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# *LIMITED SITE INVESTIGATION REPORT*

**LIMITED SITE INVESTIGATION**
**WALLOPS FLIGHT FACILITY**
**ACCOMACK COUNTY, VIRGINIA**
**Delivery Order 21**
**Contract Number DACA65-99-D-0068**

**FINAL**

***Prepared for:***

**U.S. Army Corps of Engineers**
**Norfolk District**

***Prepared by:***

**Science Applications International Corporation**
**11251 Roger Bacon Drive**
**Reston, Virginia 20190**

**May 2003**

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## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| 2,4-DNT | 2,4-Dinitrotoluene |
| AFTF | Aviation Fuel Tank Farm |
| AOC | Area of Concern |
| ARAR | Applicable or Relevant and Appropriate Requirement |
| BLS | Below Land Surface |
| BTEX | Benzene, Toluene, Ethylbenzene, and Xylenes |
| CCB | Continuing Calibration Blank |
| CDL | Construction Debris Landfill |
| CLP | Contract Laboratory Program |
| CNAAS | Chincoteague Naval Auxiliary Air Station |
| COC | Chemical of Concern |
| CoC | Chain-of-Custody |
| CSM | Conceptual Site Model |
| DAF | Dilution-attenuation Factor |
| DERP | Defense Environmental Restoration Program |
| DI | Deionized |
| DNBP | Di-n-Butyl Phthalate |
| DOD | U.S. Department of Defense |
| DOI | U.S. Department of the Interior |
| DPT | Direct Push Technology |
| DQO | Data Quality Objective |
| EM | Engineering Manual |
| EPA | U.S. Environmental Protection Agency |
| EPIC | Environmental Photographic Interpretation Center |
| ESS | Environmental Site Survey |
| FEMA | Federal Emergency Management Agency |
| FS | Feasibility Study |
| FSP | Field Sampling Plan |
| FUDS | Formerly Used Defense Site |
| GPES | General Physics Environmental Services, Inc. |
| GPS | Global Positioning System |
| GRO | Gasoline Range Organics |
| HQ | Hazard Quotient |
| I.D. | Identification |
| ICB | Initial Calibration Blank |
| IDW | Investigation-derived Waste |
| IRP | Installation Restoration Program |
| IS | Internal Standard |
| IWL | Industrial/Sanitary Waste Landfill |
| LCS | Laboratory Control Sample |
| LSI | Limited Site Investigation |
| LSIR | LSI Report |
| MCL | Maximum Contaminant Level |
| MS/MSD | Matrix Spike/Matrix Spike Duplicate |
| msl | mean sea level |
| MSS | Matrix Spike Sample |
| NAD | North American Datum |
| NASA | National Aeronautics and Space Administration |
| NOAA | National Oceanic and Atmospheric Administration |

## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| NOAEL | No-Observable-Adverse-Effect Level |
| OD | Outside Diameter |
| PA | Preliminary Assessment |
| PAH | Polynuclear Aromatic Hydrocarbon |
| PARCC | Precision, Accuracy, Representativeness, Comparability, and Completeness |
| PCE | Tetrachloroethene |
| PCP | Pentachlorophenol |
| PID | Photoionization Detector |
| PPE | Personal Protective Equipment |
| ppm | Parts per Million |
| ppt | Parts per Thousand |
| PRP | Potentially Responsible Party |
| PWP | Project Work Plan |
| QA/QC | Quality Assurance/Quality Control |
| QAPP | Quality Assurance Project Plan |
| QC | Quality Control |
| RBC | Risk-based Concentration |
| RCRA | Resource Conservation and Recovery Act |
| RI | Remedial Investigation |
| RPD | Relative Percent Difference |
| RRE | Relative Risk Evaluation |
| SAIC | Science Applications International Corporation |
| SCS | Soil Conservation Survey |
| SDWA | Safe Drinking Water Act |
| SI | Site Investigation |
| SMCL | Secondary Maximum Contaminant Level |
| SOP | Standard Operating Procedure |
| SPCS | State Plane Coordinate System |
| SSHP | Site Safety and Health Plan |
| SSL | Soil Screening Level |
| SVOC | Semivolatile Organic Compound |
| T&E | Threatened and Endangered |
| TCE | Trichloroethene |
| TPH | Total Petroleum Hydrocarbon |
| UCL | Upper Control Limit |
| USACE | U.S. Army Corps of Engineers |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| UST | Underground Storage Tank |
| UXO | Unexploded Ordnance |
| VDEQ | Virginia Department of Environmental Quality |
| VOC | Volatile Organic Compound |
| WFF | Wallops Flight Facility |
| WWII | World War II |
| WWTP | Wastewater Treatment Plant |

# EXECUTIVE SUMMARY

Site Investigation (SI) activities were conducted by Science Applications International Corporation (SAIC) at Wallops Flight Facility (WFF), Accomack County, Virginia, in support of the Formerly Used Defense Sites (FUDS) program, and in partial fulfillment of the requirements of Contract Number DACA65-99-D-0068, Delivery Order 21 for the U.S. Army Corps of Engineers (USACE), Norfolk District. This Limited Site Investigation Report (LSIR) presents the site history; sampling and analysis strategy; analytical results; human health screening assessment; and recommended action for the following four FUDS program sites:

- Site 1 – Old Wastewater Treatment Plant (WWTP)
- Site 3 – Two 600,000-Gallon Fuel Tanks, Buildings A-46A and A-46B
- Industrial Waste/Sanitary Landfill (IWL)
- Construction Debris Landfill (CDL).

During the Limited Site Investigation (LSI) field program, activities were conducted at each site to identify the presence or absence of soil, groundwater, and underground storage tank (UST) liquids contamination, as applicable to individual site conditions. LSI field program activities included the following:

- Site inspection, sample staking, and site clearance for the LSI sites
- Soil boring drilling and surface and subsurface soil sampling and analysis at the WWTP, IWL, and CDL sites
- Groundwater (Hydropunch®) sampling and analysis at the IWL and CDL sites
- Sampling and analysis of liquids present in two USTs at Site 3
- Topographic surveying
- Investigation-derived waste (IDW) management.

Site-specific sampling activities conducted at each site are summarized in Table ES-1.

**Table ES-1. Summary of Site-specific Sampling Activities**
**Wallops Flight Facility, Accomack County, Virginia**

| Site Name | Sampling Activities | Chemical Analysis |
|---|---|---|
| Old Wastewater Treatment Plant (Site 1) | • Surface soil sampling<br>• Soil borings with subsurface soil sampling | VOCs, SVOCs, and metals |
| Two 600,000-Gallon Fuel Tanks, Buildings A-46A and A-46B (Site 3) | • Sampling of liquids in the tanks | VOCs, SVOCs, and metals |
| Industrial Waste/Sanitary Landfill | • Surface soil sampling<br>• Soil borings with subsurface soil sampling<br>• Hydropunch® groundwater sampling | VOCs, SVOCs, and metals |
| Construction Debris Landfill | • Surface soil sampling<br>• Soil borings with subsurface soil sampling<br>• Hydropunch® groundwater sampling | VOCs, SVOCs, and metals |

The primary objective of the LSI was to collect and analyze representative samples from selected locations and media to further characterize the type and concentration of contamination identified during past sampling events. Data from previous site-specific investigation activities have been incorporated into the LSIR to present a complete summary of site-specific information and data available for the four sites.

This LSI is not intended to be a comprehensive evaluation of the four FUDS sites investigated; instead, it is a screening effort intended to determine if potential hazards generated by historical U.S. Department of Defense (DOD) activities exist at the sites and, if so, whether additional study or cleanup actions are required to address the identified hazards.

Screening-level evaluations were conducted as part of the LSI. Constituent concentrations detected in the groundwater were compared to U.S. Environmental Protection Agency (EPA) Region III risk-based concentration (RBCs) for Tap Water (EPA 2001a) and Federal maximum contaminant levels (MCLs) (EPA 2001b). Data collected from potentially contaminated sites were subject to a human health toxicity screen. The toxicity screen was used to evaluate human health effects by comparing site data to screening criteria (i.e., EPA Region III RBCs) (EPA 2001a) for residential and industrial soils and EPA soil screening levels (SSLs) for groundwater protection at a dilution-attenuation factor (DAF) of 20. A background comparison (soils or groundwater) to distinguish inorganic constituents that are naturally occurring from those that are site related has not been conducted for the LSIR.

## LSI CONCLUSIONS AND RECOMMENDATIONS

General conclusions and recommendations based on the results of the LSI are summarized below.

### *Site 1 – Old Wastewater Treatment Plant*

During the LSI, a total of six soil samples were collected from the former sludge drying bed and downgradient from the trickling filter. Constituent concentrations show exceedances of human health screening criteria for arsenic and polynuclear aromatic hydrocarbons (PAHs).

Additional soil sampling adjacent to and beneath the sludge bed is recommended to further delineate the vertical and horizontal extent of contamination. Installation and sampling of Hydropunch® is also recommended to evaluate potential impacts to groundwater. The revised data set should be screened against background data, and the need for conducting a human health and screening-level ecological risk assessment should be assessed.

### *Site 3 – Two 600,000-Gallon Fuel Tanks, Buildings A-46A and A-46B*

Four liquid samples were collected from the two 600,000-gallon USTs to determine the presence or absence of hydrocarbons.

The liquid in the tanks contain various organic constituents associated with the past storage of aviation fuel. This liquid should be removed and the tanks cleaned and abandoned in accordance with the Commonwealth of Virginia UST regulations. Samples of the containerized liquid should be collected prior to disposal for waste characterization. The soil and groundwater surrounding the tank have been previously investigated. Therefore, supplemental evaluation of the existing data should be conducted to support future recommendations for "No Further Action."

### *Industrial Waste/Sanitary Landfill*

During the LSI, eight soil samples and four groundwater samples were collected at four discrete locations. The samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals.

Constituent concentrations show few exceedances of human health screening criteria. Although environmental data at the IWL do not indicate significant contamination or impact from previous activities, the ability to make a determination of No Further Action will require additional information. Given the lack of historical information and the few samples collected in relation to the size of the landfill, additional soil samples are recommended. The revised data set should be screened against background data, and the need for conducting a human health and screening-level ecological risk assessment should be assessed.

### *Construction Debris Landfill*

Seven soil and three groundwater samples were collected during the LSI at the CDL. A zone of stained soil was encountered in one soil boring at 7.5 feet below land surface (BLS). To determine the boundary of the CDL and the extent of stained soil, additional soil and groundwater characterization is recommended. The revised data set should be screened against background data, and a human health risk assessment and screening-level ecological risk assessment should be conducted on the combined data set.

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# 1. INTRODUCTION

This report documents the results and recommendations of a Limited Site Investigation (LSI) of four Formerly Used Defense Site (FUDS) program sites located at the Wallops Flight Facility (WFF), Accomack County, Virginia. Science Applications International Corporation (SAIC) prepared this LSI Report (LSIR) to fulfill the requirements of the U.S. Army Corps of Engineers (USACE), Norfolk District, Contract No. DACA65-99-D-0068, Delivery Order 21. The purpose and scope of this LSIR are defined in Section 1.1. Section 1.2 provides a description and history of the Installation and summarizes current installation activities being conducted at the WFF. Information summarizing previous environmental investigations and studies associated with the LSI sites is presented in Section 1.3 and the organization of the report is provided in Section 1.4.

## 1.1 PURPOSE AND SCOPE

A preliminary potentially responsible party (PRP) analysis has been conducted at the WFF to identify responsible parties for action at sites of potential environmental concern. The preliminary PRP investigation was used, together with other information presented in documents generated during the investigation of sites under the National Aeronautics and Space Administration (NASA) Defense Environmental Restoration Program (DERP), to focus environmental investigation activities on those sites present at the WFF for which the U.S. Department of Defense (DOD) bears a probable responsibility under the FUDS program. A desktop audit for DOD has been completed at the WFF to evaluate and document existing FUDS program site information and to identify potential operations that may have released chemical constituents or pollutants to the environment (MicroPact 2002). As a result, the following 10 WFF sites have been incorporated into the FUDS program.

- Site 1 – Old Wastewater Treatment Plant (WWTP)
- Site 3 – Two 600,000-Gallon Fuel Tanks, Buildings A-46A and A-46B
- Site 9 – Abandoned Drum Field, Runway 17-35
- Site 13 – Ordnance Disposal Area, Boat Basin
- Site 14 – Debris Piles, North of Runway 10-28
- Site 15 – Debris Piles Along Runway 17-35
- Site 16 – Waste Oil Dump
- Industrial/Sanitary Waste Landfill (IWL)
- Construction Debris Landfill (CDL)
- Ordnance Disposal Area, Hanger Delta 1.

The WFF has undertaken an evaluation of the FUDS program sites located at the Main Installation to determine the impact of past DOD activities on public health or to the environment. These environmental investigation activities at the WFF have been coordinated through and managed by USACE Norfolk District. As part of this evaluation, the WFF has adopted the Installation Restoration Program (IRP) format for completion of the environmental investigation at the WFF. The five phases that constitute the IRP process and the purpose and activities associated with each phase are presented below.

***Preliminary Assessment***—A Preliminary Assessment (PA) is conducted to identify and evaluate the type and location of suspected problems associated with past hazardous waste handling procedures, disposal sites, and spill sites. This is accomplished through interviews with past and present facility employees, historical record searches, and visual site inspections. In addition, detailed geologic, hydrologic, meteorological, and environmental data for the study area are collected.

***Site Investigation***—The purpose of a Site Investigation (SI) is to acquire the necessary data to either confirm or deny the existence of suspected environmental contamination at identified sites of concern. The SI includes identifying specific chemical contaminants and their concentrations in environmental media and determining the potential for contaminant migration through site-specific hydrogeologic investigations.

***Remedial Investigation***—During a Remedial Investigation (RI), necessary data are acquired to define the extent of confirmed environmental contamination and to further assess the associated risks to human health, welfare, and the environment. The RI quantifies the magnitude and extent of contamination at the sites and identifies the specific chemical contaminants present and their concentrations in environmental media. A determination also is made as to the potential for contaminant migration by assessing site-specific hydrogeologic and contaminant characteristics.

