfan I	1.8 U	2.1 U	ND	ND	NA	0/10	0.955	0.044	0.980	-0.05	0.05	0.981
Endosulfan II	3.6 U	4.1 U	ND	ND	NA	0/10	1.865	0.078	1.910	0.62	0.04	1.912
Endosulfan sulfate	3.6 U	3.9 U	2.3 J	2.4 J	BG3-SS05-00	2/10	1.945	0.219	2.072	0.66	0.11	2.079
Endrin	3.6 U	4.1 U	ND	ND	NA	0/10	1.865	0.078	1.910	0.62	0.04	1.912
Endrin aldehyde	3.6 U	3.9 U	1.2 J	2.7 J	BG3-SS05-00	2/10	1.87	0.358	2.078	0.61	0.19	2.115
Endrin ketone	3.6 U	3.9 U	1.2 J	2.1 J	BG3-SS05-00	3/10	1.805	0.232	1.939	0.58	0.15	1.985
Heptachlor	1.8 U	2.1 U	ND	ND	NA	0/10	0.955	0.044	0.980	-0.05	0.05	0.981
Heptachlor epoxide	1.8 U	2 U	1.8 J	1.8 J	BG3-SS05-00	1/10	1.03	0.272	1.188	0.01	0.21	1.178
Methoxychlor	18 U	21 U	ND	ND	NA	0/10	9.55	0.438	9.8	2.26	0.05	9.8
Toxaphene	180 U	210 U	ND	ND	NA	0/10	95.5	4.378	98.0	4.56	0.05	98.1
alpha-BHC	1.8 U	2.1 U	ND	ND	NA	0/10	0.955	0.044	0.980	-0.05	0.05	0.981
alpha-Chlordane	1.8 U	2 U	0.65 J	1.7 J	BG3-SS08-00	7/10	1.026	0.302	1.201	-0.01	0.27	1.226
beta-BHC	1.8 U	2.1 U	0.94 J	0.94 J	BG3-SS08-00	1/10	0.954	0.044	0.980	-0.05	0.05	0.980
delta-BHC	1.8 U	2.1 U	ND	ND	NA	0/10	0.955	0.044	0.980	-0.05	0.05	0.981
gamma-BHC (Lindane)	1.8 U	2.1 U	ND	ND	NA	0/10	0.955	0.044	0.980	-0.05	0.05	0.981
gamma-Chlordane	1.8 U	2 U	0.65 J	0.65 J	BG3-SS05-00	1/10	0.915	0.097	0.971	-0.09	0.12	0.989
Aroclor-1016	36 U	41 U	ND	ND	NA	0/10	18.65	0.784	19.104	2.93	0.04	19.1
Aroclor-1221	73 U	84 U	ND	ND	NA	0/10	37.8	1.798	38.8	3.63	0.05	38.9
Aroclor-1232	36 U	41 U	ND	ND	NA	0/10	18.65	0.784	19.1	2.93	0.04	19.1
Aroclor-1242	36 U	41 U	ND	ND	NA	0/10	18.65	0.784	19.1	2.93	0.04	19.1
Aroclor-1248	36 U	41 U	ND	ND	NA	0/10	18.65	0.784	19.1	2.93	0.04	19.1
Aroclor-1254	36 U	41 U	ND	ND	NA	0/10	18.65	0.784	19.1	2.93	0.04	19.1
Aroclor-1260	36 U	41 U	ND	ND	NA	0/10	18.65	0.784	19.1	2.93	0.04	19.1

APPENDIX C
INORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Inorganics (mg/kg)												
Aluminum	ND	ND	3110	6160	BG3-SS10-00	10/10	4322	952	4,874	8.35	0.22	4,991
Antimony	0.35 UL	0.4 UL	ND	ND	NA	0/10	0.1845	0.007	0.189	-1.69	0.04	0.189
Arsenic	ND	ND	0.09 J	1.7 J	BG3-SS04-00	10/10	0.9084	0.447	1.168	-0.29	0.81	2.3
Barium	ND	ND	6 J	46.4	BG3-SS03-00	10/10	26.82	12.0	33.8	3.16	0.59	44.8
Beryllium	0.088 U	0.63 B	ND	ND	NA	0/10	0.1654	0.077	0.210	-1.91	0.54	0.261
Cadmium	0.082 U	0.094 U	ND	ND	NA	0/10	0.0433	0.002	0.044	-3.14	0.04	0.044
Calcium	ND	ND	47.4 J	925 J	BG3-SS07-00	10/10	291.77	262	443	5.29	0.99	897
Chromium	ND	ND	2.7	9	BG3-SS05-00	10/10	4.57	2.053	5.760	1.44	0.41	6.2
Cobalt	0.15 U	0.94 B	0.56 J	5.3 J	BG3-SS09-00	7/10	1.952	1.818	3.006	0.05	1.39	19.294
Copper	ND	ND	0.9 J	1.7 J	BG3-SS03-00	10/10	1.35	0.276	1.510	0.28	0.22	1.562
Cyanide	0.041 U	0.064 B	ND	ND	NA	0/10	0.0228	0.003	0.025	-3.79	0.13	0.025
Iron	ND	ND	2150	8240	BG3-SS05-00	10/10	4158	1,970	5,300	8.25	0.43	5,730
Lead	ND	ND	6.7	12.2	BG3-SS08-00	10/10	9.07	2.161	10.3	2.18	0.24	10.6
Magnesium	197 B	197 B	143 J	237 J	BG3-SS04-00	9/10	180.45	44	206	5.17	0.27	216
Manganese	ND	ND	19.2	278	BG3-SS09-00	10/10	112.68	87	163	4.42	0.88	285
Mercury	0.041 U	0.055 U	0.1 J	0.1 J	BG3-SS06-00	1/10	0.0322	0.023	0.045	-3.56	0.44	0.043
Nickel	1 B	1.4 B	1.7 J	4.4 J	BG3-SS09-00	8/10	2.35	1.217	3.055	0.68	0.7	4.745
Potassium	86.8 B	207 B	307 J	307 J	BG3-SS05-00	1/10	93.09	77	138	4.36	0.53	138
Selenium	0.57 UL	0.65 UL	0.65 J	0.65 J	BG3-SS01-00	1/10	0.337	0.111	0.401	-1.12	0.25	0.395
Silver	0.1 U	0.12 U	ND	ND	NA	0/10	0.054	0.003	0.056	-2.92	0.06	0.056
Sodium	114 B	197 B	ND	ND	NA	0/10	76.95	12	84	4.33	0.15	85
Thallium	0.84 UL	0.96 UL	ND	ND	NA	0/10	0.444	0.017	0.454	-0.81	0.04	0.454
Vanadium	ND	ND	5 J	22.1	BG3-SS05-00	10/10	9.21	5.532	12.4	2.1	0.49	13.2
Zinc	ND	ND	3.6 J	12.2	BG3-SS09-00	10/10	7.59	2.536	9.1	1.97	0.35	9.8

SURFACE SOILS – SOIL ASSOCIATION 4

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG4-SS01-00	BG4-SS02-00	BG4-SS03-00	BG4-SS04-00	BG4-SS05-00	BG4-SS06-00	BG4-SS07-00	BG4-SS08-00	BG4-SS09-00	BG4-SS10-00
SAMPLE DATE	07-26-2001	07-27-2001	07-26-2001	07-26-2001	07-26-2001	07-26-2001	07-27-2001	07-27-2001	07-27-2001	07-26-2001
SAMPLE DEPTH (inches)	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Semivolatiles (ug/kg)										
1,1'-Biphenyl	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
2,2'-oxybis(1-Chloropropane)	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
2,4,5-Trichlorophenol	1100 U	910 U	900 U	880 U	860 U	880 U	900 U	900 U	940 U	980 U
2,4,6-Trichlorophenol	420 U	360 U	360 U	350 U	340 U	350 U	360 U	360 U	380 U	390 U
2,4-Dichlorophenol	420 U	360 U	360 U	350 U	340 U	350 U	360 U	360 U	380 U	390 U
2,4-Dimethylphenol	420 U	360 U	360 U	350 U	340 U	350 U	360 U	360 U	380 U	390 U
2,4-Dinitrophenol	1100 U	910 UJ	900 UJ	880 UJ	860 U	880 U	900 U	900 U	940 U	980 U
2,4-Dinitrotoluene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
2,6-Dinitrotoluene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
2-Chloronaphthalene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
2-Chlorophenol	420 U	360 U	360 U	350 U	340 U	350 U	360 U	360 U	380 U	390 U
2-Methylnaphthalene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
2-Methylphenol	420 U	360 U	360 U	350 U	340 U	350 U	360 U	360 U	380 U	390 U
2-Nitroaniline	1100 U	910 U	900 U	880 U	860 R	880 U	900 U	900 U	940 U	980 U
2-Nitrophenol	420 U	360 U	360 U	350 U	340 U	350 U	360 U	360 U	380 U	390 U
3,3'-Dichlorobenzidine	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
3-Nitroaniline	1100 U	910 U	900 U	880 U	860 R	880 U	900 U	900 U	940 U	980 U
4,6-Dinitro-2-methylphenol	1100 U	910 U	900 U	880 U	860 U	880 U	900 U	900 U	940 U	980 U
4-Bromophenyl-phenylether	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
4-Chloro-3-methylphenol	420 U	360 U	360 U	350 U	340 U	350 U	360 U	360 U	380 U	390 U
4-Chloroaniline	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
4-Chlorophenyl-phenylether	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
4-Methylphenol	420 U	360 U	360 U	350 U	340 U	350 U	360 U	360 U	380 U	390 U
4-Nitroaniline	1100 U	910 U	900 U	880 U	860 R	880 U	900 U	900 U	940 U	980 U
4-Nitrophenol	1100 U	910 U	900 U	880 U	860 U	880 U	900 U	900 U	940 U	980 U
Acenaphthene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Acenaphthylene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Acetophenone	420 U	360 U	360 U	350 U	61 L	350 U	360 U	360 U	380 U	390 U
Anthracene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Atrazine	420 UJ	360 U	360 UJ	350 UJ	340 R	350 UJ	360 UJ	360 UJ	380 UJ	390 UJ
Benzaldehyde	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Benzo(a)anthracene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Benzo(a)pyrene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Benzo(b)fluoranthene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Benzo(g,h,i)perylene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Benzo(k)fluoranthene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG4-SS01-00	BG4-SS02-00	BG4-SS03-00	BG4-SS04-00	BG4-SS05-00	BG4-SS06-00	BG4-SS07-00	BG4-SS08-00	BG4-SS09-00	BG4-SS10-00
SAMPLE DATE	07-26-2001	07-27-2001	07-26-2001	07-26-2001	07-26-2001	07-26-2001	07-27-2001	07-27-2001	07-27-2001	07-26-2001
SAMPLE DEPTH (inches)	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Semivolatiles (ug/kg) (continued)										
Butylbenzylphthalate	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Caprolactam	420 U	360 U	360 U	350 U	340 U	350 U	360 U	360 U	380 U	390 U
Carbazole	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Chrysene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Di-n-butylphthalate	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Di-n-octylphthalate	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Dibenzo(a,h)anthracene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Dibenzofuran	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Diethylphthalate	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Dimethylphthalate	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Fluoranthene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Fluorene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Hexachlorobenzene	420 U	360 U	360 U	350 U	340 U	350 U	360 U	360 U	380 U	390 U
Hexachlorobutadiene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Hexachlorocyclopentadiene	420 U	360 U	360 U	350 U	340 U	350 U	360 U	360 U	380 U	390 U
Hexachloroethane	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Indeno(1,2,3-cd)pyrene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Isophorone	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
N-Nitroso-di-n-propylamine	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
N-nitrosodiphenylamine	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Naphthalene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Nitrobenzene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Pentachlorophenol	1100 U	910 U	900 U	880 U	860 U	880 U	900 U	900 U	940 U	980 U
Phenanthrene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
Phenol	420 U	360 U	360 U	350 U	340 U	350 U	360 U	360 U	380 U	390 U
Pyrene	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
bis(2-Chloroethoxy)methane	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
bis(2-Chloroethyl)ether	420 U	360 U	360 U	350 U	340 R	350 U	360 U	360 U	380 U	390 U
bis(2-Ethylhexyl)phthalate	200 J	240 B	230 B	54 B	340 B	200 B	750 B	2300	71 B	95 B

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG4-SS01-00	BG4-SS02-00	BG4-SS03-00	BG4-SS04-00	BG4-SS05-00	BG4-SS06-00	BG4-SS07-00	BG4-SS08-00	BG4-SS09-00	BG4-SS10-00
SAMPLE DATE	07-26-2001	07-27-2001	07-26-2001	07-26-2001	07-26-2001	07-26-2001	07-27-2001	07-27-2001	07-27-2001	07-26-2001
SAMPLE DEPTH (inches)	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Pesticides/PCBs (ug/kg)										
4,4'-DDD	1.3 J	3.6 U	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
4,4'-DDE	2.5 J	3.6 U	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
4,4'-DDT	4.2 U	3.6 U	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
Aldrin	2.2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
Dieldrin	4.2 U	3.6 U	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	2.6 J	2.4 J
Endosulfan I	2.2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
Endosulfan II	4.2 U	3.6 U	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
Endosulfan sulfate	4.2 U	3.6 U	3.6 U	3.5 U	3.4 U	1.6 J	3.6 U	3.6 U	3.8 U	3.9 U
Endrin	4.2 U	3.6 U	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
Endrin aldehyde	4.2 U	3.6 U	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
Endrin ketone	4.2 U	3.6 U	3.6 U	3.5 U	3.4 U	3.5 U	3.6 U	3.6 U	3.8 U	3.9 U
Heptachlor	2.2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
Heptachlor epoxide	2.2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
Methoxychlor	22 U	18 U	18 U	18 U	18 U	18 U	18 U	18 U	19 U	20 U
Toxaphene	220 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	190 U	200 U
alpha-BHC	2.2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
alpha-Chlordane	1.7 J	1.8 U	1.3 B	1.5 J	1.8 U	2.2	0.65 B	0.84 B	1.9 U	2.3 J
beta-BHC	2.2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
delta-BHC	2.2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
gamma-BHC (Lindane)	2.2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U
gamma-Chlordane	2.2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	0.65 J	2 U
Aroclor-1016	42 U	36 U	36 U	35 U	34 U	35 U	36 U	36 U	38 U	39 U
Aroclor-1221	85 U	73 U	73 U	71 U	70 U	71 U	73 U	73 U	76 U	79 U
Aroclor-1232	42 U	36 U	36 U	35 U	34 U	35 U	36 U	36 U	38 U	39 U
Aroclor-1242	42 U	36 U	36 U	35 U	34 U	35 U	36 U	36 U	38 U	39 U
Aroclor-1248	42 U	36 U	36 U	35 U	34 U	35 U	36 U	36 U	38 U	39 U
Aroclor-1254	42 U	36 U	36 U	35 U	34 U	35 U	36 U	36 U	38 U	39 U
Aroclor-1260	42 U	36 U	36 U	35 U	34 U	35 U	36 U	36 U	38 U	39 U

APPENDIX C
SURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG4-SS01-00	BG4-SS02-00	BG4-SS03-00	BG4-SS04-00	BG4-SS05-00	BG4-SS06-00	BG4-SS07-00	BG4-SS08-00	BG4-SS09-00	BG4-SS10-00
SAMPLE DATE	07-26-2001	07-27-2001	07-26-2001	07-26-2001	07-26-2001	07-26-2001	07-27-2001	07-27-2001	07-27-2001	07-26-2001
SAMPLE DEPTH (inches)	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
Inorganics (mg/kg)										
Aluminum	5130	2560	3330	2410	1760	3930	2150	3090	3300	5100
Antimony	0.6 B	0.35 U	0.37 U	0.35 U	0.34 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
Arsenic	12.6	0.7 B	0.83 B	0.61 B	0.47 B	0.66 B	0.26 U	1.5 J	1.4 B	5.2
Barium	19.6 J	20 J	18.6 J	16.1 B	9.6 J	19.7 B	18.8 J	13.4 J	36.6 J	41.5 J
Beryllium	0.74 B	0.21 B	0.089 B	0.083 U	0.079 U	0.082 U	0.086 U	0.084 U	0.32 B	0.79 J
Cadmium	0.1 U	0.082 U	0.087 U	0.083 U	0.079 U	0.082 U	0.086 U	0.084 U	0.088 U	0.088 U
Calcium	2860	244 J	175 J	84.4 J	95.7 J	251 J	308 J	258 B	762 J	619 J
Chromium	17.3	2.8 B	3.1	2.4	2.2	3.8	2.3	5.5	4	12.4
Cobalt	3.2 J	1 J	1.2 B	1 J	0.84 J	0.96 J	0.68 J	1.2 J	3.4 J	6.7 J
Copper	2.7 B	1.4 B	2 B	2.9 B	2.5 B	3 B	2.6 B	3.5 B	4 J	2.2 J
Cyanide	0.051 B	0.043 U	0.042 U	0.042 U	0.04 U	0.04 U	0.24 B	0.37 B	0.38 B	0.47 B
Iron	20700	2510	2810	2490	1950	3540	1720	5800	3770	10400
Lead	14.6	6.2	16	5.8	6.1	9.1	8.1	7.2	11.2	11.5
Magnesium	782 J	169 J	179 J	164 J	112 J	194 J	132 J	241 J	245 J	329 J
Manganese	85.7	150	43.7	60.4	81.9	61	60.2	40.1	304	435
Mercury	0.062 UL	0.046 U	0.045 U	0.037 U	0.047 U	0.046 U	0.051 J	0.042 U	0.042 U	0.051 U
Nickel	5.9 J	1.4 B	1.7 J	1.4 B	1.1 J	1.4 J	1 B	1.8 B	2.2 B	4.1 J
Potassium	841 J	143 B	105 B	97.1 B	87 B	112 B	92.6 B	207 B	159 B	274 B
Selenium	1.4 L	0.58 UL	0.61 UL	0.58 UL	0.55 UL	0.57 UL	0.6 UL	0.59 U	0.62 UL	1.2 K
Silver	0.12 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U	0.11 U	0.11 U	0.11 U	0.11 U
Sodium	374 B	239 B	294 B	255 B	240 B	242 B	309 B	265 B	246 B	73.6 U
Thallium	1 UL	0.85 UL	0.89 UL	0.85 UN	0.81 UL	0.84 UL	0.88 UL	0.87 UL	0.9 UL	0.9 UL
Vanadium	26.1	5.1 J	7.1 J	4.7 J	4 J	8.1 J	4.6 J	11.1	7.7 J	14
Zinc	26.7	5.9 J	4.7 J	8.7 J	6.4 J	6.5 J	6.7 J	7 J	14.6 J	22.5 J

APPENDIX C
ORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Semivolatiles (ug/kg)												
1,1'-Biphenyl	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
2,2'-oxybis(1-Chloropropane)	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
2,4,5-Trichlorophenol	860 U	1100 U	ND	ND	NA	0/10	462.5	35.1	483	6.13	0.07	483
2,4,6-Trichlorophenol	340 U	420 U	ND	ND	NA	0/10	183.5	11.8	190	5.21	0.06	191
2,4-Dichlorophenol	340 U	420 U	ND	ND	NA	0/10	183.5	11.8	190	5.21	0.06	191
2,4-Dimethylphenol	340 U	420 U	ND	ND	NA	0/10	183.5	11.8	190	5.21	0.06	191
2,4-Dinitrophenol	860 U	1100 U	ND	ND	NA	0/10	462.5	35.1	483	6.13	0.07	483
2,4-Dinitrotoluene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
2,6-Dinitrotoluene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
2-Chloronaphthalene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
2-Chlorophenol	340 U	420 U	ND	ND	NA	0/10	183.5	11.8	190	5.21	0.06	191
2-Methylnaphthalene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
2-Methylphenol	340 U	420 U	ND	ND	NA	0/10	183.5	11.8	190	5.21	0.06	191
2-Nitroaniline	880 U	1100 U	ND	ND	NA	0/9	466.1111	35.2	488	6.14	0.07	488
2-Nitrophenol	340 U	420 U	ND	ND	NA	0/10	183.5	11.8	190	5.21	0.06	191
3,3'-Dichlorobenzidine	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
3-Nitroaniline	880 U	1100 U	ND	ND	NA	0/9	466.1111	35.2	488	6.14	0.07	488
4,6-Dinitro-2-methylphenol	860 U	1100 U	ND	ND	NA	0/10	462.5	35.1	483	6.13	0.07	483
4-Bromophenyl-phenylether	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
4-Chloro-3-methylphenol	340 U	420 U	ND	ND	NA	0/10	183.5	11.8	190	5.21	0.06	191
4-Chloroaniline	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
4-Chlorophenyl-phenylether	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
4-Methylphenol	340 U	420 U	ND	ND	NA	0/10	183.5	11.8	190	5.21	0.06	191
4-Nitroaniline	880 U	1100 U	ND	ND	NA	0/9	466.1111	35.2	488	6.14	0.07	488
4-Nitrophenol	860 U	1100 U	ND	ND	NA	0/10	462.5	35.1	483	6.13	0.07	483
Acenaphthene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Acenaphthylene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Acetophenone	350 U	420 U	61 L	61 L	BG4-SS05-00	1/10	172.6	40.7	196	5.11	0.35	225
Anthracene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Atrazine	350 UJ	420 UJ	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Benzaldehyde	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Benzo(a)anthracene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Benzo(a)pyrene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Benzo(b)fluoranthene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Benzo(g,h,i)perylene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Benzo(k)fluoranthene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192

APPENDIX C
ORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Semivolatiles (ug/kg)												
Butylbenzylphthalate	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Caprolactam	340 U	420 U	ND	ND	NA	0/10	183.5	11.8	190	5.21	0.06	191
Carbazole	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Chrysene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Di-n-butylphthalate	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Di-n-octylphthalate	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Dibenzo(a,h)anthracene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Dibenzofuran	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Diethylphthalate	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Dimethylphthalate	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Fluoranthene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Fluorene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Hexachlorobenzene	340 U	420 U	ND	ND	NA	0/10	183.5	11.8	190	5.21	0.06	191
Hexachlorobutadiene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Hexachlorocyclopentadiene	340 U	420 U	ND	ND	NA	0/10	183.5	11.8	190	5.21	0.06	191
Hexachloroethane	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Indeno(1,2,3-cd)pyrene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Isophorone	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
N-Nitroso-di-n-propylamine	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
N-nitrosodiphenylamine	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Naphthalene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Nitrobenzene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Pentachlorophenol	860 U	1100 U	ND	ND	NA	0/10	462.5	35.1	483	6.13	0.07	483
Phenanthrene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
Phenol	340 U	420 U	ND	ND	NA	0/10	183.5	11.8	190	5.21	0.06	191
Pyrene	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
bis(2-Chloroethoxy)methane	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
bis(2-Chloroethyl)ether	350 U	420 U	ND	ND	NA	0/9	185	11.5	192	5.22	0.06	192
bis(2-Ethylhexyl)phthalate	54 B	750 B	200 J	2300	BG4-SS08-00	2/10	349	693.1	751	4.9	1.29	1,857

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SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Pesticides/PCBs (ug/kg)												
4,4'-DDD	3.4 U	3.9 U	1.3 J	1.3 J	BG4-SS01-00	1/10	1.755	0.176	1.857	0.56	0.11	1.883
4,4'-DDE	3.4 U	3.9 U	2.5 J	2.5 J	BG4-SS01-00	1/10	1.875	0.231	2.009	0.62	0.11	2.010
4,4'-DDT	3.4 U	4.2 U	ND	ND	NA	0/10	1.835	0.118	1.903	0.61	0.06	1.905
Aldrin	1.8 U	2.2 U	ND	ND	NA	0/10	0.935	0.067	0.974	-0.07	0.07	0.974
Dieldrin	3.4 U	4.2 U	2.4 J	2.6 J	BG4-SS09-00	2/10	1.95	0.313	2.131	0.66	0.15	2.141
Endosulfan I	1.8 U	2.2 U	ND	ND	NA	0/10	0.935	0.067	0.974	-0.07	0.07	0.974
Endosulfan II	3.4 U	4.2 U	ND	ND	NA	0/10	1.835	0.118	1.903	0.61	0.06	1.905
Endosulfan sulfate	3.4 U	4.2 U	1.6 J	1.6 J	BG4-SS06-00	1/10	1.82	0.138	1.900	0.6	0.07	1.904
Endrin	3.4 U	4.2 U	ND	ND	NA	0/10	1.835	0.118	1.903	0.61	0.06	1.905
Endrin aldehyde	3.4 U	4.2 U	ND	ND	NA	0/10	1.835	0.118	1.903	0.61	0.06	1.905
Endrin ketone	3.4 U	4.2 U	ND	ND	NA	0/10	1.835	0.118	1.903	0.61	0.06	1.905
Heptachlor	1.8 U	2.2 U	ND	ND	NA	0/10	0.935	0.067	0.974	-0.07	0.07	0.974
Heptachlor epoxide	1.8 U	2.2 U	ND	ND	NA	0/10	0.935	0.067	0.974	-0.07	0.07	0.974
Methoxychlor	18 U	22 U	ND	ND	NA	0/10	9.35	0.669	9.7	2.23	0.07	9.7
Toxaphene	180 U	220 U	ND	ND	NA	0/10	93.5	6.688	97.4	4.54	0.07	97.4
alpha-BHC	1.8 U	2.2 U	ND	ND	NA	0/10	0.935	0.067	0.974	-0.07	0.07	0.974
alpha-Chlordane	0.65 B	1.9 U	1.5 J	2.3 J	BG4-SS10-00	4/10	1.1845	0.705	1.593	-0.01	0.67	2.161
beta-BHC	1.8 U	2.2 U	ND	ND	NA	0/10	0.935	0.067	0.974	-0.07	0.07	0.974
delta-BHC	1.8 U	2.2 U	ND	ND	NA	0/10	0.935	0.067	0.974	-0.07	0.07	0.974
gamma-BHC (Lindane)	1.8 U	2.2 U	ND	ND	NA	0/10	0.935	0.067	0.974	-0.07	0.07	0.974
gamma-Chlordane	1.8 U	2.2 U	0.65 J	0.65 J	BG4-SS09-00	1/10	0.905	0.112	0.970	-0.11	0.13	0.984
Aroclor-1016	34 U	42 U	ND	ND	NA	0/10	18.35	1.180	19.034	2.91	0.06	19.1
Aroclor-1221	70 U	85 U	ND	ND	NA	0/10	37.2	2.276	38.5	3.61	0.06	38.5
Aroclor-1232	34 U	42 U	ND	ND	NA	0/10	18.35	1.180	19.0	2.91	0.06	19.1
Aroclor-1242	34 U	42 U	ND	ND	NA	0/10	18.35	1.180	19.0	2.91	0.06	19.1
Aroclor-1248	34 U	42 U	ND	ND	NA	0/10	18.35	1.180	19.0	2.91	0.06	19.1
Aroclor-1254	34 U	42 U	ND	ND	NA	0/10	18.35	1.180	19.0	2.91	0.06	19.1
Aroclor-1260	34 U	42 U	ND	ND	NA	0/10	18.35	1.180	19.0	2.91	0.06	19.1

APPENDIX C
INORGANIC COMPOUNDS IN SURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Inorganics (mg/kg)												
Aluminum	ND	ND	1760	5130	BG4-SS01-00	10/10	3276	1,158	3,947	8.04	0.35	4,216
Antimony	0.34 U	0.6 B	ND	ND	NA	0/10	0.1915	0.039	0.214	-1.67	0.17	0.212
Arsenic	0.26 U	1.4 B	1.5 J	12.6	BG4-SS01-00	3/10	2.1765	3.968	4.477	-0.35	1.45	15.5
Barium	16.1 B	19.7 B	9.6 J	41.5 J	BG4-SS10-00	8/10	19.6	11.2	26.1	2.84	0.55	30.5
Beryllium	0.079 U	0.74 B	0.79 J	0.79 J	BG4-SS10-00	1/10	0.1677	0.242	0.308	-2.44	1.08	0.588
Cadmium	0.079 U	0.1 U	ND	ND	NA	0/10	0.043	0.003	0.045	-3.15	0.06	0.045
Calcium	258 B	258 B	84.4 J	2860	BG4-SS01-00	9/10	552.81	841	1,040	5.68	1.08	1,937
Chromium	2.8 B	2.8 B	2.2	17.3	BG4-SS01-00	9/10	5.44	5.220	8.466	1.38	0.79	11.0
Cobalt	1.2 B	1.2 B	0.68 J	6.7 J	BG4-SS10-00	9/10	1.958	1.951	3.089	0.34	0.8	4.206
Copper	1.4 B	3.5 B	2.2 J	4 J	BG4-SS09-00	2/10	1.65	0.919	2.183	0.39	0.46	2.330
Cyanide	0.04 U	0.47 B	ND	ND	NA	0/10	0.0859	0.088	0.137	-3	1.11	0.352
Iron	ND	ND	1720	20700	BG4-SS01-00	10/10	5569	5,907	8,993	8.29	0.79	11,015
Lead	ND	ND	5.8	16	BG4-SS03-00	10/10	9.58	3.631	11.7	2.2	0.37	12.4
Magnesium	ND	ND	112 J	782 J	BG4-SS01-00	10/10	254.7	196	368	5.37	0.55	387
Manganese	ND	ND	40.1	435	BG4-SS10-00	10/10	132.2	132	209	4.54	0.81	284
Mercury	0.037 U	0.062 UL	0.05 J	0.05 J	BG4-SS07-00	1/10	0.026	0.009	0.031	-3.69	0.29	0.031
Nickel	1 B	2.2 B	1.1 J	5.9 J	BG4-SS01-00	5/10	1.81	1.769	2.836	0.27	0.79	3.638
Potassium	87 B	274 B	841 J	841 J	BG4-SS01-00	1/10	147.935	245	290	4.44	0.89	297
Selenium	0.55 UL	0.62 UL	1.2 K	1.4 L	BG4-SS01-00	2/10	0.495	0.427	0.743	-0.93	0.63	0.818
Silver	0.1 U	0.12 U	ND	ND	NA	0/10	0.0535	0.003	0.056	-2.93	0.06	0.056
Sodium	73.6 U	374 B	ND	ND	NA	0/10	126.88	38	149	4.78	0.44	181
Thallium	0.81 UL	1 UL	0.85 UN	0.85 UN	BG4-SS04-00	1/10	0.482	0.132	0.558	-0.75	0.22	0.555
Vanadium	ND	ND	4 J	26.1	BG4-SS01-00	10/10	9.25	6.711	13.1	2.05	0.59	14.6
Zinc	ND	ND	4.7 J	26.7	BG4-SS01-00	10/10	10.97	7.736	15.5	2.21	0.6	17.6

APPENDIX D
SUBSURFACE SOIL DATA

SUBSURFACE SOILS – SOIL ASSOCIATION 1

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SB01-01	BG1-SB02-01	BG1-SB03-01	BG1-SB04-01	BG1-SB05-01	BG1-SB06-01	BG1-SB07-01	BG1-SB08-01	BG1-SB09-01	BG1-SB10-01
SAMPLE DATE	08-06-2001	07-23-2001	07-23-2001	08-06-2001	08-06-2001	08-06-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Volatiles (ug/kg)										
1,1,1-Trichloroethane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
1,1,2,2-Tetrachloroethane	2 J	13 U	29 U	4 J	15 U	15 U	12 U	3 J	12 U	15 U
1,1,2-Trichloroethane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
1,1,2-Trichloro-1,2,2-trifluoroethane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
1,1-Dichloroethane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
1,1-Dichloroethene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
1,2,4-Trichlorobenzene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
1,2-Dibromo-3-Chloropropane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
1,2-Dibromoethane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
1,2-Dichlorobenzene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
1,2-Dichloroethane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
1,2-Dichloropropane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
1,3-Dichlorobenzene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
1,4-Dichlorobenzene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
2-Butanone	13 U	13 U	29 U	5 J	15 U	4 J	12 U	14 U	12 U	15 U
2-Hexanone	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
4-Methyl-2-Pentanone	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Acetone	12 B	5 J	42	14 B	16 B	15 B	12 U	14 U	9 J	15 U
Benzene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Bromodichloromethane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Bromoform	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Bromomethane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Carbon Disulfide	13 U	13 U	14 J	15 U	15 U	15 U	12 U	14 U	2 J	15 U
Carbon Tetrachloride	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Chlorobenzene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Chloroethane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Chloroform	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Chloromethane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Cyclohexane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Dibromochloromethane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Dichlorodifluoromethane	13 U	13 U	29 U	15 UJ	15 UJ	15 UJ	12 U	14 U	12 U	15 U
Ethylbenzene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Isopropylbenzene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Methyl Acetate	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Methyl-tert-butyl ether	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Methylcyclohexane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Methylene Chloride	8 B	13 U	29 U	26 B	13 B	4 B	12 U	14 U	12 U	15 U

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SB01-01	BG1-SB02-01	BG1-SB03-01	BG1-SB04-01	BG1-SB05-01	BG1-SB06-01	BG1-SB07-01	BG1-SB08-01	BG1-SB09-01	BG1-SB10-01
SAMPLE DATE	08-06-2001	07-23-2001	07-23-2001	08-06-2001	08-06-2001	08-06-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Volatiles (ug/kg) (continued)										
Styrene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Tetrachloroethene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Toluene	8 B	13 U	29 U	11 B	16 B	2 B	12 U	3 B	3 J	2 B
Trichloroethene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Trichlorofluoromethane	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Vinyl Chloride	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Xylene (Total)	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
cis-1,2-Dichloroethene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
cis-1,3-Dichloropropene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
trans-1,2-Dichloroethene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
trans-1,3-Dichloropropene	13 U	13 U	29 U	15 U	15 U	15 U	12 U	14 U	12 U	15 U
Semivolatiles (ug/kg)										
1,1'-Biphenyl	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
2,2'-oxybis(1-Chloropropane)	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
2,4,5-Trichlorophenol	1100 U	1000 UL	2400 U	1300 U	1300 U	1200 U	970 U	1100 U	2400 U	1200 U
2,4,6-Trichlorophenol	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
2,4-Dichlorophenol	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
2,4-Dimethylphenol	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
2,4-Dinitrophenol	1100 U	1000 UL	2400 U	1300 U	1300 U	1200 U	970 U	1100 U	2400 U	1200 U
2,4-Dinitrotoluene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
2,6-Dinitrotoluene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
2-Chloronaphthalene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
2-Chlorophenol	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
2-Methylnaphthalene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
2-Methylphenol	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
2-Nitroaniline	1100 U	1000 UL	2400 U	1300 U	1300 U	1200 U	970 U	1100 U	2400 U	1200 U
2-Nitrophenol	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
3,3'-Dichlorobenzidine	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
3-Nitroaniline	1100 U	1000 UL	2400 U	1300 U	1300 U	1200 U	970 U	1100 U	2400 U	1200 U
4,6-Dinitro-2-methylphenol	1100 U	1000 UL	2400 U	1300 U	1300 U	1200 U	970 U	1100 U	2400 U	1200 U
4-Bromophenyl-phenylether	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
4-Chloro-3-methylphenol	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
4-Chloroaniline	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
4-Chlorophenyl-phenylether	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
4-Methylphenol	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
4-Nitroaniline	1100 U	1000 UL	2400 U	1300 U	1300 U	1200 U	970 U	1100 U	2400 U	1200 U
4-Nitrophenol	1100 U	1000 UL	2400 U	1300 U	1300 U	1200 U	970 U	1100 U	2400 U	1200 U
Acenaphthene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Acenaphthylene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Acetophenone	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SB01-01	BG1-SB02-01	BG1-SB03-01	BG1-SB04-01	BG1-SB05-01	BG1-SB06-01	BG1-SB07-01	BG1-SB08-01	BG1-SB09-01	BG1-SB10-01
SAMPLE DATE	08-06-2001	07-23-2001	07-23-2001	08-06-2001	08-06-2001	08-06-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Semivolatiles (ug/kg) (continued)										
Anthracene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Atrazine	430 UJ	410 UJ	940 UJ	510 UJ	510 UJ	490 UJ	380 UJ	450 UJ	970 UJ	490 UJ
Benzaldehyde	430 U	410 UL	940 U	100 J	510 U	53 J	380 U	450 U	970 U	490 U
Benzo(a)anthracene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Benzo(a)pyrene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Benzo(b)fluoranthene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Benzo(g,h,i)perylene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Benzo(k)fluoranthene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Butylbenzylphthalate	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Caprolactam	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Carbazole	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Chrysene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Di-n-butylphthalate	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Di-n-octylphthalate	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Dibenzo(a,h)anthracene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Dibenzofuran	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Diethylphthalate	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Dimethylphthalate	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Fluoranthene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Fluorene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Hexachlorobenzene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Hexachlorobutadiene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Hexachlorocyclopentadiene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Hexachloroethane	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Indeno(1,2,3-cd)pyrene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Isophorone	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
N-Nitroso-di-n-propylamine	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
N-nitrosodiphenylamine	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Naphthalene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Nitrobenzene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Pentachlorophenol	1100 U	1000 UL	2400 U	1300 U	1300 U	1200 U	970 U	1100 U	2400 U	1200 U
Phenanthrene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Phenol	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
Pyrene	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
bis(2-Chloroethoxy)methane	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
bis(2-Chloroethyl)ether	430 U	410 UL	940 U	510 U	510 U	490 U	380 U	450 U	970 U	490 U
bis(2-Ethylhexyl)phthalate	120 B	180 B	350 B	160 B	120 B	160 B	57 B	72 B	970 U	75 B