***Feasibility Study***—A Feasibility Study (FS) is performed to develop the remedial action alternative that mitigates confirmed environmental contamination at each site and meets the applicable or relevant and appropriate requirements (ARARs). The FS considers risk assessments and cost benefit analyses in providing the necessary data, direction, and documented supportive rationale to acquire regulatory concurrence (i.e., Federal, state, and local) with the recommended remedial alternative.

***Remedial Design***—The purpose of remedial design is to provide engineering design drawings and construction specifications required to implement the recommended remedial action selected through the FS process. The implementation of the remediation plan requires appropriate regulatory acceptance.

The LSI combines aspects of the PA and SI processes identified above. This LSI is not intended to be a comprehensive evaluation of the FUDS sites investigated; instead it is a screening effort intended to determine if potential hazards generated by historical DOD activities exist and, if so, whether additional study or cleanup actions are required to address such hazards. The principal objective of the LSI is to identify and evaluate the type and location of suspected contamination associated with past activities at four FUDS program sites and to acquire the necessary data to either confirm or deny the existence of suspected environmental contamination at these sites. Sites investigated as part of the LSI are identified below:

- Site 1 – Old Wastewater Treatment Plant (WWTP)
- Site 3 – 600,000-Gallon Fuel Tanks, Buildings A46-A and A46-B
- Industrial/Sanitary Waste Landfill (IWL)
- Construction Debris Landfill (CDL).

As part of this study, SAIC evaluated the presence or absence of contamination in the soils at the Old WWTP, IWL, and CDL and groundwater at the IWL and CDL. In addition, liquids present in the Two 600,000-Gallon underground storage tanks (USTs) (Buildings A46-A and A46-B) were sampled for analysis.

The LSI includes screening-level evaluations, in which data collected at potentially contaminated sites are subject to a toxicity screen. The toxicity screen is used to evaluate the potential for identified constituents to affect human receptors by comparing site data to screening criteria. Human health screening criteria used during the LSI included:

- U.S. Environmental Protection Agency (EPA) Region III risk-based concentrations (RBCs) (EPA 2001) for residential and industrial soils
- EPA soil screening levels (SSLs) for groundwater protection at a dilution-attenuation factor (DAF) of 20.
- EPA Region III RBCs for protection of groundwater (EPA 2001)
- Federal maximum contaminant levels (MCLs) (EPA 2001b).

A background comparison (soils or groundwater) to distinguish inorganic constituent concentrations that are naturally occurring from those that are site related has not been conducted for the LSI. Because the background comparison has not been used to evaluate the LSI data, the screening process is considered conservative in that naturally occurring concentrations of inorganic constituents may exceed the various screening criteria.

Based on the review of site-specific data presented in previous investigation reports, LSI field observations and analytical data, and results of the LSI human health screening process, recommendations have been made for future activities at these sites. The following paragraphs summarize the scope of work included in the LSI at the four sites and identify the objectives of the LSI.

### 1.1.1 Scope

The scope of work for the LSI at the WFF consists of four inter-related tasks: preparing a Project Work Plan (PWP), conducting field activities, overseeing chemical and quality assurance/quality control (QA/QC) sampling and analysis, and preparing this LSIR. The PWP consisted of three separate subplans, including a Field Sampling Plan (FSP) (SAIC 2002a), a Quality Assurance Project Plan (QAPP) (SAIC 2002b), and a Site Safety and Health Plan (SSHP) (SAIC 2002c). The three subplans were submitted in Draft and Final format to the USACE, Virginia Department of Environmental Quality (VDEQ), and EPA Region III for review and comment before production of the final version. Final approval of the PWP was received in August 2002.

After SAIC received approval of the PWP, the WFF LSI field program was initiated in August 2002. The field activities followed site-specific sampling and health and safety protocols established in the PWP. Laboratory chemical analyses were conducted in accordance with project QA/QC requirements. The specific QA/QC and health and safety requirements for the LSI are presented in detail in the QAPP and SSHP (Subplans II and III of the PWP) (SAIC 2002b and 2002c), respectively.

Field program activities included visual inspection of the LSI sites, soil boring and Hydropunch® completion and sampling, UST liquid sampling, and surveying of LSI sample locations. SAIC conducted all field sampling and inspection activities at the WFF. Subcontractors providing services in support of the LSI included an analytical laboratory, General Physics Environmental Services, Inc. (GPES). Additional information about the subcontractor and their specific tasks are included in the FSP (SAIC 2002a) and QAPP (SAIC 2002b).

The analysis and evaluation of the laboratory data and field information gathered during the LSI field activities have been used to characterize the potential for contamination in the surface and subsurface soils and groundwater at the IWL and CDL, the surface and subsurface soils at the Old WWTP, and the UST liquids present in the 600,000-gallon USTs. All data quality objectives (DQOs) and procedures associated with sample collection, laboratory analysis, sample custody, equipment calibrations, and USACE QC procedures applicable to this project contained within the PWP were followed. All activities were conducted using established methodologies and standard operating procedures (SOPs) that were detailed in the FSP (SAIC 2002a). The field activities associated with the LSI were conducted in accordance with the USACE Engineering Manual (EM) 200-1-3, *Requirements for the Preparation of Sampling and Analysis Plans* (USACE 2001), EPA *Requirements for Quality Assurance Project Plans for Environmental Data Operations* (EPA 1998a) and *Guidance for Quality Assurance Project Plans* (EPA 1998b).

This document summarizes the field investigation activities, laboratory results, and data analysis; identifies protection standards; and provides recommendations pertaining to the sites being investigated. The results of the field investigation and sampling program and a qualitative presentation of field and analytical data are presented in this LSIR. Conclusions regarding the extent of detected contamination are summarized and recommendations for future actions are made for the sites under investigation.

### 1.1.2 Objectives

The primary objective of the WFF LSI at the four FUDS program sites (the Old WWTP, Site 3, the IWL, and the CDL) was to collect and analyze representative samples from site-specific environmental media to further characterize the type and concentration of contamination identified during past sampling events. The sampling program for data collection activities is designed to meet the following general objectives:

- Evaluate the current surface and subsurface conditions present in the immediate vicinity of the sites
- Determine the presence or absence of contamination in the surface and subsurface soils and identify the chemical nature of contaminants (if present)
- Determine the presence or absence of contamination in the groundwater underlying areas of the sites
- Determine the presence or absence of contamination in the site-specific structures and identify the chemical nature of contaminants (if present)
- Evaluate the geologic and hydrogeologic features of the study area
- Evaluate the potential for contaminant release and migration.

Section 4 of the FSP (SAIC 2002a) describes the sampling and analysis program recommended to meet these objectives and specifies field procedures and methods used during the LSI field investigation at the WFF.

## 1.2 INSTALLATION DESCRIPTION AND HISTORY

This section describes the history of the installation and summarizes current operations conducted at the WFF.

### 1.2.1 Installation History

The Department of the Navy acquired the property for the Installation in 1942 and constructed the Chincoteague Naval Auxiliary Air Station (CNAAS) as a training facility for World War II (WWII) naval aviators. Prior to being developed for the CNAAS, this area primarily consisted of farmland and marshes. Aerial photographs indicate that by 1943 various buildings and three runways were constructed. Over the years, the mission of the facility changed numerous times. The three runways were modified and extended as needed with the changing mission. This resulted in the construction, expansion, and occasional abandonment of numerous structures and roadways. On January 26, 1946, the Naval Aviation Ordnance Test Station was established.

In 1958, the National Aeronautics and Space Act established NASA. Although the Navy decided to close the CNAAS, the facility continued to operate until 1959, when it was officially closed. NASA took custody of the facility on June 30, 1959. Finalization of the transfer from the Navy did not take place until December 1, 1961. From 1959 to 1974, the entire complex became known as Wallops Station. During this time period, activities in the study area were conducted in support of the Civilian Space Program.

The name of the facility was changed to Wallops Flight Center in 1975, and activities were expanded to include studies of ocean processes. Noise reduction studies of aircraft on runways were conducted within the boundaries of the study area known as Wallops Research Airport. In July 1975, NASA excessed approximately 397 acres of land along the eastern extent of the Main Base to the U.S. Fish and Wildlife Service (USFWS) to establish the Wallops Island National Wildlife Refuge

(USDOI 1975). In October 1981, Wallops Flight Center was consolidated with the Goddard Space Flight Center in Maryland and the name was officially changed to the Wallops Flight Facility (WFF). Since then, the WFF has become NASA's primary facility for suborbital programs (USATEC 2000, NASA 1999, NASA Undated).

### 1.2.2 Current Operations

The WFF Main Base property was first developed commercially in the 1940s, while under control of the Navy. Many of the buildings and structures constructed at that time remain in active service today. Extensive efforts have been made throughout the Installation to renovate and modernize the current buildings.

The current mission of the facility is to further scientific, educational, and economic advancement by supporting space-based research focused on Earth and its environments. The facility is used for research and development, and tracking and data acquisition, and serves as a central platform for NASA's Suborbital and Special Orbital Programs. Current tenants include, among others, the Navy, the Coast Guard, the National Oceanic and Atmospheric Administration (NOAA), the Wallops Command and Data Acquisition Station (CDAS), and the Wallops Island Marine Science Center (in cooperation with the Marine Science Consortium, Inc.).

The Main Base currently contains the research airport, runways, hangars, administrative and technical offices, laboratories, and air traffic control facilities, as well as housing for students and Navy personnel. The research airport provides many services, including communications, telemetry, enhanced radar tracking, and flight-path guidance. The facility also supports a variety of aeronautical research programs (e.g., traction, acoustics, and navigation). The Marine Science Center is adjacent to the airport and consists of more than 57 acres of classrooms, laboratories, residences, and other facilities (NASA 1999).

## 1.3 PREVIOUS ENVIRONMENTAL INVESTIGATIONS AND STUDIES

This section summarizes the various environmental investigations or studies that have been conducted at the four LSI FUDS program sites. From 1987 to the present, a series of environmental investigations have been conducted at the WFF, including the LSI that is the focus of this report. These investigations, which have been conducted by both government agencies and private contractors, have ranged from general surveys to more detailed sampling and analysis. Table 1-1 identifies the LSI FUDS program sites characterized and outlines the chronological events conducted for the LSI sites.

## 1.4 REPORT ORGANIZATION

Sections 2 through 4 present an overview of the WFF environmental setting and the methods used in conducting the LSI. Section 5 presents site-specific results.

***Executive Summary***—This section summarizes and documents the results and recommendations for the four sites under investigation at the WFF.

***Section 1. Introduction***—This section identifies the objective and scope of this study; describes the Installation and summarizes its history and current operations; highlights previous investigations or studies; and summarizes data screening methodologies.

***Section 2. Environmental Setting of the Wallops Flight Facility***—Section 2 provides an overview of the physical setting, climate, geology, and hydrogeology. In addition, soil and groundwater characteristics of the investigated sites are discussed.

**Table 1-1. Summary of Previous Investigations and Studies for LSI Sites Wallops Flight Facility, Accomack County, Virginia**

| Document Title | Date | LSI FUDS Sites Characterized |
|---|---|---|
| Ground Water Resource Evaluation for the Main Base (Rusnow, Kane & Andrews) | March, 1987 | Wallops Flight Facility – Main Base |
| Remote Sensing Report (Ebasco Services) | June, 1990 | Site 3 – Two 600,000-Gallon Fuel Tanks |
| Environmental Sites Survey – Wallops Flight Facility (Ebasco Services) | November, 1990 | Site 1 – Old WWTP; Site 3 – Two 600,000-Gallon Fuel Tanks |
| NASA Wallops Flight Facility Site Inspection, Preliminary Report #1. Unexploded Ordnance/Magnetometer Survey Results (Metcalf & Eddy) | July, 1993 | Site 1 – Old WWTP |
| NASA Wallops Flight Facility Site Inspection, Preliminary Report #2. Soil Gas Survey Results (Metcalf & Eddy) | July 1993 | Site 1 – OLD WWTP; Site 3 – Two 600,000-Gallon Fuel Tanks |
| Preliminary Hazard Ranking System Scoring Results (Metcalf & Eddy) | December, 1994 | Site 1 – Old WWTP |
| Aerial Photographic Analysis NASA-Wallops Flight Facility (EPIC) | May, 1996 | Wallops Flight Facility – Main Base (1938 to 1996) |
| Site Inspection for Miscellaneous Sites at Wallops Flight Facility (Ebasco Services) | March, 1996 | Site 1 – Old WWTP; Site 3 – Two 600,000-Gallon Fuel Tanks |
| Limited Site Characterization Report for NOAA Facility (USACE) | April, 1999 | Site 3 – Two 600,000-Gallon Fuel Tanks (Buildings A-46A and A-46B) |
| Status Summary Report (Earth Tech) | January, 2000 | Site 1 – Old WWTP; Site 3 – Two 600,000-Gallon Fuel Tanks; IWL (fish & wildlife); CDL |
| Preliminary Potentially Responsible Party Analysis. Goddard Space Flight Center, Wallops Flight Facility (NASA) | February, 2001 | WFF |

*Section 3. Contaminant Assessment Methodology*—This section describes the field and laboratory procedures and methods used to conduct the LSI. In addition, the approach and rationale for the field activities are summarized.

*Section 4. Laboratory Chemical Analysis Program and Quality Assurance Summary*—The laboratory chemical analysis program and an assessment of the laboratory and site activity data are included. In addition, the methods and procedures used to establish the soil and groundwater concentrations are presented.

*Section 5. Site-specific Investigation Results, Conclusions, and Recommendations*—This section provides, on a site-by-site basis, the investigation approach and analytical and screening results. An assessment of field investigation activities is presented, followed by investigation results. Analytical results are summarized and screening results for the detected constituents are presented. Recommendations regarding future actions at the site also are provided.

*Section 6. References*—This section lists the references that were used in preparing this report.

*Appendices*—Appendices A through H include data from field activities or related assessments:

- Appendix A. Soil Boring Logs
- Appendix B. Soil Gas Maps

- Appendix C. Chain-of-Custody Forms
- Appendix D. Data Quality Assessment
- Appendix E. Source Water Laboratory Results
- Appendix F. Survey Data
- Appendix G. Analytical Data Presentation Tables
- Appendix H. Photographs
- Appendix I. Risk-Based Concentration Tables
- Appendix J. Maximum Contaminant Level Tables.

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# 2. ENVIRONMENTAL SETTING OF THE WALLOPS FLIGHT FACILITY

This section summarizes the environmental setting for the Wallops Flight Facility (WFF), Accomack County, Virginia. The environmental setting incorporates aspects of the Installation location, demographics and land use, physiography and topography, climate and meteorology, geology, hydrogeology, surface water hydrology, soil, and ecology for the Installation and surrounding areas. The environmental setting has been compiled predominantly from field studies and information presented in the Desktop Audit Summary Report (MicroPact 2002); information from the U.S. Geological Survey (USGS), Soil Conservation Survey (SCS), and National Oceanic and Atmospheric Administration (NOAA); and other historical project reports and maps.

Field studies have included site-specific mapping; geologic and hydrogeologic measurements and observations; and quantitative sampling and analysis of surface soil, subsurface soil, groundwater and containerized liquids. This section describes the environmental setting for the four Formerly Used Defense Sites (FUDS) program sites investigated during the Limited Site Investigation (LSI), as determined by historical documentation and field work conducted during historical and ongoing investigations and studies.

## 2.1 LOCATION

The WFF is located in Accomack County, Virginia. The facility comprises three separate areas: the Main Base, Wallops Island, and Wallops Mainland. The study area (Main Base) is situated on the Atlantic Coast of the Delmarva Peninsula, approximately 5 miles south of the Maryland/Virginia state boundary, and west of Chincoteague Island. Figure 2-1 shows the location of the WFF in Accomack County, Virginia.

The Main Base, which occupies approximately 2,230 acres, is bounded by Mosquito Creek to the north, Cedar Creek to the south, Simoneaston Bay to the east, and Wattsville Branch to the west. Wallops Island and Wallops Mainland are located approximately 7.5 miles southeast of the Main Base. Figure 2-2 shows the boundaries of the WFF and the location of the identified water resources identified above.

## 2.2 DEMOGRAPHICS AND LAND USE

The area surrounding the WFF is sparsely populated and largely agricultural. Land not in agricultural use, except for the resort town of Chincoteague, is either wooded or marshland. The main commercial industries are farming (primarily potatoes and soybeans), poultry, commercial and recreational fishing, and tourism. Two national wildlife refuges (Chincoteaue and Assateague Islands) attract a substantial number of visitors to view the wide variety of wildlife inhabiting the area.

The WFF is surrounded by rural farmland and small villages. Horntown, with approximately 1,466 acres, is located about 2.5 miles north of the Main Base. Wattsville, approximately 826 acres, is located approximately 1 mile west of the Main Base. Atlantic, approximately 459 acres, lies about 2.75 miles southwest of the Main Base.

## 2.3 GEOLOGY AND PHYSIOGRAPHY

The WFF is located within the Atlantic Coastal Plain physiographic province and is underlain by approximately 7,000 feet of sediment that overlies a crystalline basement. The sedimentary overburden ranges in age from Cretaceous to Quaternary and consists of a thick series of terrestrial deposits (Cretaceous) overlain by a thinner series of marine sediments. These sediments are generally unlithified and consist of clays, silts, sands, and gravels. The regional dip of the units is approximately to the east, toward the shore.

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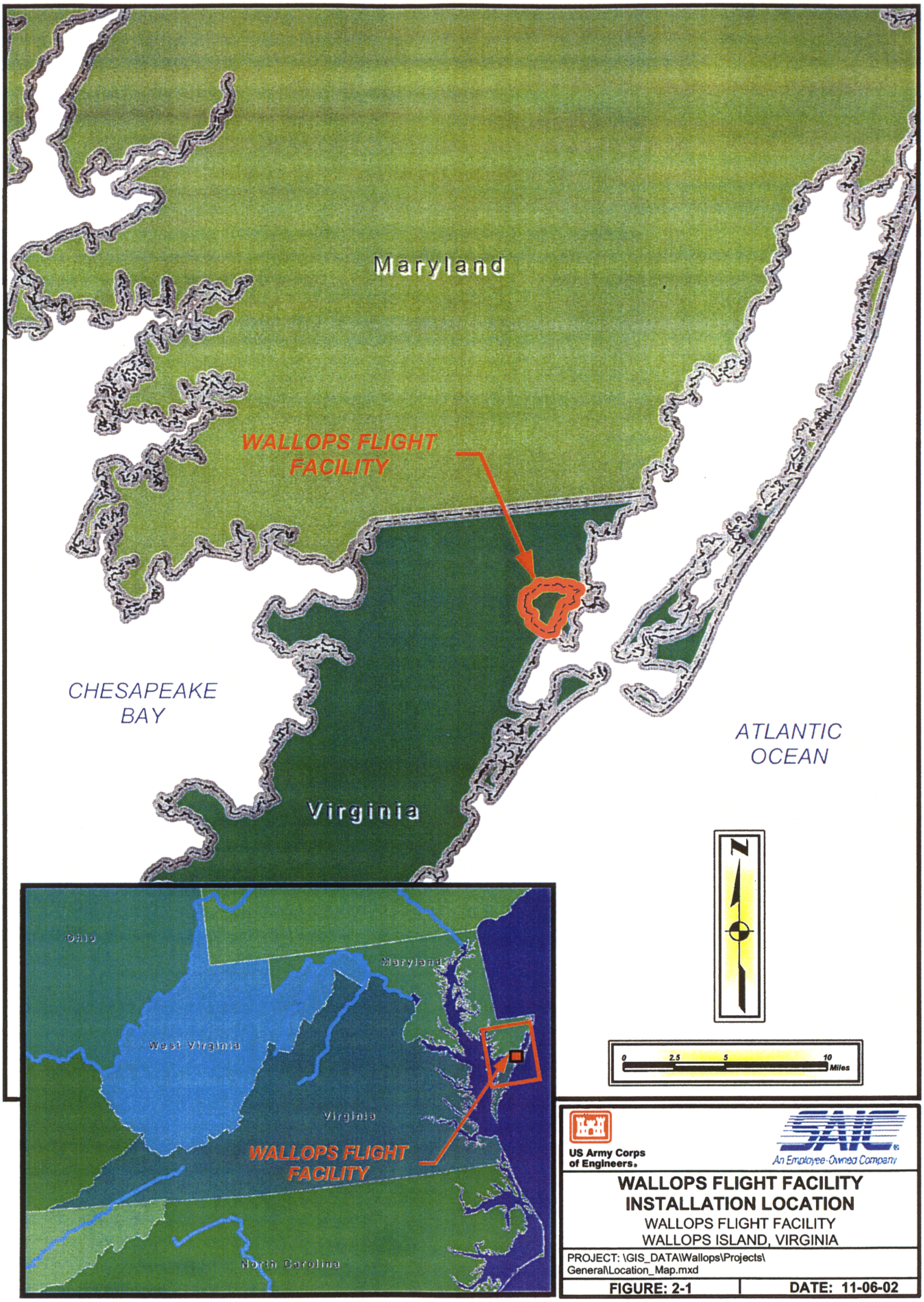
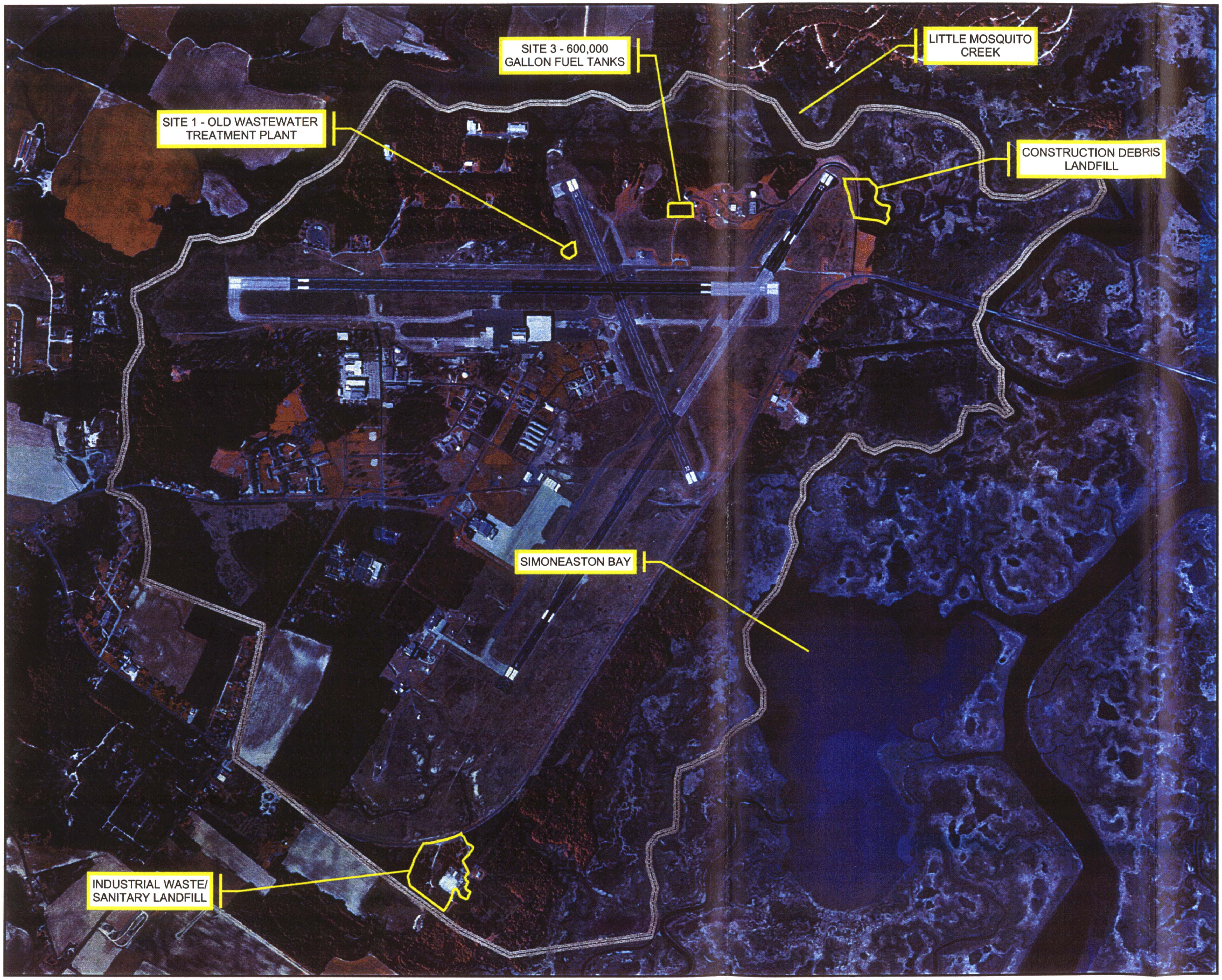



**WALLOPS FLIGHT FACILITY INSTALLATION LOCATION**

WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

PROJECT: \GIS_DATA\Wallops\Projects\General\Location_Map.mxd

FIGURE: 2-1 | DATE: 11-06-02

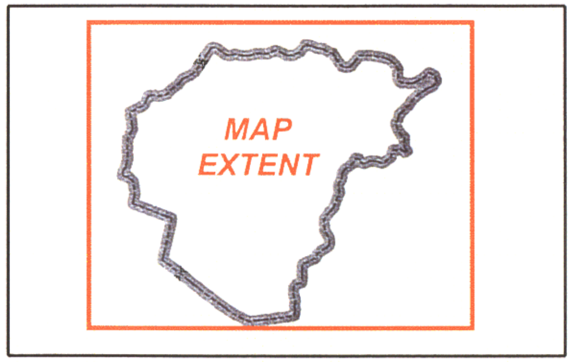



**Legend**

INSTALLATION BOUNDARY

SITE BOUNDARY

Notes: NAD 1983 UTM Zone 18N




KEY MAP
NOT TO SCALE

N

0 250 500 1,000 Meters

US Army Corps of Engineers.