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SB01-01	BG1-SB02-01	BG1-SB03-01	BG1-SB04-01	BG1-SB05-01	BG1-SB06-01	BG1-SB07-01	BG1-SB08-01	BG1-SB09-01	BG1-SB10-01
SAMPLE DATE	08-06-2001	07-23-2001	07-23-2001	08-06-2001	08-06-2001	08-06-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Pesticides/PCBs (ug/kg)										
4,4'-DDD	4.3 U	4.1 U	9.4 U	5.1 U	5.1 U	4.9 U	3.8 U	4.5 U	9.7 U	4.8 U
4,4'-DDE	4.3 U	4.1 U	3.9 J	1.7 J	5.1 U	4.9 U	3.8 U	4.5 U	2.7 J	4.8 U
4,4'-DDT	4.3 U	4.1 U	9.4 U	5.1 U	5.1 U	4.9 U	3.8 U	4.5 U	9.7 U	4.8 U
Aldrin	2.2 U	2.1 U	4.8 U	2.6 U	2.6 U	2.5 U	2 U	2.3 U	5 U	2.5 U
Dieldrin	4.3 U	4.1 U	9.4 U	5.1 U	2.5 J	4.9 U	3.8 U	4.5 U	9.7 U	4.8 U
Endosulfan I	2.2 U	2.1 U	2.3 J	2.6 U	1.2 J	0.96 J	2 U	2.3 U	5 U	2.5 U
Endosulfan II	4.3 U	4.1 U	9.4 U	5.1 U	5.1 U	4.9 U	3.8 U	4.5 U	9.7 U	4.8 U
Endosulfan sulfate	4.3 U	4.1 U	3.4 J	5.1 U	2.7 J	4.9 U	3.8 U	4.5 U	9.7 U	4.8 U
Endrin	4.3 U	4.1 U	9.4 U	5.1 U	5.1 U	4.9 U	3.8 U	4.5 U	9.7 U	4.8 U
Endrin aldehyde	4.3 U	4.1 U	9.4 U	5.1 U	5.1 U	4.9 U	3.8 U	4.5 U	9.7 U	4.8 U
Endrin ketone	4.3 U	4.1 U	9.4 U	5.1 U	2.5 J	4.9 U	3.8 U	4.5 U	9.7 U	4.8 U
Heptachlor	2.2 U	2.1 U	4.8 U	2.6 U	2.6 U	2.5 U	2 U	2.3 U	5 U	2.5 U
Heptachlor epoxide	2.2 U	2.1 U	4.8 U	2.6 U	2.6 U	2.5 U	2 U	2.3 U	5 U	2.5 U
Methoxychlor	22 U	21 U	48 U	26 U	26 U	25 U	20 U	23 U	50 U	25 U
Toxaphene	220 U	210 U	480 U	260 U	260 U	250 U	200 U	230 U	500 U	250 U
alpha-BHC	1.3 J	2.1 U	4.8 U	2.6 U	0.81 J	2.5 U	2 U	2.3 U	5 U	2.5 U
alpha-Chlordane	2.2 U	2.1 U	4.8 U	2.6 U	1.5 J	1.4 J	2 U	2.3 U	5 U	2.5 U
beta-BHC	2.2 U	2.1 U	4.8 U	2.6 U	2.6 U	2.5 U	2 U	2.3 U	5 U	2.5 U
delta-BHC	0.8 J	2.1 U	4.8 U	2.6 U	2.6 U	2.5 U	2 U	2.3 U	5 U	2.5 U
gamma-BHC (Lindane)	2.2 U	2.1 U	4.8 U	2.6 U	2.6 U	2.5 U	2 U	2.3 U	5 U	2.5 U
gamma-Chlordane	2.2 U	2.1 U	4.8 U	2.6 U	2.6 U	2.5 U	2 U	2.3 U	5 U	2.5 U
Aroclor-1016	43 U	41 U	94 U	51 U	51 U	49 U	38 U	45 U	97 U	48 U
Aroclor-1221	87 U	84 U	190 U	100 U	100 U	100 U	78 U	92 U	200 U	98 U
Aroclor-1232	43 U	41 U	94 U	51 U	51 U	49 U	38 U	45 U	97 U	48 U
Aroclor-1242	43 U	41 U	94 U	51 U	51 U	49 U	38 U	45 U	97 U	48 U
Aroclor-1248	43 U	41 U	94 U	51 U	51 U	49 U	38 U	45 U	97 U	48 U
Aroclor-1254	43 U	41 U	94 U	51 U	51 U	49 U	38 U	45 U	97 U	48 U
Aroclor-1260	43 U	41 U	94 U	51 U	51 U	49 U	38 U	45 U	97 U	48 U
Conventional (mg/kg)										
Total Organic Carbon	28660	2310	133000	34600	40740	52360	3030	10100	55100	10600

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG1-SB01-01	BG1-SB02-01	BG1-SB03-01	BG1-SB04-01	BG1-SB05-01	BG1-SB06-01	BG1-SB07-01	BG1-SB08-01	BG1-SB09-01	BG1-SB10-01
SAMPLE DATE	08-06-2001	07-23-2001	07-23-2001	08-06-2001	08-06-2001	08-06-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Metals (mg/kg)										
Aluminum	3640	238	18400	5190	3670	4570	307	1510	11600	2700
Antimony	0.43 UL	0.41 U	0.89 U	0.51 UL	0.52 UL	0.5 UL	0.39 U	0.47 U	0.79 U	0.47 U
Arsenic	4.5	0.29 U	10.4	5.5	3.4	3.2	0.28 U	1.7 B	12.5	2.5 B
Barium	21.7 J	0.9 J	28.5 J	6.6 J	12 J	14.2 J	3.8 J	3.5 J	19.8 J	5.1 J
Beryllium	0.45 B	0.13 B	1.2 B	0.54 B	0.45 B	0.44 B	0.18 B	0.32 B	0.8 B	0.48 B
Cadmium	0.1 U	0.097 U	0.21 U	0.12 U	0.12 U	0.12 U	0.092 U	0.11 U	0.19 U	0.11 U
Calcium	1120 J	307 J	1420 J	1590	3390	32200	145 J	880 J	1310 J	351 J
Chromium	8.2	2.4	37.5	17.1	12.1	15.3	4.5	5.7	25	7.5
Cobalt	1.3 B	0.17 U	3.7 J	1.4 B	2 J	1.6 J	0.2 J	0.57 J	2.7 J	1.1 J
Copper	1.4 J	0.86 J	9.6 J	2.9 J	2.6 J	3 J	0.79 J	2.3 J	9 J	2.9 B
Cyanide	0.05 U	0.046 U	2.7	0.058 U	0.061 U	0.06 U	0.045 U	0.055 U	0.096 U	0.056 U
Iron	7610	1280	22400	14000	9910	9780	1820	4510	19300	5360
Lead	6.4	2.6	23.3	4.8	5.7	5.8	6	83.7	35.3	5.4
Magnesium	318 J	214 J	4630	1810	1040 J	1350 J	213 J	710 J	3340	862 J
Manganese	16	2.9 J	86.2	14.6	15.2	17.2	6.7	13.4	53.8	14
Mercury	0.054 U	0.052 UL	0.11 UL	0.07 U	0.067 J	0.068 U	0.054 UL	0.059 UL	0.083 UL	0.05 UL
Nickel	2 J	0.51 J	11 J	3.2 J	3.1 J	3.6 J	0.57 J	2 J	7.8 J	2.8 J
Potassium	281 J	147 B	4240	2370 J	1210 J	1970 J	182 B	542 J	2790	611 J
Selenium	1.6 B	0.68 UL	1.5 UL	1.8 B	1.9 L	1.3 B	0.65 UL	0.77 UL	1.3 UL	0.78 UL
Silver	0.13 U	0.12 UL	0.26 UL	0.15 U	0.15 U	0.15 U	0.12 UL	0.14 UL	0.23 UL	0.14 UL
Sodium	467 B	1280	9810	1560	629 B	2560	973 B	1700	10400	2360
Thallium	1 UL	0.99 UL	2.1 UL	1.2 UL	1.3 UL	1.2 UL	0.95 UL	1.1 UL	1.9 UL	1.1 UL
Vanadium	12.2 J	2.1 J	53.8	19.4	12.9 J	17.7	3.1 J	7.8 J	37.8	14.1
Zinc	6.7 J	20.9	52.9	14.2 J	12.4 J	14.7 J	7.1 L	17.3	34.3	15.2

APPENDIX D
ORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/kg)												
1,1,1-Trichloroethane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
1,1,2,2-Tetrachloroethane	12 U	29 U	2 J	4 J	BG1-SB04-01	3/10	6.45	3.44	8.44	1.74	0.55	10.23
1,1,2-Trichloroethane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
1,1,2-Trichloro-1,2,2-trifluoroethane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
1,1-Dichloroethane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
1,1-Dichloroethene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
1,2,4-Trichlorobenzene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
1,2-Dibromo-3-Chloropropane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
1,2-Dibromoethane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
1,2-Dichlorobenzene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
1,2-Dichloroethane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
1,2-Dichloropropane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
1,3-Dichlorobenzene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
1,4-Dichlorobenzene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
2-Butanone	12 U	29 U	4 J	5 J	BG1-SB04-01	2/10	7.05	2.83	8.69	1.9	0.33	8.89
2-Hexanone	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
4-Methyl-2-Pentanone	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Acetone	12 U	16 B	5 J	42	BG1-SB03-01	3/10	10.5	11.13	16.95	2.11	0.59	15.79
Benzene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Bromodichloromethane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Bromoform	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Bromomethane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Carbon Disulfide	12 U	15 U	2 J	14 J	BG1-SB03-01	2/10	7.2	2.91	8.89	1.89	0.48	10.56
Carbon Tetrachloride	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Chlorobenzene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Chloroethane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Chloroform	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Chloromethane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Cyclohexane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Dibromochloromethane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Dichlorodifluoromethane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Ethylbenzene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Isopropylbenzene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Methyl Acetate	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Methyl-tert-butyl ether	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Methylcyclohexane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Methylene Chloride	4 B	29 U	ND	ND	NA	0/10	7.3	3.77	9.49	1.86	0.56	11.64
Styrene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02

APPENDIX D
ORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/kg) (Cont)												
Tetrachloroethene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Toluene	2 B	29 U	3 J	3 J	BG1-SB09-01	1/10	5.1	4.11	7.48	1.3	0.91	14.25
Trichloroethene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Trichlorofluoromethane	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Vinyl Chloride	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Xylene (Total)	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
cis-1,2-Dichloroethene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
cis-1,3-Dichloropropene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
trans-1,2-Dichloroethene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
trans-1,3-Dichloropropene	12 U	29 U	ND	ND	NA	0/10	7.65	2.48	9.09	2	0.25	9.02
Semivolatiles (ug/kg)												
1,1'-Biphenyl	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
2,2'-oxybis(1-Chloropropane)	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
2,4,5-Trichlorophenol	970 U	2400 U	ND	ND	NA	0/10	698.5	270	855	6.49	0.33	878
2,4,6-Trichlorophenol	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
2,4-Dichlorophenol	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
2,4-Dimethylphenol	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
2,4-Dinitrophenol	970 U	2400 U	ND	ND	NA	0/10	698.5	270	855	6.49	0.33	878
2,4-Dinitrotoluene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
2,6-Dinitrotoluene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
2-Chloronaphthalene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
2-Chlorophenol	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
2-Methylnaphthalene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
2-Methylphenol	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
2-Nitroaniline	970 U	2400 U	ND	ND	NA	0/10	698.5	270	855	6.49	0.33	878
2-Nitrophenol	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
3,3'-Dichlorobenzidine	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
3-Nitroaniline	970 U	2400 U	ND	ND	NA	0/10	698.5	270	855	6.49	0.33	878
4,6-Dinitro-2-methylphenol	970 U	2400 U	ND	ND	NA	0/10	698.5	270	855	6.49	0.33	878
4-Bromophenyl-phenylether	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
4-Chloro-3-methylphenol	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
4-Chloroaniline	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
4-Chlorophenyl-phenylether	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
4-Methylphenol	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
4-Nitroaniline	970 U	2400 U	ND	ND	NA	0/10	698.5	270	855	6.49	0.33	878
4-Nitrophenol	970 U	2400 U	ND	ND	NA	0/10	698.5	270	855	6.49	0.33	878
Acenaphthene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Acenaphthylene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Acetophenone	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350

APPENDIX D
ORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Leve	Log Arithmatic Mear Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Leve
Semivolatiles (ug/kg) (Cont)												
Anthracene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Atrazine	380 UJ	970 UJ	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Benzaldehyde	380 U	970 U	53 J	100 J	BG1-SB04-01	2/10	244.3	138	324	5.33	0.66	446
Benzo(a)anthracene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Benzo(a)pyrene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Benzo(b)fluoranthene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Benzo(g,h,i)perylene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Benzo(k)fluoranthene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Butylbenzylphthalate	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Caprolactam	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Carbazole	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Chrysene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Di-n-butylphthalate	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Di-n-octylphthalate	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Dibenzo(a,h)anthracene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Dibenzofuran	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Diethylphthalate	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Dimethylphthalate	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Fluoranthene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Fluorene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Hexachlorobenzene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Hexachlorobutadiene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Hexachlorocyclopentadiene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Hexachloroethane	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Indeno(1,2,3-cd)pyrene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Isophorone	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
N-Nitroso-di-n-propylamine	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
N-nitrosodiphenylamine	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Naphthalene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Nitrobenzene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Pentachlorophenol	970 U	2400 U	ND	ND	NA	0/10	698.5	270	855	6.49	0.33	878
Phenanthrene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Phenol	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
Pyrene	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
bis(2-Chloroethoxy)methane	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
bis(2-Chloroethyl)ether	380 U	970 U	ND	ND	NA	0/10	279	107	341	5.58	0.33	350
bis(2-Ethylhexyl)phthalate	57 B	970 U	ND	ND	NA	0/10	113.2	137	193	4.34	0.84	243

APPENDIX D
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SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Pesticides/PCBs (ug/kg)												
4,4'-DDD	3.8 U	9.7 U	ND	ND	NA	0/10	2.785	1.07	3.41	0.97	0.33	3.49
4,4'-DDE	3.8 U	5.1 U	1.7 J	3.9 J	BG1-SB03-01	3/10	2.405	0.61	2.76	0.85	0.23	2.80
4,4'-DDT	3.8 U	9.7 U	ND	ND	NA	0/10	2.785	1.07	3.41	0.97	0.33	3.49
Aldrin	2 U	5 U	ND	ND	NA	0/10	1.43	0.55	1.75	0.3	0.32	1.79
Dieldrin	3.8 U	9.7 U	2.5 J	2.5 J	BG1-SB05-01	1/10	2.78	1.07	3.40	0.97	0.33	3.49
Endosulfan I	2 U	5 U	0.96 J	2.3 J	BG1-SB03-01	3/10	1.381	0.55	1.70	0.27	0.34	1.74
Endosulfan II	3.8 U	9.7 U	ND	ND	NA	0/10	2.785	1.07	3.41	0.97	0.33	3.49
Endosulfan sulfate	3.8 U	9.7 U	2.7 J	3.4 J	BG1-SB03-01	2/10	2.67	0.87	3.18	0.94	0.28	3.20
Endrin	3.8 U	9.7 U	ND	ND	NA	0/10	2.785	1.07	3.41	0.97	0.33	3.49
Endrin aldehyde	3.8 U	9.7 U	ND	ND	NA	0/10	2.785	1.07	3.41	0.97	0.33	3.49
Endrin ketone	3.8 U	9.7 U	2.5 J	2.5 J	BG1-SB05-01	1/10	2.78	1.07	3.40	0.97	0.33	3.49
Heptachlor	2 U	5 U	ND	ND	NA	0/10	1.43	0.55	1.75	0.3	0.32	1.79
Heptachlor epoxide	2 U	5 U	ND	ND	NA	0/10	1.43	0.55	1.75	0.3	0.32	1.79
Methoxychlor	20 U	50 U	ND	ND	NA	0/10	14.3	5.48	17.48	2.61	0.32	17.91
Toxaphene	200 U	500 U	ND	ND	NA	0/10	143	54.78	174.76	4.91	0.32	179.13
alpha-BHC	2 U	5 U	0.81 J	1.3 J	BG1-SB01-01	2/10	1.401	0.57	1.73	0.27	0.36	1.80
alpha-Chlordane	2 U	5 U	1.4 J	1.5 J	BG1-SB05-01	2/10	1.465	0.54	1.78	0.33	0.32	1.84
beta-BHC	2 U	5 U	ND	ND	NA	0/10	1.43	0.55	1.75	0.3	0.32	1.79
delta-BHC	2 U	5 U	0.8 J	0.8 J	BG1-SB01-01	1/10	1.4	0.58	1.73	0.27	0.36	1.80
gamma-BHC (Lindane)	2 U	5 U	ND	ND	NA	0/10	1.43	0.55	1.75	0.3	0.32	1.79
gamma-Chlordane	2 U	5 U	ND	ND	NA	0/10	1.43	0.55	1.75	0.3	0.32	1.79
Aroclor-1016	38 U	97 U	ND	ND	NA	0/10	27.85	10.7	34.1	3.27	0.33	34.9
Aroclor-1221	78 U	200 U	ND	ND	NA	0/10	56.45	22.0	69.2	3.98	0.33	70.9
Aroclor-1232	38 U	97 U	ND	ND	NA	0/10	27.85	10.7	34.1	3.27	0.33	34.9
Aroclor-1242	38 U	97 U	ND	ND	NA	0/10	27.85	10.7	34.1	3.27	0.33	34.9
Aroclor-1248	38 U	97 U	ND	ND	NA	0/10	27.85	10.7	34.1	3.27	0.33	34.9
Aroclor-1254	38 U	97 U	ND	ND	NA	0/10	27.85	10.7	34.1	3.27	0.33	34.9
Aroclor-1260	38 U	97 U	ND	ND	NA	0/10	27.85	10.7	34.1	3.27	0.33	34.9
Conventional (mg/kg)												
Total Organic Carbon	ND	ND	2310	133000	BG1-SB03-01	10/10	37,050	38,940	59,623	9.92	1.32	304,165

APPENDIX D
INORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Metals (mg/kg)												
Aluminum	ND	ND	238	18400	BG1-SB03-01	10/10	5,183	5,665	8,466	7.9	1.4	51,227
Antimony	0.39 U	0.89 U	ND	ND	NA	0/10	0.269	0.0832	0.3172	-1.35	0.27	0.3218
Arsenic	0.28 U	2.5 B	3.2	12.5	BG1-SB09-01	6/10	4.1885	4.2635	6.66	0.66	1.6	91.2383
Barium	ND	ND	0.9 J	28.5 J	BG1-SB03-01	10/10	11.61	9.2494	16.9717	2.06	1.06	49.8692
Beryllium	0.13 B	1.2 B	ND	ND	NA	0/10	0.2495	0.1548	0.3392	-1.56	0.65	0.4462
Cadmium	0.092 U	0.21 U	ND	ND	NA	0/10	0.0635	0.02	0.0751	-2.8	0.28	0.0761
Calcium	ND	ND	145 J	32200	BG1-SB06-01	10/10	4,271	9,857	9,985	7.07	1.49	28,686
Chromium	ND	ND	2.4	37.5	BG1-SB03-01	10/10	13.53	10.8297	19.8078	2.31	0.83	31.8774
Cobalt	0.17 U	1.4 B	0.2 J	3.7 J	BG1-SB03-01	7/10	1.3305	1.1706	2.0091	-0.19	1.17	6.8315
Copper	2.9 B	2.9 B	0.79 J	9.6 J	BG1-SB03-01	9/10	3.39	3.2167	5.2547	0.87	0.86	7.9059
Cyanide	0.045 U	0.096 U	2.7	2.7	BG1-SB03-01	1/10	0.2964	0.8446	0.786	-3.1	1.45	0.995
Iron	ND	ND	1280	22400	BG1-SB03-01	10/10	9,597	7,110	13,719	8.84	0.95	28,834
Lead	ND	ND	2.6	83.7	BG1-SB08-01	10/10	17.9	25.3698	32.6064	2.25	1.09	63.7378
Magnesium	ND	ND	213 J	4630	BG1-SB03-01	10/10	1,449	1,462	2,296	6.8	1.07	5,878
Manganese	ND	ND	2.9 J	86.2	BG1-SB03-01	10/10	24	25.7979	38.9546	2.77	0.95	66.1052
Mercury	0.05 UL	0.11 UL	0.067 J	0.067 J	BG1-SB05-01	1/10	0.0367	0.0141	0.0449	-3.36	0.34	0.0465
Nickel	ND	ND	0.51 J	11 J	BG1-SB03-01	10/10	3.658	3.2874	5.5636	0.92	0.98	11.0739
Potassium	147 B	182 B	281 J	4240	BG1-SB03-01	8/10	1,418	1,390	2,223	6.59	1.42	14,624
Selenium	0.65 UL	1.8 B	1.9 L	1.9 L	BG1-SB05-01	1/10	0.709	0.4669	0.9797	-0.49	0.55	1.0954
Silver	0.12 UL	0.26 UL	ND	ND	NA	0/10	0.0795	0.0236	0.0932	-2.57	0.26	0.0944
Sodium	467 B	973 B	1280	10400	BG1-SB09-01	7/10	3,070	3,795	5,270	7.34	1.29	21,578
Thallium	0.95 UL	2.1 UL	ND	ND	NA	0/10	0.642	0.1976	0.7565	-0.48	0.27	0.7681
Vanadium	ND	ND	2.1 J	53.8	BG1-SB03-01	10/10	18.09	16.0878	27.4158	2.51	1	68.4199
Zinc	ND	ND	6.7 J	52.9	BG1-SB03-01	10/10	19.57	14.0593	27.7199	2.78	0.63	33.6738

SUBSURFACE SOILS – SOIL ASSOCIATION 2

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 2
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG2-SB01-01	BG2-SB02-01	BG2-SB03-01	BG2-SB04-01	BG2-SB05-01	BG2-SB06-01	BG2-SB07-01	BG2-SB08-01	BG2-SB09-01	BG2-SB10-01
SAMPLE DATE	07-27-2001	07-23-2001	07-23-2001	07-26-2001	07-26-2001	07-27-2001	07-23-2001	07-24-2001	07-24-2001	07-25-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Volatiles (ug/kg)										
1,1,1-Trichloroethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
1,1,2,2-Tetrachloroethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
1,1,2-Trichloroethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
1,1,2-Trichloro-1,2,2-trifluoroethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
1,1-Dichloroethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
1,1-Dichloroethene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
1,2,4-Trichlorobenzene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
1,2-Dibromo-3-Chloropropane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
1,2-Dibromoethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
1,2-Dichlorobenzene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
1,2-Dichloroethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
1,2-Dichloropropane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
1,3-Dichlorobenzene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
1,4-Dichlorobenzene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
2-Butanone	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
2-Hexanone	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
4-Methyl-2-Pentanone	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Acetone	6 J	11 U	11 U	12 U	11 U	4 J	11 U	11 U	11 U	14 U
Benzene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Bromodichloromethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Bromoform	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Bromomethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Carbon Disulfide	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Carbon Tetrachloride	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Chlorobenzene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Chloroethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Chloroform	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Chloromethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Cyclohexane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Dibromochloromethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Dichlorodifluoromethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Ethylbenzene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Isopropylbenzene	13 U	11 U	1 J	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Methyl Acetate	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Methyl-tert-butyl ether	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Methylcyclohexane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Methylene Chloride	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Styrene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Tetrachloroethene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 2
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG2-SB01-01	BG2-SB02-01	BG2-SB03-01	BG2-SB04-01	BG2-SB05-01	BG2-SB06-01	BG2-SB07-01	BG2-SB08-01	BG2-SB09-01	BG2-SB10-01
SAMPLE DATE	07-27-2001	07-23-2001	07-23-2001	07-26-2001	07-26-2001	07-27-2001	07-23-2001	07-24-2001	07-24-2001	07-25-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Volatiles (ug/kg) (continued)										
Toluene	1 B	11 U	2 B	12 U	1 B	1 B	11 U	1 B	11 U	14 U
Trichloroethene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Trichlorofluoromethane	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Vinyl Chloride	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Xylene (Total)	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
cis-1,2-Dichloroethene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
cis-1,3-Dichloropropene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
trans-1,2-Dichloroethene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
trans-1,3-Dichloropropene	13 U	11 U	11 U	12 U	11 U	13 U	11 U	11 U	11 U	14 U
Semivolatiles (ug/kg)										
1,1'-Biphenyl	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
2,2'-oxybis(1-Chloropropane)	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
2,4,5-Trichlorophenol	1100 U	950 U	890 U	990 U	910 U	1100 U	930 U	930 U	910 U	1200 U
2,4,6-Trichlorophenol	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
2,4-Dichlorophenol	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
2,4-Dimethylphenol	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
2,4-Dinitrophenol	1100 U	950 U	890 U	990 U	910 U	1100 U	930 U	930 U	910 U	1200 U
2,4-Dinitrotoluene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
2,6-Dinitrotoluene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
2-Chloronaphthalene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
2-Chlorophenol	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
2-Methylnaphthalene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
2-Methylphenol	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
2-Nitroaniline	1100 U	950 U	890 U	990 U	910 U	1100 U	930 U	930 U	910 U	1200 U
2-Nitrophenol	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
3,3'-Dichlorobenzidine	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
3-Nitroaniline	1100 U	950 U	890 U	990 U	910 U	1100 U	930 U	930 U	910 U	1200 U
4,6-Dinitro-2-methylphenol	1100 U	950 U	890 U	990 U	910 U	1100 U	930 U	930 U	910 U	1200 U
4-Bromophenyl-phenylether	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
4-Chloro-3-methylphenol	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
4-Chloroaniline	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
4-Chlorophenyl-phenylether	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
4-Methylphenol	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
4-Nitroaniline	1100 U	950 U	890 U	990 U	910 U	1100 U	930 U	930 U	910 U	1200 U
4-Nitrophenol	1100 U	950 U	890 U	990 U	910 U	1100 U	930 U	930 U	910 U	1200 U
Acenaphthene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Acenaphthylene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Acetophenone	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Anthracene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Atrazine	420 UJ	380 UJ	350 UJ	390 UJ	360 UJ	420 UJ	370 UJ	370 UJ	360 UJ	460 UJ
Benzaldehyde	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 2
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG2-SB01-01	BG2-SB02-01	BG2-SB03-01	BG2-SB04-01	BG2-SB05-01	BG2-SB06-01	BG2-SB07-01	BG2-SB08-01	BG2-SB09-01	BG2-SB10-01
SAMPLE DATE	07-27-2001	07-23-2001	07-23-2001	07-26-2001	07-26-2001	07-27-2001	07-23-2001	07-24-2001	07-24-2001	07-25-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Semivolatiles (ug/kg) (continued)										
Benzo(a)anthracene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Benzo(a)pyrene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Benzo(b)fluoranthene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Benzo(g,h,i)perylene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Benzo(k)fluoranthene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Butylbenzylphthalate	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Caprolactam	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Carbazole	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Chrysene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Di-n-butylphthalate	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Di-n-octylphthalate	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Dibenzo(a,h)anthracene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Dibenzofuran	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Diethylphthalate	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Dimethylphthalate	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Fluoranthene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Fluorene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Hexachlorobenzene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Hexachlorobutadiene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Hexachlorocyclopentadiene	420 UJ	380 U	350 U	390 UJ	360 UJ	420 UJ	370 U	370 UJ	360 UJ	460 UJ
Hexachloroethane	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Indeno(1,2,3-cd)pyrene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Isophorone	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
N-Nitroso-di-n-propylamine	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
N-nitrosodiphenylamine	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Naphthalene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Nitrobenzene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Pentachlorophenol	1100 U	950 U	890 U	990 U	910 U	1100 U	930 U	930 U	910 U	1200 U
Phenanthrene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Phenol	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
Pyrene	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
bis(2-Chloroethoxy)methane	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
bis(2-Chloroethyl)ether	420 U	380 U	350 U	390 U	360 U	420 U	370 U	370 U	360 U	460 U
bis(2-Ethylhexyl)phthalate	670	380 U	610	160 B	67 B	120 J	180 J	58 J	73 J	660

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 2
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG2-SB01-01	BG2-SB02-01	BG2-SB03-01	BG2-SB04-01	BG2-SB05-01	BG2-SB06-01	BG2-SB07-01	BG2-SB08-01	BG2-SB09-01	BG2-SB10-01
SAMPLE DATE	07-27-2001	07-23-2001	07-23-2001	07-26-2001	07-26-2001	07-27-2001	07-23-2001	07-24-2001	07-24-2001	07-25-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Pesticides/PCBs (ug/kg)										
4,4'-DDD	4.2 U	3.8 U	3.5 U	3.9 U	3.6 U	4.2 U	30 U	3.7 U	3.6 U	4.6 U
4,4'-DDE	4.2 U	3.8 U	3.5 U	3.9 U	3.6 U	4.2 U	30 U	3.7 U	3.6 U	4.6 U
4,4'-DDT	4.2 U	3.8 U	3.5 U	3.9 U	3.6 U	4.2 U	30 U	3.7 U	3.6 U	4.6 U
Aldrin	2.2 U	2 U	1.8 U	2 U	1.8 U	2.2 U	15 U	1.9 U	1.9 U	2.4 U
Dieldrin	4.2 U	3.8 U	1.9 J	3.9 U	3.6 U	4.2 U	30 U	3.7 U	3.6 U	4.6 U
Endosulfan I	2.2 U	2 U	1.8 U	2 U	1.8 U	2.2 U	15 U	1.9 U	1.9 U	2.4 U
Endosulfan II	4.2 U	3.8 U	3.5 U	3.9 U	3.6 U	4.2 U	30 U	3.7 U	3.6 U	4.6 U
Endosulfan sulfate	4.2 U	3.8 U	3.5 U	3.9 U	3.6 U	4.2 U	30 U	3.7 U	3.6 U	4.6 U
Endrin	4.2 U	3.8 U	3.5 U	3.9 U	3.6 U	4.2 U	30 U	3.7 U	3.6 U	4.6 U
Endrin aldehyde	4.2 U	3.8 U	2.7 J	3.9 U	3.6 U	4.2 U	30 U	3.7 U	3.6 U	4.6 U
Endrin ketone	4.2 U	3.8 U	3.5 U	3.9 U	3.6 U	4.2 U	30 U	3.7 U	3.6 U	4.6 U
Heptachlor	2.2 U	2 U	1.8 U	2 U	1.8 U	2.2 U	15 U	1.9 U	1.9 U	2.4 U
Heptachlor epoxide	2.2 U	2 U	1.8 U	2 U	1.8 U	2.2 U	15 U	1.9 U	1.9 U	2.4 U
Methoxychlor	22 U	20 U	18 U	20 U	18 U	22 U	150 U	19 U	19 U	24 U
Toxaphene	220 U	200 U	180 U	200 U	180 U	220 U	1500 U	190 U	190 U	240 U
alpha-BHC	2.2 U	2 U	1.8 U	2 U	1.8 U	2.2 U	15 U	1.9 U	1.9 U	2.4 U
alpha-Chlordane	2.2 U	2 U	1.8 U	2 U	1.8 U	2.2 U	15 U	1.9 U	1.9	2.4 U
beta-BHC	2.2 U	2 U	1.8 U	0.74 J	1.8 U	0.79 J	15 U	1.9 U	0.99 J	2.4 U
delta-BHC	2.2 U	2 U	1.8 U	2 U	1.8 U	2.2 U	15 U	1.9 U	1.9 U	2.4 U
gamma-BHC (Lindane)	2.2 U	2 U	1.8 U	2 U	1.8 U	2.2 U	15 U	1.9 U	1.9 U	2.4 U
gamma-Chlordane	2.2 U	2 U	1.8 U	2 U	1.8 U	2.2 U	15 U	1.9 U	1.9 U	2.4 U
Aroclor-1016	42 U	38 U	35 U	39 U	36 U	42 U	300 U	37 U	36 U	46 U
Aroclor-1221	85 U	77 U	72 U	80 U	73 U	85 U	610 U	75 U	74 U	94 U
Aroclor-1232	42 U	38 U	35 U	39 U	36 U	42 U	300 U	37 U	36 U	46 U
Aroclor-1242	42 U	38 U	35 U	39 U	36 U	42 U	300 U	37 U	36 U	46 U
Aroclor-1248	42 U	38 U	35 U	39 U	36 U	42 U	300 U	37 U	36 U	46 U
Aroclor-1254	42 U	38 U	35 U	39 U	36 U	42 U	300 U	37 U	36 U	46 U
Aroclor-1260	42 U	38 U	35 U	39 U	36 U	42 U	300 U	37 U	36 U	46 U
Conventional (mg/kg)										
Total Organic Carbon	4338	5010	6030	5971	6795	9307	5530	4584	6682	8982