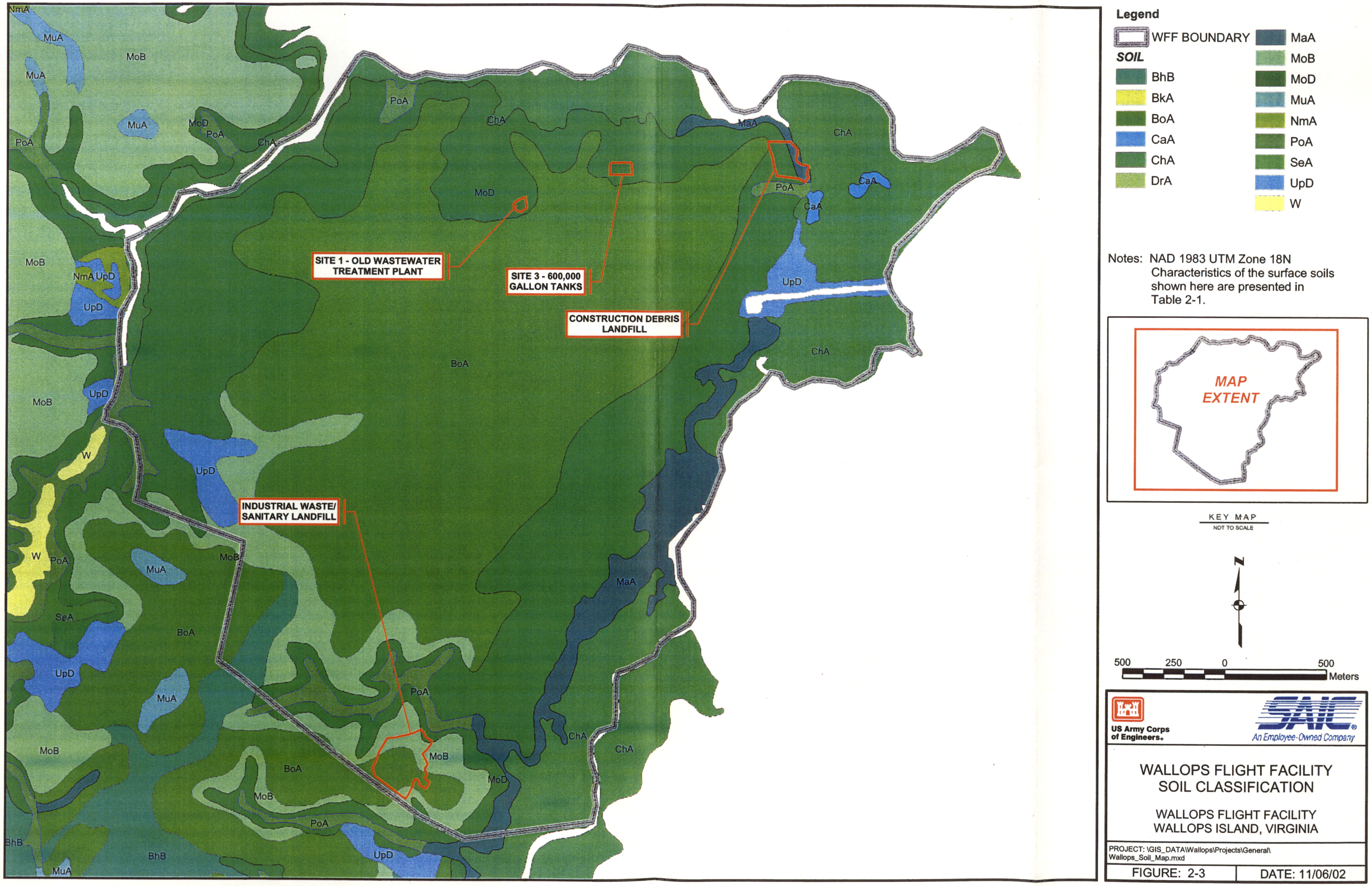
SAIC
An Employee-Owned Company

WALLOPS FLIGHT FACILITY
LIMITED SITE INVESTIGATION
SITE LOCATION MAP

WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

PROJECT: \GIS_DATA\Wallops\Projects\General\Wallops_Base_Map.mxd

FIGURE: 2-2 DATE: 11/06/02


Legend
WFF BOUNDARY
SOIL
BhB
BkA
BoA
CaA
ChA
DrA
MaA
MoB
MoD
MuA
NmA
PoA
SeA
UpD
W
SITE 1 - OLD WASTEWATER TREATMENT PLANT
SITE 3 - 600,000 GALLON TANKS
CONSTRUCTION DEBRIS LANDFILL
INDUSTRIAL WASTE/ SANITARY LANDFILL
Notes: NAD 1983 UTM Zone 18N
Characteristics of the surface soils shown here are presented in Table 2-1.
MAP EXTENT
KEY MAP
NOT TO SCALE
500 250 0 500
Meters
US Army Corps of Engineers.
SAIC
An Employee-Owned Company
WALLOPS FLIGHT FACILITY
SOIL CLASSIFICATION
WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA
PROJECT: \GIS_DATA\Wallops\Projects\General\Wallops_Soil_Map.mxd
FIGURE: 2-3
DATE: 11/06/02

## Table 2-1. Characteristics of Surface Soil Wallops Flight Facility, Accomack County, Virginia

| Mapping Unit | Setting | Soil Properties | | | | |
|---|---|---|---|---|---|---|
| | | Drainage Class | Permeability | Organic Matter Content | Depth to Water | Soil Reaction |
| BhB – Bojac loamy sand, 2 to 6 percent slopes | **Landform:** Stream terraces **Landscape Position:** Undulating surfaces and rims of Carolina bays | Well drained | Moderately rapid | Low | More than 48 inches | Extremely acid to slightly acid in the surface layer and subsoil, very strongly acid to moderately acid in the substratum |
| BkA – Bojac sandy loam, 0 to 2 percent slopes | **Landform:** Stream terraces **Landscape Position:** Nearly level and undulating surfaces | Well drained | Moderately rapid | Low | 48 to 72 inches | Extremely acid to slightly acid in the surface layer and subsoil, very strongly acid to moderately acid in the substratum |
| BoA – Bojac fine sandy loam, 0 to 2 percent slopes | **Landform:** Stream terraces **Landscape Position:** Nearly level and undulating surfaces | Well drained | Moderately rapid | Low | More than 48 inches | Extremely acid to slightly acid in the surface layer and subsoil, very strongly acid to moderately acid in the substratum |
| CaA – Camocca fine sand, 0 to 2 percent slopes, frequently flooded | **Landform:** Intermingled dunes and marshes **Landscape Position:** Depressions and flats between dunes | Poorly drained | Very rapid | Low | 0 to 12 inches | Extremely acid to moderately alkaline |
| ChA – Chincoteague silt loam, 0 to 1 percent slopes, frequently flooded | **Landform:** Tidal salt marshes **Landscape Position:** Level marsh surfaces | Very poorly drained | Moderately slow to rapid | Moderate to very high | Ponded 0 to 36 inches above the surface | Moderately acid to slightly alkaline |
| DrA – Dragston fine sandy loam, 0 to 2 percent slopes | **Landform:** Stream terraces **Landscape Position:** Rims of depressions, flats, and depressions | Somewhat poorly drained | Moderately rapid in the subsoil and rapid in the substratum | Low | 12 to 30 inches | Very strongly acid or strongly acid in the surface layer and the upper part of the subsoil, very strongly acid to slightly acid in the lower part of the subsoil and in the substratum |
| MaA – Magotha fine sandy loam, 0 to 2 percent slopes, frequently flooded | **Landform:** Tidal salt marshes **Landscape Position:** Level marsh surfaces | Poorly drained | Moderate to rapid | Moderate to high | 0 to 12 inches | Very strongly acid to slightly alkaline |

**Table 2-1. Characteristics of Surface Soil**
**Wallops Flight Facility, Accomack County, Virginia (Continued)**

| Mapping Unit | Setting | Soil Properties | | | | |
|---|---|---|---|---|---|---|
| | | Drainage Class | Permeability | Organic Matter Content | Depth to Water | Soil Reaction |
| MoB – Molena loamy sand, 0 to 6 percent slopes | **Landform:** Coastal-plain uplands and stream terraces **Landscape Position:** Undulating surfaces | Somewhat excessively drained | Rapid | Low | More than 60 inches | Very strongly acid to moderately acid |
| MoD – Molena loamy sand, 6 to 35 percent slopes | **Landform:** Coastal-plain uplands and stream terraces **Landscape Position:** Sloping surfaces and escarpments | Somewhat excessively drained | Rapid | Low | More than 60 inches | Very strongly acid to moderately acid |
| MuA – Munden sandy loam, 0 to 2 percent slopes | **Landform:** Coastal-plain uplands and stream terraces **Landscape Position:** Nearly level surfaces | Moderately well drained | Moderately rapid in the subsoil, moderately rapid or rapid in the substratum | Low | 18 to 30 inches | Very strongly acid to moderately acid |
| NmA – Nimmo sandy loam, 0 to 2 percent slopes | **Landform:** Coastal-plain uplands and stream terraces **Landscape Position:** Flats, depressions, and drainageways | Poorly drained | Moderate in the subsoil, moderately rapid or rapid in the substratum | Low to moderate | 0 to 12 inches | Extremely acid to strongly acid |
| PoA – Polawana mucky sandy loam, 0 to 2 percent slopes, frequently flooded | **Landform:** Coastal-plain uplands and stream terraces **Landscape Position:** Adjacent to drainageways and streams | Very poorly drained | Rapid | Moderate to very high | Ponded 12 inches above to 6 inches below the surface | Very strongly acid to neutral |
| SeA – Seabrook loamy fine sand, 0 to 2 percent slopes | **Landform:** Coastal-plain uplands and stream terraces **Landscape Position:** Nearly level surfaces | Moderately well drained | Rapid | Low | 24 to 48 inches | Very strongly acid to slightly acid |
| UpD – Udorthents and Udipsamments soils, 0 to 30 percent slopes | **Landform:** Coastal-plain uplands, stream terraces, and marshes **Landscape Position:** Filled areas and borrow pits | Somewhat poorly drained to excessively drained | Slow to rapid | Low to high | 18 to more than 60 inches | Ultra acid to moderately alkaline |

**Table 2-2. Classification of WFF Wetlands**
**Wallops Flight Facility, Accomack County, Virginia**

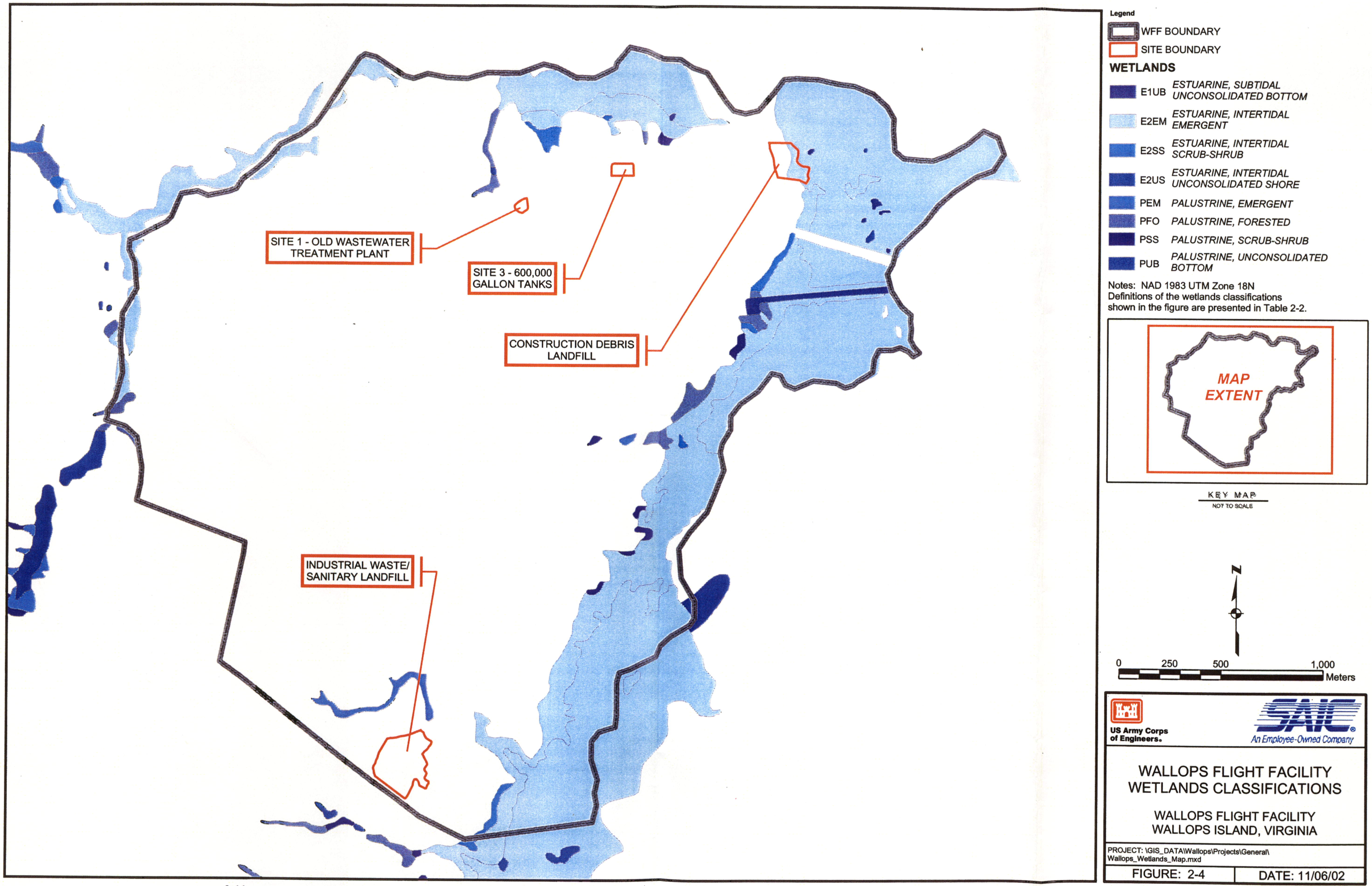
| Wetland Systems |
|---|
| **[E] Estuarine** – The Estuarine System describes deepwater tidal habitats and adjacent tidal wetlands with low energy and variable salinity, influenced and often semi-enclosed by land. |
| **[P] Palustrine** – The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 parts per thousand (ppt). Wetlands lacking such vegetation are also included if they exhibit all of the following characteristics:<br>• are less than 8 hectares (20 acres)<br>• do not have an active wave-formed or bedrock shoreline feature<br>• have at low water a depth less than 2 meters (6.6 feet) in the deepest part of the basin<br>• have a salinity due to ocean-derived salts of less than 0.5 ppt. |
| **Wetland Subsystems** |
| **Subtidal** – These habitats are continuously submerged substrate, (i.e. below extreme low water). |
| **Intertidal** – This is defined as the area from extreme low water to extreme high water and associated splash zone. |
| **Wetland Classes** |
| **[UB] Unconsolidated Bottom** – Includes all wetlands and deepwater habitats with at least 25% cover of particles smaller than stones (less than 6-7 cm), and a vegetative cover less than 30%. |
| **[EM] Emergent** – Characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. |
| **[US] Unconsolidated Shore** – Includes all wetland habitats having three characteristics:<br>• unconsolidated substrates with less than 75% areal cover of stones, boulders, or bedrock<br>• less than 30% areal cover of vegetation other than pioneering plants;<br>• any of the following water regimes: irregularly exposed, regularly flooded, irregularly flooded, seasonally flooded, temporarily flooded, intermittently flooded, saturated, seasonal-tidal, temporary-tidal, or artificially flooded.<br>Intermittent or intertidal channels of the Riverine System or intertidal channels of the Estuarine System are classified as Stream Bed. Landforms such as beaches, bars, and flats are included in the Unconsolidated Shore class. |
| **[FO] Forested** – Characterized by woody vegetation that is 6 m tall or taller. |
| **[SS] Scrub-Shrub** – Includes areas dominated by woody vegetation less than 6 m (20 feet) tall. The species include true shrubs, young trees (saplings), and trees or shrubs that are small or stunted because of environmental conditions. |

## 2.6 ECOLOGY AND SENSITIVE ENVIRONMENTS

The Chincoteague National Wildlife Refuge is located adjacent to Chincoteague Inlet. The Wallops Island National Wildlife Refuge is located east and southeast of State Road 175, adjacent to the Main Base. The refuge is used primarily for limited wildfowl hunting and for wildlife and habitat surveys. Assateague Island National Seashore is located to the north. The federally listed threatened and endangered (T&E) species known to occur at Wallops Island include the piping plover (*Charadrius melodius*), bald eagle (*Haliaeetus leucoccephalus*), and peregrine falcon (*Falco peregrinus*). Numerous wetlands are located around the Main Base and are protected according to state and Federal regulations. The estimated total wetlands area within a 4-mile radius of the WFF is 14,646 acres. A variety of important finfish and shellfish species can be found in the tidal waters in the vicinity of the WFF. These species include summer flounder, sea trout, northern kingfish, menhaden, bluefish, striped bass, American oyster, quahog clam, and blue crab. Little Mosquito Creek and its tributaries were condemned as shellfish areas in April 1989 due to high fecal coliform bacteria levels or the presence of permitted discharge locations. Closures to shellfish harvesting in the vicinity of permitted discharges serve as buffer zones to ensure public health. No data on shellfish production were available for Jenny's Gut, Mosquito Creek, or Cockle Creek. These areas are used for commercial and recreational fishing (Versar 1992).

## 2.7 CLIMATE

The WFF is located in the climatic region known as the humid continental warm summer climate zone. The Soil Survey for Accomack County (USDA 1994) provides climatic data at Wallops Island for the time period 1967 to 1979. Precipitation is well-distributed throughout the year. Frequent, steady storms in the winter, spring, and fall result in local flooding and severe shoreline erosion. Summer is hot and humid with thunderstorms occurring on an average of 18 days per year. The total average annual rainfall for Wallops Island is 40.8 inches. Of this, 20.6 inches usually falls in April through September. The heaviest 1-day rainfall during the period of record was 4 inches. In winter, sustained snowfall events are rare. The average seasonal snowfall is 9.8 inches. In the winter, the average daily temperature is 37.1°F and the average minimum daily temperature is 29.6°F. Winter temperatures have ranged as low as 5°F. The average summer temperature is 73.7°F and the average maximum daily temperature is 80.2°F. Summer temperatures have ranged as high as 101°F. The average relative humidity is 60 percent.


SITE 1 - OLD WASTEWATER TREATMENT PLANT
SITE 3 - 600,000 GALLON TANKS
CONSTRUCTION DEBRIS LANDFILL
INDUSTRIAL WASTE/ SANITARY LANDFILL
Legend
WFF BOUNDARY
SITE BOUNDARY
WETLANDS
E1UB ESTUARINE, SUBTIDAL UNCONSOLIDATED BOTTOM
E2EM ESTUARINE, INTERTIDAL EMERGENT
E2SS ESTUARINE, INTERTIDAL SCRUB-SHRUB
E2US ESTUARINE, INTERTIDAL UNCONSOLIDATED SHORE
PEM PALUSTRINE, EMERGENT
PFO PALUSTRINE, FORESTED
PSS PALUSTRINE, SCRUB-SHRUB
PUB PALUSTRINE, UNCONSOLIDATED BOTTOM
Notes: NAD 1983 UTM Zone 18N
Definitions of the wetlands classifications shown in the figure are presented in Table 2-2.
MAP EXTENT
KEY MAP
NOT TO SCALE
N
0 250 500 1,000
Meters
US Army Corps of Engineers.
SAIC
An Employee-Owned Company
WALLOPS FLIGHT FACILITY
WETLANDS CLASSIFICATIONS
WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA
PROJECT: \GIS_DATA\Wallops\Projects\General\Wallops_Wetlands_Map.mxd
FIGURE: 2-4
DATE: 11/06/02

# 3. CONTAMINANT ASSESSMENT METHODOLOGY

This section summarizes the field activities conducted by Science Applications International Corporation (SAIC) at the Wallops Flight Facility (WFF) as part of the Limited Site Investigation (LSI). The LSI field investigation sampling methodology, including planned activities, objectives, and rationale for the LSI, are presented in Section 3.1. Field activities completed and procedures used during the investigation of these sites are provided in Section 3.2. A detailed discussion of the methods, procedures, and rationale for the site-specific sampling also is presented in Section 4 of the Field Sampling Plan (FSP) (SAIC 2002a). Deviations from the planned field activities are specified in Section 3.3. Section 3.4 presents an overview of the soil and groundwater standards used for the screening assessment.

## 3.1 SAMPLING METHODOLOGY

The LSI field investigation program was designed to characterize current environmental conditions at the four sites (the Old Wastewater Treatment Plant [WWTP], Industrial/Sanitary Waste Landfill [IWL], Construction Debris Landfill [CDL], and Two 600,000-Gallon Fuel Tanks under investigation at the WFF. The LSI program was conducted in accordance with the Project Work Plan (PWP) that was specifically prepared for the LSI. The PWP was reviewed and approved by the U.S. Environmental Protection Agency (EPA) Region III, Virginia Department of Environmental Quality (VDEQ), and U.S. Army Corps of Engineers (USACE), Norfolk District. Final approval of the PWP was received in August 2002 prior to the initiation of field investigation activities. Adherence to the requirements outlined in these documents (FSP [SAIC 2002a], Quality Assurance Project Plan [QAPP] [SAIC 2002b], and Site Safety and Health Plan [SSHP] [SAIC 2002c]) ensured that the project data quality objectives (DQOs) were met. Based on EPA guidance for environmental studies, the DQOs for the LSI activities included precision, accuracy, representativeness, comparability, and completeness (PARCC). During the course of the LSI, all activities and analyses were conducted using standard procedures so that known and acceptable PARCC properties were achieved.

The LSI field investigation activities conducted at the four previously identified WFF sites included site inspections; surface and subsurface soil, containerized liquid (USTs) and groundwater (Hydropunch®) sampling; and topographic surveying. Direct-push (Geoprobe®) drilling and groundwater (Hydropunch®) sampling was conducted by SAIC personnel. Prior to initiating the field program, sample locations were staked by SAIC personnel and utilities and vegetation were cleared by SAIC and WFF personnel. General Physics Environmental Services, Inc. (GPES) of Gaithersburg, Maryland, provided soil and water analytical services. Section 4 provides a quality assessment of the data provided to SAIC by GPES. Supplemental information associated with the data quality assessment is presented in Appendix D.

### *3.1.1 Sample Selection*

Table 3-1 summarizes the site-specific sampling activities and sampling rationale for each of the four sites included in this Limited Site Investigation Report (LSIR). The type of data required to meet the LSI objectives is site specific and sampling requirements were based on the previously handled materials, past operations, and previous investigations conducted at the installation. Site-specific rational associated with sample selection are presented in Section 5.

### *3.1.2 Parameter Selection*

Target compound and element lists for each site were prepared on the basis of the type of activities conducted, the suspected contaminants, and previous sampling results. Because the LSI focused on the identification of potential contamination and historical records for most of the sites were very limited, the chemicals of concern (COCs) for each location included volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals. A detailed discussion of target analytes is included in the QAPP (SAIC 2002b).

## Table 3-1. Limited Site Investigation Field Activities
## Old WWTP (Site 1), Two 600,000-Gallon USTs (Site 3), IWL, and CDL
## Wallops Flight Facility, Accomack County, Virginia

| Site Name | LSI Field Activities |
|---|---|
| Site 1 – Old Wastewater Treatment Plant (WWTP) | Based on results of previous investigation activities, drilled three soil borings at or adjacent to former soil gas sample locations. Characterized current conditions at these locations by completion of the following:<br>• Collected one surface soil sample (0 to <0.5 feet BLS) from below the top of the natural soil<br>• Conducted field screening at each soil boring location to 4 feet BLS (except at sludge bed location) using a PID. Collected one subsurface soil sample from the soil interval that indicated the greatest potential for contamination (e.g., elevated PID readings, discolored soil).<br>• No groundwater (Hydropunch®) samples collected.<br>Samples were analyzed for VOCs, SVOCs, and metals. |
| Site 3 – 600,000-Gallon USTs (Buildings A-46A and A-46B) | Conducted visual inspection of the 600,000-gallon USTs to determine tank depth and if free product is present.<br>Collected two samples from each of the 600,000-gallon USTs (A-46A and A-46B) to determine the absence or presence of hydrocarbons within the USTs.<br>Analyzed samples for VOCs, SVOCs, and metals. |
| Industrial/Sanitary Waste Landfill (IWL) | Based on the interpretation of aerial photographs and current site conditions. Eight soil and four groundwater samples were collected at four discrete locations<br>• Four soil and two groundwater samples were collected in an area identified in the EPIC report as an area previously containing mounded material.<br>• Two soil and one groundwater samples were collected at location adjacent to mounded material running parallel with Route 175<br>• Two soil samples and one groundwater sample were collected downgradient from the potential source areas also identified in the EPIC report.<br>The following samples were collected from each boring:<br>• One surface soil sample 0 to <0.5 feet BLS below the top of the natural soil (surface soil at SB-IWL-04 was not collected due to elevated PID concentrations detected in the subsurface soil).<br>• One subsurface soil sample at the soil-groundwater interface.<br>• One groundwater sample using Hydropunch® technique.<br>Samples were analyzed for VOCs, SVOCs, and metals (filtered metal analysis conducted for groundwater sample). |
| Construction Debris Landfill (CDL) | Based on the review of the aerial photographs, three soil borings (SB-CDL-01 through SB-CDL-03) were drilled along the eastern boundary of the former CDL. The following samples were collected from each boring and used to characterize potential constituents released from the site:<br>• One surface soil sample 0 to <0.5 feet BLS below the top of the natural soil.<br>• One subsurface soil sample at the soil-groundwater interface.<br>• One groundwater sample using Hydropunch® technique.<br>Samples were analyzed for VOCs, SVOCs, and metals (filtered metal analysis conducted for groundwater sample). |

## 3.2 FIELD ACTIVITIES AND PROCEDURES

The WFF LSI included a site walkover, direct-push drilling and subsurface soil and groundwater sampling, and liquid sampling from the 600,000-gallon USTs. This section describes the activities used to qualitatively and quantitatively assess the presence of contamination at the four LSI sites. Qualitative activities included the field screening and site walkover activities. Quantitative activities included the subsurface soil sampling, Hydropunch® sampling, sampling of the liquids in the USTs, and topographic surveying. The field methods and procedures associated with the completion of LSI field activities at the WFF are summarized below. LSI activities were supervised by SAIC and USACE (Norfolk District) personnel to ensure field activities were being conducted in accordance with the PWP. Results and their interpretations are provided in Section 5.

### *3.2.1 Visual Inspection*

A visual inspection was conducted at each site prior to the initiation of investigation activities. Site characteristics, such as topography, surface water drainage patterns, buildings and structures (e.g., location of doors or potential release pathways), visible surface stains, stressed vegetation, exposed soils, and utility locations were considered in locating sampling points. Site visual inspection activities also included the staking of soil boring/Hydropunch® sample locations. These visual inspection and staking activities were conducted in July 2002 by SAIC field personnel. The site-specific sample location rationale and observations made during the inspection are discussed in Section 5.

### *3.2.2 Field Screening*

Screening activities were conducted during field operations at the WFF using a photoionization detector (PID). This instrument was used to ensure the safety of the field staff and screen samples for the presence of potential VOCs. SAIC personnel used the monitoring instrument to screen the borehole atmosphere, soil samples, and the breathing zone around the rig during drilling operations. Instrument readings were recorded on soil boring field logs and in the field logbook. Copies of the soil boring field logs are contained in Appendix A.

The Photovac Microtip PID was calibrated using isobutylene gas in accordance with the manufacturer's instructions and SAIC's standard operating procedures (SOPs). Calibration checks were performed at the beginning of each sampling day or more frequently if field personnel suspected that calibration might have been altered or affected by an external factor (e.g., temperature or humidity).

### *3.2.3 Soil Sampling*

All soil samples were collected in accordance with the procedures outlined in the following sections. Quality control (QC) samples were collected using the same procedures described for collecting environmental samples.

Soil sampling was conducted to determine the presence or absence of contamination in the surface and shallow subsurface soil horizons. Soil sampling was conducted at various depths in accordance with site-specific conditions. Sampling depths, sampling methods, and frequency were based on site-specific requirements and rationales. In general, samples were collected from three strata: surface (the top 0.5 feet of soil), the soil-groundwater interface, and the subsurface (from 0.5 to 15 feet below land surface [BLS]) based on site-specific conditions and observations. The site-specific details and depth of sample collection were recorded in the boring logs (Appendix A).

All underground utilities were cleared before conducting any intrusive sampling at the sites. Each sample location was surveyed and the coordinates recorded on the boring logs. Survey data are included in Appendix E. The following sections describe the methods and equipment that were used to collect the surface and subsurface soil samples.

Surface soil samples (0 to <0.5 feet BLS) were collected at the IWL, CDL, and the Old WWTP during the LSI field activities. The sample collection techniques and methods that were used to collect surface soil samples are summarized in the following paragraphs.

Surface soil samples were collected using stainless steel sampling tools (e.g., augers and spoons) or in a sampler attached to a direct-push Geoprobe®. If samples were to be analyzed for VOCs, samples were collected directly from the surface soil or the Geoprobe® core barrel using the Encore™® sampler before the semivolatile or metal samples were collected. The remaining sample material, to be used for samples other than VOCs, was placed into stainless steel sampling bowls, homogenized, and placed into a sample container (i.e., glass jar).

All sampling equipment and tools were decontaminated prior to use; all sample jars were glass with Teflon® septa, and were certified clean by the manufacturer. All sample containers were labeled, placed in a cooler, and maintained at 4°C ± 2°C pending shipment to the laboratory. All shipments were forwarded to the laboratory using overnight express or were delivered to the laboratory by field personnel. Following completion of sampling activities, the borehole was filled to the surrounding surface elevation using bentonite.

Subsurface soil sampling at the Old WWTP was conducted by using a hand auger. Subsurface soil samples were collected at various depths (0.5 to 4 feet BLS) based on physical site conditions, (e.g., soil discoloration, field screening results), intended sample depths, and the professional judgment of the SAIC Field Manager.

Direct push techniques using the Geoprobe® system were used to collect subsurface soil samples from soil borings with planned total depths greater than 5 feet BLS (IWL and CDL soil borings). Soil descriptions and other relevant information were recorded in the field logbook. The following sections outline the procedures associated with the collection of subsurface soil samples.

***Hand Auger Procedures for Sampling Soil***—Hand augers were used to collect soil samples from depths equal to or less than approximately 5 feet BLS. The samples were collected using 2- or 4-inch-width stainless steel hand augers. Each auger was used in only one sampling location before being decontaminated.