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 2
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG2-SB01-01	BG2-SB02-01	BG2-SB03-01	BG2-SB04-01	BG2-SB05-01	BG2-SB06-01	BG2-SB07-01	BG2-SB08-01	BG2-SB09-01	BG2-SB10-01
SAMPLE DATE	07-27-2001	07-23-2001	07-23-2001	07-26-2001	07-26-2001	07-27-2001	07-23-2001	07-24-2001	07-24-2001	07-25-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Metals (mg/kg)										
Aluminum	6960	11400	4590	12600	4820	8350	9770	8040	6310	9990
Antimony	0.56 B	0.36 U	0.35 U	0.71 B	0.54 B	0.86 B	0.37 U	0.6 B	0.76 B	0.47 U
Arsenic	15.9	3.8	1.3 B	4.2	1.6 B	6.8	5	3	2.4	4.2
Barium	21.4 J	38.7 J	36.2 J	32.4 J	32.2 J	48.5	37.1 J	35.2 J	33.7 J	42 J
Beryllium	0.95 B	0.77 B	0.51 B	0.55 B	0.65 B	0.94 B	0.64 B	0.71 B	0.69 B	0.7 B
Cadmium	0.098 U	0.084 U	0.082 U	0.091 U	0.081 U	0.093 UL	0.087 U	0.09 U	0.088 U	0.11 U
Calcium	1810	1060	412 J	479 J	231 J	162000	474 J	363 J	546 J	819 J
Chromium	25.3	26.4	5.3	15.2	7.2	24.5	15.2	11.4	9.8	15.1
Cobalt	4.4 J	2.4 J	4.2 J	3.1 J	7.3 J	4 J	2.1 J	2.4 J	1.7 J	2.2 J
Copper	2.2 B	2.5 B	1 B	3.9 B	0.61 B	5 J	2.4 B	0.92 B	0.75 B	1.4 B
Cyanide	0.12 B	0.043 U	0.043 U	0.057 B	0.044 U	0.11 B	0.1 B	0.044 U	0.042 U	0.056 U
Iron	30000	21700	5140	18300	7320	20900	18200	12800	11200	19500
Lead	7.1	7.7	7.7	8.1	4.1	6.9 L	6.1	6	6.6	8.3
Magnesium	765 J	1420	357 J	667 J	563 J	3340	819 J	649 J	455 J	550 J
Manganese	131	44.2	82.5	101	135	104	60.8	31.8	26.1	37.6
Mercury	0.11 B	0.045 UL	0.043 UL	0.11 B	0.082 B	0.12 B	0.046 UL	0.082 B	0.076 B	0.1 B
Nickel	8.2 J	5.5 J	3.4 J	6.8 J	5.3 J	9.1 J	5 J	4 J	2.9 J	3.5 J
Potassium	889 J	1140	210 B	459 J	373 J	2100	563 J	409 J	298 J	389 J
Selenium	1.2 J	0.59 UL	0.57 UL	0.64 UL	0.57 UL	0.65 UL	0.61 UL	0.87 J	0.61 UL	0.77 UL
Silver	0.12 U	0.1 UL	0.1 UL	0.11 U	0.1 U	0.12 U	0.11 UL	0.11 U	0.11 U	0.14 U
Sodium	321 B	206 B	175 B	305 B	268 B	815 B	152 B	297 B	299 B	371 B
Thallium	1 UL	0.86 UL	0.84 UL	0.94 UL	0.83 UL	0.95 UL	0.89 UL	0.92 UJ	0.9 UL	1.1 UL
Vanadium	33.2	32	9.1 J	28.5	10.7	20.6	26	19.8	16.5	28
Zinc	29.5	19.9	7.4 L	18.4	10.6	30.8	16	9.8	7.5 L	10.2

APPENDIX D
ORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/kg)												
1,1,1-Trichloroethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
1,1,2,2-Tetrachloroethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
1,1,2-Trichloroethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
1,1,2-Trichloro-1,2,2-trifluoroethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
1,1-Dichloroethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
1,1-Dichloroethene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
1,2,4-Trichlorobenzene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
1,2-Dibromo-3-Chloropropane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
1,2-Dibromoethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
1,2-Dichlorobenzene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
1,2-Dichloroethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
1,2-Dichloropropane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
1,3-Dichlorobenzene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
1,4-Dichlorobenzene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
2-Butanone	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
2-Hexanone	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
4-Methyl-2-Pentanone	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Acetone	11 U	14 U	4 J	6 J	BG2-SB01-01	2/10	5.6	0.74	6.03	1.71	0.14	6.12
Benzene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Bromodichloromethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Bromoform	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Bromomethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Carbon Disulfide	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Carbon Tetrachloride	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Chlorobenzene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Chloroethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Chloroform	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Chloromethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Cyclohexane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Dibromochloromethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Dichlorodifluoromethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Ethylbenzene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Isopropylbenzene	11 U	14 U	1 J	1 J	BG2-SB03-01	1/10	5.45	1.66	6.41	1.6	0.57	9.14
Methyl Acetate	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Methyl-tert-butyl ether	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Methylcyclohexane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Methylene Chloride	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Styrene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24

APPENDIX D
ORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Leve	Log Arithmatic Mear Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Leve
Volatiles (ug/kg) (Cont)												
Tetrachloroethene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Toluene	1 B	14 U	ND	ND	NA	0/10	3.25	2.83	4.89	0.61	1.24	18.03
Trichloroethene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Trichlorofluoromethane	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Vinyl Chloride	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Xylene (Total)	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
cis-1,2-Dichloroethene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
cis-1,3-Dichloropropene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
trans-1,2-Dichloroethene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
trans-1,3-Dichloropropene	11 U	14 U	ND	ND	NA	0/10	5.9	0.57	6.23	1.77	0.09	6.24
Semivolatiles (ug/kg)												
1,1'-Biphenyl	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
2,2'-oxybis(1-Chloropropane)	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
2,4,5-Trichlorophenol	890 U	1200 U	ND	ND	NA	0/10	495.5	53	526	6.2	0.1	529
2,4,6-Trichlorophenol	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
2,4-Dichlorophenol	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
2,4-Dimethylphenol	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
2,4-Dinitrophenol	890 U	1200 U	ND	ND	NA	0/10	495.5	53	526	6.2	0.1	529
2,4-Dinitrotoluene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
2,6-Dinitrotoluene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
2-Chloronaphthalene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
2-Chlorophenol	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
2-Methylnaphthalene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
2-Methylphenol	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
2-Nitroaniline	890 U	1200 U	ND	ND	NA	0/10	495.5	53	526	6.2	0.1	529
2-Nitrophenol	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
3,3'-Dichlorobenzidine	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
3-Nitroaniline	890 U	1200 U	ND	ND	NA	0/10	495.5	53	526	6.2	0.1	529
4,6-Dinitro-2-methylphenol	890 U	1200 U	ND	ND	NA	0/10	495.5	53	526	6.2	0.1	529
4-Bromophenyl-phenylether	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
4-Chloro-3-methylphenol	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
4-Chloroaniline	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
4-Chlorophenyl-phenylether	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
4-Methylphenol	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
4-Nitroaniline	890 U	1200 U	ND	ND	NA	0/10	495.5	53	526	6.2	0.1	529
4-Nitrophenol	890 U	1200 U	ND	ND	NA	0/10	495.5	53	526	6.2	0.1	529
Acenaphthene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Acenaphthylene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Acetophenone	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204

APPENDIX D
ORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Leve	Log Arithmatic Mear Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Leve
Semivolatiles (ug/kg) (Cont)												
Anthracene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Atrazine	350 UJ	460 UJ	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Benzaldehyde	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Benzo(a)anthracene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Benzo(a)pyrene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Benzo(b)fluoranthene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Benzo(g,h,i)perylene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Benzo(k)fluoranthene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Butylbenzylphthalate	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Caprolactam	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Carbazole	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Chrysene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Di-n-butylphthalate	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Di-n-octylphthalate	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Dibenzo(a,h)anthracene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Dibenzofuran	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Diethylphthalate	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Dimethylphthalate	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Fluoranthene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Fluorene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Hexachlorobenzene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Hexachlorobutadiene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Hexachlorocyclopentadiene	350 U	460 UJ	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Hexachloroethane	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Indeno(1,2,3-cd)pyrene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Isophorone	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
N-Nitroso-di-n-propylamine	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
N-nitrosodiphenylamine	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Naphthalene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Nitrobenzene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Pentachlorophenol	890 U	1200 U	ND	ND	NA	0/10	495.5	53	526	6.2	0.1	529
Phenanthrene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Phenol	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
Pyrene	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
bis(2-Chloroethoxy)methane	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
bis(2-Chloroethyl)ether	350 U	460 U	ND	ND	NA	0/10	194	17	204	5.26	0.09	204
bis(2-Ethylhexyl)phthalate	67 B	380 U	58 J	670	BG2-SB01-01	7/10	267.45	267	422	5.09	1.08	1,083

APPENDIX D
ORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Pesticides/PCBs (ug/kg)												
4,4'-DDD	3.5 U	30 U	ND	ND	NA	0/10	3.26	4.13	5.65	0.87	0.65	5.11
4,4'-DDE	3.5 U	30 U	ND	ND	NA	0/10	3.26	4.13	5.65	0.87	0.65	5.11
4,4'-DDT	3.5 U	30 U	ND	ND	NA	0/10	3.26	4.13	5.65	0.87	0.65	5.11
Aldrin	1.8 U	15 U	ND	ND	NA	0/10	1.66	2.05	2.85	0.21	0.64	2.60
Dieldrin	3.6 U	30 U	1.9 J	1.9 J	BG2-SB03-01	1/10	3.27	4.12	5.66	0.88	0.65	5.12
Endosulfan I	1.8 U	15 U	ND	ND	NA	0/10	1.66	2.05	2.85	0.21	0.64	2.60
Endosulfan II	3.5 U	30 U	ND	ND	NA	0/10	3.26	4.13	5.65	0.87	0.65	5.11
Endosulfan sulfate	3.5 U	30 U	ND	ND	NA	0/10	3.26	4.13	5.65	0.87	0.65	5.11
Endrin	3.5 U	30 U	ND	ND	NA	0/10	3.26	4.13	5.65	0.87	0.65	5.11
Endrin aldehyde	3.6 U	30 U	2.7 J	2.7 J	BG2-SB03-01	1/10	3.35	4.10	5.73	0.91	0.64	5.27
Endrin ketone	3.5 U	30 U	ND	ND	NA	0/10	3.26	4.13	5.65	0.87	0.65	5.11
Heptachlor	1.8 U	15 U	ND	ND	NA	0/10	1.66	2.05	2.85	0.21	0.64	2.60
Heptachlor epoxide	1.8 U	15 U	ND	ND	NA	0/10	1.66	2.05	2.85	0.21	0.64	2.60
Methoxychlor	18 U	150 U	ND	ND	NA	0/10	16.6	20.54	28.51	2.51	0.64	25.99
Toxaphene	180 U	1500 U	ND	ND	NA	0/10	166	205.42	285.08	4.81	0.64	259.92
alpha-BHC	1.8 U	15 U	ND	ND	NA	0/10	1.66	2.05	2.85	0.21	0.64	2.60
alpha-Chlordane	1.8 U	15 U	1.9	1.9	BG2-SB09-01	1/10	1.755	2.04	2.94	0.28	0.65	2.81
beta-BHC	1.8 U	15 U	0.74 J	0.99 J	BG2-SB09-01	3/10	1.607	2.08	2.81	0.15	0.67	2.56
delta-BHC	1.8 U	15 U	ND	ND	NA	0/10	1.66	2.05	2.85	0.21	0.64	2.60
gamma-BHC (Lindane)	1.8 U	15 U	ND	ND	NA	0/10	1.66	2.05	2.85	0.21	0.64	2.60
gamma-Chlordane	1.8 U	15 U	ND	ND	NA	0/10	1.66	2.05	2.85	0.21	0.64	2.60
Aroclor-1016	35 U	300 U	ND	ND	NA	0/10	32.6	41.3	56.5	3.17	0.65	51.1
Aroclor-1221	72 U	610 U	ND	ND	NA	0/10	66.3	84.0	114.9	3.88	0.65	104.0
Aroclor-1232	35 U	300 U	ND	ND	NA	0/10	32.6	41.3	56.5	3.17	0.65	51.1
Aroclor-1242	35 U	300 U	ND	ND	NA	0/10	32.6	41.3	56.5	3.17	0.65	51.1
Aroclor-1248	35 U	300 U	ND	ND	NA	0/10	32.6	41.3	56.5	3.17	0.65	51.1
Aroclor-1254	35 U	300 U	ND	ND	NA	0/10	32.6	41.3	56.5	3.17	0.65	51.1
Aroclor-1260	35 U	300 U	ND	ND	NA	0/10	32.6	41.3	56.5	3.17	0.65	51.1
Conventional (mg/kg)												
Total Organic Carbon	ND	ND	4338	9307	BG2-SB06-01	10/10	6,323	1,695	7,305	8.72	0.26	7,508

APPENDIX D
INORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Metals (mg/kg)												
Aluminum	ND	ND	4590	12600	BG2-SB04-01	10/10	8,283	2,684	9,839	8.97	0.34	10,606
Antimony	0.35 U	0.86 B	ND	ND	NA	0/10	0.279	0.0886	0.3304	-1.32	0.32	0.3512
Arsenic	1.3 B	1.6 B	2.4	15.9	BG2-SB01-01	8/10	4.675	4.3594	7.2021	1.18	0.95	13.5791
Barium	ND	ND	21.4 J	48.5	BG2-SB06-01	10/10	35.74	7.0443	39.8235	3.56	0.21	41.2881
Beryllium	0.51 B	0.95 B	ND	ND	NA	0/10	0.3555	0.0724	0.3975	-1.05	0.2	0.4065
Cadmium	0.081 U	0.11 U	ND	ND	NA	0/10	0.0452	0.0043	0.0477	-3.1	0.09	0.0478
Calcium	ND	ND	231 J	162000	BG2-SB06-01	10/10	16,819	51,013	46,391	6.92	1.88	171,733
Chromium	ND	ND	5.3	26.4	BG2-SB02-01	10/10	15.54	7.5895	19.9395	2.62	0.54	24.4241
Cobalt	ND	ND	1.7 J	7.3 J	BG2-SB05-01	10/10	3.38	1.6772	4.3522	1.12	0.44	4.714
Copper	0.61 B	3.9 B	5 J	5 J	BG2-SB06-01	1/10	1.284	1.4029	2.0972	-0.12	0.85	2.9126
Cyanide	0.042 U	0.12 B	ND	ND	NA	0/10	0.033	0.0156	0.042	-3.5	0.43	0.0454
Iron	ND	ND	5140	30000	BG2-SB01-01	10/10	16,506	7,445	20,822	9.6	0.54	26,137
Lead	ND	ND	4.1	8.3	BG2-SB10-01	10/10	6.86	1.251	7.5852	1.91	0.21	7.894
Magnesium	ND	ND	357 J	3340	BG2-SB06-01	10/10	959	886	1,472	6.63	0.64	1,596
Manganese	ND	ND	26.1	135	BG2-SB05-01	10/10	75.4	40.9799	99.1553	4.17	0.6	129.4491
Mercury	0.043 UL	0.12 B	ND	ND	NA	0/10	0.0407	0.0145	0.0491	-3.27	0.4	0.0544
Nickel	ND	ND	2.9 J	9.1 J	BG2-SB06-01	10/10	5.37	2.0945	6.5841	1.61	0.38	7.0702
Potassium	210 B	210 B	298 J	2100	BG2-SB06-01	9/10	673	583	1,011	6.22	0.82	1,541
Selenium	0.57 UL	0.77 UL	0.87 J	1.2 J	BG2-SB01-01	2/10	0.4575	0.3155	0.6404	-0.93	0.51	0.6764
Silver	0.1 U	0.14 U	ND	ND	NA	0/10	0.056	0.0061	0.0595	-2.89	0.1	0.0598
Sodium	152 B	815 B	ND	ND	NA	0/10	160	93	215	4.97	0.46	226
Thallium	0.83 UL	1.1 UL	ND	ND	NA	0/10	0.4615	0.0406	0.485	-0.78	0.09	0.4859
Vanadium	ND	ND	9.1 J	33.2	BG2-SB01-01	10/10	22.44	8.4912	27.3622	3.03	0.45	31.9557
Zinc	ND	ND	7.4 L	30.8	BG2-SB06-01	10/10	16.01	8.6262	21.0104	2.65	0.53	24.5584

SUBSURFACE SOILS – SOIL ASSOCIATION 3

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 3
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG3-SB01-01	BG3-SB02-01	BG3-SB03-01	BG3-SB04-01	BG3-SB05-01	BG3-SB06-01	BG3-SB07-01	BG3-SB08-01	BG3-SB09-01	BG3-SB10-01
SAMPLE DATE	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Volatiles (ug/kg)										
1,1,1-Trichloroethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
1,1,2,2-Tetrachloroethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
1,1,2-Trichloroethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
1,1,2-Trichloro-1,2,2-trifluoroethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
1,1-Dichloroethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
1,1-Dichloroethene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
1,2,4-Trichlorobenzene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
1,2-Dibromo-3-Chloropropane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
1,2-Dibromoethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
1,2-Dichlorobenzene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
1,2-Dichloroethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
1,2-Dichloropropane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
1,3-Dichlorobenzene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
1,4-Dichlorobenzene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
2-Butanone	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
2-Hexanone	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
4-Methyl-2-Pentanone	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Acetone	9 B	11 U	11 U	11 U	12 U	11 U	11 U	7 B	11 U	11 U
Benzene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Bromodichloromethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Bromoform	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Bromomethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Carbon Disulfide	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Carbon Tetrachloride	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Chlorobenzene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Chloroethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Chloroform	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Chloromethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Cyclohexane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Dibromochloromethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Dichlorodifluoromethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Ethylbenzene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Isopropylbenzene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Methyl Acetate	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Methyl-tert-butyl ether	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Methylcyclohexane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Methylene Chloride	11 U	1 J	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Styrene	4 J	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Tetrachloroethene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Toluene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 3
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG3-SB01-01	BG3-SB02-01	BG3-SB03-01	BG3-SB04-01	BG3-SB05-01	BG3-SB06-01	BG3-SB07-01	BG3-SB08-01	BG3-SB09-01	BG3-SB10-01
SAMPLE DATE	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Volatiles (ug/kg) (continued)										
Trichloroethene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Trichlorofluoromethane	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Vinyl Chloride	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Xylene (Total)	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
cis-1,2-Dichloroethene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
cis-1,3-Dichloropropene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
trans-1,2-Dichloroethene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
trans-1,3-Dichloropropene	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U
Semivolatiles (ug/kg)										
1,1'-Biphenyl	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
2,2'-oxybis(1-Chloropropane)	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
2,4,5-Trichlorophenol	940 U	930 U	900 U	890 U	980 U	870 U	890 U	930 U	920 U	930 U
2,4,6-Trichlorophenol	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
2,4-Dichlorophenol	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
2,4-Dimethylphenol	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
2,4-Dinitrophenol	940 U	930 U	900 U	890 U	980 U	870 U	890 U	930 U	920 U	930 U
2,4-Dinitrotoluene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
2,6-Dinitrotoluene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
2-Chloronaphthalene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
2-Chlorophenol	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
2-Methylnaphthalene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
2-Methylphenol	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
2-Nitroaniline	940 U	930 U	900 U	890 U	980 U	870 U	890 U	930 U	920 U	930 U
2-Nitrophenol	380 U	370 U	360 U	350 U	390 U	350 UJ	350 U	370 U	370 U	370 U
3,3'-Dichlorobenzidine	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
3-Nitroaniline	940 U	930 U	900 U	890 U	980 U	870 U	890 U	930 U	920 U	930 U
4,6-Dinitro-2-methylphenol	940 U	930 U	900 U	890 U	980 U	870 U	890 U	930 U	920 U	930 U
4-Bromophenyl-phenylether	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
4-Chloro-3-methylphenol	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
4-Chloroaniline	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
4-Chlorophenyl-phenylether	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 3
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG3-SB01-01	BG3-SB02-01	BG3-SB03-01	BG3-SB04-01	BG3-SB05-01	BG3-SB06-01	BG3-SB07-01	BG3-SB08-01	BG3-SB09-01	BG3-SB10-01
SAMPLE DATE	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Semivolatiles (ug/kg) (continued)										
4-Methylphenol	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
4-Nitroaniline	940 U	930 U	900 U	890 U	980 U	870 U	890 U	930 U	920 U	930 U
4-Nitrophenol	940 UJ	930 UJ	900 UJ	890 UJ	980 UJ	870 U	890 UJ	930 UJ	920 UJ	930 U
Acenaphthene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Acenaphthylene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Acetophenone	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Anthracene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Atrazine	380 UJ	370 UJ	360 UJ	350 UJ	390 UJ	350 UJ	350 UJ	370 UJ	370 UJ	370 UJ
Benzaldehyde	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Benzo(a)anthracene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Benzo(a)pyrene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Benzo(b)fluoranthene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Benzo(g,h,i)perylene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Benzo(k)fluoranthene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Butylbenzylphthalate	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Caprolactam	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Carbazole	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Chrysene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Di-n-butylphthalate	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Di-n-octylphthalate	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Dibenzo(a,h)anthracene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Dibenzofuran	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Diethylphthalate	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Dimethylphthalate	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Fluoranthene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Fluorene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Hexachlorobenzene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Hexachlorobutadiene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Hexachlorocyclopentadiene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Hexachloroethane	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Indeno(1,2,3-cd)pyrene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Isophorone	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
N-Nitroso-di-n-propylamine	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
N-nitrosodiphenylamine	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Naphthalene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Nitrobenzene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Pentachlorophenol	940 U	930 U	900 U	890 U	980 U	870 U	890 U	930 U	920 U	930 U
Phenanthrene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Phenol	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
Pyrene	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
bis(2-Chloroethoxy)methane	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
bis(2-Chloroethyl)ether	380 U	370 U	360 U	350 U	390 U	350 U	350 U	370 U	370 U	370 U
bis(2-Ethylhexyl)phthalate	380 U	370 U	360 U	37 B	58 J	350 U	140 J	41 J	370 U	160 B

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 3
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG3-SB01-01	BG3-SB02-01	BG3-SB03-01	BG3-SB04-01	BG3-SB05-01	BG3-SB06-01	BG3-SB07-01	BG3-SB08-01	BG3-SB09-01	BG3-SB10-01
SAMPLE DATE	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Pesticides/PCBs (ug/kg)										
4,4'-DDD	3.8 U	3.1 J	3.6 U	3.6 U	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U
4,4'-DDE	3.8 U	3.7 U	3.6 U	3.6 U	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U
4,4'-DDT	3.8 U	3.7 U	3.6 U	3.6 U	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U
Aldrin	1.9 U	1.9 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U
Dieldrin	3.8 U	2.3 J	3.6 U	3.6 U	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U
Endosulfan I	1.9 U	1.9 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U
Endosulfan II	3.8 U	3.7 U	3.6 U	3.6 U	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U
Endosulfan sulfate	3.8 U	3.7 U	3.6 U	3.6 U	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U
Endrin	3.8 U	3.7 U	3.6 U	3.6 U	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U
Endrin aldehyde	3.8 U	3.7 U	3.6 U	3.6 U	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U
Endrin ketone	3.8 U	3.7 U	3.6 U	3.6 U	3.9 U	3.5 U	3.6 U	3.7 U	3.6 U	3.7 U
Heptachlor	1.9 U	1.9 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U
Heptachlor epoxide	1.9 U	1.9 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U
Methoxychlor	19 U	19 U	18 U	18 U	20 U	18 U	18 U	19 U	19 U	19 U
Toxaphene	190 U	190 U	180 U	180 U	200 U	180 U	180 U	190 U	190 U	190 U
alpha-BHC	1.9 U	1.9 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U
alpha-Chlordane	1.9 U	1.9 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U	2.4 J	1.9 U	4.7
beta-BHC	1.9 U	1.9 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U
delta-BHC	1.9 U	1.9 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U
gamma-BHC (Lindane)	1.9 U	1.9 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U
gamma-Chlordane	1.9 U	1.9 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U
Aroclor-1016	38 U	37 U	36 U	36 U	39 U	35 U	36 U	37 U	36 U	37 U
Aroclor-1221	76 U	75 U	73 U	72 U	79 U	70 U	72 U	75 U	74 U	75 U
Aroclor-1232	38 U	37 U	36 U	36 U	39 U	35 U	36 U	37 U	36 U	37 U
Aroclor-1242	38 U	37 U	36 U	36 U	39 U	35 U	36 U	37 U	36 U	37 U
Aroclor-1248	38 U	37 U	36 U	36 U	39 U	35 U	36 U	37 U	36 U	37 U
Aroclor-1254	38 U	37 U	36 U	36 U	39 U	35 U	36 U	37 U	36 U	37 U
Aroclor-1260	38 U	37 U	36 U	36 U	39 U	35 U	36 U	37 U	36 U	37 U
Conventional (mg/kg)										
Total Organic Carbon	7050	3760	4680	3360	4490	6200	4730	6680	5200	8060

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 3
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG3-SB01-01	BG3-SB02-01	BG3-SB03-01	BG3-SB04-01	BG3-SB05-01	BG3-SB06-01	BG3-SB07-01	BG3-SB08-01	BG3-SB09-01	BG3-SB10-01
SAMPLE DATE	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001	07-23-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Metals (mg/kg)										
Aluminum	6830	4970	3620	3290	9110	1920	3610	5800	6280	10900
Antimony	0.38 U	0.37 U	0.37 U	0.35 U	0.38 U	0.35 U	0.36 U	0.37 U	0.35 U	0.38 U
Arsenic	0.86 B	0.87 B	1.1 B	2.1	1.2 B	0.4 B	1.2 B	1.2 B	1.3 B	1.5 B
Barium	18.3 J	38.3 J	28 J	21.7 J	8.2 J	19.4 J	28.7 J	18.8 J	47.8	26.1 J
Beryllium	0.16 B	0.22 B	0.23 B	0.4 B	0.1 B	0.28 B	0.19 B	0.22 B	0.66 B	0.22 B
Cadmium	0.089 U	0.087 U	0.087 U	0.083 U	0.09 U	0.083 U	0.084 U	0.087 U	0.082 U	0.089 U
Calcium	76.8 J	112 J	234 J	102 J	304 J	96.4 J	242 J	56.4 J	151 J	111 J
Chromium	7.8	4.7	5.1	7.6	15.6	2.9	5.3	7.2	4.6	11.9
Cobalt	0.4 B	1.3 J	2.8 J	4 J	0.16 U	2.4 J	1.5 J	0.84 J	8.1 J	0.92 B
Copper	1.2 J	0.71 J	0.93 J	0.59 B	2.2 J	0.95 J	1.5 J	1.1 J	1.3 J	2.4 J
Cyanide	0.1 B	0.066 B	0.063 B	0.041 U	0.047 U	0.04 B	0.21 B	0.045 U	0.44 B	0.045 U
Iron	8390	4790	3940	4790	12500	1740	5520	6780	5070	12500
Lead	5.6	6.1	3.6	5	6.7	3.2	4.5	5.3	5.5	6.6
Magnesium	175 J	206 J	241 J	251 J	218 J	115 J	300 J	202 J	324 J	392 J
Manganese	13.5	30.4	51.1	40	5.4	49.3	38.3	14.4	208	16.4
Mercury	0.056 UL	0.056 UL	0.044 UL	0.054 UL	0.044 UL	0.036 UL	0.038 UL	0.048 UL	0.048 UL	0.039 UL
Nickel	1.1 B	1.8 J	2.4 J	3.8 J	0.99 B	2 J	2 J	1.9 J	6.4 J	2.6 J
Potassium	179 B	131 B	167 B	177 B	278 J	78.8 B	193 B	173 B	168 B	253 B
Selenium	0.62 UL	0.61 UL	0.61 UL	0.58 UL	0.63 UL	0.58 UL	0.59 UL	0.61 UL	0.58 UL	0.62 UL
Silver	0.11 UL	0.11 UL	0.11 UL	0.1 UL	0.11 UL	0.1 UL	0.1 UL	0.11 UL	0.1 UL	0.11 UL
Sodium	205 B	214 B	170 B	162 B	210 B	177 B	217 B	208 B	135 B	199 B
Thallium	0.92 UL	0.9 UL	0.89 UL	0.85 UL	0.92 UL	0.85 UL	0.86 UL	0.89 UL	0.84 UL	0.91 UL
Vanadium	17.6	10 J	7.9 J	7.5 J	36	3.4 J	9.6 J	12.7	7.2 J	22.3
Zinc	5 L	5.2 L	5.7 L	6.6 L	5 L	4 B	5.8 L	6.9 L	13.8	12.3

APPENDIX D
ORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/kg)												
1,1,1-Trichloroethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
1,1,2,2-Tetrachloroethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
1,1,2-Trichloroethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
1,1,2-Trichloro-1,2,2-trifluoroethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
1,1-Dichloroethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
1,1-Dichloroethene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
1,2,4-Trichlorobenzene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
1,2-Dibromo-3-Chloropropane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
1,2-Dibromoethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
1,2-Dichlorobenzene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
1,2-Dichloroethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
1,2-Dichloropropane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
1,3-Dichlorobenzene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
1,4-Dichlorobenzene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
2-Butanone	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
2-Hexanone	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
4-Methyl-2-Pentanone	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Acetone	7 B	12 U	ND	ND	NA	0/10	5.25	0.717	5.67	1.65	0.16	5.80
Benzene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Bromodichloromethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Bromoform	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Bromomethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Carbon Disulfide	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Carbon Tetrachloride	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Chlorobenzene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Chloroethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Chloroform	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Chloromethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Cyclohexane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Dibromochloromethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Dichlorodifluoromethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Ethylbenzene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Isopropylbenzene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Methyl Acetate	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Methyl-tert-butyl ether	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Methylcyclohexane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Methylene Chloride	11 U	12 U	1 J	1 J	BG3-SB02-01	1/10	5.1	1.449	5.94	1.54	0.54	8.32
Styrene	11 U	12 U	4 J	4 J	BG3-SB01-01	1/10	5.4	0.516	5.70	1.68	0.11	5.78

APPENDIX D
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SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Leve	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Leve
Volatiles (ug/kg) (Cont)												
Tetrachloroethene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Toluene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Trichloroethene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Trichlorofluoromethane	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Vinyl Chloride	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Xylene (Total)	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
cis-1,2-Dichloroethene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
cis-1,3-Dichloropropene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
trans-1,2-Dichloroethene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
trans-1,3-Dichloropropene	11 U	12 U	ND	ND	NA	0/10	5.55	0.158	5.64	1.71	0.03	5.64
Semivolatiles (ug/kg)												
1,1'-Biphenyl	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
2,2'-oxybis(1-Chloropropane)	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
2,4,5-Trichlorophenol	870 U	980 U	ND	ND	NA	0/10	459	15.78	468	6.13	0.03	469
2,4,6-Trichlorophenol	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
2,4-Dichlorophenol	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
2,4-Dimethylphenol	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
2,4-Dinitrophenol	870 U	980 U	ND	ND	NA	0/10	459	15.78	468	6.13	0.03	469
2,4-Dinitrotoluene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
2,6-Dinitrotoluene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
2-Chloronaphthalene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
2-Chlorophenol	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
2-Methylnaphthalene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
2-Methylphenol	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
2-Nitroaniline	870 U	980 U	ND	ND	NA	0/10	459	15.78	468	6.13	0.03	469
2-Nitrophenol	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
3,3'-Dichlorobenzidine	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
3-Nitroaniline	870 U	980 U	ND	ND	NA	0/10	459	15.78	468	6.13	0.03	469
4,6-Dinitro-2-methylphenol	870 U	980 U	ND	ND	NA	0/10	459	15.78	468	6.13	0.03	469
4-Bromophenyl-phenylether	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
4-Chloro-3-methylphenol	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
4-Chloroaniline	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
4-Chlorophenyl-phenylether	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
4-Methylphenol	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
4-Nitroaniline	870 U	980 U	ND	ND	NA	0/10	459	15.78	468	6.13	0.03	469
4-Nitrophenol	870 U	980 UJ	ND	ND	NA	0/10	459	15.78	468	6.13	0.03	469
Acenaphthene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Acenaphthylene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Acetophenone	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187

APPENDIX D
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SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Semivolatiles (ug/kg) (Cont)												
Anthracene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Atrazine	350 UJ	390 UJ	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Benzaldehyde	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Benzo(a)anthracene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Benzo(a)pyrene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Benzo(b)fluoranthene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Benzo(g,h,i)perylene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Benzo(k)fluoranthene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Butylbenzylphthalate	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Caprolactam	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Carbazole	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Chrysene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Di-n-butylphthalate	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Di-n-octylphthalate	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Dibenzo(a,h)anthracene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Dibenzofuran	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Diethylphthalate	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Dimethylphthalate	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Fluoranthene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Fluorene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Hexachlorobenzene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Hexachlorobutadiene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Hexachlorocyclopentadiene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Hexachloroethane	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Indeno(1,2,3-cd)pyrene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Isophorone	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
N-Nitroso-di-n-propylamine	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
N-nitrosodiphenylamine	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Naphthalene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Nitrobenzene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Pentachlorophenol	870 U	980 U	ND	ND	NA	0/10	459	15.78	468	6.13	0.03	469
Phenanthrene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Phenol	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
Pyrene	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
bis(2-Chloroethoxy)methane	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
bis(2-Chloroethyl)ether	350 U	390 U	ND	ND	NA	0/10	183	6.75	187	5.21	0.04	187
bis(2-Ethylhexyl)phthalate	37 B	380 U	41 J	140 J	BG3-SB07-01	3/10	125.25	68.38	165	4.61	0.81	305

APPENDIX D
ORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Leve	Log Arithmatic Mear Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Leve
Pesticides/PCBs (ug/kg)												
4,4'-DDD	3.5 U	3.9 U	3.1 J	3.1 J	BG3-SB02-01	1/10	1.96	0.40	2.19	0.66	0.17	2.18
4,4'-DDE	3.5 U	3.9 U	ND	ND	NA	0/10	1.835	0.06	1.87	0.61	0.03	1.87
4,4'-DDT	3.5 U	3.9 U	ND	ND	NA	0/10	1.835	0.06	1.87	0.61	0.03	1.87
Aldrin	1.8 U	2 U	ND	ND	NA	0/10	0.935	0.03	0.95	-0.07	0.04	0.96
Dieldrin	3.5 U	3.9 U	2.3 J	2.3 J	BG3-SB02-01	1/10	1.88	0.16	1.97	0.63	0.08	1.97
Endosulfan I	1.8 U	2 U	ND	ND	NA	0/10	0.935	0.03	0.95	-0.07	0.04	0.96
Endosulfan II	3.5 U	3.9 U	ND	ND	NA	0/10	1.835	0.06	1.87	0.61	0.03	1.87
Endosulfan sulfate	3.5 U	3.9 U	ND	ND	NA	0/10	1.835	0.06	1.87	0.61	0.03	1.87
Endrin	3.5 U	3.9 U	ND	ND	NA	0/10	1.835	0.06	1.87	0.61	0.03	1.87
Endrin aldehyde	3.5 U	3.9 U	ND	ND	NA	0/10	1.835	0.06	1.87	0.61	0.03	1.87
Endrin ketone	3.5 U	3.9 U	ND	ND	NA	0/10	1.835	0.06	1.87	0.61	0.03	1.87
Heptachlor	1.8 U	2 U	ND	ND	NA	0/10	0.935	0.03	0.95	-0.07	0.04	0.96
Heptachlor epoxide	1.8 U	2 U	ND	ND	NA	0/10	0.935	0.03	0.95	-0.07	0.04	0.96
Methoxychlor	18 U	20 U	ND	ND	NA	0/10	9.35	0.34	9.55	2.23	0.04	9.55
Toxaphene	180 U	200 U	ND	ND	NA	0/10	93.5	3.37	95.46	4.54	0.04	95.55
alpha-BHC	1.8 U	2 U	ND	ND	NA	0/10	0.935	0.03	0.95	-0.07	0.04	0.96
alpha-Chlordane	1.8 U	2 U	2.4 J	4.7	BG3-SB10-01	2/10	1.455	1.23	2.17	0.18	0.56	2.20
beta-BHC	1.8 U	2 U	ND	ND	NA	0/10	0.935	0.03	0.95	-0.07	0.04	0.96
delta-BHC	1.8 U	2 U	ND	ND	NA	0/10	0.935	0.03	0.95	-0.07	0.04	0.96
gamma-BHC (Lindane)	1.8 U	2 U	ND	ND	NA	0/10	0.935	0.03	0.95	-0.07	0.04	0.96
gamma-Chlordane	1.8 U	2 U	ND	ND	NA	0/10	0.935	0.03	0.95	-0.07	0.04	0.96
Aroclor-1016	35 U	39 U	ND	ND	NA	0/10	18.35	0.6	18.7	2.91	0.03	18.7
Aroclor-1221	70 U	79 U	ND	ND	NA	0/10	37.05	1.3	37.8	3.61	0.03	37.8
Aroclor-1232	35 U	39 U	ND	ND	NA	0/10	18.35	0.6	18.7	2.91	0.03	18.7
Aroclor-1242	35 U	39 U	ND	ND	NA	0/10	18.35	0.6	18.7	2.91	0.03	18.7
Aroclor-1248	35 U	39 U	ND	ND	NA	0/10	18.35	0.6	18.7	2.91	0.03	18.7
Aroclor-1254	35 U	39 U	ND	ND	NA	0/10	18.35	0.6	18.7	2.91	0.03	18.7
Aroclor-1260	35 U	39 U	ND	ND	NA	0/10	18.35	0.6	18.7	2.91	0.03	18.7
Conventional (mg/kg)												
Total Organic Carbon	ND	ND	3360	8060	BG3-SB10-01	10/10	5,421	1,519	6,301	8.56	0.28	6,556