Samples from the augers were collected by depositing the removed soil into a stainless steel bowl and immediately collecting the VOC sample (if required). The soil then was homogenized and the remaining jars were filled. These samples then were placed in coolers and kept at 4°C ± 2°C until received by the analytical laboratory.

***Direct Push Procedures for Sampling Soil***—Direct push sampling activities were conducted using the Geoprobe® system, which is a hydraulically powered soil probe unit capable of exerting more than 15,000 pounds of downward force. The system is used to push or drive soil or groundwater sampling tools into the subsurface. Geoprobe® soil sampling was conducted by using a small-diameter (3-inch outside diameter [OD]) stainless steel core barrel sampler with a retractable drive point that is pushed or driven to sampling depth. Once the sampling depth was obtained, the probe or drive point was retracted, and the soil was collected.

The Geoprobe® pushed and hammered the core sampler into the ground to the desired depth for sampling. The core samplers were 4 feet long and were filled with acetate liners. As the core sampler was driven into the ground, soil was collected in hard acetate liners contained within the sampler. Once the sampling depth was reached, the core sampler was retracted from the boring. The cutting shoe holding the sample in place in the core sampler was removed and the acetate liner was removed from the core sampler and placed onto a table for examination by the rig geologist. The rig geologist then screened the soil sample for VOCs using a PID. Detectable organic vapors above the site background and physical soil characteristics, such as soil type, color, moisture, and grain size, were logged and noted by the rig geologist on the boring log.

After the acetate liner was retrieved from the core sampler, the soil was screened using the PID. If the sample interval was used for VOC analysis, an Encore™ sampler attached to a T-handle was used to collect three Encore™ samples from the sample interval. The Encore™ samplers were sealed with plastic caps and labeled, placed in sealed plastic bags, and cooled to 4°C ± 2°C prior to delivery to the laboratory. The soil from the remaining sample interval sleeves was placed in a stainless steel bowl and homogenized before distribution into glass jars. The jars then were labeled, placed in resealable plastic bags, and stored in coolers.

### 3.2.4 Hydropunch® Groundwater Sampling Procedures

Groundwater samples were collected using Hydropunch® techniques from each soil boring drilled at the IWL and CDL to evaluate site groundwater quality at these sites. No groundwater samples were collected from the Old WWTP or the 600,000-gallon USTs. Samples were analyzed for the same parameters as the site soil (VOCs, SVOCs, and metals). The analytical results obtained using the Hydropunch® technique were used to indicate organic and inorganic contamination, if present. All groundwater metal samples were filtered prior to analysis. The Hydropunch® groundwater sampling procedures are discussed below.

Hydropunch® sampling was conducted using a small-diameter (1-inch OD), percussion-driven, steel probing tool or rod with a retractable drive point that was driven using a truck-mounted hydraulic percussion unit (Geoprobe®). The sampling rod with an expendable point was driven approximately 3 feet below the anticipated or field-identified groundwater level. When the probe reached the desired depth, it was retracted, exposing the open bore of the probe rod and allowing the rod to fill with formation water. A Teflon® tube with a bottom check valve was inserted inside the probe rod and attached to a peristaltic pump at the surface. Groundwater was collected directly into the appropriate sample containers from the Teflon® tube.

Groundwater samples were collected from four soil borings at the IWL (SB-IWL-01 through SB-IWL-04) and three soil borings at the CDL (SB-CDL-01 through SB-CDL-03) during the LSI. Analytical groundwater samples were collected from each soil boring location using the Hydropunch® groundwater sampling procedure specified above. All samples were retrieved using the peristaltic pump and Teflon® tube and dispensed directly into an appropriate sample bottle. VOC samples always were obtained first and placed into 40-mL vials. The vials were filled completely to eliminate all headspace. Following the collection of the VOC samples, the remaining analytes were collected in the appropriate sample containers, labeled, and stored in iced coolers. All information was recorded directly in the field logbook. All samples were maintained at 4°C ± 2°C from the time of collection until they were delivered to the laboratory.

### 3.2.5 Sample Identification

A sample identification (I.D.) system developed by SAIC was used to identify each environmental sample collected and field QC blank prepared during the field investigation. This I.D. system allowed precise documentation of locations and sample information. Site I.D. codes and field sample numbers were assigned to each environmental and field QC sample collected. A complete list of field sample numbers and site IDs was maintained by the Field Manager. The format of the field sample numbers and site IDs is as follows:

***Site Identification*** —A site I.D. served as a unique identification code for each location sampled. These site I.D.s were assigned before the start of the field investigation. The following are typical identifiers that were used for the field investigation at the WFF.

| Code | Media Description |
|---|---|
| SB-IWL-02 | Soil boring number 2 at the IWL |
| HP-CDL-03 | Hydropunch® number 3 at the CDL |

The first two letters represented the site type as defined by SB for soil boring samples and HP for groundwater (Hydropunch®) samples. The next three letters (e.g., CDL) designates the site. The last two digits denote the sample location at the site.

***Field Sample Number***—The field sample number was a unique designation assigned by the field team to each environmental sample and field QC sample collected. This numerical code indicated the sample number for its corresponding site I.D. For example, a field sample number of SAIC01 for site I.D. SB-CDL-01 indicates that it is the first soil sample collected from soil boring number 1 at the CDL.

***Duplicate and Field QC Blanks***—The following QC test and flagging codes were used to identify duplicate environmental and field QC blank samples:

- "D" entered in the flagging code field was used to identify all field duplicates collected in the field.
- "R" entered in the QC test code field was used to identify all rinsate blanks collected in the field.
- "T" entered in the QC test code field was used to identify all trip blanks prepared by the analytical laboratory.

### 3.2.6 Sample Handling, Storage, and Shipping

The procedures followed during the transportation of environmental samples and field QC blanks from the WFF to the analytical laboratory are summarized below:

- The outer surface of all sample containers was cleaned with white paper towels. The sample label was placed on the container and covered with clear tape.
- After the containers for a given sample location were filled, they were placed in a rigid ice cooler and preserved at a temperature of 4°C ± 2°C.
- Sample collection points, depth increments, and sampling devices documented in the field logbooks were verified with the information written on the sample label and chain-of-custody (CoC) form.
- Logbook entries and CoC forms with sample identification points, date, time, and names or initials of all persons handling the sample in the field were completed prior to sample shipping.
- One custody seal was placed over the neck and down the side of each container.
- Samples were packaged in thermally insulated, rigid coolers for delivery to the laboratory. Environmental samples and field QC blanks submitted to the laboratory were placed in a sample cooler along with ice packs and coolant blanks, and the final cooler temperature was recorded prior to sealing the cooler. After a cooler was filled, the appropriate CoC form was placed inside a Zip-loc® plastic bag and taped to the inside lid of the cooler, the outer surface of the cooler was cleaned, and the cooler was sealed.
- Custody tape was attached at two separate locations on the outside of each cooler. Sample coolers were shipped to the analytical laboratory by overnight delivery or because of the

laboratory's close proximity to the WFF, the sample containers were transported to the laboratory via the SAIC Field Manager. The Field Manager received a signed CoC upon delivery of the samples to document and trace sample possession. Completed CoC forms are shown in Appendix C. A detailed discussion of CoC procedures is presented in Section 5 of the QAPP (SAIC 2002b).

### *3.2.7 Decontamination Procedures*

Field equipment was decontaminated before sampling activities began, between drilling and sampling activities, and at the conclusion of the sampling program. Decontamination operations were conducted to prevent cross-contamination. Only potable water from a sampled source, isopropanol, and deionized (DI) water from the laboratory were used during the decontamination process. DI water was used as a final rinse in the decontamination process. These water sources were identified and sampled during the field investigation activities to aid in the validation of the data collected during the field investigation activities. The analytical results from the sampling of the DI and potable water sources are presented in Appendix E. The decontamination procedures used during the WFF LSI are summarized below.

#### 3.2.7.1 Drill Rig and Drilling Equipment Decontamination

Decontamination of large equipment associated with sampling, such as drill rigs, and all downhole equipment not coming in direct contact with the soil or groundwater sample, was performed using a water from the potable water source. Equipment was vigorously scrubbed and given a final rinse with approved water.

#### 3.2.7.2 Sampling Equipment Decontamination

All equipment directly contacting analytical sample media, including hand augers, stainless steel core barrels, stainless steel bowl, and stainless steel sampling tools (e.g., spoons) was decontaminated before and after each use. The following decontamination procedures were followed during the LSI:

- The equipment was washed and scrubbed in a solution of potable water and Liquinox™ with brushes to remove particulate matter and surface films. Once the equipment was thoroughly scrubbed, it was placed into a potable water rinse.
- Rinse with DI, analyte-free water
- Rinse with isopropanol
- Rinse with DI, analyte-free water
- Air dry
- Wrap in aluminum foil.

#### 3.2.7.3 Investigation-derived Waste Management

Investigation-derived waste (IDW) was generated as a result of the field activities conducted during the WFF LSI. The types of generated IDW included soil cuttings, solid waste, and liquid waste. SAIC was responsible for the proper handling, labeling, and staging of site IDW as described in the following sections. Site IDW was managed and handled in compliance with Federal and Commonwealth of Virginia requirements. The following sections describe the WFF IDW management.

#### 3.2.7.4 Liquid Investigation-derived Waste

Liquid IDW was generated from decontamination and Hydropunch® purging operations conducted during the investigation. Decontamination water and pre-sample purge water was collected and containerized in 55-gallon drums pending further laboratory characterization at the point of generation pending groundwater sampling results. The storage and drums were labeled with the following information:

- Project name
- Brief description of the contents (e.g., decontamination water, Hydropunch® HP-CDL-01 purge water)
- Date container was filled
- Installation point-of-contact and telephone number
- Estimated number of gallons
- Number of containers (e.g., 1 of 1, 1 of 2).

#### 3.2.7.5 Solid Investigation-derived Waste

Solid IDW generated during the WFF LSI included soil cuttings, personal protective equipment (PPE), and noncontaminated municipal solid waste. The following sections describe the disposition of each type of solid IDW.

***Soil Cuttings***—Soil cuttings were generated during drilling and soil sampling operations. Soil cuttings from each boring were placed on 20-mil plastic until the PID screening results were obtained and then were containerized in 55-gallon drums and stored in a designated area. The soils from soil borings drilled at the CDL were containerized in a separate 55-gallon drum at the request of USACE. The drums containing soil IDW were labeled with the following information:

- Project name
- Brief description of the contents (i.e., soil boring cuttings, decontamination water)
- Date container was filled
- Installation point-of-contact and telephone number
- Number of containers (e.g., 1 of 1, 1 of 2).

***Personal Protective Equipment***—PPE wastes generated during the WFF LSI included latex gloves, vinyl gloves, and Tyvek® suits. This material was double-bagged using large trash bags and screened using the PID. All PPE IDW was disposed of as municipal solid waste because PID readings did not exceed background concentrations.

### *3.2.8 Topographic Surveying*

A topographic survey was conducted to determine the map coordinates of the soil borings at the four LSI sites. The Global Positioning System (GPS) was used to establish the horizontal location of the soil borings at the WFF. The borings were located to an accuracy of ±1 foot using the North American Datum (NAD) 83/93 Virginia State Plane Coordinate System (SPCS). Information and data pertaining to the completion of the survey is contained in Appendix F.

## 3.3 DEVIATIONS FROM PLANNED ACTIVITIES

Although activities conducted under the LSI were extensively planned and approved by EPA, VDEQ, and USACE, initial plans were modified as field conditions were more fully understood. In general, these changes were the result of unanticipated field conditions, site requirements, or screening results that emerged for a given site. Deviations from planned field sampling tasks were deemed necessary to obtain project objectives. The planned versus actual tasks and the rationale for associated changes are presented in the following subsections. In these cases, the deviations were discussed prior to implementation.

### 3.3.1 Old WWTP Plant Investigation

During soil boring drilling activities at the Old WWTP sludge bed, soil boring location SB-WTP-03, the hand-auger could not be advanced to a depth greater that 1 feet BLS because of auger refusal encountered in the sludge beds. As a result, soil screening activities at the boring could not be completed to a depth of 4 feet as proposed in the FSP (SAIC 2002a).

### 3.3.2 CDL Soil Boring Investigation

During soil boring drilling activities at SB-CDL-01 elevated PID concentrations were detected in the shallow subsurface soil. Therefore, a soil sample was collected from the interval with the greatest potential for contamination. As a result, no samples were collected from the surface soil interval as proposed in the FSP (SAIC 2002a). In addition, because potential contamination was identified (e.g., elevated PID concentrations, discolored soils) during the drilling and sampling of SB-CDL-01, the boring was advanced to a depth greater than the soil-groundwater interface to aid in the delineation of the vertical extent of the identified contamination.

## 3.4 PROTECTION STANDARDS

This section describes the basis for the comparison of the WFF sample data to protection standards based on applicable or relevant and appropriate requirements (ARARs). Sample results from the LSI were compared to the protection standards to provide information that will support recommendations for further investigations or no further action.

### 3.4.1 Soil Protection Standards

There are no enforceable standards for contamination in soil resulting from waste disposal activities. Instead, EPA Region III risk-based concentrations (RBCs) for soils are used for the comparison. The RBCs are target concentration limits based on risk to human health and are calculated for both residential and industrial land use.

The residential RBCs used in the comparison are protective of a receptor during childhood and adulthood (chronic, long-term exposure) that is exposed to contaminants in soil via the ingestion route. Industrial RBCs assume exposure only as an adult. The RBCs are published by EPA Region III and the most recent concentrations (April 2002) are presented in Table 3-2.

The RBCs are calculated by using a target hazard quotient (HQ) of 1 and a target cancer risk of $1 \times 10^{-6}$. Using the cancer target is, therefore, conservative and allows for additive effects for multiple contaminants. However, using the HI of 1 does not allow for additive effects for multiple chemicals.

As noted by EPA Region III, the RBCs are protective as no-action levels or cleanup goals, with the following provisions:

- A single medium is contaminated
- A single contaminant contributes nearly all of the health risk
- Volatilization, dermal contact, and other pathways not included in the RBCs are expected to be insignificant

## Table 3-2. Regulatory Screening Criteria
## Wallops Flight Facility, Accomack County, Virginia

| Chemical Constituent | EPA Region III RBC Residential Soil Inorganic (mg/kg) Organic (µg/kg) | EPA Region III RBC Industrial Soil Inorganic (mg/kg) Organic (µg/kg) | EPA Region III RBC Migration to Groundwater Groundwater DAF 20 Inorg mg/kg, Org µg/kg | EPA Region III RBC Tap Water (µg/L) | Federal MCLs Water (µg/L) |
|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 21,900,000 | 572,320,000 | 60,326 | 3171.7 | 200 |
| 1,1,2-Trichloroethane | 11,206 | 100,407 | .78 | .19 | 5 |
| 1,1-Dichloroethylene | 1,065 | 9,539 | .36 | .044 | 7 |
| 1,1-Dichloroethane | 7,821,429 | 204,400,000 | 4,544 | 798.4 | |
| 1,2,4-Trichlorobenzene | 782,143 | 20,440,000 | 7,518 | 194.4 | 70 |
| 1,2-Dichlorobenzene | 7,039,286 | 183,960,000 | 4,553 | 268.2 | 600 |
| 1,2-Dichloroethane | 7,019 | 62,892 | 1 | .12 | 5 |
| 1,2-Dichloropropane | 9,393 | 84,165 | 2 | .16 | 5 |
| 1,3-Dichlorobenzene | 2,346,429 | 61,320,000 | 2,910 | 182.5 | |
| 1,4-Dichlorobenzene | 26,614 | 238,467 | 7 | .47 | 75 |
| 2,4,5-Trichlorophenol | 7,821,429 | 204,400,000 | | 3650.0 | |
| 2,4,6-Trichlorophenol | 58,066 | 520,291 | | 6.1 | |
| 2,4-Dichlorophenol | 234,643 | 6,132,000 | 1,205 | 109.5 | |
| 2,4-Dimethylphenol | 1,564,286 | 40,880,000 | 6,716 | 730.0 | |
| 2,4-Dinitrophenol | 156,429 | 4,088,000 | | 73.0 | |
| 2,4-Dinitrotoluene | 156,429 | 4,088,000 | 572 | 73.0 | |
| 2,6-Dinitrotoluene | 78,214 | 2,044,000 | 247 | 36.5 | |
| 2-Chlorophenol | 391,071 | 10,220,000 | | 30.4 | |
| 2-Chloronaphthalene | 6,257,143 | 163,520,000 | 32,131 | 486.7 | |
| 2-Methylnaphthalene | 1,564,286 | 40,880,000 | 22,231 | 121.7 | |
| 2-Methyl Phenol | 3,910,714 | 102,200,000 | | 1825.0 | |
| 2-Nitroaniline | | | | | |
| 2-Nitrophenol | | | | | |
| 3,3'-Dichlorobenzidine | 1,419 | 12,718 | 5 | .15 | |
| 3-Nitroaniline | | | | | |
| 4,6-Dinitro-2-methylphenol | 78,214 | 2,044,000 | | 36.5 | |
| 4-Bromophenyl Phenyl Ether | | | | | |
| 4-Chloroaniline | 312,857 | 8,176,000 | 969 | 146.0 | |
| 4-Chloro-3-methylphenol | | | | | |
| 4-Chlorophenyl Phenyl Ether | | | | | |
| 4-Methyl Phenol | 391,071 | 10,220,000 | | 182.5 | |
| 4-Nitroaniline | | | | | |
| 4-Nitrophenol | 625,714 | 16,352,000 | 1,740 | 292.0 | |
| Acetone | 7,821,429 | 204,400,000 | 2,459 | 608.3 | |
| Silver | 391 | 10,220 | 31 | 182.5 | |
| Aluminum | 78,214 | 2,044,000 | | 36500.0 | |
| Acenaphthene | 4,692,857 | 122,640,000 | 104,832 | 365.0 | |
| Acenaphthylene | | | | | |
| Anthracene | 23,464,286 | 613,200,000 | 465,603 | 1825.0 | |
| Arsenic | .426 | 4 | .03 | .045 | 10 |
| bis(2-Chloroethoxy) Methane | | | | | |
| bis(2-Chloroisopropyl) Ether | 9,125 | 81,760 | 2 | .26 | |
| bis(2-Chloroethyl)ether | 581 | 5,203 | .04 | .010 | |
| bis(2-Ethylhexyl)phthalate | 45,623 | 408,800 | 2,889,403 | 4.8 | 6 |

## Table 3-2. Regulatory Screening Criteria
## Wallops Flight Facility, Accomack County, Virginia

| Chemical Constituent | EPA Region III RBC Residential Soil Inorganic (mg/kg) Organic (µg/kg) | EPA Region III RBC Industrial Soil Inorganic (mg/kg) Organic (µg/kg) | EPA Region III RBC Migration to Groundwater Groundwater DAF 20 Inorg mg/kg, Org µg/kg | EPA Region III RBC Tap Water (µg/L) | Federal MCLs Water (µg/L) |
|---|---|---|---|---|---|
| Barium | 5,475 | 143,080 | 2,105 | 2555.0 | 2000 |
| Benzo(a)anthracene | 875 | 7,840 | 1,461 | .092 | .20 |
| Benzo(a)pyrene | 87 | 784 | 374 | .009 | |
| Benzo(b)fluoranthene | 875 | 7,840 | 4,514 | .092 | |
| Butyl Benzyl Phthalate | 15,642,857 | 408,800,000 | 16,819,201 | 7300.0 | |
| Beryllium | 156 | 4,088 | 1,154 | 73.0 | 4 |
| Benzo(g,h,i)perylene | | | | | |
| Benzo(k)fluoranthene | 8,750 | 78,400 | 45,141 | .92 | |
| Bromodichloromethane | 10,302 | 92,310 | 1 | .17 | |
| cis-1,2-Dichloroethene | 782,143 | 20,440,000 | 349 | 60.8 | 70 |
| cis-1,3-Dichloropropene | | | | | |
| Vinyl Chloride | 90 | 7,949 | .33 | .015 | 2 |
| Chloroethane | 220,250 | 1,973,517 | 19 | 3.6 | |
| Benzene | 11,613 | 104,058 | 2 | .32 | 5 |
| Calcium | | | | | |
| Carbazole | 31,936 | 286,160 | 467 | 3.3 | |
| Carbon Tetrachloride | 4,913 | 44,025 | 2 | .16 | 5 |
| Cadmium | 78 | 2,044 | 55 | 36.5 | |
| Methylene Chloride | 85,163 | 763,093 | 19 | 4.1 | |
| Bromomethane | 109,500 | 2,861,600 | 41 | 8.5 | |
| Chloromethane | 49,133 | 440,246 | 10 | 2.1 | |
| Bromoform | 80,851 | 724,456 | 67 | 8.5 | |
| Chloroform | 782,143 | 20,440,000 | .91 | .15 | |
| Chrysene | 87,497 | 784,000 | 146,092 | 9.2 | |
| Hexachlorobenzene | 399 | 3,577 | 52 | .042 | 1 |
| Hexachlorocyclopentadiene | 469,286 | 12,264,000 | 1,753,309 | 219.0 | 50 |
| Hexachloroethane | 45,623 | 408,800 | 361 | 4.8 | |
| Chlorobenzene | 1,564,286 | 40,880,000 | 801 | 106.1 | 100 |
| Cobalt | 1,564 | 40,880 | | 730.0 | |
| Chromium | 117,321 | 3,066,000 | 1,971,000,219 | 54750.0 | 100 |
| Carbon Disulfide | 7,821,429 | 204,400,000 | 19,000 | 1042.9 | |
| Copper | 3,129 | 81,760 | 10,518 | 1460.0 | 1300 |
| Dibenzo(a,h)anthracene | 87 | 784 | 1,395 | .009 | |
| Dibromochloromethane | 7,604 | 68,133 | .83 | .13 | |
| Dibenzofuran | 312,857 | 8,176,000 | 7,650 | 24.3 | |
| Diethyl Phthalate | 62,571,429 | 1,635,200,000 | 453,185 | 29200.0 | |
| Dimethyl Phthalate | 782,142,857 | 20,440,000,000 | | 365000.0 | |
| di-N-Butyl Phthalate | 7,821,429 | 204,400,000 | 4,964,000 | 3650.0 | |
| di-N-Octyl Phthalate | 1,564,286 | 40,880,000 | 2,429,442,924 | 730.0 | |
| Ethylbenzene | 7,821,429 | 204,400,000 | 36 | 3.3 | 700 |
| Fluoranthene | 3,128,571 | 81,760,000 | 6,254,642 | 1460.0 | |
| Iron | 23,464 | 613,200 | | 10950.0 | |
| Fluorene | 3,128,571 | 81,760,000 | 135,294 | 243.3 | |
| Hexachlorobutadiene | 8,189 | 73,374 | 1,848 | .86 | |

**Table 3-2. Regulatory Screening Criteria**
**Wallops Flight Facility, Accomack County, Virginia**

| Chemical Constituent | EPA Region III RBC Residential Soil Inorganic (mg/kg) Organic (µg/kg) | EPA Region III RBC Industrial Soil Inorganic (mg/kg) Organic (µg/kg) | EPA Region III RBC Migration to Groundwater Groundwater DAF 20 Inorg mg/kg, Org µg/kg | EPA Region III RBC Tap Water (µg/L) | Federal MCLs Water (µg/L) |
|---|---|---|---|---|---|
| Mercury | | | | | 2 |
| Indeno(1,2,3-cd)pyrene | 875 | 7,840 | 12,734 | .092 | |
| Isophorone | 672,343 | 6,024,421 | 415 | 70.5 | |
| Potassium | | | | | |
| Toluene | 15,642,857 | 408,800,000 | 8,790 | 747.0 | 1000 |
| Methyl ethyl ketone | 46,928,571 | 1,226,400,000 | 7,937 | 1906.1 | |
| Magnesium | | | | | |
| Methylisobutylketone | 6,257,143 | 163,520,000 | 1,303 | 139.0 | |
| Manganese | 1,564 | 40,880 | 952 | 730.0 | |
| 2-Hexanone | 3,128,571 | 81,760,000 | | 1460.0 | |
| Sodium | | | | | |
| Naphthalene | 1,564,286 | 40,880,000 | 154 | 6.5 | |
| Nitrobenzene | 39,107 | 1,022,000 | 23 | 3.5 | |
| Nickel | 1,564 | 40,880 | | 730.0 | |
| N-Nitroso-di-N-propylamine | 91 | 818 | .05 | .010 | |
| N-Nitrosodiphenylamine | 130,352 | 1,168,000 | 760 | 13.7 | |
| Lead | | | | | 15 |
| Pentachlorophenol | 5,323 | 47,693 | | .56 | 1 |
| Phenanthrene | | | | | |
| Phenol | 46,928,571 | 1,226,400,000 | 133,153 | 21900.0 | |
| Pyrene | 2,346,429 | 61,320,000 | 682,003 | 182.5 | |
| Antimony | 31 | 818 | 13 | 14.6 | 6 |
| Selenium | 391 | 10,220 | 19 | 182.5 | 50 |
| Styrene | 15,642,857 | 408,800,000 | 57,214 | 1623.5 | 100 |
| trans-1,2-Dichloroethene | 1,564,286 | 40,880,000 | 823 | 121.7 | 100 |
| trans-1,3-Dichloropropene | | | | | |
| 1,1,2,2-Tetrachloroethane | 3,194 | 28,616 | .68 | .053 | |
| Tetrachloroethylene | 12,283 | 110,062 | 29 | .63 | 5 |
| Thallium | 5 | 143 | 4 | 2.6 | 2 |
| Trichloroethylene | 1,597 | 14,308 | .26 | .026 | 5 |
| Xylenes | 156,428,571 | 4,088,000,000 | 170,190 | 12166.7 | 10000 |
| Vanadium | 548 | 14,308 | 5,111 | 255.5 | |
| Zinc | 23,464 | 613,200 | 13,622 | 10950.0 | |

- The land use and exposure scenarios assumed in the RBCs is appropriate for the site
- The target risk levels assumed in the RBCs are appropriate for the site.

### 3.4.2 Groundwater Protection Standards

For groundwater, each sample result was compared to EPA Region III tap water RBCs (April 2002) and Federal drinking water maximum contaminant levels (MCLs) (July 2002). The tap water RBCs are designed to be protective of human health and are generally more restrictive than the MCLs. In addition, the tap water RBCs include contaminants not regulated under the MCLs. The tap water RBCs are presented in Table 3-2. The MCLs are enforceable limits (defined by the Safe Drinking Water Act [SDWA]) for a contaminant in a public water system.

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# 4. LABORATORY CHEMICAL ANALYSIS PROGRAM AND QUALITY ASSURANCE SUMMARY

This section summarizes the laboratory chemical analysis program implemented as part of the Limited Site Investigation (LSI) conducted at the Wallops Flight Facility (WFF), Accomack County, . Sections 4.1 and 4.2 summarize analytical methods and data reporting and validation, respectively. Additional information on these topics is presented in the Quality Assurance Project Plan (QAPP) submitted as Appendix A of the Field Sampling Plan (FSP) prepared by Science Applications International Corporation (SAIC) (SAIC 2002b), which was followed during the laboratory chemical analysis program. GPL Laboratories, Inc. (GPL), 202 Perry Parkway, Gaithersburg, Maryland, was the analytical laboratory under contract for the WFF LSI.

A quality assurance (QA) summary of the analytical data is presented in Section 4.3. Appendix D provides additional information on the QA assessment. Appendix D (Tables D-1a and D-1b) presents the number of soil and groundwater samples collected during the WFF LSI, in addition to the number of field quality control (QC) samples collected and selected laboratory QC (i.e., matrix spike/matrix spike duplicates [MS/MSDs] and laboratory duplicates) samples analyzed.

## 4.1 LABORATORY ANALYTICAL METHODS

The chemical analysis program for the WFF LSI conforms to the analytical requirements presented in the U.S. Environmental Protection Agency (EPA) *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW846* and the QAPP (SAIC 2002b) for the chemical analysis of soil and groundwater samples. GPL analyzed all samples collected during the WFF LSI for use in data analysis. The analytical methods are presented in Table 4-1.