APPENDIX D
INORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Metals (mg/kg)												
Aluminum	ND	ND	1920	10900	BG3-SB10-01	10/10	5,633	2,780	7,245	8.52	0.52	8,669
Antimony	0.35 U	0.38 U	ND	ND	NA	0/10	0.183	0.0063	0.1867	-1.7	0.03	0.1869
Arsenic	0.4 B	1.5 B	2.1	2.1	BG3-SB04-01	1/10	0.6915	0.5175	0.9915	-0.54	0.58	1.0933
Barium	ND	ND	8.2 J	47.8	BG3-SB09-01	10/10	25.53	11.1835	32.0129	3.15	0.48	37.2381
Beryllium	0.1 B	0.66 B	ND	ND	NA	0/10	0.134	0.0792	0.1799	-2.13	0.51	0.2008
Cadmium	0.082 U	0.09 U	ND	ND	NA	0/10	0.0431	0.0014	0.0439	-3.15	0.03	0.0439
Calcium	ND	ND	56.4 J	304 J	BG3-SB05-01	10/10	149	83	196	4.87	0.54	231
Chromium	ND	ND	2.9	15.6	BG3-SB05-01	10/10	7.27	3.839	9.4954	1.87	0.49	10.5525
Cobalt	0.16 U	0.92 B	0.84 J	8.1 J	BG3-SB09-01	7/10	2.168	2.4293	3.5762	0.1	1.41	21.4351
Copper	0.59 B	0.59 B	0.71 J	2.4 J	BG3-SB10-01	9/10	1.2585	0.6421	1.6307	0.09	0.6	2.0956
Cyanide	0.04 B	0.44 B	ND	ND	NA	0/10	0.0549	0.0635	0.0917	-3.28	0.8	0.1135
Iron	ND	ND	1740	12500	BG3-SB05-01,BG3-SB1(	10/10	6,602	3,553	8,662	8.66	0.58	10,749
Lead	ND	ND	3.2	6.7	BG3-SB05-01	10/10	5.21	1.1723	5.8896	1.63	0.25	6.154
Magnesium	ND	ND	115 J	392 J	BG3-SB10-01	10/10	242	79	288	5.44	0.34	311
Manganese	ND	ND	5.4	208	BG3-SB09-01	10/10	46.68	58.873	80.8076	3.37	0.99	132.8666
Mercury	0.036 UL	0.056 UL	ND	ND	NA	0/10	0.0232	0.0037	0.0253	-3.78	0.16	0.0256
Nickel	0.99 B	1.1 B	1.8 J	6.4 J	BG3-SB09-01	8/10	2.3945	1.6991	3.3794	0.63	0.78	5.1594
Potassium	78.8 B	253 B	278 J	278 J	BG3-SB05-01	1/10	104	65	141	4.52	0.49	149
Selenium	0.58 UL	0.63 UL	ND	ND	NA	0/10	0.3015	0.0094	0.3069	-1.2	0.03	0.3073
Silver	0.1 UL	0.11 UL	ND	ND	NA	0/10	0.053	0.0026	0.0545	-2.94	0.05	0.0546
Sodium	135 B	217 B	ND	ND	NA	0/10	95	14	103	4.54	0.16	105
Thallium	0.84 UL	0.92 UL	ND	ND	NA	0/10	0.4415	0.0153	0.4504	-0.82	0.03	0.4508
Vanadium	ND	ND	3.4 J	36	BG3-SB05-01	10/10	13.42	9.6471	19.0122	2.39	0.67	23.9898
Zinc	4 B	4 B	5 L	13.8	BG3-SB09-01	9/10	6.83	3.5525	8.8893	1.8	0.53	10.6007

SUBSURFACE SOILS – SOIL ASSOCIATION 4

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 4
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG4-SB01-01	BG4-SB02-01	BG4-SB03-01	BG4-SB04-01	BG4-SB05-01	BG4-SB06-01	BG4-SB07-01	BG4-SB08-01	BG4-SB09-01	BG4-SB10-01
SAMPLE DATE	07-26-2001	07-27-2001	07-26-2001	07-26-2001	07-26-2001	07-26-2001	07-27-2001	07-27-2001	07-27-2001	07-26-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Volatiles (ug/kg)										
1,1,1-Trichloroethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,1,2,2-Tetrachloroethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,1,2-Trichloroethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,1,2-Trichloro-1,2,2-trifluoroethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,1-Dichloroethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,1-Dichloroethene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,2,4-Trichlorobenzene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,2-Dibromo-3-Chloropropane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,2-Dibromoethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,2-Dichlorobenzene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,2-Dichloroethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,2-Dichloropropane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,3-Dichlorobenzene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
1,4-Dichlorobenzene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
2-Butanone	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
2-Hexanone	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
4-Methyl-2-Pentanone	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Acetone	9 B	11 U	11 U	11 U	11 U	3 B	3 B	11 U	11 U	11 U
Benzene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Bromodichloromethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Bromoform	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Bromomethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Carbon Disulfide	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Carbon Tetrachloride	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Chlorobenzene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Chloroethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Chloroform	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Chloromethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Cyclohexane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Dibromochloromethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Dichlorodifluoromethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Ethylbenzene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Isopropylbenzene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Methyl Acetate	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Methyl-tert-butyl ether	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Methylcyclohexane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Methylene Chloride	2 B	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 4
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG4-SB01-01	BG4-SB02-01	BG4-SB03-01	BG4-SB04-01	BG4-SB05-01	BG4-SB06-01	BG4-SB07-01	BG4-SB08-01	BG4-SB09-01	BG4-SB10-01
SAMPLE DATE	07-26-2001	07-27-2001	07-26-2001	07-26-2001	07-26-2001	07-26-2001	07-27-2001	07-27-2001	07-27-2001	07-26-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Volatiles (ug/kg) (continued)										
Styrene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Tetrachloroethene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Toluene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Trichloroethene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Trichlorofluoromethane	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Vinyl Chloride	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Xylene (Total)	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
cis-1,2-Dichloroethene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
cis-1,3-Dichloropropene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
trans-1,2-Dichloroethene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
trans-1,3-Dichloropropene	13 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Semivolatiles (ug/kg)										
1,1'-Biphenyl	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
2,2'-oxybis(1-Chloropropane)	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
2,4,5-Trichlorophenol	1100 U	920 U	950 U	920 U	890 U	940 U	900 U	930 U	900 U	900 U
2,4,6-Trichlorophenol	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
2,4-Dichlorophenol	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
2,4-Dimethylphenol	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
2,4-Dinitrophenol	1100 U	920 U	950 U	920 U	890 U	940 U	900 U	930 U	900 U	900 U
2,4-Dinitrotoluene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
2,6-Dinitrotoluene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
2-Chloronaphthalene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
2-Chlorophenol	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
2-Methylnaphthalene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
2-Methylphenol	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
2-Nitroaniline	1100 U	920 U	950 U	920 U	890 U	940 U	900 U	930 U	900 U	900 U
2-Nitrophenol	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
3,3'-Dichlorobenzidine	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
3-Nitroaniline	1100 U	920 U	950 U	920 U	890 U	940 U	900 U	930 U	900 U	900 U
4,6-Dinitro-2-methylphenol	1100 U	920 U	950 U	920 U	890 U	940 U	900 U	930 U	900 U	900 U
4-Bromophenyl-phenylether	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
4-Chloro-3-methylphenol	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
4-Chloroaniline	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
4-Chlorophenyl-phenylether	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
4-Methylphenol	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
4-Nitroaniline	1100 U	920 U	950 U	920 U	890 U	940 U	900 U	930 U	900 U	900 U
4-Nitrophenol	1100 U	920 U	950 U	920 U	890 U	940 U	900 U	930 U	900 U	900 U
Acenaphthene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Acenaphthylene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 4
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG4-SB01-01	BG4-SB02-01	BG4-SB03-01	BG4-SB04-01	BG4-SB05-01	BG4-SB06-01	BG4-SB07-01	BG4-SB08-01	BG4-SB09-01	BG4-SB10-01
SAMPLE DATE	07-26-2001	07-27-2001	07-26-2001	07-26-2001	07-26-2001	07-26-2001	07-27-2001	07-27-2001	07-27-2001	07-26-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Semivolatiles (ug/kg) (continued)										
Acetophenone	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Anthracene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Atrazine	420 UJ	370 UJ	380 UJ	370 UJ	350 UJ	380 UJ	360 UJ	370 UJ	360 UJ	360 UJ
Benzaldehyde	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	51 J	360 U
Benzo(a)anthracene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Benzo(a)pyrene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Benzo(b)fluoranthene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Benzo(g,h,i)perylene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Benzo(k)fluoranthene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Butylbenzylphthalate	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Caprolactam	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Carbazole	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Chrysene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Di-n-butylphthalate	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Di-n-octylphthalate	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Dibenzo(a,h)anthracene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Dibenzofuran	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Diethylphthalate	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Dimethylphthalate	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Fluoranthene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Fluorene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Hexachlorobenzene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Hexachlorobutadiene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Hexachlorocyclopentadiene	420 U	370 UJ	380 UJ	370 UJ	350 UJ	380 UJ	360 UJ	370 UJ	360 UJ	360 UJ
Hexachloroethane	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Indeno(1,2,3-cd)pyrene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Isophorone	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
N-Nitroso-di-n-propylamine	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
N-nitrosodiphenylamine	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Naphthalene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Nitrobenzene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Pentachlorophenol	1100 U	920 U	950 U	920 U	890 U	940 U	900 U	930 U	900 U	900 U
Phenanthrene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
Phenol	420 U	370 U	380 U	370 U	340 J	53 J	360 U	370 U	360 U	360 U
Pyrene	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
bis(2-Chloroethoxy)methane	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
bis(2-Chloroethyl)ether	420 U	370 U	380 U	370 U	350 U	380 U	360 U	370 U	360 U	360 U
bis(2-Ethylhexyl)phthalate	470	130 J	380 U	410	100 B	55 B	130 J	580	57 J	85 B

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 4
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG4-SB01-01	BG4-SB02-01	BG4-SB03-01	BG4-SB04-01	BG4-SB05-01	BG4-SB06-01	BG4-SB07-01	BG4-SB08-01	BG4-SB09-01	BG4-SB10-01
SAMPLE DATE	07-26-2001	07-27-2001	07-26-2001	07-26-2001	07-26-2001	07-26-2001	07-27-2001	07-27-2001	07-27-2001	07-26-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Pesticides/PCBs (ug/kg)										
4,4'-DDD	4.2 U	3.7 U	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
4,4'-DDE	4.2 U	3.7 U	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
4,4'-DDT	4.2 U	3.7 U	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
Aldrin	2.2 U	1.9 U	2 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U
Dieldrin	4.2 U	3.7 U	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
Endosulfan I	2.2 U	1.9 U	2 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U
Endosulfan II	4.2 U	3.7 U	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
Endosulfan sulfate	4.2 U	3.7 U	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
Endrin	4.2 U	3.7 U	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
Endrin aldehyde	4.2 U	3.7 U	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
Endrin ketone	4.2 U	3.7 U	3.8 U	3.6 U	3.5 U	3.8 U	3.6 U	3.7 U	3.6 U	3.6 U
Heptachlor	2.2 U	1.9 U	2 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U
Heptachlor epoxide	2.2 U	1.9 U	2 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U
Methoxychlor	22 U	19 U	20 U	19 U	18 U	19 U	18 U	19 U	18 U	18 U
Toxaphene	220 U	190 U	200 U	190 U	180 U	190 U	180 U	190 U	180 U	180 U
alpha-BHC	2.2 U	1.9 U	2 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U
alpha-Chlordane	2.2 U	1.9 U	2 U	0.86 B	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U	1.5 J
beta-BHC	2.2 U	1.9 U	2 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U
delta-BHC	2.2 U	1.9 U	2 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U
gamma-BHC (Lindane)	2.2 U	1.9 U	2 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U
gamma-Chlordane	2.2 U	1.9 U	2 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U	1.8 U
Aroclor-1016	42 U	37 U	38 U	36 U	35 U	38 U	36 U	37 U	36 U	36 U
Aroclor-1221	86 U	74 U	77 U	74 U	72 U	76 U	73 U	75 U	72 U	72 U
Aroclor-1232	42 U	37 U	38 U	36 U	35 U	38 U	36 U	37 U	36 U	36 U
Aroclor-1242	42 U	37 U	38 U	36 U	35 U	38 U	36 U	37 U	36 U	36 U
Aroclor-1248	42 U	37 U	38 U	36 U	35 U	38 U	36 U	37 U	36 U	36 U
Aroclor-1254	42 U	37 U	38 U	36 U	35 U	38 U	36 U	37 U	36 U	36 U
Aroclor-1260	42 U	37 U	38 U	36 U	35 U	38 U	36 U	37 U	36 U	36 U
Conventional (mg/kg)										
Total Organic Carbon	7332	3019	3537	4282	3013	2967	2324	2665	4088	4010

APPENDIX D
SUBSURFACE SOIL DATA SUMMARY
SOIL ASSOCIATION 4
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	BG4-SB01-01	BG4-SB02-01	BG4-SB03-01	BG4-SB04-01	BG4-SB05-01	BG4-SB06-01	BG4-SB07-01	BG4-SB08-01	BG4-SB09-01	BG4-SB10-01
SAMPLE DATE	07-26-2001	07-27-2001	07-26-2001	07-26-2001	07-26-2001	07-26-2001	07-27-2001	07-27-2001	07-27-2001	07-26-2001
SAMPLE DEPTH (inches)	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"	6 - 24"
Metals (mg/kg)										
Aluminum	7380	5540	10700	8460	2310	11000	6870	6680	4740	7900
Antimony	0.5 B	0.38 U	0.38 U	0.82 B	0.36 U	0.65 B	0.49 B	0.38 U	0.36 U	0.53 B
Arsenic	18.6	1.1 B	2 J	3	0.46 B	1.4 B	1.3 B	2.4	1.2 B	13.8
Barium	27.4 J	41 J	33.5 J	58	20.4 J	10.8 J	19.4 J	21.1 J	48.2	46
Beryllium	0.89 B	0.4 B	0.33 B	0.36 B	0.22 B	0.12 B	0.13 B	0.16 B	0.6 B	0.73 B
Cadmium	0.084 U	0.088 U	0.088 U	0.083 U	0.086 U	0.088 U	0.086 U	0.09 U	0.085 U	0.083 U
Calcium	2080	261 J	345 J	362 J	87.2 J	300 J	138 J	481 J	123 J	493 J
Chromium	25.6	6.1	12	10.2	2.8	10.8	7.8	8.3	3.5 B	18.4
Cobalt	4.4 J	2.6 J	1.1 J	2.3 J	1.2 J	0.5 J	1.1 J	2 J	7 J	6 J
Copper	3.2 J	1.2 B	1.8 B	2.8 B	0.43 B	1.5 B	1.7 B	3.1 J	0.68 B	2.9 J
Cyanide	0.042 U	0.044 U	0.045 U	0.11 B	0.043 U	0.045 U	0.041 U	0.075 B	0.1 B	0.046 B
Iron	31700	6700	12800	12400	2310	10200	7560	11000	3870	23600
Lead	7.8	6.8	5.8	5.5	3.8	6.2	5.1	5.4	6.1	8.1
Magnesium	754 J	371 J	414 J	471 J	193 J	273 J	318 J	322 J	178 J	447 J
Manganese	195	86.1	27.7	67.8	39	7.4	21.6	62.2	154	137
Mercury	0.053 UL	0.084 B	0.14	0.12 B	0.075 B	0.093 B	0.1 B	0.11 B	0.066 B	0.092 B
Nickel	8.5	4.9 J	3 J	4.9 J	1.5 J	1.8 J	2.4 J	3.3 J	2.5 J	6.3 J
Potassium	764 J	259 B	276 J	367 J	102 B	191 B	197 B	287 J	117 B	471 J
Selenium	0.59 UL	0.62 UL	0.62 UL	0.58 UL	0.6 UL	0.61 UL	0.6 UL	0.63 UL	0.59 UL	0.64 J
Silver	0.1 U	0.11 U	0.11 U	0.1 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.1 U
Sodium	314 B	303 B	337 B	294 B	300 B	332 B	373 B	332 B	222 B	292 B
Thallium	0.86 UL	0.9 UL	0.9 UL	0.85 UL	0.88 UL	0.9 UL	0.89 UL	0.92 UL	0.87 UL	0.85 UL
Vanadium	35.1	11.9	22	18.9	4.7 J	30	14.6	17.8	5.8 J	30.8
Zinc	32	7.1 L	10.1	10.3	2.5 B	3.8 B	6.3 L	8.2 L	4.5 L	19.9

APPENDIX D
ORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/kg)												
1,1,1-Trichloroethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
1,1,2,2-Tetrachloroethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
1,1,2-Trichloroethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
1,1,2-Trichloro-1,2,2-trifluoroethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
1,1-Dichloroethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
1,1-Dichloroethene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
1,2,4-Trichlorobenzene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
1,2-Dibromo-3-Chloropropane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
1,2-Dibromoethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
1,2-Dichlorobenzene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
1,2-Dichloroethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
1,2-Dichloropropane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
1,3-Dichlorobenzene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
1,4-Dichlorobenzene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
2-Butanone	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
2-Hexanone	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
4-Methyl-2-Pentanone	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Acetone	3 B	11 U	ND	ND	NA	0/10	4.60	1.66	5.56	1.42	0.54	7.37
Benzene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Bromodichloromethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Bromoform	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Bromomethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Carbon Disulfide	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Carbon Tetrachloride	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Chlorobenzene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Chloroethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Chloroform	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Chloromethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Cyclohexane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Dibromochloromethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Dichlorodifluoromethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Ethylbenzene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Isopropylbenzene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Methyl Acetate	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Methyl-tert-butyl ether	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Methylcyclohexane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Methylene Chloride	2 B	11 U	ND	ND	NA	0/10	5.05	1.42	5.87	1.53	0.54	8.21
Styrene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78

APPENDIX D
ORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/kg) (Cont)												
Tetrachloroethene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Toluene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Trichloroethene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Trichlorofluoromethane	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Vinyl Chloride	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Xylene (Total)	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
cis-1,2-Dichloroethene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
cis-1,3-Dichloropropene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
trans-1,2-Dichloroethene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
trans-1,3-Dichloropropene	11 U	13 U	ND	ND	NA	0/10	5.60	0.32	5.78	1.72	0.05	5.78
Semivolatiles (ug/kg)												
1,1'-Biphenyl	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
2,2'-oxybis(1-Chloropropane)	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
2,4,5-Trichlorophenol	890 U	1100 U	ND	ND	NA	0/10	467.5	30.6	485	6.15	0.06	485
2,4,6-Trichlorophenol	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
2,4-Dichlorophenol	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
2,4-Dimethylphenol	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
2,4-Dinitrophenol	890 U	1100 U	ND	ND	NA	0/10	467.5	30.6	485	6.15	0.06	485
2,4-Dinitrotoluene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
2,6-Dinitrotoluene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
2-Chloronaphthalene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
2-Chlorophenol	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
2-Methylnaphthalene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
2-Methylphenol	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
2-Nitroaniline	890 U	1100 U	ND	ND	NA	0/10	467.5	30.6	485	6.15	0.06	485
2-Nitrophenol	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
3,3'-Dichlorobenzidine	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
3-Nitroaniline	890 U	1100 U	ND	ND	NA	0/10	467.5	30.6	485	6.15	0.06	485
4,6-Dinitro-2-methylphenol	890 U	1100 U	ND	ND	NA	0/10	467.5	30.6	485	6.15	0.06	485
4-Bromophenyl-phenylether	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
4-Chloro-3-methylphenol	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
4-Chloroaniline	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
4-Chlorophenyl-phenylether	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
4-Methylphenol	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
4-Nitroaniline	890 U	1100 U	ND	ND	NA	0/10	467.5	30.6	485	6.15	0.06	485
4-Nitrophenol	890 U	1100 U	ND	ND	NA	0/10	467.5	30.6	485	6.15	0.06	485
Acenaphthene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Acenaphthylene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Acetophenone	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192

APPENDIX D
ORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Semivolatiles (ug/kg) (Cont)												
Anthracene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Atrazine	350 UJ	420 UJ	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Benzaldehyde	350 U	420 U	51 J	51 J	BG4-SB09-01	1/10	173.1	43.9	199	5.1	0.41	242
Benzo(a)anthracene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Benzo(a)pyrene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Benzo(b)fluoranthene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Benzo(g,h,i)perylene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Benzo(k)fluoranthene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Butylbenzylphthalate	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Caprolactam	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Carbazole	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Chrysene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Di-n-butylphthalate	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Di-n-octylphthalate	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Dibenzo(a,h)anthracene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Dibenzofuran	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Diethylphthalate	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Dimethylphthalate	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Fluoranthene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Fluorene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Hexachlorobenzene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Hexachlorobutadiene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Hexachlorocyclopentadiene	350 UJ	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Hexachloroethane	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Indeno(1,2,3-cd)pyrene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Isophorone	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
N-Nitroso-di-n-propylamine	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
N-nitrosodiphenylamine	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Naphthalene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Nitrobenzene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Pentachlorophenol	890 U	1100 U	ND	ND	NA	0/10	467.5	30.6	485	6.15	0.06	485
Phenanthrene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
Phenol	360 U	420 U	53 J	340 J	BG4-SB05-01	2/10	188.8	68.3	228	5.16	0.46	274
Pyrene	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
bis(2-Chloroethoxy)methane	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
bis(2-Chloroethyl)ether	350 U	420 U	ND	ND	NA	0/10	186	9.7	192	5.22	0.05	192
bis(2-Ethylhexyl)phthalate	55 B	380 U	57 J	580	BG4-SB08-01	6/10	208.7	202.2	326	4.85	1.09	862

APPENDIX D
ORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Pesticides/PCBs (ug/kg)												
4,4'-DDD	3.5 U	4.2 U	ND	ND	NA	0/10	1.855	0.10	1.91	0.62	0.05	1.91
4,4'-DDE	3.5 U	4.2 U	ND	ND	NA	0/10	1.855	0.10	1.91	0.62	0.05	1.91
4,4'-DDT	3.5 U	4.2 U	ND	ND	NA	0/10	1.855	0.10	1.91	0.62	0.05	1.91
Aldrin	1.8 U	2.2 U	ND	ND	NA	0/10	0.95	0.06	0.99	-0.05	0.06	0.99
Dieldrin	3.5 U	4.2 U	ND	ND	NA	0/10	1.855	0.10	1.91	0.62	0.05	1.91
Endosulfan I	1.8 U	2.2 U	ND	ND	NA	0/10	0.95	0.06	0.99	-0.05	0.06	0.99
Endosulfan II	3.5 U	4.2 U	ND	ND	NA	0/10	1.855	0.10	1.91	0.62	0.05	1.91
Endosulfan sulfate	3.5 U	4.2 U	ND	ND	NA	0/10	1.855	0.10	1.91	0.62	0.05	1.91
Endrin	3.5 U	4.2 U	ND	ND	NA	0/10	1.855	0.10	1.91	0.62	0.05	1.91
Endrin aldehyde	3.5 U	4.2 U	ND	ND	NA	0/10	1.855	0.10	1.91	0.62	0.05	1.91
Endrin ketone	3.5 U	4.2 U	ND	ND	NA	0/10	1.855	0.10	1.91	0.62	0.05	1.91
Heptachlor	1.8 U	2.2 U	ND	ND	NA	0/10	0.95	0.06	0.99	-0.05	0.06	0.99
Heptachlor epoxide	1.8 U	2.2 U	ND	ND	NA	0/10	0.95	0.06	0.99	-0.05	0.06	0.99
Methoxychlor	18 U	22 U	ND	ND	NA	0/10	9.5	0.62	9.86	2.25	0.06	9.87
Toxaphene	180 U	220 U	ND	ND	NA	0/10	95	6.24	98.62	4.55	0.06	98.68
alpha-BHC	1.8 U	2.2 U	ND	ND	NA	0/10	0.95	0.06	0.99	-0.05	0.06	0.99
alpha-Chlordane	0.86 B	2.2 U	1.5 J	1.5 J	BG4-SB10-01	1/10	0.963	0.26	1.11	-0.08	0.31	1.21
beta-BHC	1.8 U	2.2 U	ND	ND	NA	0/10	0.95	0.06	0.99	-0.05	0.06	0.99
delta-BHC	1.8 U	2.2 U	ND	ND	NA	0/10	0.95	0.06	0.99	-0.05	0.06	0.99
gamma-BHC (Lindane)	1.8 U	2.2 U	ND	ND	NA	0/10	0.95	0.06	0.99	-0.05	0.06	0.99
gamma-Chlordane	1.8 U	2.2 U	ND	ND	NA	0/10	0.955	0.06	0.99	-0.05	0.06	0.99
Aroclor-1016	35 U	42 U	ND	ND	NA	0/10	18.55	1.0	19.1	2.92	0.05	19.1
Aroclor-1221	72 U	86 U	ND	ND	NA	0/10	37.55	2.1	38.8	3.62	0.05	38.8
Aroclor-1232	35 U	42 U	ND	ND	NA	0/10	18.55	1.0	19.1	2.92	0.05	19.1
Aroclor-1242	35 U	42 U	ND	ND	NA	0/10	18.55	1.0	19.1	2.92	0.05	19.1
Aroclor-1248	35 U	42 U	ND	ND	NA	0/10	18.55	1.0	19.1	2.92	0.05	19.1
Aroclor-1254	35 U	42 U	ND	ND	NA	0/10	18.55	1.0	19.1	2.92	0.05	19.1
Aroclor-1260	35 U	42 U	ND	ND	NA	0/10	18.55	1.0	19.1	2.92	0.05	19.1
Conventional (mg/kg)												
Total Organic Carbon	ND	ND	2324	7332	BG4-SB01-01	10/10	3,724	1,423	4,549	8.17	0.32	4,666

APPENDIX D
INORGANIC COMPOUNDS IN SUBSURFACE SOIL - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Metals (mg/kg)												
Aluminum	ND	ND	2310	11000	BG4-SB06-01	10/10	7158	2622.148	8678.0109	8.8	0.45	10253.6182
Antimony	0.36 U	0.82 B	ND	ND	NA	0/10	0.2425	0.0757	0.2864	-1.45	0.28	0.2923
Arsenic	0.46 B	1.4 B	2 J	18.6	BG4-SB01-01	5/10	4.253	6.4628	7.9994	0.48	1.44	34.3665
Barium	ND	ND	10.8 J	58	BG4-SB04-01	10/10	32.58	15.2645	41.4285	3.37	0.52	50.3969
Beryllium	0.12 B	0.89 B	ND	ND	NA	0/10	0.197	0.133	0.2741	-1.84	0.71	0.3891
Cadmium	0.083 U	0.09 U	ND	ND	NA	0/10	0.0431	0.0012	0.0438	-3.15	0.03	0.0438
Calcium	ND	ND	87.2 J	2080	BG4-SB01-01	10/10	467	584	806	5.72	0.9	1,085
Chromium	3.5 B	3.5 B	2.8	25.6	BG4-SB01-01	9/10	10.375	7.1495	14.5194	2.09	0.81	24.4221
Cobalt	ND	ND	0.5 J	7 J	BG4-SB09-01	10/10	2.82	2.236	4.1162	0.74	0.84	6.72
Copper	0.43 B	2.8 B	2.9 J	3.2 J	BG4-SB01-01	3/10	1.4255	1.1793	2.1091	0	0.93	4.0393
Cyanide	0.041 U	0.11 B	ND	ND	NA	0/10	0.0296	0.0131	0.0372	-3.59	0.38	0.0386
Iron	ND	ND	2310	31700	BG4-SB01-01	10/10	12,214	9,037	17,453	9.16	0.78	25,980
Lead	ND	ND	3.8	8.1	BG4-SB10-01	10/10	6.06	1.2738	6.7984	1.78	0.22	7.02
Magnesium	ND	ND	178 J	754 J	BG4-SB01-01	10/10	374	166	470	5.84	0.43	518
Manganese	ND	ND	7.4	195	BG4-SB01-01	10/10	79.78	62.849	116.2124	4.01	1.01	314.732
Mercury	0.053 UL	0.12 B	0.14	0.14	BG4-SB03-01	1/10	0.0537	0.0319	0.0722	-3.03	0.45	0.0741
Nickel	ND	ND	1.5 J	8.5	BG4-SB01-01	10/10	3.91	2.2228	5.1985	1.22	0.56	6.1633
Potassium	102 B	259 B	276 J	764 J	BG4-SB01-01	5/10	260	227	392	5.2	0.92	719
Selenium	0.58 UL	0.63 UL	0.64 J	0.64 J	BG4-SB10-01	1/10	0.336	0.1071	0.3981	-1.12	0.24	0.3922
Silver	0.1 U	0.11 U	ND	ND	NA	0/10	0.0535	0.0024	0.0549	-2.93	0.05	0.055
Sodium	222 B	373 B	ND	ND	NA	0/10	155	20	166	5.04	0.14	169
Thallium	0.85 UL	0.92 UL	ND	ND	NA	0/10	0.441	0.012	0.448	-0.82	0.03	0.4483
Vanadium	ND	ND	4.7 J	35.1	BG4-SB01-01	10/10	19.16	10.4251	25.2032	2.78	0.68	36.119
Zinc	2.5 B	3.8 B	4.5 L	32	BG4-SB01-01	8/10	10.155	9.3073	15.5503	1.94	0.98	30.7074

APPENDIX E – GROUNDWATER DATA

GROUNDWATER – SOIL ASSOCIATION 1

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 1
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG1-GW01	CXBG1-GW02	CXBG1-GW03
SAMPLE DATE	08-21-2001	08-15-2001	08-20-2001
Volatiles (ug/l)			
1,1,1-Trichloroethane	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U
1,2-Dibromo-3-Chloropropane	10 R	10 R	10 R
1,2-Dibromoethane	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U
Acetone	10 U	10 U	10 U
Benzene	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U
Carbon Disulfide	1 J	9 J	3 J
Carbon Tetrachloride	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U
Chloromethane	10 U	10 U	10 U
Cyclohexane	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U
Dichlorodifluoromethane	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U
Isopropylbenzene	10 U	10 U	10 U
Methyl Acetate	10 U	10 U	10 U
Methyl tert-Butyl Ether	10 U	10 U	10 U
Methylcyclohexane	10 U	10 U	10 U
Methylene Chloride	3 B	2 B	3 J
Styrene	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 1
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG1-GW01	CXBG1-GW02	CXBG1-GW03
SAMPLE DATE	08-21-2001	08-15-2001	08-20-2001
Volatiles (ug/l) (continued)			
Toluene	1 J	10 U	0.9 J
Trichloroethene	10 U	10 U	10 U
Trichlorofluoromethane	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U
Xylene (Total)	10 U	10 U	10 U
cis-1,2-Dichloroethene	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U
trans-1,2-Dichloroethene	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U
Semivolatiles (ug/l)			
1,1'-Biphenyl	10 U	10 U	11 U
2,2'-oxybis(1-Chloropropane)	10 U	10 U	11 U
2,4,5-Trichlorophenol	25 U	25 U	26 U
2,4,6-Trichlorophenol	10 U	10 U	11 U
2,4-Dichlorophenol	10 U	10 U	11 U
2,4-Dimethylphenol	10 U	10 U	11 U
2,4-Dinitrophenol	25 UJ	25 U	26 UJ
2,4-Dinitrotoluene	10 U	10 U	11 U
2,6-Dinitrotoluene	10 U	10 U	11 U
2-Chloronaphthalene	10 U	10 U	11 U
2-Chlorophenol	10 U	10 U	11 U
2-Methylnaphthalene	10 U	10 U	11 U
2-Methylphenol	10 U	10 U	11 U
2-Nitroaniline	25 U	25 U	26 U
2-Nitrophenol	10 U	10 U	11 U
3,3'-Dichlorobenzidine	10 U	10 U	11 U
3-Nitroaniline	25 U	25 U	26 U
4,6-Dinitro-2-methylphenol	25 U	25 U	26 U
4-Bromophenyl-phenylether	10 U	10 U	11 U
4-Chloro-3-methylphenol	10 U	10 U	11 U
4-Chloroaniline	10 U	10 U	11 U
4-Chlorophenyl-phenylether	10 U	10 U	11 U
4-Methylphenol	10 U	10 U	11 U
4-Nitroaniline	25 U	25 U	26 U
4-Nitrophenol	25 U	25 U	26 U
Acenaphthene	10 U	10 U	11 U
Acenaphthylene	10 U	10 U	11 U
Acetophenone	10 U	10 U	11 U
Anthracene	10 U	10 U	11 U
Atrazine	10 UJ	10 UJ	11 UJ
Benzaldehyde	10 U	10 U	11 U

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 1
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG1-GW01	CXBG1-GW02	CXBG1-GW03
SAMPLE DATE	08-21-2001	08-15-2001	08-20-2001
Semivolatiles (ug/l)			
Benzo(a)anthracene	10 U	10 U	11 U
Benzo(a)pyrene	10 U	10 U	11 U
Benzo(b)fluoranthene	10 U	10 U	11 U
Benzo(g,h,i)perylene	10 U	10 U	11 U
Benzo(k)fluoranthene	10 U	10 U	11 U
Butylbenzylphthalate	10 U	10 U	11 U
Caprolactam	10 U	10 U	11 U
Carbazole	10 U	10 U	11 U
Chrysene	10 U	10 U	11 U
Di-n-butylphthalate	10 U	10 U	11 U
Di-n-octylphthalate	10 U	10 U	11 U
Dibenzo(a,h)anthracene	10 U	10 U	11 U
Dibenzofuran	10 U	10 U	11 U
Diethylphthalate	10 U	10 U	11 U
Dimethylphthalate	10 U	10 U	11 U
Fluoranthene	10 U	10 U	11 U
Fluorene	10 U	10 U	11 U
Hexachlorobenzene	10 U	10 U	11 U
Hexachlorobutadiene	10 U	10 U	11 U
Hexachlorocyclopentadiene	10 U	10 U	11 U
Hexachloroethane	10 U	10 U	11 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	11 U
Isophorone	10 U	10 U	11 U
N-Nitroso-di-n-propylamine	10 U	10 U	11 U
N-nitrosodiphenylamine	10 U	10 U	11 U
Naphthalene	10 U	10 U	11 U
Nitrobenzene	10 U	10 U	11 U
Pentachlorophenol	25 U	25 U	26 U
Phenanthrene	10 U	10 U	11 U
Phenol	10 U	10 U	11 U
Pyrene	10 U	10 U	11 U
bis(2-Chloroethoxy)methane	10 U	10 U	11 U
bis(2-Chloroethyl)ether	10 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	10 U	10 U	11 U

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 1
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG1-GW01	CXBG1-GW02	CXBG1-GW03
SAMPLE DATE	08-21-2001	08-15-2001	08-20-2001
Pesticides/PCBs (ug/l)			
4,4'-DDD	0.1 U	0.11 U	0.1 U
4,4'-DDE	0.1 U	0.11 U	0.1 U
4,4'-DDT	0.1 U	0.11 U	0.1 U
Aldrin		0.054 U	0.053 U
Dieldrin	0.1 U	0.11 U	0.1 U
Endosulfan I	0.053 U	0.054 U	0.053 U
Endosulfan II	0.1 U	0.11 U	0.1 U
Endosulfan sulfate	0.1 U	0.11 U	0.1 U
Endrin	0.1 U	0.11 U	0.1 U
Endrin aldehyde	0.1 U	0.11 U	0.1 U
Endrin ketone	0.1 U	0.11 U	0.1 U
Heptachlor	0.053 U	0.054 U	0.053 U
Heptachlor epoxide	0.053 U	0.054 U	0.053 U
Methoxychlor	0.53 U	0.54 U	0.53 U
Toxaphene	5.3 U	5.4 U	5.3 U
alpha-BHC	0.053 U	0.054 U	0.053 U
alpha-Chlordane	0.053 U	0.054 U	0.053 U
beta-BHC	0.053 U	0.054 U	0.053 U
delta-BHC	0.053 U	0.054 U	0.053 U
gamma-BHC (Lindane)	0.053 U	0.054 U	0.053 U
gamma-Chlordane	0.053 U	0.054 U	0.053 U
Aroclor-1016	1 U	1.1 U	1 U
Aroclor-1221	2.1 U	2.2 U	2.1 U
Aroclor-1232	1 U	1.1 U	1 U
Aroclor-1242	1 U	1.1 U	1 U
Aroclor-1248	1 U	1.1 U	1 U
Aroclor-1254	1 U	1.1 U	1 U
Aroclor-1260	1 U	1.1 U	1 U

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 1
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG1-GW01	CXBG1-GW02	CXBG1-GW03
SAMPLE DATE	08-21-2001	08-15-2001	08-20-2001
Dissolved Inorganics (ug/l)			
Aluminum	43.6 U	66.3 B	95.6 B
Antimony	1.7 U	1.7 U	1.7 U
Arsenic	1.2 UL	1.2 UL	1.5 J
Barium	39 B	49.4 B	66.3 B
Beryllium	0.4 U	0.4 U	0.4 U
Cadmium	0.4 U	0.4 U	0.4 U
Calcium	153000 B	196000 B	233000
Chromium	1 U	1.1 B	3.1 B
Cobalt	0.7 U	0.7 U	0.7 U
Copper	1.6 U	1.6 U	1.6 U
Iron	68.2 B	10700	2530
Lead	1.8 U	1.8 U	1.8 U
Magnesium	1860 B	464000	641000
Manganese	13.3 B	730	509
Mercury	0.1 UL	0.1 UL	0.1 UL
Nickel	1.4 U	1.4 U	1.4 U
Potassium	495 J	287000	360000
Selenium	2.8 U	2.8 U	3.2 B
Silver	0.5 U	0.5 U	0.71 J
Sodium	11400 B	4E+06	5E+06
Thallium	4.1 U	8 J	6.3 J
Vanadium	1.1 B	5.2 J	14.6 J
Zinc	3 B	0.7 UL	0.7 UL

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 1
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG1-GW01	CXBG1-GW02	CXBG1-GW03
SAMPLE DATE	08-21-2001	08-15-2001	08-20-2001
Total Inorganics (ug/l)			
Aluminum	69.1 J	43.6 U	70.9 B
Antimony	1.7 U	2 J	1.7 U
Arsenic	4.6 B	4.5 B	6.9 B
Barium	37.8 B	49.7 B	66.9 B
Beryllium	0.4 U	0.4 U	0.4 U
Cadmium	0.4 U	0.4 U	0.4 U
Calcium	158000 B	213000	257000
Chromium	1 U	2.8 J	3.3 J
Cobalt	0.7 U	0.7 U	0.7 U
Copper	1.6 U	1.6 U	2 J
Iron	166 B	11400 J	2520 J
Lead	1.8 U	1.8 UL	1.8 U
Magnesium	1800 B	480000	658000
Manganese	10.8 B	760	538
Mercury	0.1 U	0.1 U	0.1 U
Nickel	1.4 U	1.4 U	1.4 U
Potassium	481 B	293000	370000
Selenium	2.8 UL	4.6 B	2.8 UL
Silver	0.5 UL	0.5 U	0.5 U
Sodium	9640 B	4E+06	5E+06
Thallium	4.1 U	4.1 U	7.5 J
Vanadium	1.5 B	6.1 B	14.5 J
Zinc	0.7 UL	0.7 U	0.7 U
Cyanide	0.8 U	1.3 B	0.8 U

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/l)												
1,1,1-Trichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1,2,2-Tetrachloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1,2-Trichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1,2-Trichloro-1,2,2-trifluoroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1-Dichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1-Dichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2,4-Trichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dibromoethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dichloropropane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,3-Dichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,4-Dichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
2-Butanone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
2-Hexanone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
4-Methyl-2-Pentanone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Acetone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Benzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Bromodichloromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Bromoform	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Bromomethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Carbon Disulfide	ND	ND	1 J	9 J	CXBG1-GW02	3/3	4.3333	4.1633	11.352	1.1	1.1	1772062
Carbon Tetrachloride	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chloroform	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chloromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Cyclohexane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Dibromochloromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Dichlorodifluoromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Ethylbenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Isopropylbenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Methyl Acetate	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Methyl tert-Butyl Ether	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/l) (Cont)												
Methylcyclohexane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Methylene Chloride	2 B	3 B	3 J	3 J	CXBG1-GW03	1/3	1.8333	1.0408	3.5879	0.5	0.56	41.36
Styrene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Tetrachloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Toluene	10 U	10 U	0.9 J	1 J	CXBG1-GW01	2/3	2.3	2.3388	6.2429	0.5	0.96	18621
Trichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Trichlorofluoromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Vinyl Chloride	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Xylene (Total)	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
cis-1,2-Dichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
cis-1,3-Dichloropropene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
trans-1,2-Dichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
trans-1,3-Dichloropropene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Semivolatiles (ug/l)												
1,1'-Biphenyl	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2,2'-oxybis(1-Chloropropane)	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2,4,5-Trichlorophenol	25 U	26 U	ND	ND	NA	0/3	12.67	0.2887	13.1534	2.54	0.02	13.24
2,4,6-Trichlorophenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2,4-Dichlorophenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2,4-Dimethylphenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2,4-Dinitrophenol	25 U	26 UJ	ND	ND	NA	0/3	12.67	0.2887	13.1534	2.54	0.02	13.24
2,4-Dinitrotoluene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2,6-Dinitrotoluene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2-Chloronaphthalene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2-Chlorophenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2-Methylnaphthalene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2-Methylphenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2-Nitroaniline	25 U	26 U	ND	ND	NA	0/3	12.67	0.2887	13.1534	2.54	0.02	13.24
2-Nitrophenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
3,3'-Dichlorobenzidine	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
3-Nitroaniline	25 U	26 U	ND	ND	NA	0/3	12.67	0.2887	13.1534	2.54	0.02	13.24
4,6-Dinitro-2-methylphenol	25 U	26 U	ND	ND	NA	0/3	12.67	0.2887	13.1534	2.54	0.02	13.24
4-Bromophenyl-phenylether	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
4-Chloro-3-methylphenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
4-Chloroaniline	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
4-Chlorophenyl-phenylether	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Semivolatiles (ug/l) (Cont)												
4-Methylphenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
4-Nitroaniline	25 U	26 U	ND	ND	NA	0/3	12.67	0.2887	13.1534	2.54	0.02	13.24
4-Nitrophenol	25 U	26 U	ND	ND	NA	0/3	12.67	0.2887	13.1534	2.54	0.02	13.24
Acenaphthene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Acenaphthylene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Acetophenone	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Anthracene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Atrazine	10 UJ	11 UJ	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Benzaldehyde	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Benzo(a)anthracene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Benzo(a)pyrene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Benzo(b)fluoranthene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Benzo(g,h,i)perylene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Benzo(k)fluoranthene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Butylbenzylphthalate	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Caprolactam	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Carbazole	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Chrysene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Di-n-butylphthalate	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Di-n-octylphthalate	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Dibenzo(a,h)anthracene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Dibenzofuran	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Diethylphthalate	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Dimethylphthalate	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Fluoranthene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Fluorene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Hexachlorobenzene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Hexachlorobutadiene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Hexachlorocyclopentadiene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Hexachloroethane	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Indeno(1,2,3-cd)pyrene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Isophorone	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
N-Nitroso-di-n-propylamine	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
N-nitrosodiphenylamine	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Naphthalene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Nitrobenzene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Leve	Log Arithmatic Mear Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Leve
Semivolatiles (ug/l) (Cont)												
Pentachlorophenol	25 U	26 U	ND	ND	NA	0/3	12.67	0.2887	13.1534	2.54	0.02	13.24
Phenanthrene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Phenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Pyrene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
bis(2-Chloroethoxy)methan	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
bis(2-Chloroethyl)ether	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
bis(2-Ethylhexyl)phthalate	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Pesticides/PCBs (ug/l)												
4,4'-DDD	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
4,4'-DDE	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
4,4'-DDT	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Aldrin	0.053 U	0.054 U	ND	ND	NA	0/2	0.0268	0.0004	0.0286	-3.62	0.01	0.0277
Dieldrin	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Endosulfan I	0.053 U	0.054 U	ND	ND	NA	0/3	0.0267	0.0003	0.0272	-3.62	0.01	0.0272
Endosulfan II	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Endosulfan sulfate	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Endrin	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Endrin aldehyde	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Endrin ketone	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Heptachlor	0.053 U	0.054 U	ND	ND	NA	0/3	0.0267	0.0003	0.0272	-3.62	0.01	0.0272
Heptachlor epoxide	0.053 U	0.054 U	ND	ND	NA	0/3	0.0267	0.0003	0.0272	-3.62	0.01	0.0272
Methoxychlor	0.53 U	0.54 U	ND	ND	NA	0/3	0.2667	0.0029	0.2716	-1.32	0.01	0.2723
Toxaphene	5.3 U	5.4 U	ND	ND	NA	0/3	2.6667	0.0289	2.7154	0.98	0.01	2.7233
alpha-BHC	0.053 U	0.054 U	ND	ND	NA	0/3	0.0267	0.0003	0.0272	-3.62	0.01	0.0272
alpha-Chlordane	0.053 U	0.054 U	ND	ND	NA	0/3	0.0267	0.0003	0.0272	-3.62	0.01	0.0272
beta-BHC	0.053 U	0.054 U	ND	ND	NA	0/3	0.0267	0.0003	0.0272	-3.62	0.01	0.0272
delta-BHC	0.053 U	0.054 U	ND	ND	NA	0/3	0.0267	0.0003	0.0272	-3.62	0.01	0.0272
gamma-BHC (Lindane)	0.053 U	0.054 U	ND	ND	NA	0/3	0.0267	0.0003	0.0272	-3.62	0.01	0.0272
gamma-Chlordane	0.053 U	0.054 U	ND	ND	NA	0/3	0.0267	0.0003	0.0272	-3.62	0.01	0.0272
Aroclor-1016	1 U	1.1 U	ND	ND	NA	0/3	0.5167	0.0289	0.5654	-0.66	0.06	0.5753
Aroclor-1221	2.1 U	2.2 U	ND	ND	NA	0/3	1.0667	0.0289	1.1154	0.06	0.03	1.1241
Aroclor-1232	1 U	1.1 U	ND	ND	NA	0/3	0.5167	0.0289	0.5654	-0.66	0.06	0.5753
Aroclor-1242	1 U	1.1 U	ND	ND	NA	0/3	0.5167	0.0289	0.5654	-0.66	0.06	0.5753
Aroclor-1248	1 U	1.1 U	ND	ND	NA	0/3	0.5167	0.0289	0.5654	-0.66	0.06	0.5753
Aroclor-1254	1 U	1.1 U	ND	ND	NA	0/3	0.5167	0.0289	0.5654	-0.66	0.06	0.5753
Aroclor-1260	1 U	1.1 U	ND	ND	NA	0/3	0.5167	0.0289	0.5654	-0.66	0.06	0.5753

APPENDIX E
TOTAL INORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Total Inorganics (ug/l)												
Aluminum	43.6 U	70.9 B	69.1 J	69.1 J	CXBG1-GW01	1/3	42.1167	24.3445	83.158	3.63	0.58	1,090
Antimony	1.7 U	1.7 U	2 J	2 J	CXBG1-GW02	1/3	1.2333	0.664	2.3527	0.12	0.49	12.348
Arsenic	4.5 B	6.9 B	ND	ND	NA	0/3	2.6667	0.6788	3.8111	0.96	0.24	5.4142
Barium	37.8 B	66.9 B	ND	ND	NA	0/3	25.7333	7.3151	38.0655	3.22	0.29	59.7982
Beryllium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Cadmium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Calcium	158000 B	158000 B	213000	257000	CXBG1-GW03	2/3	183000	92714.616	339303.4414	12	0.63	11,865,071
Chromium	1 U	1 U	2.8 J	3.3 J	CXBG1-GW03	2/3	2.2	1.4933	4.7175	0.51	1.05	502,103
Cobalt	0.7 U	0.7 U	ND	ND	NA	0/3	0.35	0	0.35	-1.05	0	0.35
Copper	1.6 U	1.6 U	2 J	2 J	CXBG1-GW03	1/3	1.2	0.6928	2.368	0.08	0.53	23.1618
Iron	166 B	166 B	2520 J	11400 J	CXBG1-GW02	2/3	4667.6667	5956.3392	14709.1937	7.2	2.52	7.74E+34
Lead	1.8 U	1.8 U	ND	ND	NA	0/3	0.9	0	0.9	-0.11	0	0.9
Magnesium	1800 B	1800 B	480000	658000	CXBG1-GW03	2/3	379633.3333	339853.21	952576.7202	11.09	3.72	3.76E+67
Manganese	10.8 B	10.8 B	538	760	CXBG1-GW02	2/3	434.4667	387.8075	1088.2541	4.87	2.76	1.10E+37
Mercury	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Nickel	1.4 U	1.4 U	ND	ND	NA	0/3	0.7	0	0.7	-0.36	0	0.7
Potassium	481 B	481 B	293000	370000	CXBG1-GW03	2/3	221080.1667	195089.39	549972.6742	10.3	4.17	4.30E+83
Selenium	2.8 UL	4.6 B	ND	ND	NA	0/3	1.7	0.5196	2.576	0.5	0.29	3.9582
Silver	0.5 U	0.5 U	ND	ND	NA	0/3	0.25	0	0.25	-1.39	0	0.25
Sodium	9640 B	9640 B	3660000	4990000	CXBG1-GW03	2/3	2884940	2581384	7236780.327	13.01	3.92	9.73E+71
Thallium	4.1 U	4.1 U	7.5 J	7.5 J	CXBG1-GW03	1/3	3.8667	3.1466	9.1714	1.15	0.75	1,047
Vanadium	1.5 B	6.1 B	14.5 J	14.5 J	CXBG1-GW03	1/3	6.1	7.365	18.5163	1.17	1.48	7,967,986,455
Zinc	0.7 U	0.7 U	ND	ND	NA	0/3	0.35	0	0.35	-1.05	0	0.35
Cyanide	0.8 U	1.3 B	ND	ND	NA	0/3	0.4833	0.1443	0.7266	-0.75	0.28	1.1043

APPENDIX E
DISSOLVED INORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 1
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Dissolved Inorganics (ug/l)												
Aluminum	43.6 U	95.6 B	ND	ND	NA	0/3	34.25	13.0349	56.225	3.48	0.39	150
Antimony	1.7 U	1.7 U	ND	ND	NA	0/3	0.85	0	0.85	-0.16	0	0.85
Arsenic	1.2 UL	1.2 UL	1.5 J	1.5 J	CXBG1-GW03	1/3	0.9	0.5196	1.776	-0.21	0.53	17.371
Barium	39 B	66.3 B	ND	ND	NA	0/3	25.7833	6.8892	37.3975	3.23	0.27	56.4699
Beryllium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Cadmium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Calcium	153000 B	196000 B	233000	233000	CXBG1-GW03	1/3	135833.3333	84832.679	278848.9675	11.7	0.58	3,606,381
Chromium	1 U	3.1 B	ND	ND	NA	0/3	0.8667	0.5923	1.8652	-0.28	0.63	52
Cobalt	0.7 U	0.7 U	ND	ND	NA	0/3	0.35	0	0.35	-1.05	0	0.35
Copper	1.6 U	1.6 U	ND	ND	NA	0/3	0.8	0	0.8	-0.22	0	0.8
Iron	68.2 B	68.2 B	2530	10700	CXBG1-GW02	2/3	4421.3667	5578.8266	13826.462	6.88	2.99	9.18E+40
Lead	1.8 U	1.8 U	ND	ND	NA	0/3	0.9	0	0.9	-0.11	0	0.9
Magnesium	1860 B	1860 B	464000	641000	CXBG1-GW03	2/3	368643.3333	330517.88	925848.7124	11.08	3.68	8.59E+66
Manganese	13.3 B	13.3 B	509	730	CXBG1-GW02	2/3	415.2167	370.6822	1040.1333	4.91	2.61	1.31E+35
Mercury	0.1 UL	0.1 UL	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Nickel	1.4 U	1.4 U	ND	ND	NA	0/3	0.7	0	0.7	-0.36	0	0.7
Potassium	ND	ND	495 J	360000	CXBG1-GW03	3/3	215831.6667	190025.42	536187.0574	10.52	3.74	4.98E+67
Selenium	2.8 U	3.2 B	ND	ND	NA	0/3	1.4667	0.1155	1.6614	0.38	0.08	1.7056
Silver	0.5 U	0.5 U	0.71 J	0.71 J	CXBG1-GW03	1/3	0.4033	0.2656	0.8511	-1.04	0.6	20.6811
Sodium	11400 B	11400 B	3850000	4890000	CXBG1-GW03	2/3	2915233.333	2572826.9	7252647.578	13.07	3.83	2.70E+70
Thallium	4.1 U	4.1 U	6.3 J	8 J	CXBG1-GW02	2/3	5.45	3.0647	10.6166	1.55	0.73	1,302
Vanadium	1.1 B	1.1 B	5.2 J	14.6 J	CXBG1-GW03	2/3	6.7833	7.1576	18.85	1.24	1.68	8.41E+12
Zinc	0.7 UL	3 B	ND	ND	NA	0/3	0.7333	0.664	1.8527	-0.56	0.84	865.3487

GROUNDWATER – SOIL ASSOCIATION 2

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 2
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG2-GW01	CXBG2-GW02	CXBG2-GW03
SAMPLE DATE	08-23-2001	08-14-2001	08-14-2001
Volatiles (ug/l)			
1,1,1-Trichloroethane	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U
1,2-Dibromo-3-Chloropropane	10 R	10 R	10 R
1,2-Dibromoethane	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U
Acetone	10 U	10 U	10 U
Benzene	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U
Carbon Disulfide	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U
Chloroform	10 U	5 B	10 U
Chloromethane	10 U	10 U	10 U
Cyclohexane	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U
Dichlorodifluoromethane	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U
Isopropylbenzene	10 U	10 U	10 U
Methyl Acetate	10 U	10 U	10 U
Methyl tert-Butyl Ether	10 U	10 U	10 U
Methylcyclohexane	10 U	10 U	10 U
Methylene Chloride	10 U	2 B	1 B

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 2
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG2-GW01	CXBG2-GW02	CXBG2-GW03
SAMPLE DATE	08-23-2001	08-14-2001	08-14-2001
Volatiles (ug/l) (continued)			
Styrene	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U
Toluene	10 U	0.9 B	10 U
Trichloroethene	10 U	10 U	10 U
Trichlorofluoromethane	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U
Xylene (Total)	10 U	10 U	10 U
cis-1,2-Dichloroethene	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U
trans-1,2-Dichloroethene	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U
Semivolatiles (ug/l)			
1,1'-Biphenyl	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 U
2,4,6-Trichlorophenol	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 U
2,4-Dinitrotoluene	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	25 U
2-Nitrophenol	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	25 U	25 U
4-Bromophenyl-phenylether	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 U
Acenaphthene	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U
Acetophenone	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 2
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG2-GW01	CXBG2-GW02	CXBG2-GW03
SAMPLE DATE	08-23-2001	08-14-2001	08-14-2001
Semivolatiles (ug/l) (continued)			
Atrazine	10 UJ	10 UJ	10 UJ
Benzaldehyde	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U
Caprolactam	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	10 U
Di-n-octylphthalate	10 U	10 U	10 U
Dibenzo(a,h)anthracene	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U
Dimethylphthalate	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	10 U	10 U	10 U
N-nitrosodiphenylamine	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U
Pentachlorophenol	25 U	25 U	25 U
Phenanthrene	10 U	10 U	10 U
Phenol	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	10 U	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	10 U	10 U	10 U

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 2
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG2-GW01	CXBG2-GW02	CXBG2-GW03
SAMPLE DATE	08-23-2001	08-14-2001	08-14-2001
Pesticides/PCBs (ug/l)			
4,4'-DDD	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U
Aldrin	0.053 U	0.05 U	0.05 U
Dieldrin	0.1 U	0.1 U	0.1 U
Endosulfan I	0.053 U	0.05 U	0.05 U
Endosulfan II	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	0.1 U	0.1 U	0.1 U
Endrin	0.1 U	0.1 U	0.1 U
Endrin aldehyde	0.1 U	0.1 U	0.1 U
Endrin ketone	0.1 U	0.1 U	0.1 U
Heptachlor	0.053 U	0.05 U	0.05 U
Heptachlor epoxide	0.053 U	0.05 U	0.05 U
Methoxychlor	0.53 U	0.5 U	0.5 U
Toxaphene	5.3 U	5 U	5 U
alpha-BHC	0.053 U	0.05 U	0.05 U
alpha-Chlordane	0.053 U	0.05 U	0.05 U
beta-BHC	0.053 U	0.05 U	0.05 U
delta-BHC	0.053 U	0.05 U	0.05 U
gamma-BHC (Lindane)	0.053 U	0.05 U	0.05 U
gamma-Chlordane	0.053 U	0.05 U	0.05 U
Aroclor-1016	1 U	1 U	1 U
Aroclor-1221	2.1 U	2 U	2 U
Aroclor-1232	1 U	1 U	1 U
Aroclor-1242	1 U	1 U	1 U
Aroclor-1248	1 U	1 U	1 U
Aroclor-1254	1 U	1 U	1 U
Aroclor-1260	1 U	1 U	1 U

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 2
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG2-GW01	CXBG2-GW02	CXBG2-GW03
SAMPLE DATE	08-23-2001	08-14-2001	08-14-2001
Dissolved Inorganics (ug/l)			
Aluminum	43.6 U	43.6 U	43.6 U
Antimony	1.7 U	1.7 U	1.7 U
Arsenic	1.2 UL	1.2 UL	1.2 UL
Barium	42.1 B	57.7 B	42.4 B
Beryllium	0.4 U	0.4 U	0.4 U
Cadmium	0.4 U	0.4 U	0.4 U
Calcium	118000 B	128000 B	98700 B
Chromium	1 U	1 B	1 U
Cobalt	0.7 U	0.7 U	1.2 J
Copper	1.6 U	1.6 U	1.6 U
Iron	10.6 U	26.4 B	10.6 U
Lead	1.8 U	1.8 U	1.8 U
Magnesium	1770 B	2840 B	5840 B
Manganese	10.8 B	25.1 B	32.4 B
Mercury	0.1 UL	0.1 UL	0.1 UL
Nickel	1.4 U	1.4 U	3.8 B
Potassium	547 J	1260 J	1440 J
Selenium	2.8 U	2.9 B	2.8 U
Silver	0.5 U	0.5 U	0.5 U
Sodium	5360 B	8800 B	22300 B
Thallium	4.1 U	4.1 U	4.1 U
Vanadium	0.73 B	0.86 B	0.6 B
Zinc	0.7 UL	0.7 UL	2.9 B

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 2
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG2-GW01	CXBG2-GW02	CXBG2-GW03
SAMPLE DATE	08-23-2001	08-14-2001	08-14-2001
Total Inorganics (ug/l)			
Aluminum	43.6 U	43.6 U	43.6 U
Antimony	1.7 U	1.7 U	1.7 J
Arsenic	1.2 U	3.3 B	2.6 B
Barium	45.3 B	59.8 B	45.5 B
Beryllium	0.4 U	0.4 U	0.4 U
Cadmium	0.4 U	0.4 U	0.4 U
Calcium	131000 B	135000 B	100000 B
Chromium	1 U	1.5 J	1 U
Cobalt	0.7 U	0.7 U	0.7 U
Copper	1.6 U	1.6 U	1.6 U
Iron	10.6 U	49.9 B	53.5 B
Lead	1.8 U	1.8 UL	1.8 UL
Magnesium	1920 B	2870 B	5940 B
Manganese	12 B	26 B	29.5 B
Mercury	0.1 U	0.1 U	0.1 U
Nickel	1.4 U	1.5 B	3.6 B
Potassium	604 B	1320 B	1420 B
Selenium	2.8 UL	2.8 UL	2.8 UL
Silver	0.5 UL	0.5 U	0.5 U
Sodium	5930 B	8680 B	21700 B
Thallium	4.1 U	4.1 U	4.1 U
Vanadium	0.74 B	0.6 U	0.6 U
Zinc	0.7 UL	0.7 U	2.6 B
Cyanide	0.8 U	0.8 U	0.8 U

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/l)												
1,1,1-Trichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1,2,2-Tetrachloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1,2-Trichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1,2-Trichloro-1,2,2-trifluoroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1-Dichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1-Dichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2,4-Trichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dibromoethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dichloropropane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,3-Dichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,4-Dichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
2-Butanone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
2-Hexanone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
4-Methyl-2-Pentanone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Acetone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Benzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Bromodichloromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Bromoform	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Bromomethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Carbon Disulfide	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5
Carbon Tetrachloride	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chloroform	5 B	10 U	ND	ND	NA	0/3	4.1667	1.4434	6.6001	1.38	0.4	27.02
Chloromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Cyclohexane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Dibromochloromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Dichlorodifluoromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Ethylbenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Isopropylbenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Methyl Acetate	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Methyl tert-Butyl Ether	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/l) (Cont)												
Methylcyclohexane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Methylene Chloride	1 B	10 U	ND	ND	NA	0/3	2.1667	2.4664	6.3247	0.31	1.18	2289100.32
Styrene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Tetrachloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Toluene	0.9 B	10 U	ND	ND	NA	0/3	3.4833	2.6269	7.9119	0.81	1.39	1373072855
Trichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Trichlorofluoromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Vinyl Chloride	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Xylene (Total)	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
cis-1,2-Dichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
cis-1,3-Dichloropropene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
trans-1,2-Dichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
trans-1,3-Dichloropropene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Semivolatiles (ug/l)												
1,1'-Biphenyl	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2,2'-oxybis(1-Chloropropane)	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2,4,5-Trichlorophenol	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
2,4,6-Trichlorophenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2,4-Dichlorophenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2,4-Dimethylphenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2,4-Dinitrophenol	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
2,4-Dinitrotoluene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2,6-Dinitrotoluene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2-Chloronaphthalene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2-Chlorophenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2-Methylnaphthalene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2-Methylphenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2-Nitroaniline	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
2-Nitrophenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
3,3'-Dichlorobenzidine	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
3-Nitroaniline	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
4,6-Dinitro-2-methylphenol	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
4-Bromophenyl-phenylether	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
4-Chloro-3-methylphenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
4-Chloroaniline	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
4-Chlorophenyl-phenylether	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Leve	Log Arithmatic Mear Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Leve
Semivolatiles (ug/l) (Cont)												
4-Methylphenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
4-Nitroaniline	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
4-Nitrophenol	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
Acenaphthene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Acenaphthylene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Acetophenone	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Anthracene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Atrazine	10 UJ	10 UJ	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Benzaldehyde	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Benzo(a)anthracene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Benzo(a)pyrene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Benzo(b)fluoranthene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Benzo(g,h,i)perylene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Benzo(k)fluoranthene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Butylbenzylphthalate	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Caprolactam	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Carbazole	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Chrysene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Di-n-butylphthalate	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Di-n-octylphthalate	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Dibenzo(a,h)anthracene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Dibenzofuran	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Diethylphthalate	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Dimethylphthalate	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Fluoranthene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Fluorene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Hexachlorobenzene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Hexachlorobutadiene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Hexachlorocyclopentadiene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Hexachloroethane	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Indeno(1,2,3-cd)pyrene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Isophorone	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
N-Nitroso-di-n-propylamine	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
N-nitrosodiphenylamine	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Naphthalene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Nitrobenzene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Leve	Log Arithmatic Mear Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Leve
Semivolatiles (ug/l) (Cont)												
Pentachlorophenol	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
Phenanthrene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Phenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Pyrene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
bis(2-Chloroethoxy)methanc	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
bis(2-Chloroethyl)ether	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
bis(2-Ethylhexyl)phthalate	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Pesticides/PCBs (ug/l)												
4,4'-DDD	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
4,4'-DDE	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
4,4'-DDT	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Aldrin	0.05 U	0.053 U	ND	ND	NA	0/3	0.0255	0.0009	0.027	-3.67	0.03	0.0272
Dieldrin	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Endosulfan I	0.05 U	0.053 U	ND	ND	NA	0/3	0.0255	0.0009	0.027	-3.67	0.03	0.0272
Endosulfan II	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Endosulfan sulfate	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Endrin	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Endrin aldehyde	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Endrin ketone	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Heptachlor	0.05 U	0.053 U	ND	ND	NA	0/3	0.0255	0.0009	0.027	-3.67	0.03	0.0272
Heptachlor epoxide	0.05 U	0.053 U	ND	ND	NA	0/3	0.0255	0.0009	0.027	-3.67	0.03	0.0272
Methoxychlor	0.5 U	0.53 U	ND	ND	NA	0/3	0.255	0.0087	0.2697	-1.37	0.03	0.2723
Toxaphene	5 U	5.3 U	ND	ND	NA	0/3	2.55	0.0866	2.696	0.94	0.03	2.7226
alpha-BHC	0.05 U	0.053 U	ND	ND	NA	0/3	0.0255	0.0009	0.027	-3.67	0.03	0.0272
alpha-Chlordane	0.05 U	0.053 U	ND	ND	NA	0/3	0.0255	0.0009	0.027	-3.67	0.03	0.0272
beta-BHC	0.05 U	0.053 U	ND	ND	NA	0/3	0.0255	0.0009	0.027	-3.67	0.03	0.0272
delta-BHC	0.05 U	0.053 U	ND	ND	NA	0/3	0.0255	0.0009	0.027	-3.67	0.03	0.0272
gamma-BHC (Lindane)	0.05 U	0.053 U	ND	ND	NA	0/3	0.0255	0.0009	0.027	-3.67	0.03	0.0272
gamma-Chlordane	0.05 U	0.053 U	ND	ND	NA	0/3	0.0255	0.0009	0.027	-3.67	0.03	0.0272
Aroclor-1016	1 U	1 U	ND	ND	NA	0/3	0.5	0	0.5	-0.69	0	0.5
Aroclor-1221	2 U	2.1 U	ND	ND	NA	0/3	1.0167	0.0289	1.0654	0.02	0.03	1.0742
Aroclor-1232	1 U	1 U	ND	ND	NA	0/3	0.5	0	0.5	-0.69	0	0.5
Aroclor-1242	1 U	1 U	ND	ND	NA	0/3	0.5	0	0.5	-0.69	0	0.5
Aroclor-1248	1 U	1 U	ND	ND	NA	0/3	0.5	0	0.5	-0.69	0	0.5
Aroclor-1254	1 U	1 U	ND	ND	NA	0/3	0.5	0	0.5	-0.69	0	0.5
Aroclor-1260	1 U	1 U	ND	ND	NA	0/3	0.5	0	0.5	-0.69	0	0.5

APPENDIX E
TOTAL INORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Total Inorganics (ug/l)												
Aluminum	43.6 U	43.6 U	ND	ND	NA	0/3	21.8	0	21.8	3.08	0	22
Antimony	1.7 U	1.7 U	1.7 J	1.7 J	CXBG2-GW03	1/3	1.1333	0.4907	1.9605	0.07	0.4	7.2904
Arsenic	1.2 U	3.3 B	ND	ND	NA	0/3	1.1833	0.5346	2.0846	0.08	0.53	23.1754
Barium	45.3 B	59.8 B	ND	ND	NA	0/3	25.1	4.1572	32.1084	3.21	0.16	36.5085
Beryllium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Cadmium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Calcium	100000 B	135000 B	ND	ND	NA	0/3	61000	9578.622	77148.1722	11.01	0.17	90,093
Chromium	1 U	1 U	1.5 J	1.5 J	CXBG2-GW02	1/3	0.8333	0.5774	1.8067	-0.33	0.63	53
Cobalt	0.7 U	0.7 U	ND	ND	NA	0/3	0.35	0	0.35	-1.05	0	0.35
Copper	1.6 U	1.6 U	ND	ND	NA	0/3	0.8	0	0.8	-0.22	0	0.8
Iron	10.6 U	53.5 B	ND	ND	NA	0/3	19	11.8986	39.0593	2.72	0.92	1.08E+05
Lead	1.8 UL	1.8 UL	ND	ND	NA	0/3	0.9	0	0.9	-0.11	0	0.9
Magnesium	1920 B	5940 B	ND	ND	NA	0/3	1788.3333	1050.5514	3559.4111	7.38	0.57	4.44E+04
Manganese	12 B	29.5 B	ND	ND	NA	0/3	11.25	4.6301	19.0557	2.35	0.49	1.10E+02
Mercury	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Nickel	1.4 U	3.6 B	ND	ND	NA	0/3	1.0833	0.6212	2.1306	-0.02	0.53	20.6184
Potassium	604 B	1420 B	ND	ND	NA	0/3	557.3333	222.5339	932.4933	6.26	0.47	5.14E+03
Selenium	2.8 UL	2.8 UL	ND	ND	NA	0/3	1.4	0	1.4	0.34	0	1.4
Silver	0.5 U	0.5 U	ND	ND	NA	0/3	0.25	0	0.25	-1.39	0	0.25
Sodium	5930 B	21700 B	ND	ND	NA	0/3	6051.6667	4211.9661	13152.4327	8.55	0.67	4.78E+05
Thallium	4.1 U	4.1 U	ND	ND	NA	0/3	2.05	0	2.05	0.72	0	2
Vanadium	0.6 U	0.74 B	ND	ND	NA	0/3	0.3233	0.0404	0.3914	-1.13	0.12	0
Zinc	0.7 U	2.6 B	ND	ND	NA	0/3	0.6667	0.5485	1.5914	-0.61	0.76	192.8616
Cyanide	0.8 U	0.8 U	ND	ND	NA	0/3	0.4	0	0.4	-0.92	0	0.4

APPENDIX E
DISSOLVED INORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 2
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Dissolved Inorganics (ug/l)												
Aluminum	43.6 U	43.6 U	ND	ND	NA	0/3	21.8	0	21.8	3.08	0	22
Antimony	1.7 U	1.7 U	ND	ND	NA	0/3	0.85	0	0.85	-0.16	0	0.85
Arsenic	1.2 UL	1.2 UL	ND	ND	NA	0/3	0.6	0	0.6	-0.51	0	0.6
Barium	42.1 B	57.7 B	ND	ND	NA	0/3	23.7	4.4607	31.2201	3.15	0.18	36.2299
Beryllium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Cadmium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Calcium	98700 B	128000 B	ND	ND	NA	0/3	57450	7446.9793	70004.5307	10.95	0.13	78,560
Chromium	1 U	1 U	ND	ND	NA	0/3	0.5	0	0.5	-0.69	0	1
Cobalt	0.7 U	0.7 U	1.2 J	1.2 J	CXBG2-GW03	1/3	0.6333	0.4907	1.4605	-0.64	0.71	129.1027
Copper	1.6 U	1.6 U	ND	ND	NA	0/3	0.8	0	0.8	-0.22	0	0.8
Iron	10.6 U	26.4 B	ND	ND	NA	0/3	7.9333	4.5611	15.6227	1.97	0.53	1.51E+02
Lead	1.8 U	1.8 U	ND	ND	NA	0/3	0.9	0	0.9	-0.11	0	0.9
Magnesium	1770 B	5840 B	ND	ND	NA	0/3	1741.6667	1054.9447	3520.151	7.34	0.6	8.92E+04
Manganese	10.8 B	32.4 B	ND	ND	NA	0/3	11.3833	5.4937	20.6449	2.33	0.57	2.91E+02
Mercury	0.1 UL	0.1 UL	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Nickel	1.4 U	3.8 B	ND	ND	NA	0/3	1.1	0.6928	2.268	-0.02	0.58	27.7956
Potassium	ND	ND	547 J	1440 J	CXBG2-GW03	3/3	1082.3333	472.2672	1878.5075	6.91	0.52	2.07E+04
Selenium	2.8 U	2.9 B	ND	ND	NA	0/3	1.4167	0.0289	1.4654	0.35	0.02	1.4739
Silver	0.5 U	0.5 U	ND	ND	NA	0/3	0.25	0	0.25	-1.39	0	0.25
Sodium	5360 B	22300 B	ND	ND	NA	0/3	6076.6667	4477.0117	13624.2613	8.53	0.72	1.37E+06
Thallium	4.1 U	4.1 U	ND	ND	NA	0/3	2.05	0	2.05	0.72	0	2
Vanadium	0.6 B	0.86 B	ND	ND	NA	0/3	0.365	0.065	0.4746	-1.02	0.18	1
Zinc	0.7 UL	2.9 B	ND	ND	NA	0/3	0.7167	0.6351	1.7874	-0.58	0.82	715.4048

GROUNDWATER – SOIL ASSOCIATION 3

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 3
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG3-GW01	CXBG3-GW02	CXBG3-GW03
SAMPLE DATE	08-20-2001	08-21-2001	08-15-2001
Volatiles (ug/l)			
1,1,1-Trichloroethane	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U
1,2-Dibromo-3-Chloropropane	10 U	10 U	10 R
1,2-Dibromoethane	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U
Acetone	10 U	10 U	10 U
Benzene	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U
Carbon Disulfide	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U
Chloroform	0.9 B	10 U	4 B
Chloromethane	10 U	10 U	10 U
Cyclohexane	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U
Dichlorodifluoromethane	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U
Isopropylbenzene	10 U	10 U	10 U
Methyl Acetate	10 U	10 U	10 U
Methyl tert-Butyl Ether	10 U	10 U	10 U
Methylcyclohexane	10 U	10 U	10 U
Methylene Chloride	2 J	2 B	2 B

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 3
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG3-GW01	CXBG3-GW02	CXBG3-GW03
SAMPLE DATE	08-20-2001	08-21-2001	08-15-2001
Volatiles (ug/l) (continued)			
Styrene	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U
Toluene	10 U	10 U	0.9 B
Trichloroethene	10 U	10 U	10 U
Trichlorofluoromethane	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U
Xylene (Total)	10 U	10 U	10 U
cis-1,2-Dichloroethene	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U
trans-1,2-Dichloroethene	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U
Semivolatiles (ug/l)			
1,1'-Biphenyl	10 U	10 U	11 U
2,2'-oxybis(1-Chloropropane)	10 U	10 U	11 U
2,4,5-Trichlorophenol	26 U	25 U	28 U
2,4,6-Trichlorophenol	10 U	10 U	11 U
2,4-Dichlorophenol	10 U	10 U	11 U
2,4-Dimethylphenol	10 U	10 U	11 U
2,4-Dinitrophenol	*26 UJ*	*25 UJ*	*28 U*
2,4-Dinitrotoluene	10 U	10 U	11 U
2,6-Dinitrotoluene	10 U	10 U	11 U
2-Chloronaphthalene	10 U	10 U	11 U
2-Chlorophenol	10 U	10 U	11 U
2-Methylnaphthalene	10 U	10 U	11 U
2-Methylphenol	10 U	10 U	11 U
2-Nitroaniline	*26 U*	*25 U*	*28 U*
2-Nitrophenol	10 U	10 U	11 U
3,3'-Dichlorobenzidine	10 U	10 U	11 U
3-Nitroaniline	26 U	25 U	28 U
4,6-Dinitro-2-methylphenol	26 U	25 U	28 U
4-Bromophenyl-phenylether	10 U	10 U	11 U
4-Chloro-3-methylphenol	10 U	10 U	11 U
4-Chloroaniline	10 U	10 U	11 U
4-Chlorophenyl-phenylether	10 U	10 U	11 U
4-Methylphenol	10 U	10 U	11 U
4-Nitroaniline	26 U	25 U	28 U
4-Nitrophenol	26 U	25 U	28 U
Acenaphthene	10 U	10 U	11 U
Acenaphthylene	10 U	10 U	11 U
Acetophenone	10 U	10 U	11 U
Anthracene	10 U	10 U	11 U

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 3
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG3-GW01	CXBG3-GW02	CXBG3-GW03
SAMPLE DATE	08-20-2001	08-21-2001	08-15-2001
Semivolatiles (ug/l) (continued)			
Atrazine	10 UJ	10 UJ	11 UJ
Benzaldehyde	10 U	10 U	11 U
Benzo(a)anthracene	10 U	10 U	11 U
Benzo(a)pyrene	10 U	10 U	11 U
Benzo(b)fluoranthene	10 U	10 U	11 U
Benzo(g,h,i)perylene	10 U	10 U	11 U
Benzo(k)fluoranthene	10 U	10 U	11 U
Butylbenzylphthalate	10 U	10 U	11 U
Caprolactam	10 U	10 U	11 U
Carbazole	10 U	10 U	11 U
Chrysene	10 U	10 U	11 U
Di-n-butylphthalate	10 U	10 U	11 U
Di-n-octylphthalate	10 U	10 U	11 U
Dibenzo(a,h)anthracene	10 U	10 U	11 U
Dibenzofuran	10 U	10 U	11 U
Diethylphthalate	10 U	10 U	11 U
Dimethylphthalate	10 U	10 U	11 U
Fluoranthene	10 U	10 U	11 U
Fluorene	10 U	10 U	11 U
Hexachlorobenzene	10 U	10 U	11 U
Hexachlorobutadiene	10 U	10 U	11 U
Hexachlorocyclopentadiene	10 U	10 U	11 U
Hexachloroethane	10 U	10 U	11 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	11 U
Isophorone	10 U	10 U	11 U
N-Nitroso-di-n-propylamine	10 U	10 U	11 U
N-nitrosodiphenylamine	10 U	10 U	11 U
Naphthalene	10 U	10 U	11 U
Nitrobenzene	10 U	10 U	11 U
Pentachlorophenol	26 U	25 U	28 U
Phenanthrene	10 U	10 U	11 U
Phenol	10 U	10 U	11 U
Pyrene	10 U	10 U	11 U
bis(2-Chloroethoxy)methane	10 U	10 U	11 U
bis(2-Chloroethyl)ether	10 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	10 U	10 U	1 B

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 3
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG3-GW01	CXBG3-GW02	CXBG3-GW03
SAMPLE DATE	08-20-2001	08-21-2001	08-15-2001
Pesticides/PCBs (ug/l)			
4,4'-DDD	0.1 U	0.1 U	0.11 U
4,4'-DDE	0.1 U	0.1 U	0.11 U
4,4'-DDT	0.1 U	0.1 U	0.11 U
Aldrin	0.053 U	0.053 U	0.056 U
Dieldrin	0.1 U	0.1 U	0.11 U
Endosulfan I	0.053 U	0.053 U	0.056 U
Endosulfan II	0.1 U	0.1 U	0.11 U
Endosulfan sulfate	0.1 U	0.1 U	0.11 U
Endrin	0.1 U	0.1 U	0.11 U
Endrin aldehyde	0.1 U	0.1 U	0.11 U
Endrin ketone	0.1 U	0.1 U	0.11 U
Heptachlor	0.053 U	0.053 U	0.056 U
Heptachlor epoxide	0.053 U	0.053 U	0.056 U
Methoxychlor	0.53 U	0.53 U	0.56 U
Toxaphene	5.3 U	5.3 U	5.6 U
alpha-BHC	0.053 U	0.053 U	0.056 U
alpha-Chlordane	0.053 U	0.053 U	0.056 U
beta-BHC	0.053 U	0.053 U	0.056 U
delta-BHC	0.053 U	0.053 U	0.056 U
gamma-BHC (Lindane)	0.053 U	0.053 U	0.056 U
gamma-Chlordane	0.053 U	0.053 U	0.056 U
Aroclor-1016	1 U	1 U	1.1 U
Aroclor-1221	2.1 U	2.1 U	2.2 U
Aroclor-1232	1 U	1 U	1.1 U
Aroclor-1242	1 U	1 U	1.1 U
Aroclor-1248	1 U	1 U	1.1 U
Aroclor-1254	1 U	1 U	1.1 U
Aroclor-1260	1 U	1 U	1.1 U

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 3
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG3-GW01	CXBG3-GW02	CXBG3-GW03
SAMPLE DATE	08-20-2001	08-21-2001	08-15-2001
Dissolved Inorganics (ug/l)			
Aluminum	43.6 U	43.6 U	43.6 U
Antimony	1.7 U	1.7 U	1.7 U
Arsenic	1.2 UL	1.2 UL	1.2 UL
Barium	53.9 B	65.5 B	56 B
Beryllium	0.63 B	0.4 U	0.4 U
Cadmium	0.4 U	0.4 U	0.4 U
Calcium	3690 B	87600 B	104000 B
Chromium	1.5 B	1 U	1 U
Cobalt	11.1 J	1 J	0.7 U
Copper	1.6 U	1.6 U	1.6 U
Iron	1190	968 B	10.6 U
Lead	1.8 U	1.8 U	1.8 U
Magnesium	618 B	2330 B	2360 B
Manganese	74	76.7	59.5
Mercury	0.1 UL	0.1 UL	0.1 UL
Nickel	13.7 B	1.8 B	10.4 B
Potassium	631 J	1510 J	1260 J
Selenium	2.8 U	2.8 U	2.8 U
Silver	0.5 U	0.5 U	0.5 U
Sodium	4060 B	10400 B	6590 B
Thallium	4.1 U	4.1 U	4.1 U
Vanadium	1.5 B	0.6 U	0.7 B
Zinc	36.8 B	7.7 B	29.4 B

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 3
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG3-GW01	CXBG3-GW02	CXBG3-GW03
SAMPLE DATE	08-20-2001	08-21-2001	08-15-2001
Total Inorganics (ug/l)			
Aluminum	43.6 U	43.6 U	43.6 U
Antimony	3.3 J	1.7 U	1.7 U
Arsenic	3.9 B	5.4 B	1.8 B
Barium	55.7 B	68.2 B	61.2 B
Beryllium	0.4 U	0.4 U	0.4 U
Cadmium	0.4 U	0.4 U	0.4 U
Calcium	4170 B	93400 B	117000 B
Chromium	3.4 J	1.4 J	1 U
Cobalt	11.1 J	0.81 B	0.7 U
Copper	1.6 U	1.6 U	1.6 U
Iron	1360 J	1730 J	10.6 U
Lead	1.8 UL	1.8 UL	1.8 UL
Magnesium	615 B	2380 B	2690 B
Manganese	81.7	79.2	81
Mercury	0.1 U	0.1 U	0.1 U
Nickel	14.3 B	3 B	10.5 B
Potassium	687 B	1590 B	1460 B
Selenium	2.8 UL	2.8 UL	2.8 UL
Silver	0.5 U	0.5 U	0.5 U
Sodium	3530 B	10900 B	7470 B
Thallium	4.1 U	4.1 U	4.1 U
Vanadium	0.6 U	0.6 U	0.6 U
Zinc	38.2 J	8.5 B	0.7 U
Cyanide	0.8 U	0.8 U	0.8 U

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/l)												
1,1,1-Trichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1,2,2-Tetrachloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1,2-Trichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1,2-Trichloro-1,2,2-trifluoroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1-Dichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1-Dichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2,4-Trichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dibromo-3-Chloropropane	10 U	10 U	ND	ND	NA	0/2	5	0	5	1.61	0	5.00
1,2-Dibromoethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dichloropropane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,3-Dichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,4-Dichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
2-Butanone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
2-Hexanone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
4-Methyl-2-Pentanone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Acetone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Benzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Bromodichloromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Bromoform	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Bromomethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Carbon Disulfide	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5
Carbon Tetrachloride	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chloroform	0.9 B	10 U	ND	ND	NA	0/3	2.4833	2.3132	6.383	0.5	1.22	4300697.13
Chloromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Cyclohexane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Dibromochloromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Dichlorodifluoromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Ethylbenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Isopropylbenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Methyl Acetate	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Methyl tert-Butyl Ether	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/l) (Cont)												
Methylcyclohexane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Methylene Chloride	2 B	2 B	2 J	2 J	CXBG3-GW01	1/3	1.3333	0.5774	2.3067	0.23	0.4	8.58
Styrene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Tetrachloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Toluene	0.9 B	10 U	ND	ND	NA	0/3	3.4833	2.6269	7.9119	0.81	1.39	1373072855
Trichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Trichlorofluoromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Vinyl Chloride	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Xylene (Total)	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
cis-1,2-Dichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
cis-1,3-Dichloropropene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
trans-1,2-Dichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
trans-1,3-Dichloropropene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Semivolatiles (ug/l)												
1,1'-Biphenyl	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2,2'-oxybis(1-Chloropropane)	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2,4,5-Trichlorophenol	25 U	28 U	ND	ND	NA	0/3	13.17	0.7638	14.4544	2.58	0.06	14.74
2,4,6-Trichlorophenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2,4-Dichlorophenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2,4-Dimethylphenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2,4-Dinitrophenol	25 UJ	28 U	ND	ND	NA	0/3	13.17	0.7638	14.4544	2.58	0.06	14.74
2,4-Dinitrotoluene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2,6-Dinitrotoluene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2-Chloronaphthalene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2-Chlorophenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2-Methylnaphthalene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2-Methylphenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
2-Nitroaniline	25 U	28 U	ND	ND	NA	0/3	13.17	0.7638	14.4544	2.58	0.06	14.74
2-Nitrophenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
3,3'-Dichlorobenzidine	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
3-Nitroaniline	25 U	28 U	ND	ND	NA	0/3	13.17	0.7638	14.4544	2.58	0.06	14.74
4,6-Dinitro-2-methylphenol	25 U	28 U	ND	ND	NA	0/3	13.17	0.7638	14.4544	2.58	0.06	14.74
4-Bromophenyl-phenylether	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
4-Chloro-3-methylphenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
4-Chloroaniline	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
4-Chlorophenyl-phenylether	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Leve	Log Arithmatic Mear Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Leve
Semivolatiles (ug/l) (Cont)												
4-Methylphenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
4-Nitroaniline	25 U	28 U	ND	ND	NA	0/3	13.17	0.7638	14.4544	2.58	0.06	14.74
4-Nitrophenol	25 U	28 U	ND	ND	NA	0/3	13.17	0.7638	14.4544	2.58	0.06	14.74
Acenaphthene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Acenaphthylene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Acetophenone	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Anthracene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Atrazine	10 UJ	11 UJ	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Benzaldehyde	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Benzo(a)anthracene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Benzo(a)pyrene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Benzo(b)fluoranthene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Benzo(g,h,i)perylene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Benzo(k)fluoranthene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Butylbenzylphthalate	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Caprolactam	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Carbazole	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Chrysene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Di-n-butylphthalate	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Di-n-octylphthalate	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Dibenzo(a,h)anthracene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Dibenzofuran	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Diethylphthalate	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Dimethylphthalate	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Fluoranthene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Fluorene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Hexachlorobenzene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Hexachlorobutadiene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Hexachlorocyclopentadiene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Hexachloroethane	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Indeno(1,2,3-cd)pyrene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Isophorone	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
N-Nitroso-di-n-propylamine	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
N-nitrosodiphenylamine	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Naphthalene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Nitrobenzene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Leve	Log Arithmatic Mear Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Leve
Semivolatiles (ug/l) (Cont)												
Pentachlorophenol	25 U	28 U	ND	ND	NA	0/3	13.17	0.7638	14.4544	2.58	0.06	14.74
Phenanthrene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Phenol	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
Pyrene	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
bis(2-Chloroethoxy)methane	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
bis(2-Chloroethyl)ether	10 U	11 U	ND	ND	NA	0/3	5.17	0.2887	5.6534	1.64	0.06	5.75
bis(2-Ethylhexyl)phthalate	1 B	10 U	ND	ND	NA	0/3	3.50	2.5981	7.88	0.84	1.33	563735752.78
Pesticides/PCBs (ug/l)												
4,4'-DDD	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
4,4'-DDE	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
4,4'-DDT	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Aldrin	0.053 U	0.056 U	ND	ND	NA	0/3	0.027	0.0009	0.0285	-3.61	0.03	0.0287
Dieldrin	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Endosulfan I	0.053 U	0.056 U	ND	ND	NA	0/3	0.027	0.0009	0.0285	-3.61	0.03	0.0287
Endosulfan II	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Endosulfan sulfate	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Endrin	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Endrin aldehyde	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Endrin ketone	0.1 U	0.11 U	ND	ND	NA	0/3	0.0517	0.0029	0.0566	-2.96	0.06	0.0575
Heptachlor	0.053 U	0.056 U	ND	ND	NA	0/3	0.027	0.0009	0.0285	-3.61	0.03	0.0287
Heptachlor epoxide	0.053 U	0.056 U	ND	ND	NA	0/3	0.027	0.0009	0.0285	-3.61	0.03	0.0287
Methoxychlor	0.53 U	0.56 U	ND	ND	NA	0/3	0.27	0.0087	0.2847	-1.31	0.03	0.2873
Toxaphene	5.3 U	5.6 U	ND	ND	NA	0/3	2.7	0.0866	2.846	0.99	0.03	2.8727
alpha-BHC	0.053 U	0.056 U	ND	ND	NA	0/3	0.027	0.0009	0.0285	-3.61	0.03	0.0287
alpha-Chlordane	0.053 U	0.056 U	ND	ND	NA	0/3	0.027	0.0009	0.0285	-3.61	0.03	0.0287
beta-BHC	0.053 U	0.056 U	ND	ND	NA	0/3	0.027	0.0009	0.0285	-3.61	0.03	0.0287
delta-BHC	0.053 U	0.056 U	ND	ND	NA	0/3	0.027	0.0009	0.0285	-3.61	0.03	0.0287
gamma-BHC (Lindane)	0.053 U	0.056 U	ND	ND	NA	0/3	0.027	0.0009	0.0285	-3.61	0.03	0.0287
gamma-Chlordane	0.053 U	0.056 U	ND	ND	NA	0/3	0.027	0.0009	0.0285	-3.61	0.03	0.0287
Aroclor-1016	1 U	1.1 U	ND	ND	NA	0/3	0.5167	0.0289	0.5654	-0.66	0.06	0.5753
Aroclor-1221	2.1 U	2.2 U	ND	ND	NA	0/3	1.0667	0.0289	1.1154	0.06	0.03	1.1241
Aroclor-1232	1 U	1.1 U	ND	ND	NA	0/3	0.5167	0.0289	0.5654	-0.66	0.06	0.5753
Aroclor-1242	1 U	1.1 U	ND	ND	NA	0/3	0.5167	0.0289	0.5654	-0.66	0.06	0.5753
Aroclor-1248	1 U	1.1 U	ND	ND	NA	0/3	0.5167	0.0289	0.5654	-0.66	0.06	0.5753
Aroclor-1254	1 U	1.1 U	ND	ND	NA	0/3	0.5167	0.0289	0.5654	-0.66	0.06	0.5753
Aroclor-1260	1 U	1.1 U	ND	ND	NA	0/3	0.5167	0.0289	0.5654	-0.66	0.06	0.5753

APPENDIX E
TOTAL INORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Total Inorganics (ug/l)												
Aluminum	43.6 U	43.6 U	ND	ND	NA	0/3	21.8	0	21.8	3.08	0	22
Antimony	1.7 U	1.7 U	3.3 J	3.3 J	CXBG3-GW01	1/3	1.6667	1.4145	4.0513	0.29	0.78	585.0412
Arsenic	1.8 B	5.4 B	ND	ND	NA	0/3	1.85	0.9042	3.3744	0.52	0.56	44.388
Barium	55.7 B	68.2 B	ND	ND	NA	0/3	30.85	3.1325	36.1309	3.43	0.1	39.1285
Beryllium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Cadmium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Calcium	4170 B	117000 B	ND	ND	NA	0/3	35761.6667	29755.645	85925.3833	9.79	1.86	9.21E+19
Chromium	1 U	1 U	1.4 J	3.4 J	CXBG3-GW01	2/3	1.7667	1.4844	4.2692	0.29	0.96	14,784
Cobalt	0.7 U	0.81 B	11.1 J	11.1 J	CXBG3-GW01	1/3	3.9517	6.1907	14.3883	0.15	1.96	3.88E+16
Copper	1.6 U	1.6 U	ND	ND	NA	0/3	0.8	0	0.8	-0.22	0	0.8
Iron	10.6 U	10.6 U	1360 J	1730 J	CXBG3-GW02	2/3	1031.7667	907.9925	2562.5108	5.45	3.27	5.23E+50
Lead	1.8 UL	1.8 UL	ND	ND	NA	0/3	0.9	0	0.9	-0.11	0	0.9
Magnesium	615 B	2690 B	ND	ND	NA	0/3	947.5	559.6483	1890.9861	6.67	0.82	9.89E+05
Manganese	ND	ND	79.2	81.7	CXBG3-GW01	3/3	80.6333	1.2897	82.8075	4.39	0.02	8.32E+01
Mercury	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Nickel	3 B	14.3 B	ND	ND	NA	0/3	4.6333	2.875	9.4801	1.34	0.83	5171.1485
Potassium	687 B	1590 B	ND	ND	NA	0/3	622.8333	244.0831	1034.3221	6.37	0.46	5.42E+03
Selenium	2.8 UL	2.8 UL	ND	ND	NA	0/3	1.4	0	1.4	0.34	0	1.4
Silver	0.5 U	0.5 U	ND	ND	NA	0/3	0.25	0	0.25	-1.39	0	0.25
Sodium	3530 B	10900 B	ND	ND	NA	0/3	3650	1843.9699	6758.6667	8.1	0.57	9.25E+04
Thallium	4.1 U	4.1 U	ND	ND	NA	0/3	2.05	0	2.05	0.72	0	2
Vanadium	0.6 U	0.6 U	ND	ND	NA	0/3	0.3	0	0.3	-1.2	0	0
Zinc	0.7 U	8.5 B	38.2 J	38.2 J	CXBG3-GW01	1/3	14.2667	20.8184	49.3635	1.35	2.35	2.2496E+25
Cyanide	0.8 U	0.8 U	ND	ND	NA	0/3	0.4	0	0.4	-0.92	0	0.4

APPENDIX E
DISSOLVED INORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 3
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Dissolved Inorganics (ug/l)												
Aluminum	43.6 U	43.6 U	ND	ND	NA	0/3	21.8	0	21.8	3.08	0	22
Antimony	1.7 U	1.7 U	ND	ND	NA	0/3	0.85	0	0.85	-0.16	0	0.85
Arsenic	1.2 UL	1.2 UL	ND	ND	NA	0/3	0.6	0	0.6	-0.51	0	0.6
Barium	53.9 B	65.5 B	ND	ND	NA	0/3	29.2333	3.0904	34.4433	3.37	0.1	37.2524
Beryllium	0.4 U	0.63 B	ND	ND	NA	0/3	0.2383	0.0664	0.3502	-1.46	0.26	0.5161
Cadmium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Calcium	3690 B	104000 B	ND	ND	NA	0/3	32548.3333	26904.108	77904.77	9.69	1.88	1.17E+20
Chromium	1 U	1.5 B	ND	ND	NA	0/3	0.5833	0.1443	0.8266	-0.56	0.23	1
Cobalt	0.7 U	0.7 U	1 J	11.1 J	CXBG3-GW01	2/3	4.15	6.0276	14.3117	0.45	1.77	1.27E+15
Copper	1.6 U	1.6 U	ND	ND	NA	0/3	0.8	0	0.8	-0.22	0	0.8
Iron	10.6 U	968 B	1190	1190	CXBG3-GW01	1/3	559.7667	595.9731	1564.4912	4.98	2.9	8.72E+38
Lead	1.8 U	1.8 U	ND	ND	NA	0/3	0.9	0	0.9	-0.11	0	0.9
Magnesium	618 B	2360 B	ND	ND	NA	0/3	884.6667	498.5984	1725.2315	6.62	0.77	2.96E+05
Manganese	ND	ND	59.5	76.7	CXBG3-GW02	3/3	70.0667	9.25	85.6609	4.24	0.14	9.68E+01
Mercury	0.1 UL	0.1 UL	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Nickel	1.8 B	13.7 B	ND	ND	NA	0/3	4.3167	3.0718	9.4953	1.16	1.1	1.93E+06
Potassium	ND	ND	631 J	1510 J	CXBG3-GW02	3/3	1133.6667	452.9132	1897.2129	6.97	0.46	9.80E+03
Selenium	2.8 U	2.8 U	ND	ND	NA	0/3	1.4	0	1.4	0.34	0	1.4
Silver	0.5 U	0.5 U	ND	ND	NA	0/3	0.25	0	0.25	-1.39	0	0.25
Sodium	4060 B	10400 B	ND	ND	NA	0/3	3508.3333	1595.7313	6198.5056	8.09	0.47	3.16E+04
Thallium	4.1 U	4.1 U	ND	ND	NA	0/3	2.05	0	2.05	0.72	0	2
Vanadium	0.6 U	1.5 B	ND	ND	NA	0/3	0.4667	0.2466	0.8824	-0.85	0.49	5
Zinc	7.7 B	36.8 B	ND	ND	NA	0/3	12.3167	7.5621	25.0653	2.32	0.85	1.62E+04

GROUNDWATER – SOIL ASSOCIATION 4

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 4
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG4-GW01	CXBG4-GW02	CXBG4-GW03
SAMPLE DATE	08-24-2001	08-24-2001	08-23-2001
Volatiles (ug/l)			
1,1,1-Trichloroethane	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U
1,2-Dibromo-3-Chloropropane	10 R	10 R	10 R
1,2-Dibromoethane	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U
Acetone	20 B	14 B	10 U
Benzene	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U
Carbon Disulfide	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U
Chloromethane	10 U	10 U	10 U
Cyclohexane	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U
Dichlorodifluoromethane	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U
Isopropylbenzene	10 U	10 U	10 U
Methyl Acetate	10 U	10 U	10 U
Methyl tert-Butyl Ether	10 U	10 U	10 U
Methylcyclohexane	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	2 B

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 4
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG4-GW01	CXBG4-GW02	CXBG4-GW03
SAMPLE DATE	08-24-2001	08-24-2001	08-23-2001
Volatiles (ug/l) (continued)			
Styrene	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U
Toluene	10 U	10 U	0.8 J
Trichloroethene	10 U	10 U	10 U
Trichlorofluoromethane	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U
Xylene (Total)	10 U	10 U	10 U
cis-1,2-Dichloroethene	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U
trans-1,2-Dichloroethene	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U
Semivolatiles (ug/l)			
1,1'-Biphenyl	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 U
2,4,6-Trichlorophenol	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 U
2,4-Dinitrotoluene	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	25 U
2-Nitrophenol	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	25 U	25 U
4-Bromophenyl-phenylether	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 U
Acenaphthene	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U
Acetophenone	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 4
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG4-GW01	CXBG4-GW02	CXBG4-GW03
SAMPLE DATE	08-24-2001	08-24-2001	08-23-2001
Semivolatiles (ug/l) (continued)			
Atrazine	10 UJ	10 UJ	10 UJ
Benzaldehyde	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U
Caprolactam	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	10 U
Di-n-octylphthalate	10 U	10 U	10 U
Dibenzo(a,h)anthracene	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U
Dimethylphthalate	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	10 U	10 U	10 U
N-nitrosodiphenylamine	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U
Pentachlorophenol	25 U	25 U	25 U
Phenanthrene	10 U	10 U	10 U
Phenol	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	10 U	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	10 U	1 B	10 U

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 4
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG4-GW01	CXBG4-GW02	CXBG4-GW03
SAMPLE DATE	08-24-2001	08-24-2001	08-23-2001
Pesticides/PCBs (ug/l)			
4,4'-DDD	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U
Aldrin	0.05 U	0.05 U	0.05 U
Dieldrin	0.1 U	0.1 U	0.1 U
Endosulfan I	0.05 U	0.05 U	0.05 U
Endosulfan II	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	0.1 U	0.1 U	0.1 U
Endrin	0.1 U	0.1 U	0.1 U
Endrin aldehyde	0.1 U	0.1 U	0.1 U
Endrin ketone	0.1 U	0.1 U	0.1 U
Heptachlor	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.05 U
Methoxychlor	0.5 U	0.5 U	0.5 U
Toxaphene	5 U	5 U	5 U
alpha-BHC	0.05 U	0.05 U	0.05 U
alpha-Chlordane	0.05 U	0.05 U	0.05 U
beta-BHC	0.05 U	0.05 U	0.05 U
delta-BHC	0.05 U	0.05 U	0.05 U
gamma-BHC (Lindane)	0.05 U	0.05 U	0.05 U
gamma-Chlordane	0.05 U	0.05 U	0.05 U
Aroclor-1016	1 U	1 U	1 U
Aroclor-1221	2 U	2 U	2 U
Aroclor-1232	1 U	1 U	1 U
Aroclor-1242	1 U	1 U	1 U
Aroclor-1248	1 U	1 U	1 U
Aroclor-1254	1 U	1 U	1 U
Aroclor-1260	1 U	1 U	1 U

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 4
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG4-GW01	CXBG4-GW02	CXBG4-GW03
SAMPLE DATE	08-24-2001	08-24-2001	08-23-2001
Dissolved Inorganics (ug/l)			
Aluminum	43.6 U	43.6 U	43.6 U
Antimony	3.8 J	1.7 U	1.7 U
Arsenic	9.8 J	1.2 UL	1.2 UL
Barium	52.6 B	100 B	24.7 B
Beryllium	0.4 U	0.4 U	0.4 U
Cadmium	0.4 U	0.4 U	0.4 U
Calcium	120000 B	116000 B	79200 B
Chromium	17 B	1 B	7 B
Cobalt	0.7 U	0.7 U	0.7 U
Copper	2.3 B	2.5 B	1.6 U
Iron	7960	10.6 U	10.6 U
Lead	1.8 U	1.8 U	1.8 U
Magnesium	2080 B	1440 B	917 B
Manganese	88.9	17.1 B	0.34 B
Mercury	0.1 UL	0.1 UL	0.1 UL
Nickel	7.4 B	2.2 B	1.5 B
Potassium	936 J	1760 J	652 J
Selenium	2.8 U	2.8 U	2.8 U
Silver	0.5 U	0.5 U	0.5 U
Sodium	7150 B	6030 B	3750 B
Thallium	4.1 U	4.6 J	4.1 U
Vanadium	0.6 U	0.7 B	0.96 B
Zinc	2.7 B	10.1 B	2.6 B

APPENDIX E
GROUNDWATER DATA SUMMARY
SOIL ASSOCIATION 4
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG4-GW01	CXBG4-GW02	CXBG4-GW03
SAMPLE DATE	08-24-2001	08-24-2001	08-23-2001
Total Inorganics (ug/l)			
Aluminum	85.9 J	43.6 U	43.6 U
Antimony	1.7 U	3.3 J	1.8 J
Arsenic	12.6	4.8 B	1.2 U
Barium	52.7 B	102 J	25.1 B
Beryllium	0.4 U	0.4 U	0.4 U
Cadmium	0.4 U	0.4 U	0.4 U
Calcium	126000 B	121000 B	82600 B
Chromium	1 U	26.5	24.2
Cobalt	0.7 U	0.7 U	0.7 U
Copper	1.6 U	3.9 B	3.4 B
Iron	8260 J	89.9 B	85.8 B
Lead	1.8 U	1.8 U	1.8 U
Magnesium	2140 B	1500 B	943 B
Manganese	91.1	21.5 B	2.2 B
Mercury	0.1 U	0.1 U	0.1 U
Nickel	1.4 U	12.2 B	7.9 B
Potassium	975 B	1820 B	684 B
Selenium	2.8 UL	2.8 UL	2.8 UL
Silver	0.5 UL	0.5 UL	0.5 UL
Sodium	7540 B	6200 B	4170 B
Thallium	4.1 U	4.1 U	4.1 U
Vanadium	1.1 B	0.6 U	0.97 B
Zinc	1.2 B	6.5 B	4.6 B
Cyanide	0.8 U	0.8 U	0.8 U

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/l)												
1,1,1-Trichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1,2,2-Tetrachloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1,2-Trichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1,2-Trichloro-1,2,2-trifluoroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1-Dichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,1-Dichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2,4-Trichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dibromoethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dichloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,2-Dichloropropane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,3-Dichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
1,4-Dichlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
2-Butanone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
2-Hexanone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
4-Methyl-2-Pentanone	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Acetone	10 U	20 B	ND	ND	NA	0/3	7.3333	2.5166	11.5759	1.95	0.35	26.90
Benzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Bromodichloromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Bromoform	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Bromomethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Carbon Disulfide	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5
Carbon Tetrachloride	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chlorobenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chloroethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chloroform	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Chloromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Cyclohexane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Dibromochloromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Dichlorodifluoromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Ethylbenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Isopropylbenzene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Methyl Acetate	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Methyl tert-Butyl Ether	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Volatiles (ug/l) (Cont)												
Methylcyclohexane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Methylene Chloride	2 B	10 U	ND	ND	NA	0/3	3.6667	2.3094	7.56	1.07	0.93	23840.13
Styrene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Tetrachloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Toluene	10 U	10 U	0.8 J	0.8 J	CXBG4-GW03	1/3	3.6	2.4249	7.688	1	1.06	960361
Trichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Trichlorofluoromethane	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Vinyl Chloride	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Xylene (Total)	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
cis-1,2-Dichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
cis-1,3-Dichloropropene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
trans-1,2-Dichloroethene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
trans-1,3-Dichloropropene	10 U	10 U	ND	ND	NA	0/3	5	0	5	1.61	0	5.00
Semivolatiles (ug/l)												
1,1'-Biphenyl	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2,2'-oxybis(1-Chloropropane)	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2,4,5-Trichlorophenol	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
2,4,6-Trichlorophenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2,4-Dichlorophenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2,4-Dimethylphenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2,4-Dinitrophenol	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
2,4-Dinitrotoluene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2,6-Dinitrotoluene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2-Chloronaphthalene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2-Chlorophenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2-Methylnaphthalene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2-Methylphenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
2-Nitroaniline	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
2-Nitrophenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
3,3'-Dichlorobenzidine	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
3-Nitroaniline	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
4,6-Dinitro-2-methylphenol	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
4-Bromophenyl-phenylether	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
4-Chloro-3-methylphenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
4-Chloroaniline	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
4-Chlorophenyl-phenylether	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Semivolatiles (ug/l) (Cont)												
4-Methylphenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
4-Nitroaniline	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
4-Nitrophenol	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
Acenaphthene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Acenaphthylene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Acetophenone	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Anthracene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Atrazine	10 UJ	10 UJ	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Benzaldehyde	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Benzo(a)anthracene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Benzo(a)pyrene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Benzo(b)fluoranthene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Benzo(g,h,i)perylene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Benzo(k)fluoranthene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Butylbenzylphthalate	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Caprolactam	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Carbazole	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Chrysene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Di-n-butylphthalate	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Di-n-octylphthalate	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Dibenzo(a,h)anthracene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Dibenzofuran	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Diethylphthalate	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Dimethylphthalate	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Fluoranthene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Fluorene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Hexachlorobenzene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Hexachlorobutadiene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Hexachlorocyclopentadiene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Hexachloroethane	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Indeno(1,2,3-cd)pyrene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Isophorone	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
N-Nitroso-di-n-propylamine	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
N-nitrosodiphenylamine	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Naphthalene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Nitrobenzene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00

APPENDIX E
ORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Semivolatiles (ug/l) (Cont)												
Pentachlorophenol	25 U	25 U	ND	ND	NA	0/3	12.50	0	12.5	2.53	0	12.50
Phenanthrene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Phenol	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
Pyrene	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
bis(2-Chloroethoxy)methane	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
bis(2-Chloroethyl)ether	10 U	10 U	ND	ND	NA	0/3	5.00	0	5	1.61	0	5.00
bis(2-Ethylhexyl)phthalate	1 B	10 U	ND	ND	NA	0/3	3.50	2.5981	7.88	0.84	1.33	563735752.78
Pesticides/PCBs (ug/l)												
4,4'-DDD	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
4,4'-DDE	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
4,4'-DDT	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Aldrin	0.05 U	0.05 U	ND	ND	NA	0/3	0.025	0	0.025	-3.69	0	0.025
Dieldrin	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Endosulfan I	0.05 U	0.05 U	ND	ND	NA	0/3	0.025	0	0.025	-3.69	0	0.025
Endosulfan II	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Endosulfan sulfate	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Endrin	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Endrin aldehyde	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Endrin ketone	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Heptachlor	0.05 U	0.05 U	ND	ND	NA	0/3	0.025	0	0.025	-3.69	0	0.025
Heptachlor epoxide	0.05 U	0.05 U	ND	ND	NA	0/3	0.025	0	0.025	-3.69	0	0.025
Methoxychlor	0.5 U	0.5 U	ND	ND	NA	0/3	0.25	0	0.25	-1.39	0	0.25
Toxaphene	5 U	5 U	ND	ND	NA	0/3	2.5	0	2.5	0.92	0	2.5
alpha-BHC	0.05 U	0.05 U	ND	ND	NA	0/3	0.025	0	0.025	-3.69	0	0.025
alpha-Chlordane	0.05 U	0.05 U	ND	ND	NA	0/3	0.025	0	0.025	-3.69	0	0.025
beta-BHC	0.05 U	0.05 U	ND	ND	NA	0/3	0.025	0	0.025	-3.69	0	0.025
delta-BHC	0.05 U	0.05 U	ND	ND	NA	0/3	0.025	0	0.025	-3.69	0	0.025
gamma-BHC (Lindane)	0.05 U	0.05 U	ND	ND	NA	0/3	0.025	0	0.025	-3.69	0	0.025
gamma-Chlordane	0.05 U	0.05 U	ND	ND	NA	0/3	0.025	0	0.025	-3.69	0	0.025
Aroclor-1016	1 U	1 U	ND	ND	NA	0/3	0.5	0	0.5	-0.69	0	0.5
Aroclor-1221	2 U	2 U	ND	ND	NA	0/3	1	0	1	0	0	1
Aroclor-1232	1 U	1 U	ND	ND	NA	0/3	0.5	0	0.5	-0.69	0	0.5
Aroclor-1242	1 U	1 U	ND	ND	NA	0/3	0.5	0	0.5	-0.69	0	0.5
Aroclor-1248	1 U	1 U	ND	ND	NA	0/3	0.5	0	0.5	-0.69	0	0.5
Aroclor-1254	1 U	1 U	ND	ND	NA	0/3	0.5	0	0.5	-0.69	0	0.5
Aroclor-1260	1 U	1 U	ND	ND	NA	0/3	0.5	0	0.5	-0.69	0	0.5

APPENDIX E
TOTAL INORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Total Inorganics (ug/l)												
Aluminum	43.6 U	43.6 U	85.9 J	85.9 J	CXBG4-GW01	1/3	43.1667	37.0082	105.5572	3.54	0.79	16,176
Antimony	1.7 U	1.7 U	1.8 J	3.3 J	CXBG4-GW02	2/3	1.9833	1.2352	4.0657	0.54	0.68	172.8681
Arsenic	1.2 U	4.8 B	12.6	12.6	CXBG4-GW01	1/3	5.2	6.4715	16.11	0.97	1.52	4.26E+11
Barium	25.1 B	52.7 B	102 J	102 J	CXBG4-GW02	1/3	46.9667	48.1571	128.1526	3.48	1.06	1.21E+07
Beryllium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Cadmium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Calcium	82600 B	126000 B	ND	ND	NA	0/3	54933.3333	11872.798	74949.1546	10.9	0.23	109,177
Chromium	1 U	1 U	24.2	26.5	CXBG4-GW02	2/3	17.0667	14.3932	41.3316	1.92	2.27	5.06E+24
Cobalt	0.7 U	0.7 U	ND	ND	NA	0/3	0.35	0	0.35	-1.05	0	0.35
Copper	1.6 U	3.9 B	ND	ND	NA	0/3	1.4833	0.6048	2.5029	0.33	0.48	14.0589
Iron	85.8 B	89.9 B	8260 J	8260 J	CXBG4-GW01	1/3	2782.6167	4743.5532	10779.5618	5.53	3.02	7.69E+46
Lead	1.8 U	1.8 U	ND	ND	NA	0/3	0.9	0	0.9	-0.11	0	0.9
Magnesium	943 B	2140 B	ND	ND	NA	0/3	763.8333	299.4897	1268.7296	6.58	0.41	5.19E+03
Manganese	2.2 B	21.5 B	91.1	91.1	CXBG4-GW01	1/3	34.3167	49.412	117.6182	2.33	2.21	1.75E+24
Mercury	0.1 U	0.1 U	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Nickel	1.4 U	12.2 B	ND	ND	NA	0/3	3.5833	2.7186	8.1665	0.94	1.15	2737338.593
Potassium	684 B	1820 B	ND	ND	NA	0/3	579.8333	295.0425	1077.2323	6.28	0.5	5.87E+03
Selenium	2.8 UL	2.8 UL	ND	ND	NA	0/3	1.4	0	1.4	0.34	0	1.4
Silver	0.5 UL	0.5 UL	ND	ND	NA	0/3	0.25	0	0.25	-1.39	0	0.25
Sodium	4170 B	7540 B	ND	ND	NA	0/3	2985	848.3661	4415.2226	7.97	0.3	9.24E+03
Thallium	4.1 U	4.1 U	ND	ND	NA	0/3	2.05	0	2.05	0.72	0	2
Vanadium	0.6 U	1.1 B	ND	ND	NA	0/3	0.445	0.1297	0.6637	-0.84	0.32	1
Zinc	1.2 B	6.5 B	ND	ND	NA	0/3	2.05	1.3426	4.3134	0.5	0.89	4054.1958
Cyanide	0.8 U	0.8 U	ND	ND	NA	0/3	0.4	0	0.4	-0.92	0	0.4

APPENDIX E
DISSOLVED INORGANIC COMPOUNDS IN GROUNDWATER - STATISTICAL SUMMARY
SOIL ASSOCIATION 4
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Log Upper 95% Confidence Level
Dissolved Inorganics (ug/l)												
Aluminum	43.6 U	43.6 U	ND	ND	NA	0/3	21.8	0	21.8	3.08	0	22
Antimony	1.7 U	1.7 U	3.8 J	3.8 J	CXBG4-GW01	1/3	1.8333	1.7032	4.7046	0.34	0.86	2664.8048
Arsenic	1.2 UL	1.2 UL	9.8 J	9.8 J	CXBG4-GW01	1/3	3.6667	5.3116	12.6213	0.42	1.61	1.18E+12
Barium	24.7 B	100 B	ND	ND	NA	0/3	29.55	19.0342	61.6389	3.23	0.7	2953.8648
Beryllium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Cadmium	0.4 U	0.4 U	ND	ND	NA	0/3	0.2	0	0.2	-1.61	0	0.2
Calcium	79200 B	120000 B	ND	ND	NA	0/3	52533.3333	11245.147	71491.0259	10.85	0.23	103,695
Chromium	1 B	17 B	ND	ND	NA	0/3	4.1667	4.0415	10.9801	0.9	1.45	3.71E+09
Cobalt	0.7 U	0.7 U	ND	ND	NA	0/3	0.35	0	0.35	-1.05	0	0.35
Copper	1.6 U	2.5 B	ND	ND	NA	0/3	1.0667	0.2363	1.4651	0.05	0.24	2.1473
Iron	10.6 U	10.6 U	7960	7960	CXBG4-GW01	1/3	2656.8667	4592.6482	10399.4077	4.11	4.22	9.45E+81
Lead	1.8 U	1.8 U	ND	ND	NA	0/3	0.9	0	0.9	-0.11	0	0.9
Magnesium	917 B	2080 B	ND	ND	NA	0/3	739.5	291.24	1230.4885	6.55	0.41	5.01E+03
Manganese	0.34 B	17.1 B	88.9	88.9	CXBG4-GW01	1/3	32.54	48.9887	115.1279	1.62	3.16	2.13E+47
Mercury	0.1 UL	0.1 UL	ND	ND	NA	0/3	0.05	0	0.05	-3	0	0.05
Nickel	1.5 B	7.4 B	ND	ND	NA	0/3	1.85	1.6117	4.5671	0.37	0.83	2071.1631
Potassium	ND	ND	652 J	1760 J	CXBG4-GW02	3/3	1116	575.5137	2086.2329	6.93	0.5	1.86E+04
Selenium	2.8 U	2.8 U	ND	ND	NA	0/3	1.4	0	1.4	0.34	0	1.4
Silver	0.5 U	0.5 U	ND	ND	NA	0/3	0.25	0	0.25	-1.39	0	0.25
Sodium	3750 B	7150 B	ND	ND	NA	0/3	2821.6667	866.3333	4282.1794	7.91	0.33	9.90E+03
Thallium	4.1 U	4.1 U	4.6 J	4.6 J	CXBG4-GW02	1/3	2.9	1.4722	5.3819	0.99	0.47	26
Vanadium	0.6 U	0.96 B	ND	ND	NA	0/3	0.3767	0.0929	0.5333	-1	0.24	1
Zinc	2.6 B	10.1 B	ND	ND	NA	0/3	2.5667	2.1508	6.1926	0.73	0.77	833.3098

APPENDIX F –
QUALITY ASSURANCE / QUALITY CONTROL DATA

FIELD BLANKS

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
FIELD BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-FB01	CXBG-FB02	CXBG-FB03
SAMPLE DATE	07-30-2001	07-30-2001	08-08-2001
Volatiles (ug/l)			
1,1,1-Trichloroethane	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U
1,1,2-trichloro-1,2,2-trifluo	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U
1,2-Dibromo-3-Chloropropane	10 U	10 U	10 U
1,2-Dibromoethane	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U
Acetone	10 U	10 U	10 U
Benzene	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	11
Bromoform	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U
Carbon Disulfide	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U
Chloroform	10 U	10 U	44
Chloromethane	10 U	10 U	10 U
Cyclohexane	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	2 J

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
FIELD BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-FB01	CXBG-FB02	CXBG-FB03
SAMPLE DATE	07-30-2001	07-30-2001	08-08-2001
Volatiles (ug/l) cont.			
Dichlorodifluoromethane	10 U	10 U	10 UJ
Ethylbenzene	10 U	10 U	10 U
Isopropylbenzene	10 U	10 U	10 U
Methyl Acetate	10 U	10 U	10 U
Methyl tert-Butyl Ether	10 U	10 U	10 U
Methylcyclohexane	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U
Styrene	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U
Toluene	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U
Trichlorofluoromethane	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U
Xylene (Total)	10 U	10 U	10 U
cis-1,2-Dichloroethene	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U
trans-1,2-Dichloroethene	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U
Semivolatiles (ug/l)			
1,1'-Biphenyl	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 R
2,4,6-Trichlorophenol	10 U	10 U	10 R
2,4-Dichlorophenol	10 U	10 U	10 R
2,4-Dimethylphenol	10 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 R
2,4-Dinitrotoluene	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
FIELD BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-FB01	CXBG-FB02	CXBG-FB03
SAMPLE DATE	07-30-2001	07-30-2001	08-08-2001
Semivolatiles (ug/l) cont.			
2-Methylnaphthalene	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 R
2-Nitroaniline	25 U	25 U	25 U
2-Nitrophenol	10 U	10 U	10 R
3,3'-Dichlorobenzidine	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	25 U	25 R
4-Bromophenyl-phenylether	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 R
4-Chloroaniline	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 R
4-Nitroaniline	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 R
Acenaphthene	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U
Acetophenone	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U
Atrazine	10 UJ	10 UJ	10 UJ
Benzaldehyde	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U
Caprolactam	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	10 U

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
FIELD BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-FB01	CXBG-FB02	CXBG-FB03
SAMPLE DATE	07-30-2001	07-30-2001	08-08-2001
Semivolatiles (ug/l) cont.			
Di-n-octylphthalate	10 U	10 U	10 U
Dibenzo(a,h)anthracene	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U
Dimethylphthalate	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	10 U	10 U	10 U
N-nitrosodiphenylamine	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U
Pentachlorophenol	25 U	25 U	25 R
Phenanthrene	10 U	10 U	10 U
Phenol	10 U	10 U	10 R
Pyrene	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	10 U	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	10 U	10 U	7 J
Pesticides/PCBs (ug/l)			
4,4'-DDD	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U
Aldrin	0.05 U	0.05 U	0.05 U
Dieldrin	0.1 U	0.1 U	0.1 U

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
FIELD BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-FB01	CXBG-FB02	CXBG-FB03
SAMPLE DATE	07-30-2001	07-30-2001	08-08-2001
Pesticides/PCBs (ug/l) cont.			
Endosulfan I	0.05 U	0.05 U	0.05 U
Endosulfan II	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	0.1 U	0.1 U	0.1 U
Endrin	0.1 U	0.1 U	0.1 U
Endrin aldehyde	0.1 U	0.1 U	0.1 U
Endrin ketone	0.1 U	0.1 U	0.1 U
Heptachlor	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.05 U
Methoxychlor	0.5 U	0.5 U	0.5 U
Toxaphene	5 U	5 U	5 U
alpha-BHC	0.05 U	0.05 U	0.05 U
alpha-Chlordane	0.05 U	0.015 J	0.05 U
beta-BHC	0.05 U	0.05 U	0.05 U
delta-BHC	0.05 U	0.05 U	0.05 U
gamma-BHC (Lindane)	0.05 U	0.05 U	0.05 U
gamma-Chlordane	0.05 U	0.05 U	0.05 U
Aroclor-1016	1 U	1 U	1 U
Aroclor-1221	2 U	2 U	2 U
Aroclor-1232	1 U	1 U	1 U
Aroclor-1242	1 U	1 U	1 U
Aroclor-1248	1 U	1 U	1 U
Aroclor-1254	1 U	1 U	1 U
Aroclor-1260	1 U	1 U	1 U

EQUIPMENT RINSATE BLANKS

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
EQUIPMENT RINSATE BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-RS01	CXBG-RS02	CXBG-RS03	CXBG-RS04	CXBG-RS05	CXBG-RS06	CXBG-RS07	CXBG-RS08
SAMPLE DATE	07-24-2001	07-24-2001	07-24-2001	07-30-2001	08-08-2001	08-14-2001	08-20-2001	08-24-2001
Volatiles (ug/l)								
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-trichloro-1,2,2-trifluo	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dibromo-3-Chloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 R	10 R
1,2-Dibromoethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	7 J	8 J	10 U	10 U	10 U	10 U	10 U	21 J
Benzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cyclohexane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
EQUIPMENT RINSATE BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-RS01	CXBG-RS02	CXBG-RS03	CXBG-RS04	CXBG-RS05	CXBG-RS06	CXBG-RS07	CXBG-RS08
SAMPLE DATE	07-24-2001	07-24-2001	07-24-2001	07-30-2001	08-08-2001	08-14-2001	08-20-2001	08-24-2001
Volatiles (ug/l) cont.								
Dichlorodifluoromethane	10 UJ	10 UJ	10 U	10 U	10 UJ	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isopropylbenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methyl Acetate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methyl tert-Butyl Ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylcyclohexane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U	10 U	10 U	2 B	3 J	2 J
Styrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	10 U	1 B	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylene (Total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,2-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,2-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Semivolatiles (ug/l)								
1,1'-Biphenyl	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 UJ	25 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
EQUIPMENT RINSATE BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, *WILLIAMSBURG, VIRGINIA*

SAMPLE ID	CXBG-RS01	CXBG-RS02	CXBG-RS03	CXBG-RS04	CXBG-RS05	CXBG-RS06	CXBG-RS07	CXBG-RS08
SAMPLE DATE	07-24-2001	07-24-2001	07-24-2001	07-30-2001	08-08-2001	08-14-2001	08-20-2001	08-24-2001
Semivolatiles (ug/l) cont.								
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetophenone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Atrazine	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Benzaldehyde	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Caprolactam	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	3 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
EQUIPMENT RINSATE BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-RS01	CXBG-RS02	CXBG-RS03	CXBG-RS04	CXBG-RS05	CXBG-RS06	CXBG-RS07	CXBG-RS08
SAMPLE DATE	07-24-2001	07-24-2001	07-24-2001	07-30-2001	08-08-2001	08-14-2001	08-20-2001	08-24-2001
Semivolatiles (ug/l) cont.								
Di-n-octylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzo(a,h)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dimethylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	1 J	10 U	1 J	10 U	2 J	10 U	10 U	10 U
Pesticides/PCBs (ug/l)								
4,4'-DDD	0.11 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.11 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	0.11 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Aldrin	0.056 U	0.05 U	0.05 U	0.05 U	0.05 U	0.024 J	0.05 U	0.05 U
Dieldrin	0.11 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
EQUIPMENT RINSATE BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-RS01	CXBG-RS02	CXBG-RS03	CXBG-RS04	CXBG-RS05	CXBG-RS06	CXBG-RS07	CXBG-RS08
SAMPLE DATE	07-24-2001	07-24-2001	07-24-2001	07-30-2001	08-08-2001	08-14-2001	08-20-2001	08-24-2001
Pesticides/PCBs (ug/l) cont.								
Endosulfan I	0.056 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U	0.05 U	0.05 U
Endosulfan II	0.11 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	0.11 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin	0.11 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	0.11 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin ketone	0.11 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Heptachlor	0.056 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U	0.05 U	0.05 U
Heptachlor epoxide	0.056 U	0.02 J	0.05 U	0.05 U	0.05 U	0.012 J	0.05 U	0.05 U
Methoxychlor	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51 U	0.5 U	0.5 U
Toxaphene	5.6 U	5 U	5 U	5 U	5 U	5.1 U	5 U	5 U
alpha-BHC	0.056 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U	0.05 U	0.05 U
alpha-Chlordane	0.056 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U	0.05 U	0.05 U
beta-BHC	0.056 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U	0.05 U	0.05 U
delta-BHC	0.056 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U	0.05 U	0.05 U
gamma-BHC (Lindane)	0.056 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U	0.05 U	0.05 U
gamma-Chlordane	0.056 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U	0.05 U	0.05 U
Aroclor-1016	1.1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1221	2.2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Aroclor-1232	1.1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1242	1.1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1248	1.1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1254	1.1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1260	1.1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

TRIP BLANKS

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
TRIP BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-TB01	CXBG-TB02	CXBG-TB03	CXBG-TB04	CXBG-TB05	CXBG-TB06	CXBG-TB07
SAMPLE DATE	07-25-2001	07-27-2001	07-30-2001	08-06-2001	08-15-2001	08-21-2001	08-24-2001
Volatiles (ug/l)							
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-trichloro-1,2,2-trifluo	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dibromo-3-Chloropropane	10 U	10 U	10 U	10 U	10 R	10 R	10 R
1,2-Dibromoethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cyclohexane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
TRIP BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-TB01	CXBG-TB02	CXBG-TB03	CXBG-TB04	CXBG-TB05	CXBG-TB06	CXBG-TB07
SAMPLE DATE	07-25-2001	07-27-2001	07-30-2001	08-06-2001	08-15-2001	08-21-2001	08-24-2001
Volatiles (ug/l) cont.							
Dichlorodifluoromethane	10 UJ	10 UJ	10 U	10 UJ	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isopropylbenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methyl Acetate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methyl tert-Butyl Ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylcyclohexane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	3 J	10 U	10 U	2 B	2 J	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylene (Total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,2-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,2-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Semivolatiles (ug/l)							
1,1'-Biphenyl	NA	NA	NA	NA	NA	NA	NA
2,2'-oxybis(1-Chloropropane)	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
TRIP BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-TB01	CXBG-TB02	CXBG-TB03	CXBG-TB04	CXBG-TB05	CXBG-TB06	CXBG-TB07
SAMPLE DATE	07-25-2001	07-27-2001	07-30-2001	08-06-2001	08-15-2001	08-21-2001	08-24-2001
Semivolatiles (ug/l) cont.							
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA
Atrazine	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA
Caprolactam	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
TRIP BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-TB01	CXBG-TB02	CXBG-TB03	CXBG-TB04	CXBG-TB05	CXBG-TB06	CXBG-TB07
SAMPLE DATE	07-25-2001	07-27-2001	07-30-2001	08-06-2001	08-15-2001	08-21-2001	08-24-2001
Semivolatiles (ug/l) cont.							
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA
Dimethylphthalate	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA
N-nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA
Pesticides/PCBs (ug/l)							
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA

APPENDIX F
ORGANIC COMPOUNDS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
TRIP BLANKS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG, VIRGINIA

SAMPLE ID	CXBG-TB01	CXBG-TB02	CXBG-TB03	CXBG-TB04	CXBG-TB05	CXBG-TB06	CXBG-TB07
SAMPLE DATE	07-25-2001	07-27-2001	07-30-2001	08-06-2001	08-15-2001	08-21-2001	08-24-2001
Pesticides/PCBs (ug/l) cont.							
Endosulfan I	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	NA	NA	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA	NA	NA
Endrin aldehyde	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	NA	NA	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	NA	NA	NA	NA
Toxaphene	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	NA	NA	NA	NA	NA	NA
alpha-Chlordane	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA
delta-BHC	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA

APPENDIX G – MULTIVARIATE ANALYSIS OF VARIANCE STATISTICAL TEST RESULTS

Background Statistics - General Information

For surface and subsurface soils, a Multivariate Analysis of Variance (MANOVA) was used to determined if the data could be combined (i.e. there is more not more variation among soil groups than between soil groups). MANOVA tests use statistics based on a matrix of individual ANOVA results and takes into account each degree of freedom in the model. The individual Analysis of Variance (ANOVA) p values are listed in the summary table for each media.

Note that the Navy guidance does not mention use of multivariate techniques. It recommends use of descriptive statistics, graphs, and ANOVAs. However, in this case if only univariate procedures were used, each of these methods (for each chemical) would have to be weighed and each of the p values for the separate tests would have to be added to account for the error (e.g., at $p<0.05$ for 23 chemicals, we would have an overall p value of 1.15 [0.05 x 23], which is meaningless). Note that the design of study is really a randomized block – with each boring/groundwater well sampled representing a block. This is not accounted for in the MANOVA model directly but was addressed in the internal workings of the test (assessing the covariate matrix and multicolinearity).

Censoring of the groundwater data precluded use of parametric statistics. Following Zar (1999) and Conover (1999), a MANOVA was performed on ranked values in each groundwater (total recoverable and dissolved) data set. Detections, detections below the contract reporting limit (B-flagged values), and non-detections (U-flagged values) were treated equally during the ranking procedure. Only those variables (inorganics) detected in more than one soil group were included in the model in order to gain power and achieve meaningful results.

Conover, W.J. 1999. Practical Nonparametric Statistics. Third Edition. John Wiley and Sons, Inc. New York. 584 pp.

Zar. J. H. 1999. Biostatistical Analysis. Fourth Edition. Prentice Hall. Upper Saddle River, New Jersey. 663 pp.

Surface Soils:

Each of the four multivariate test statistics (*in italics*) agree at $p<0.05$ that there is a significant difference between soil groups. This would mean that data cannot be combined and should be treated separately (based on inorganics in soils only, no TOC data available from surface horizons). Box plots demonstrate the much larger variability in Soil Association 1 (those collected from marshy areas) for almost all of the inorganics. Tests were also run on the data from Soil Groups 2, 3, and 4 only to determine if the variability in Soil Group 1 may be driving the difference, but the same results were obtained.

Assumptions/Data manipulation:

- One-half non-detects were used as the data set is large (40 samples/chemical) and the pattern of non-detects was not systematic within soil group.
- The data were log-transformed to address normality issues (as determined by Shapiro-Wilks test ($n<50$)). Data were considered normal at $p<.01$ as MANOVA is robust with respect to normality (instead of $p<0.05$). Outliers (outside 95% UCL) were Winsorized to address cases where $p>.01$ (outlier value replaced with next closest value in soil group).
- Homogeneity of the covariance matrix was not tested as the design was balanced (10 samples each per soil group), and MANOVA is robust in balanced designs.
- Multicollinearity was addressed by removal of those variables with a within-cell correlation greater than 0.99 (antimony, cadmium, thallium).

MANOVA Tests Section

Term(DF) Test Statistic	Test Value	DF1	DF2	F-Ratio	Prob Level	Ho (0.05)
A(3):SoilGroup						
Wilks' Lambda	*0.001711*	*63*	*49*	*5.75*	*0.000001*	*Reject*
Hotelling-Lawley Trace	*32.152833*	*63*	*44*	*7.49*	*0.000001*	*Reject*
Pillai's Trace	*2.530915*	*63*	*54*	*4.62*	*0.000001*	*Reject*
Roy's Largest Root	*24.187489*	*21*	*18*	*20.73*	*0.000001*	*Reject*
logAluminum	0.124264	3	36	1.05	0.381261	Accept
logArsenic	0.214089	3	36	0.70	0.558819	Accept
logBarium	0.448118	3	36	4.56	0.008305	Reject
logBeryllium	0.296442	3	36	2.11	0.115590	Accept
logCalcium	1.715054	3	36	7.10	0.000724	Reject
logChromium	0.308961	3	36	3.71	0.020111	Reject
logCobalt	0.309306	3	36	1.27	0.298314	Accept
logCopper	0.379109	3	36	3.34	0.029860	Reject
logCyanide	0.312712	3	36	3.74	0.019453	Reject
logIron	0.159136	3	36	1.71	0.181922	Accept
logLead	0.016694	3	36	0.18	0.906758	Accept
logMagnesium	0.808241	3	36	5.44	0.003457	Reject
logManganese	0.687308	3	36	5.80	0.002429	Reject
logMercury	0.397896	3	36	9.86	0.000069	Reject
logNickel	0.165360	3	36	1.26	0.301194	Accept
logPotassium	1.791231	3	36	10.48	0.000043	Reject
logSelenium	0.239428	3	36	7.88	0.000360	Reject
logSilver	0.112797	3	36	9.05	0.000134	Reject
logSodium	2.983047	3	36	16.12	0.000001	Reject
logVanadium	0.095654	3	36	1.16	0.339067	Accept
logZinc	0.360130	3	36	4.87	0.006073	Reject

Subsurface Soils:

Each of the 4 multivariate test statistics (*in italics*) agree at $p<0.05$, that there is a significant difference between soil groups and that the data cannot be combined (based on inorganic and TOC data).

Assumptions/Data manipulation:

- One-half non-detects were used as the data set is large (40 samples/chemical) and the pattern of non-detects was not systematic within soil group.
- The data were log-transformed to address normality issues (as determined by Shapiro-Wilks test ($n<50$)). Data were considered normal at $p<.01$ as MANOVA is robust with respect to normality (instead of $p<0.05$). Outliers (outside 95% UCL) were Winsorized to address cases where $p>.01$ (outlier value replaced with next closest value in soil group).
- Homogeneity of the covariance matrix was not tested as the design was balanced (10 samples each per soil group), and MANOVA is robust in balanced designs.
- Silver was removed from the model as the data were not continuous (multiple values of same detection limit) and could not be transformed/winsorizes to approach normality.
- Multicollinearity was addressed by removal of those variables with a within-cell correlation greater than 0.99 (iron, thallium).

MANOVA Tests Section

Term(DF) **Test Statistic**	**Test Value**	**DF1**	**DF2**	**F-Ratio**	**Prob Level**	**Ho (0.05)**
A(3):Soil_Group						
Wilks' Lambda	*0.000554*	*66*	*46*	*7.83*	*0.000000*	*Reject*
Hotelling-Lawley Trace	*78.513411*	*66*	*41*	*16.26*	*0.000000*	*Reject*
Pillai's Trace	*2.584917*	*66*	*51*	*4.81*	*0.000000*	*Reject*
Roy's Largest Root	*70.361905*	*22*	*17*	*54.37*	*0.000000*	*Reject*
logTOC	1.067208	3	36	11.43	0.000021	Reject
logAluminum	0.351678	3	36	2.67	0.061978	Accept
logAntimony	0.051209	3	36	4.05	0.014036	Reject
logArsenic	0.641120	3	36	2.10	0.117658	Accept
logBarium	0.832505	3	36	10.26	0.000050	Reject
logBeryllium	0.372724	3	36	6.28	0.001539	Reject
logCadmium	0.055485	3	36	13.75	0.000004	Reject
logCalcium	1.581678	3	36	8.99	0.000141	Reject
logChromium	0.103507	3	36	1.05	0.383499	Accept
logCobalt	0.594277	3	36	2.94	0.046114	Reject
logCopper	0.435167	3	36	3.35	0.029549	Reject
logCyanide	0.011471	3	36	0.56	0.644352	Accept
logLead	0.134434	3	36	2.19	0.106330	Accept
logMagnesium	0.715920	3	36	7.32	0.000592	Reject
logManganese	0.718462	3	36	4.79	0.006579	Reject
logMercury	0.183520	3	36	8.94	0.000147	Reject
logNickel	0.204339	3	36	1.86	0.153509	Accept
logPotassium	1.551650	3	36	8.28	0.000256	Reject
logSelenium	0.224099	3	36	15.05	0.000002	Reject
logSodium	3.033798	3	36	33.52	0.000000	Reject
logVanadium	0.066935	3	36	0.55	0.649631	Accept
logZinc	0.370640	3	36	3.40	0.027941	Reject

Total Recoverable Groundwater:

Only those inorganic chemicals detected in more than one soil group were included in the MANOVA model (aluminum, antimony, chromium, iron, manganese). Data were ranked prior to analysis. Three of the four multivariate test statistics (*in italics*) agree at $p<0.05$, that there is no significant difference between soil groups and that the data can be combined (based on inorganics). However, groundwater data points per soil association group were limited in that there were fewer observations per factor category (soil association group) than there were dependent variables (inorganics), which seriously impact the power of the test. This is being reflected in the disparity between test statistics and strongly indicates that the statistics are not meaningful given all the departures from assumptions. To be conservative, combining soil association data groups is not recommended.

MANOVA Tests Section

Term(DF) Test Statistic	Test Value	DF1	DF2	F-Ratio	Prob Level	(0.05)
A(3):Soil_Group						
Wilks' Lambda	*0.071228*	*15*	*11*	*1.22*	*0.370810*	*Accept*
Hotelling-Lawley Trace	*6.281939*	*15*	*8*	*1.12*	*0.456268*	*Accept*
Pillai's Trace	*1.479245*	*15*	*18*	*1.17*	*0.373065*	*Accept*
Roy's Largest Root	*5.206275*	*5*	*6*	*6.25*	*0.022640*	*Reject*
Aluminum	0.305556	3	8	0.73	0.560731	Accept
Antimony	1.638889	3	8	0.60	0.635188	Accept
Chromium	7.333333	3	8	1.11	0.398872	Accept
Iron	22.972222	3	8	2.87	0.103520	Accept
Manganese	11.222222	3	8	0.82	0.517864	Accept

Dissolved Groundwater:

Only those inorganic chemicals detected in more than one soil group were included in the MANOVA model (arsenic, cobalt, iron, manganese, potassium, thallium). Data were ranked prior to analysis. Three of the four multivariate test statistics (*in italics*) agree at $p<0.05$, that there is no significant difference between soil groups and that the data can be combined (based on inorganics). Again though, groundwater data points per soil association group were limited in that there were fewer observations per factor category (soil association group) than there were dependent variables (inorganics). This is being reflected in the disparity between test statistics and strongly indicates that the statistics are not meaningful given all the departures from assumptions. To be conservative, combining soil association data groups is not recommended.

MANOVA Tests Section

Term(DF) Test Statistic	Test Value	DF1	DF2	F-Ratio	Prob Level	(0.05)
A(3):Soil_Group						
Wilks' Lambda	*0.030679*	*18*	*9*	*1.21*	*0.399597*	*Accept*
Hotelling-Lawley Trace	*11.479833*	*18*	*5*	*1.06*	*0.521461*	*Accept*
Pillai's Trace	*1.655863*	*18*	*15*	*1.03*	*0.485179*	*Accept*
Roy's Largest Root	*9.654986*	*6*	*5*	*8.05*	*0.018505*	*Reject*
Arsenic	0.305556	3	8	0.73	0.560731	Accept
Cobalt	1.222222	3	8	1.33	0.329989	Accept
Iron	9.555556	3	8	1.66	0.251302	Accept
Manganese	13.888889	3	8	1.10	0.405025	Accept
Potassium	2.972222	3	8	0.18	0.908712	Accept
Thallium	1.888889	3	8	2.83	0.106189	Accept

FIGURE G-1
DISTRIBUTION OF INORGANIC DETECTIONS IN SURFACE SOIL ACROSS SOIL ASSOCIATION GROUPS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG VIRGINIA

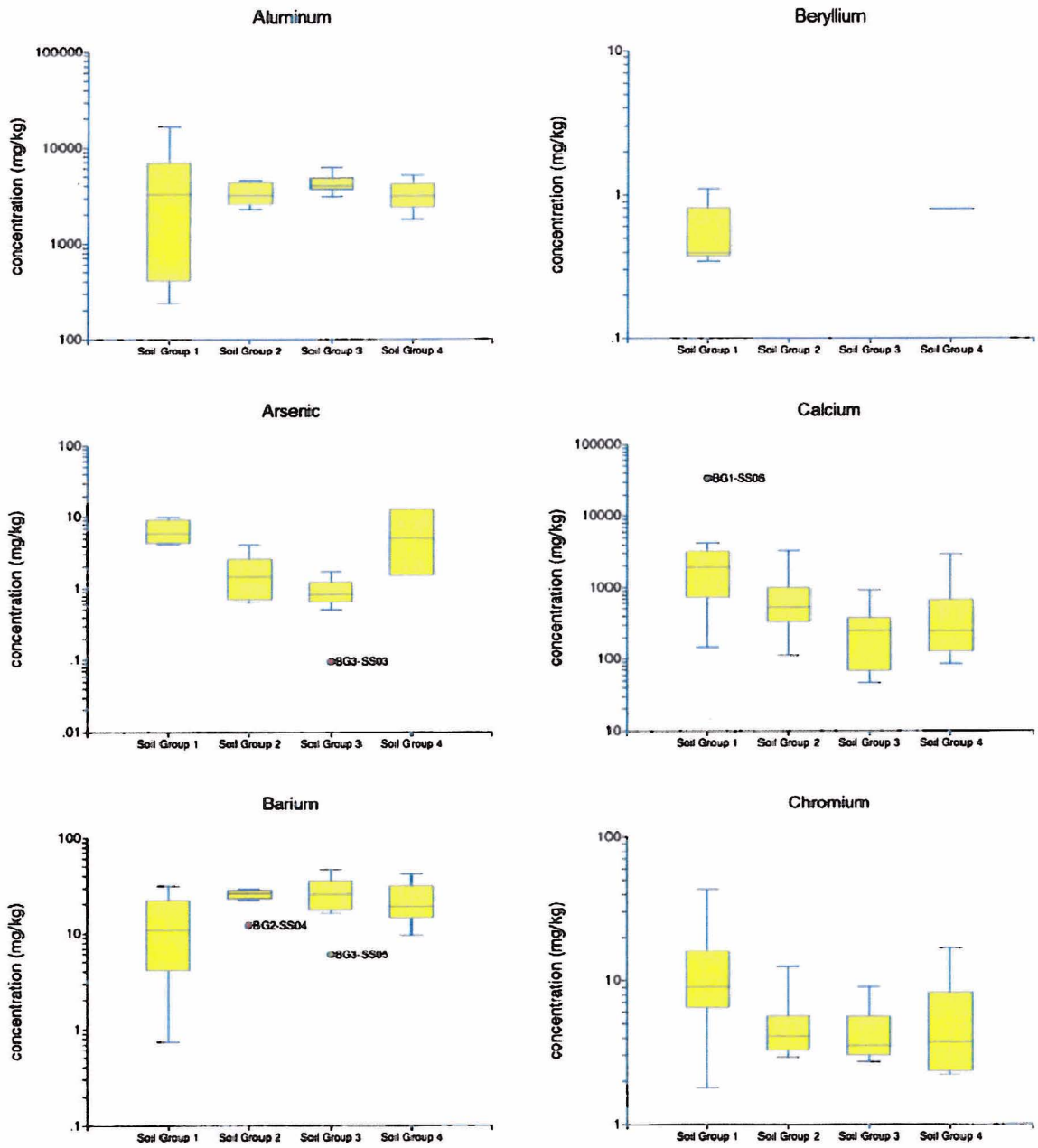


FIGURE G-1 (continued)
DISTRIBUTION OF INORGANIC DETECTIONS IN SURFACE SOIL ACROSS SOIL ASSOCIATION GROUPS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG VIRGINIA

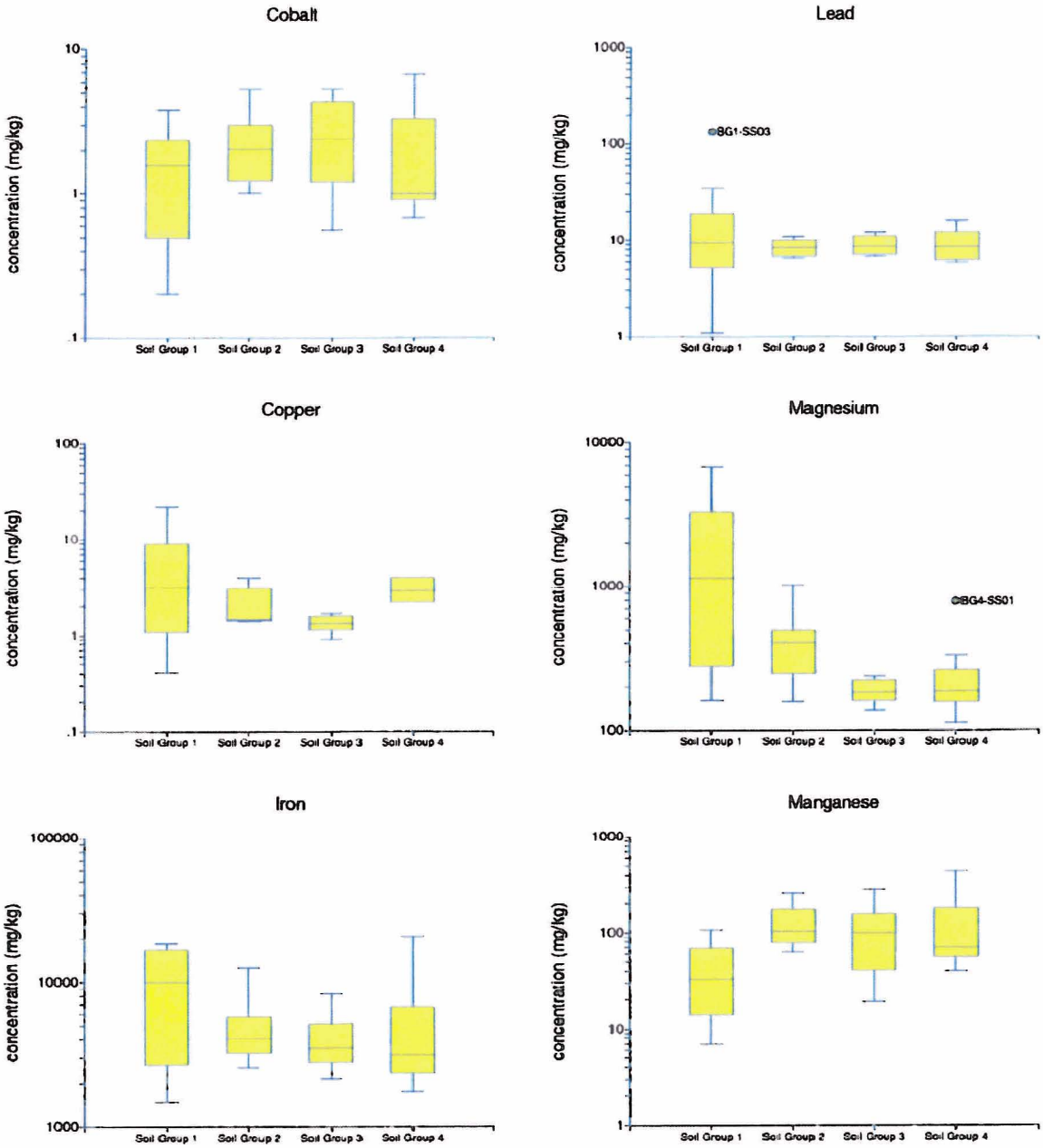


FIGURE G-1 (continued)
DISTRIBUTION OF INORGANIC DETECTIONS IN SURFACE SOIL ACROSS SOIL ASSOCIATION GROUPS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG VIRGINIA

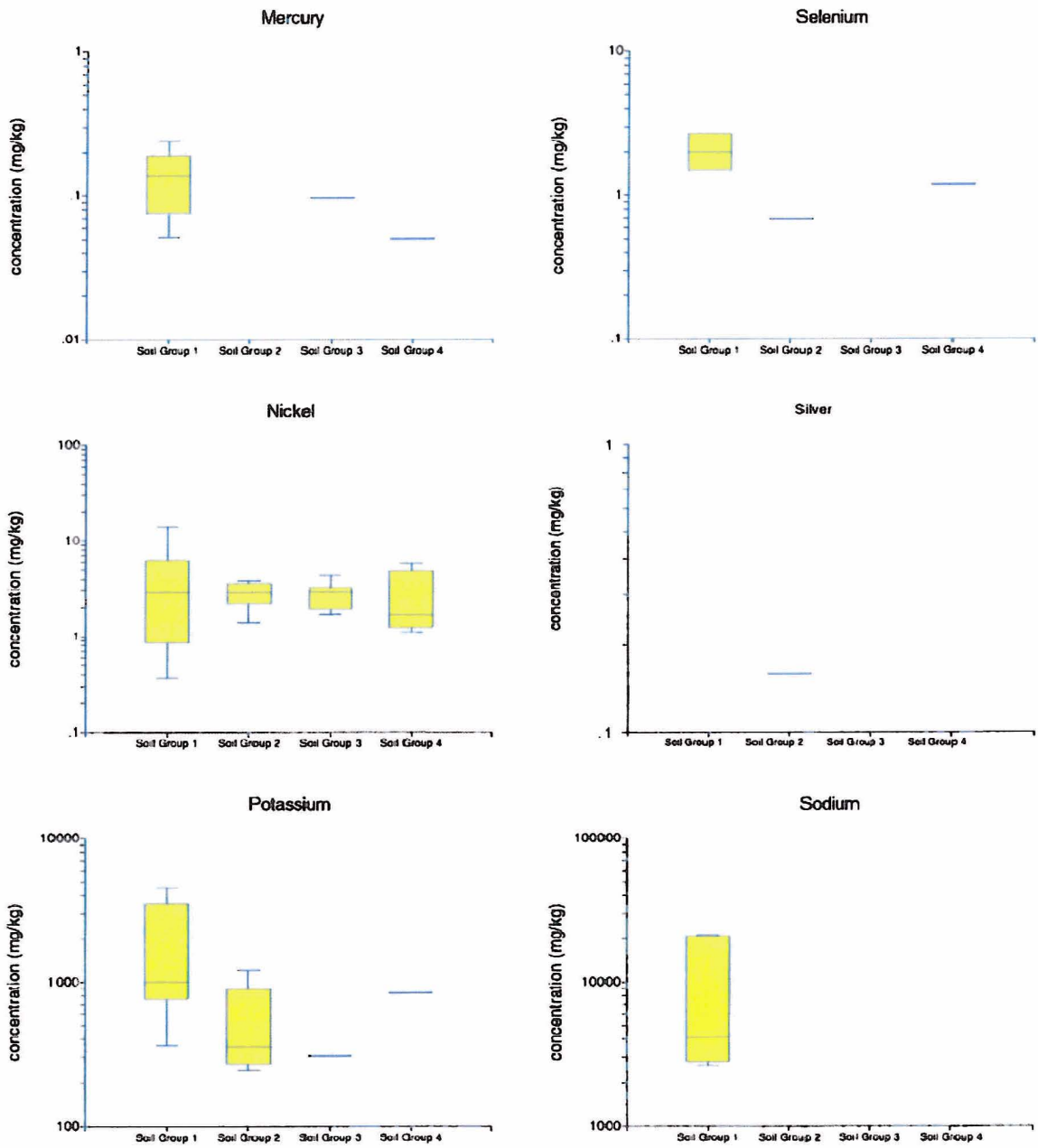
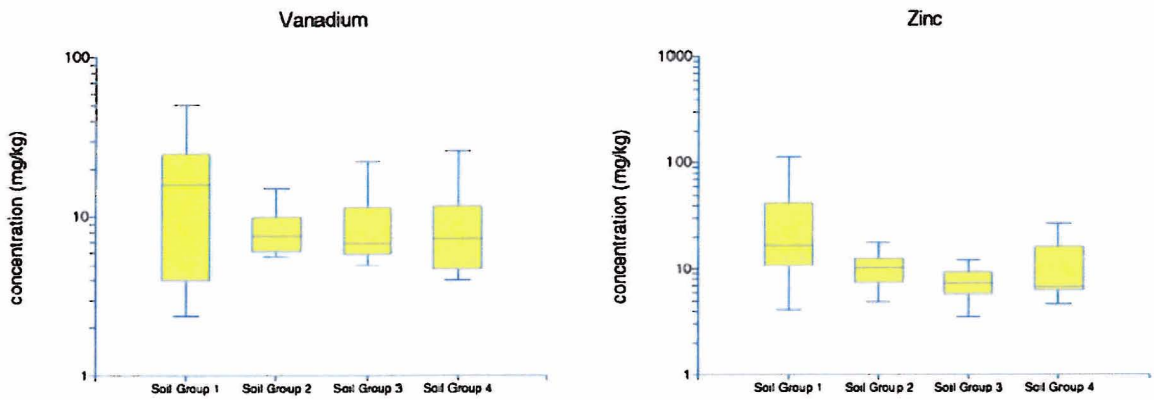


FIGURE G-1 (continued)
DISTRIBUTION OF INORGANIC DETECTIONS IN SURFACE SOIL ACROSS SOIL ASSOCIATION GROUPS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG VIRGINIA



NOTE: Antimony, cadmium, cyanide, and thallium not detected in background soils.

FIGURE G-2
DISTRIBUTION OF INORGANIC DETECTIONS IN SUBSURFACE SOIL ACROSS SOIL ASSOCIATION GROUPS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG VIRGINIA

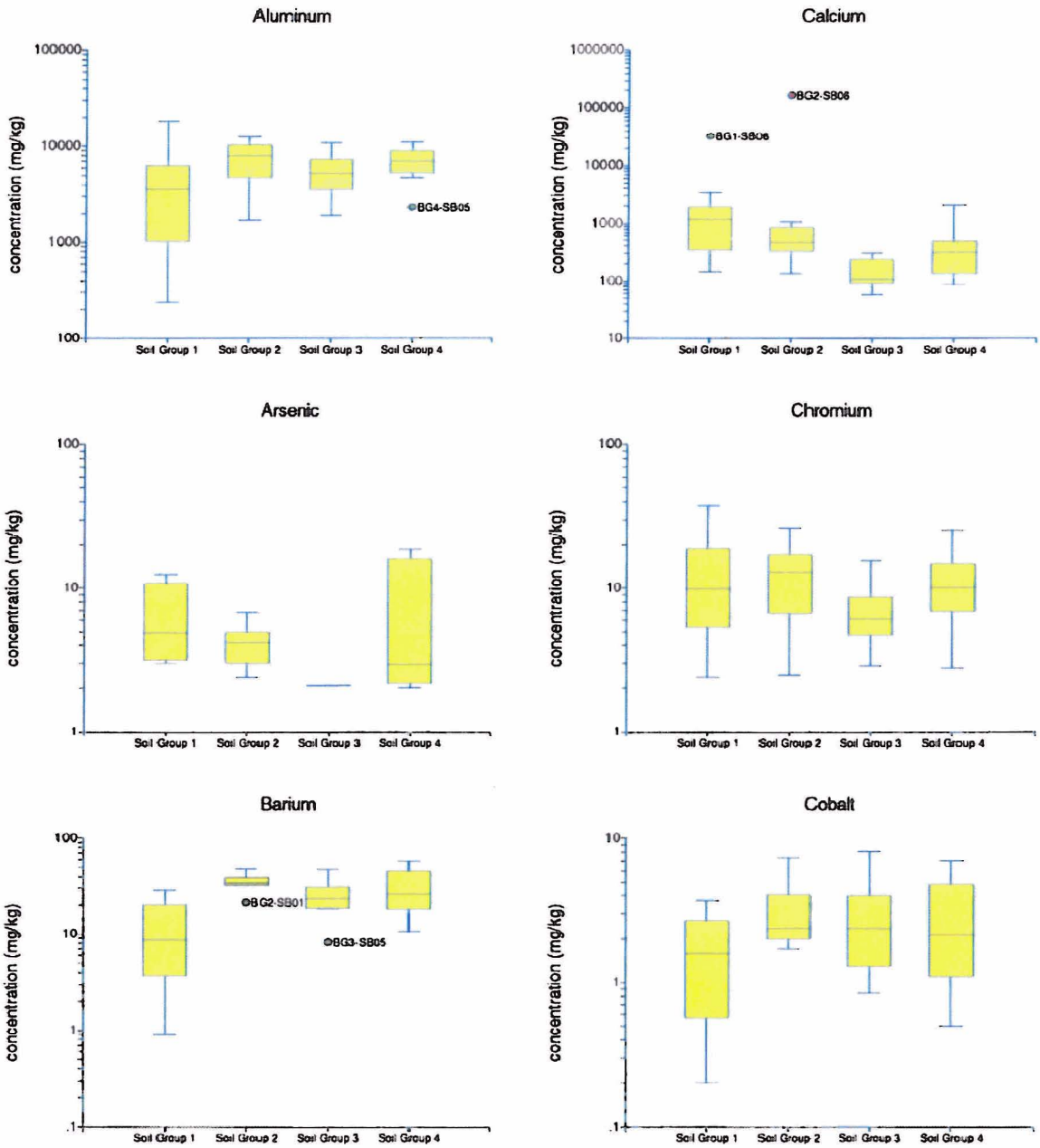


FIGURE G-2 (continued)
DISTRIBUTION OF INORGANIC DETECTIONS IN SUBSURFACE SOIL ACROSS SOIL ASSOCIATION GROUPS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG VIRGINIA

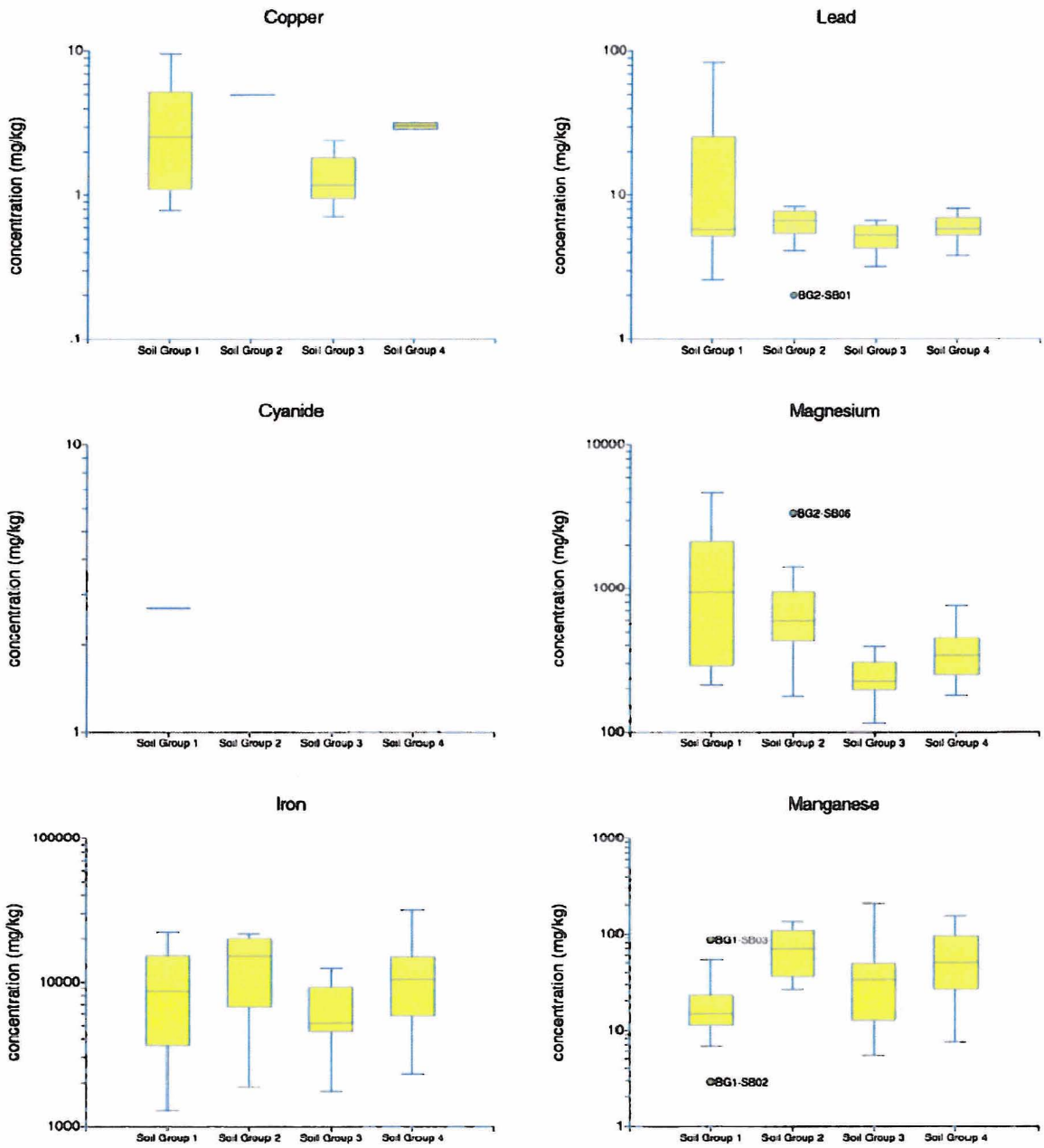


FIGURE G-2 (continued)
DISTRIBUTION OF INORGANIC DETECTIONS IN SUBSURFACE SOIL ACROSS SOIL ASSOCIATION GROUPS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG VIRGINIA

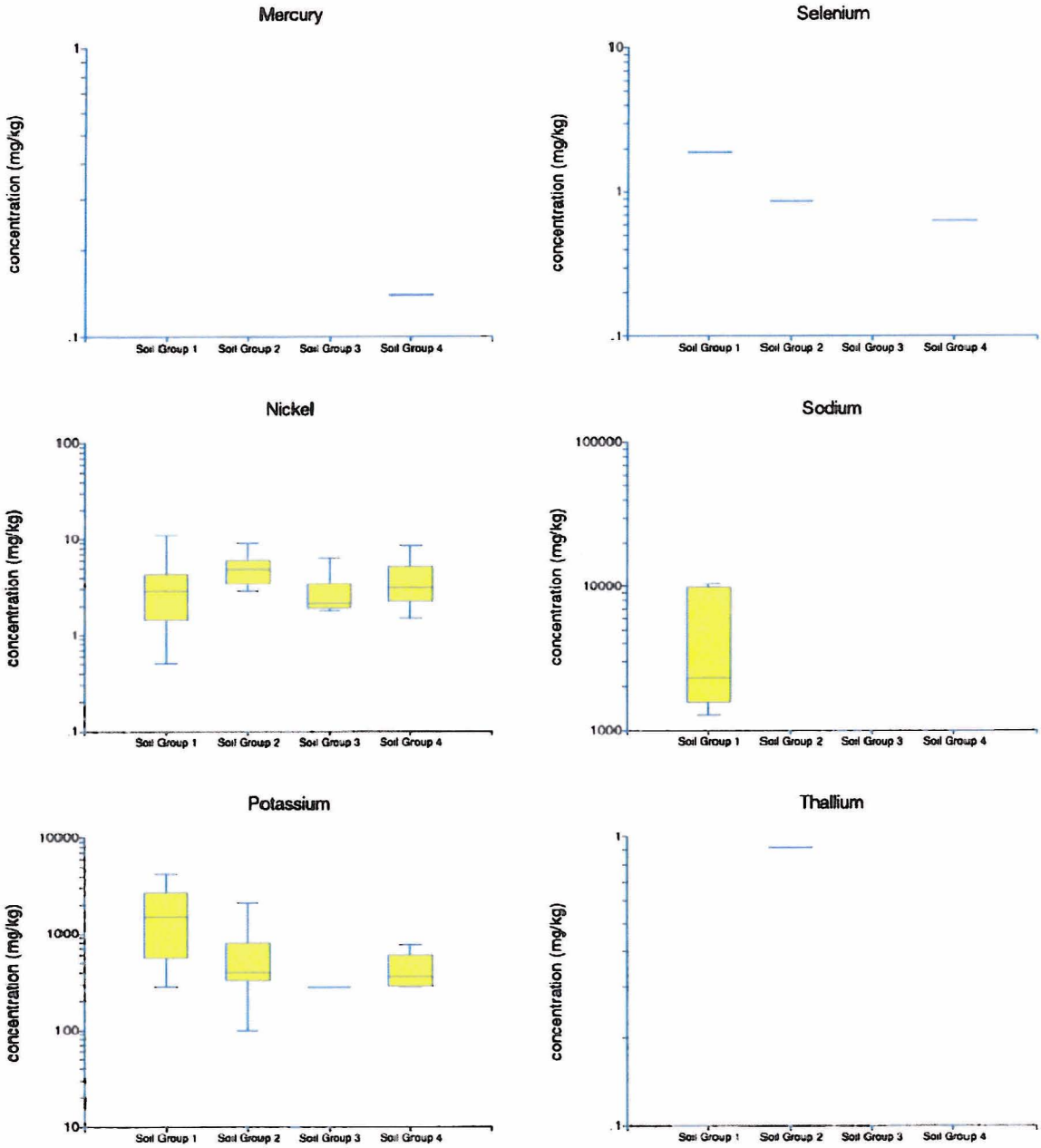
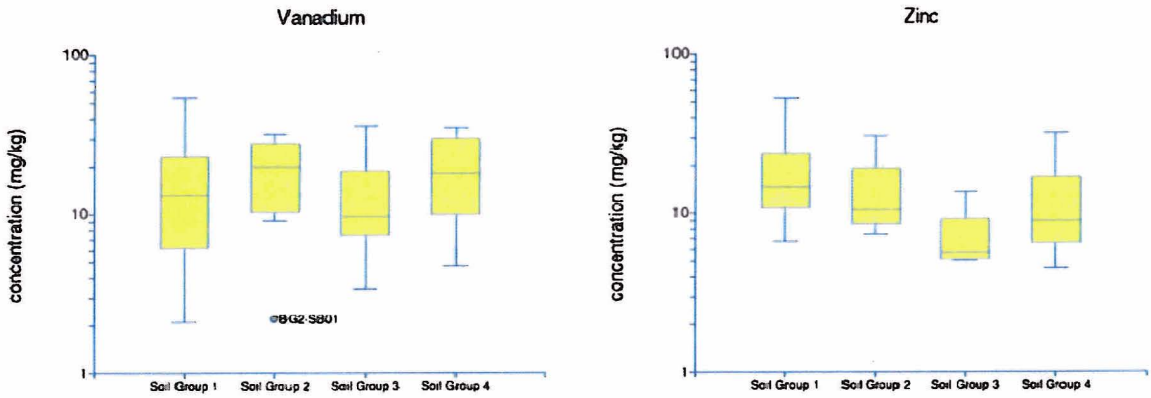


FIGURE G-2 (continued)
DISTRIBUTION OF INORGANIC DETECTIONS IN SUBSURFACE SOIL ACROSS SOIL ASSOCIATION GROUPS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG VIRGINIA



NOTE: Antimony, beryllium, cadmium, and silver not detected in background subsurface soils.

FIGURE G-3
DISTRIBUTION OF TOTAL RECOVERABLE INORGANIC DETECTIONS IN GROUNDWATER ACROSS SOIL ASSOCIATION GROUPS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG VIRGINIA

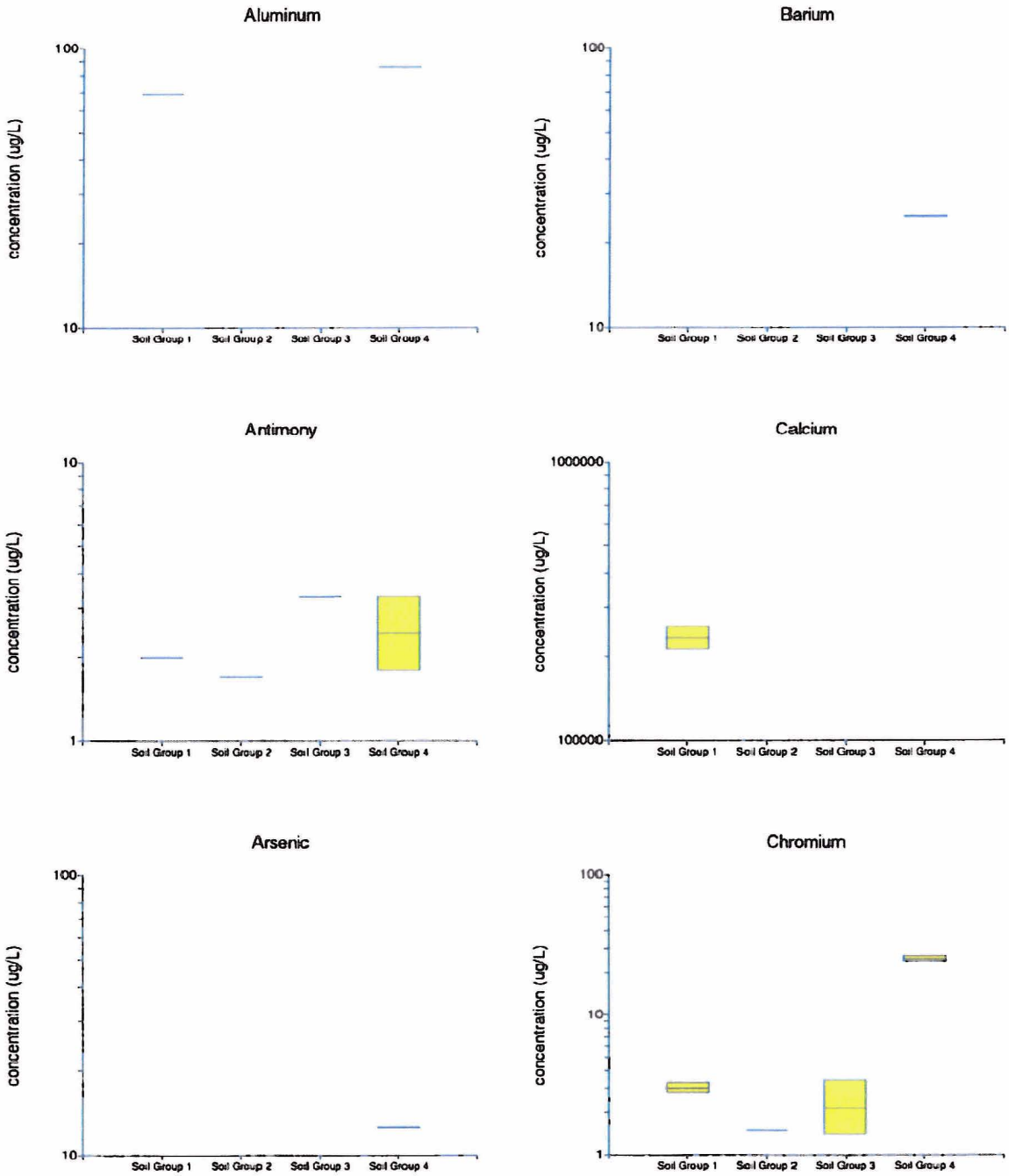


FIGURE G-3 (continued)
DISTRIBUTION OF TOTAL RECOVERABLE INORGANIC DETECTIONS IN GROUNDWATER ACROSS SOIL ASSOCIATION GROUPS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG VIRGINIA

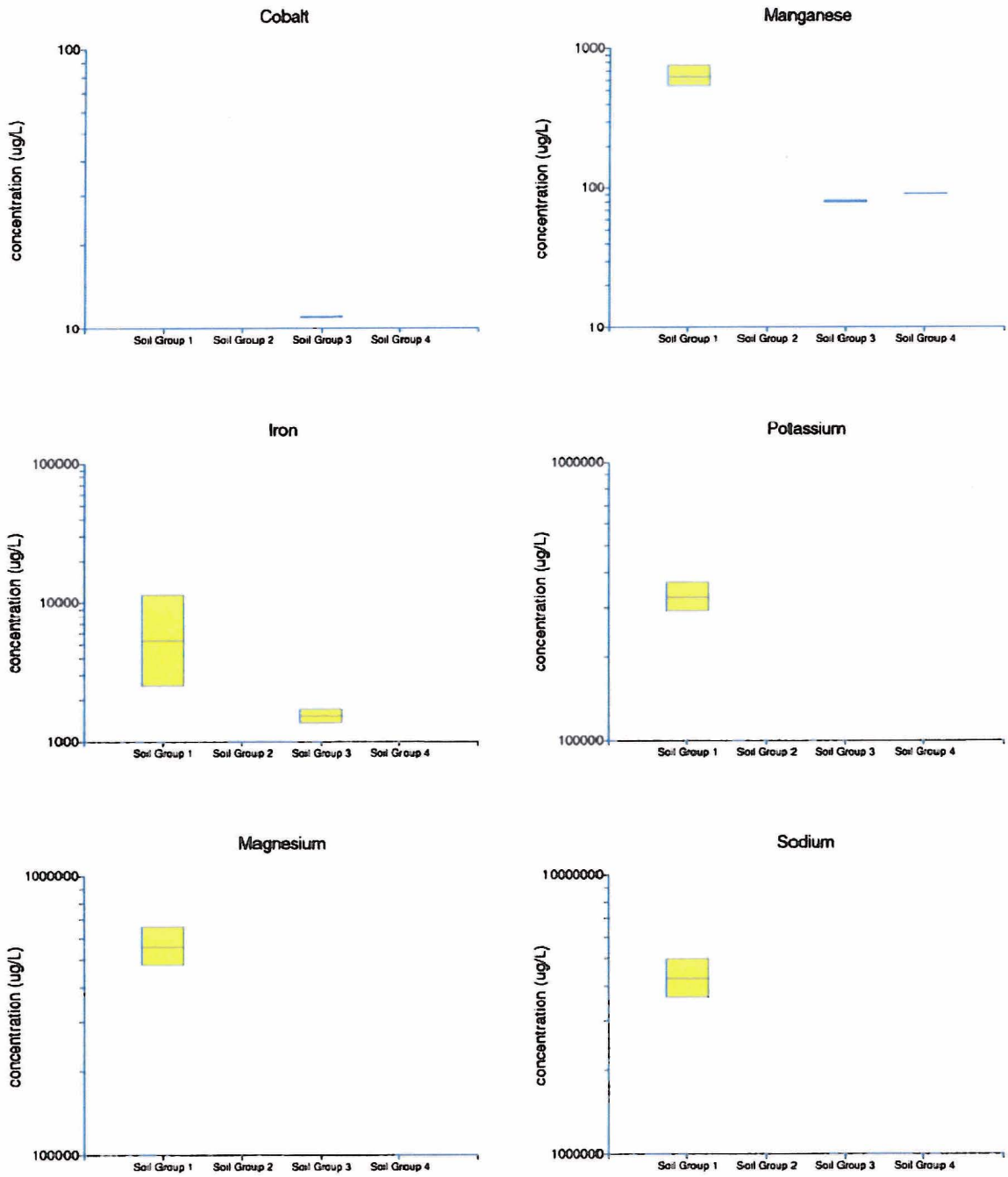
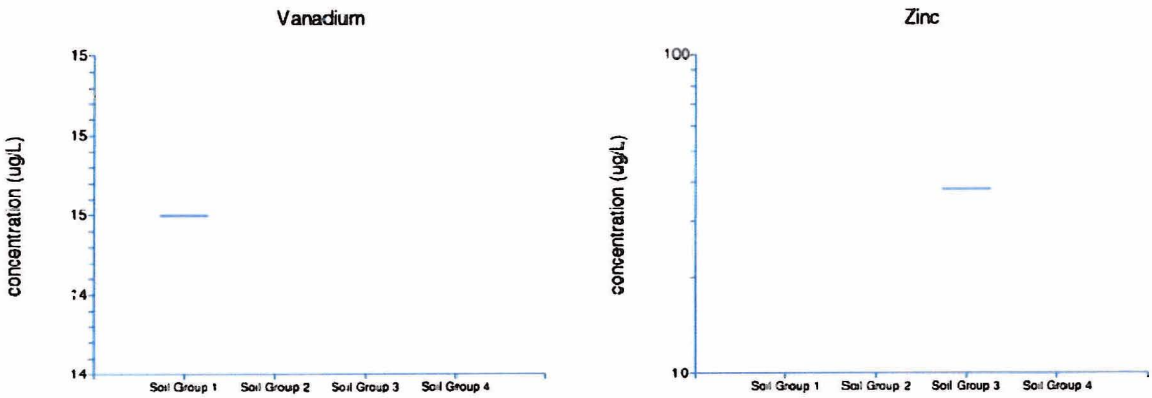


FIGURE G-3 (continued)
DISTRIBUTION OF TOTAL RECOVERABLE INORGANIC DETECTIONS IN GROUNDWATER ACROSS SOIL ASSOCIATION GROUPS
BACKGROUND INVESTIGATION
CHEATHAM ANNEX SITE, WILLIAMSBURG VIRGINIA



NOTE: Beryllium, cadmium, copper, cyanide, lead, mercury, nickel, selenium, silver, and thallium not detected in background groundwater.