**Table 4-1. Analytical Laboratory Methods**
**Wallops Flight Facility, Accomack County, Virginia**

| Parameters | Water | Soil |
|---|---|---|
| Volatile Organic Compounds | SW8260B | SW8260B |
| Semivolatile Organic Compounds | SW8270C | SW8270C |
| Metals | SW6010B/SW7470 | SW6010B/SW7471 |

## 4.2 DATA REPORTING AND VALIDATION

The SAIC QA Officer or designee initiated a validation of the analytical data packages. One hundred percent of the data were validated using a modification of the 1994 EPA *Contract Laboratory Program (CLP) National Functional Guidelines for Organic and Inorganic Data Review* (EPA 1994a and 1994b). Non-CLP parameters were validated against similar CLP parameter guidelines. For example, volatile organic compounds (VOCs) were analyzed by SW846 Method 8260B and validated against the National Functional Guidelines VOC criteria. As such, CLP Forms 1 to 14 were reviewed to ensure that the QC results fell within appropriate QC limits for holding times, blank contamination, calibrations, surrogates, MS/MSDs, laboratory control samples (LCSs), internal standards (ISs), cleanup checks, laboratory duplicates, serial dilutions, detection limits, and any other required QC data. Laboratory QC forms were reviewed to ensure that the QC results fell within the appropriate QC limits. Any resulting data validation qualifiers were applied and a data validation report was prepared. No recalculations were done.

A secondary stage of validation occurred once the initial validation for a discrete sampling event was completed. Individual trip blanks, equipment rinsate blanks, and field blanks were associated with the corresponding environmental samples. These field QC blanks were evaluated following the same criteria as method blanks, and the associated environmental samples were appropriately qualified. After all of the data validation for the project was completed, a project data quality assessment was prepared (see Appendix D).

## 4.3 QUALITY ASSURANCE SUMMARY

This section summarizes the results of the data quality assessment conducted for the analytical data resulting from this investigation. A comparison of the analytical results to project data quality objectives (DQOs), as defined in the QAPP (SAIC 2002b), formed the basis for evaluating the quality of the analytical data. Data verification and validation were conducted on 100 percent of the resulting analytical data packages to ensure that the laboratory produced an acceptable quality level for results. One hundred percent of the data were evaluated for contamination due to field activities by evaluating all field QC blanks (i.e., trip blanks, equipment rinsate blanks, and field blanks).

The following sections summarize the DQOs for the precision, accuracy, representativeness, comparability, and completeness (PARCC) and sensitivity parameters obtained during the WFF LSI. A detailed project data quality assessment is presented in Appendix D. Appendix D (Tables D-1a and D-1b) presents the number of samples, the parameters of interest, and the related field QC samples (i.e., trip blanks, equipment rinsate blanks, and field blanks). All data validation qualifiers applied to the data are presented in Appendix D (Table D-2). Appendix C presents the chain-of-custody (CoC) forms associated with this investigation.

### *4.3.1 Precision*

Precision is defined in Section 3 of the QAPP (SAIC 2002b) and was evaluated based on the analysis of three different types of QC samples: MS/MSDs, laboratory duplicates, and field duplicate samples.

The first type of QC sample used to assess the precision of the data quality was the relative percent differences (RPDs) of the MS/MSDs. All MS/MSD RPDs were within the control limits specified within Section 3 of the QAPP (SAIC 2002b).

The second type of QC sample used to assess the precision of the data quality was the RPDs of the laboratory duplicate samples. Laboratory duplicate RPDs were within acceptable ranges.

The third type of QC sample used to monitor field precision was field duplicate samples. Duplicate sample pairs were collected to ascertain the contribution of variability (i.e., precision) due to environmental media and sampling precision techniques. Field duplicate RPDs were calculated on 10 percent of the data and reviewed to identify any percentages that were suspicious. Data have not been qualified based on the results of field duplicates, since the National Functional Guidelines do not include control limits for RPDs. No specific control limits for field duplicates were established in part because the natural heterogeneity of the environmental media was much greater than the variability imparted by field and laboratory activities.

Based on an evaluation of MS/MSD, laboratory duplicate, and field duplicate RPDs, the overall precision is acceptable. As a result, the laboratory DQO for precision has been fulfilled. A comprehensive discussion of MS/MSD and duplicate results is presented in Appendix D.

### 4.3.2 Accuracy

Analytical accuracy is defined in Section 3 of the QAPP (SAIC 2002b) and was measured through the use of surrogates, MS/MSDs, metals matrix spike samples (MSSs), LCSs, blanks (method, calibration, and field QC), and calibration standards (initial and continuing).

A few surrogate percent recoveries for VOCs and semivolatile organic compounds (SVOCs) were outside the control limits specified in Section 3 of the QAPP (SAIC 2002b), as discussed in Appendix D. No data validation qualifiers were applied based on SVOC surrogate results, since SVOCs were not detected in the associated water samples. For VOCs, positive results in associated samples were qualified as estimated "J" and nondetect results were qualified as estimated "UJ." These qualified data points are considered to be acceptable, but estimates, and were used in the human health-based data screen. Appendix D (Table D-2) lists the samples that were qualified due to surrogate results.

A few SVOC MS/MSD percent recoveries were outside the control limits specified in Section 3 of the QAPP (SAIC 2002b), as discussed in Appendix D. Six SVOC soil percent recovery values (of 36 total values) were outside the control limits. Since the National Functional Guidelines do not recommend the application of data validation qualifiers based solely on MS/MSD results, these results were used in conjunction with other QC indicators (i.e., surrogates, LCSs, and ISs) when qualifying the data. No data validation qualifiers were applied based on the MS/MSD results, since these other QC criteria were met. Two soil metals MSS percent recovery values (of 46 total values) were outside the QC limits. As a result, antimony in 11 soil samples was qualified as estimated "UJ" or "J." These qualified data points are considered to be acceptable, but estimates, and were used in the human health-based data screen. Appendix D (Table D-2) lists the samples that were qualified with a "J" or "UJ" due to MSS results.

The LCS was the fourth QC type used to assess analytical accuracy. Based on an evaluation of the data, all criteria were within the control limits specified in Section 3 of the QAPP (SAIC 2002b) with the exception of a few SVOC outliers. 4-Chloro-3-methylphenol, 4-nitrophenol, and pentachlorophenol (PCP) each had an LCS recovery above the upper control limit (UCL) in one water lot. 2,4-Dinitrotoluene (2,4-DNT) and phenol each had an LCS recovery above the UCL in one soil lot. No data validation qualifiers were applied, since no positive results were identified in the associated soil and water samples.

All supporting QC information cited above also was qualitatively evaluated with respect to the analytical accuracy DQO. Based on the evaluation of the surrogate, MS/MSD, MSS, and LCS results and the associated laboratory QC results summarized in Appendix D, the laboratory accuracy has been determined to be acceptable for all analyses. The analytical DQO for accuracy has been met.

Method blank analysis was conducted with each analytical batch of environmental samples analyzed, and the results evaluated for interferents that might potentially interfere with accurate quantitation of a target compound. Methylene chloride, acetone, and trichloroethene (TCE) were detected at concentrations and frequencies in the organic method blanks that might bias the analytical results. The data validation qualifier "U" was applied to 22 methylene chloride, 14 acetone, and 15 TCE soil concentrations, as well as 37 methylene chloride water concentrations, that were less than 10 or 5 times the concentration detected in the associated method blanks. These qualified data points are considered to be acceptable, but nondetect, and were used in the human health-based data screen. Appendix D (Table D-2) lists the samples that were qualified with a "U" due to method blank results.

Antimony, arsenic, calcium, cobalt, copper, iron, magnesium, manganese, nickel, sodium, thallium, vanadium, and zinc were detected in various method blanks, initial calibration blanks (ICBs), and continuing calibration blanks (CCBs) at concentrations and frequencies that might bias the analytical results. Associated soil and water concentrations that were less than the action level associated with the concentration detected in the method blanks, ICBs, and CCBs were qualified with a "U." These qualified data points are considered to be acceptable, but nondetect, and were used in the human health-based data screen. Appendix D (Table D-2) lists the samples that were qualified with a "U" due to laboratory blank results.

Field QC blanks (i.e., trip blanks, equipment rinsate blanks, and field blanks) were collected to determine the degree of cross-contamination or ensure successful decontamination procedures. The data validation qualifier "U" was applied to one carbon disulfide and seven acetone soil concentrations, as well as six carbon disulfide and four acetone water concentrations, that were detected at concentrations below the action level in the associated trip blank. The data validation qualifier "U" was applied to three toluene, four di-n-butyl phthalate (DNBP), four antimony, one chromium, four cobalt, two copper, and four potassium soil concentrations, as well as eight copper water concentrations that were detected at concentrations below the action level in the associated equipment rinsate blanks. No VOC, SVOC, or metals results were qualified based on field blank results. Data points qualified with a "U" in the above samples are biased high due to trip blank and equipment rinsate blank contamination and should be considered nondetect. These qualified data points are considered to be acceptable, but nondetect, and were used in the human health-based data screen. Appendix D (Table D-2) lists the samples that were qualified with a "U" due to field QC blank results.

Based on an evaluation of the compounds and elements detected in the blanks and calibration results, the overall accuracy has been determined to be acceptable for all analyses. The analytical DQO for accuracy has been met. A comprehensive discussion of the method and field QC blank results is presented in Appendix D.

### 4.3.3 Representativeness

Based on an evaluation of sample precision and accuracy, the samples collected during the WFF LSI are considered to be representative of the environmental conditions.

### 4.3.4 Comparability

Based on the precision and accuracy assessment presented above, the data collected during the WFF LSI are considered to be comparable with the data collected during previous investigations.

### 4.3.5 Completeness

Completeness measures the amount of valid data obtained from the laboratory analysis process and sampling. For data to be considered valid, they must have met all acceptance criteria, including accuracy and precision, as well as any other criteria specified by the analytical methods used. Furthermore, project completeness was defined as the percentage of data used to perform the human health-based data screen, upon which LSI recommendations were made. For analytical data to be considered usable for the LSI recommendations, each data point must be satisfactorily validated.

Results that have been qualified "U," "UJ," or "J" for various reasons encountered minor analytical problems with limited impact on the data quality. Data were qualified rejected "R" when significant errors were identified and were not used to calculate project completeness. No data collected during the WFF LSI were rejected as a result of the data validation process.

DQOs for the WFF LSI were set at 90 percent for field sampling and laboratory completeness. Based on the evaluation of the field and laboratory QC results presented in Appendix D, 100 percent of the total environmental sample data collected during the WFF LSI were used as the basis for all recommendations presented in this report.

# 5. SITE INVESTIGATION RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

This section presents the results of the Limited Site Investigation (LSI) conducted at four Formerly Used Defense Sites (FUDS) program sites (Site 1 – Old Wastewater Treatment Plant [WWTP], Site 3 – Two 600,000-gallon Fuel Storage Tanks, Buildings A-46A and A-46B, the Industrial Waste/Sanitary Landfill [IWL], and the Construction Debris Landfill [CDL]) at the Wallops Flight Facility (WFF). This section includes a physical description and history of each site, a summary of the LSI field activities, the analytical results of the environmental sampling, the nature and extent of identified constituents, the results of screening assessments, and the conclusions and recommendations for each site.

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## 5.1 SITE 1 – OLD WASTEWATER TREATMENT PLANT

This section presents the results of the LSI for the Old WWTP (Site 1). A description and history of the site, a summary of the site conditions and environmental setting, and an overview of the environmental investigation activities previously conducted at the Old WWTP are provided in Section 5.1.1. Section 5.1.2 discusses the LSI activities conducted at Site 1. Section 5.1.3 presents the laboratory analytical results of the LSI field investigation and summarizes the nature and extent of contamination identified during the investigation of the Old WWTP. The results of the human health toxicological screening assessment also are presented in Section 5.1.3. Conclusions and recommendations for Site 1 are summarized in Section 5.1.4.

### *5.1.1 Site Description, History, and Environmental Setting*

Information pertinent to the physical description of Site 1, the operational history, and the environmental setting for the site was obtained from historical site maps, aerial photographs, anecdotal evidence, site visual inspections, and information and data presented in previous site investigations and studies. Topographic information was obtained from the EG&G, Inc. digital base map.

#### 5.1.1.1 Site Description and History

The WWTP was constructed by the Navy in the early 1940s and is located northwest of the intersection of Runway 17-35 and the taxiway that parallels Runway 10-28. The WWTP is no longer active and the structures are partially degraded and overgrown with vegetation. The National Aeronautics and Space Administration (NASA) abandoned the facility upon obtaining custody of the land and has not used the WWTP for any purpose since the transfer of the facility ownership in 1959. The Principal Responsible Party (PRP) Analysis (NASA 2001) concluded that the U.S. Department of Defense (DOD) and U.S. Army Corps of Engineers (USACE) should assume responsibility for Site 1 under the FUDS program. Figure 5.1-1 shows the location of the Old WWTP (Site 1) at the WFF.

The former wastewater treatment plant consists of three cinder-block structures (control/pump house, process tanks [clarifiers], and sludge drying beds) and a trickling filter. Influent to the Old WWTP probably flowed by gravity or pump stations to the headworks (control/pump house), where the flow was routed through a screening process before it entered the process tanks (clarifiers). Effluent from the clarifier in these processes are pumped over the trickling filter, generally returning to the inlet side of the clarifier tanks. As a result, effluent from the trickling filter is recirculated continuously through the clarifier or a secondary clarifier to aid in the removal of the suspended solids. Once the effluent from the clarifier has undergone significant treatment in the trickling filter process, the effluent may be discharged and sludge from the clarifiers discarded to the sludge drying beds. The photograph presented in Figure 5.1-2 shows the current conditions of the Old WWTP and the physical features of the surrounding area.

#### 5.1.1.2 Site Conditions and Environmental Setting

Site 1 is located at the base of a moderate hill that consists of approximately 30 feet of topographic relief. The defined site, as shown in Figure 5.1-1 is approximately 0.8 acres and the hill slopes down to the WWTP, toward the northwest. The site is surrounded by woodland brush, young trees, and dense vegetative cover. A temporary access road was cleared for the LSI sampling activities through the western portion of the site by WFF personnel prior to the arrival of the Science Applications International Corporation (SAIC) sampling team. The site contains mounded material identified in previous investigations as residual sludge piles located approximately 150 to 200 feet north of the Site 1 concrete structures. In addition, the sludge drying beds also may contain residual sludge materials associated with former WWTP activities.

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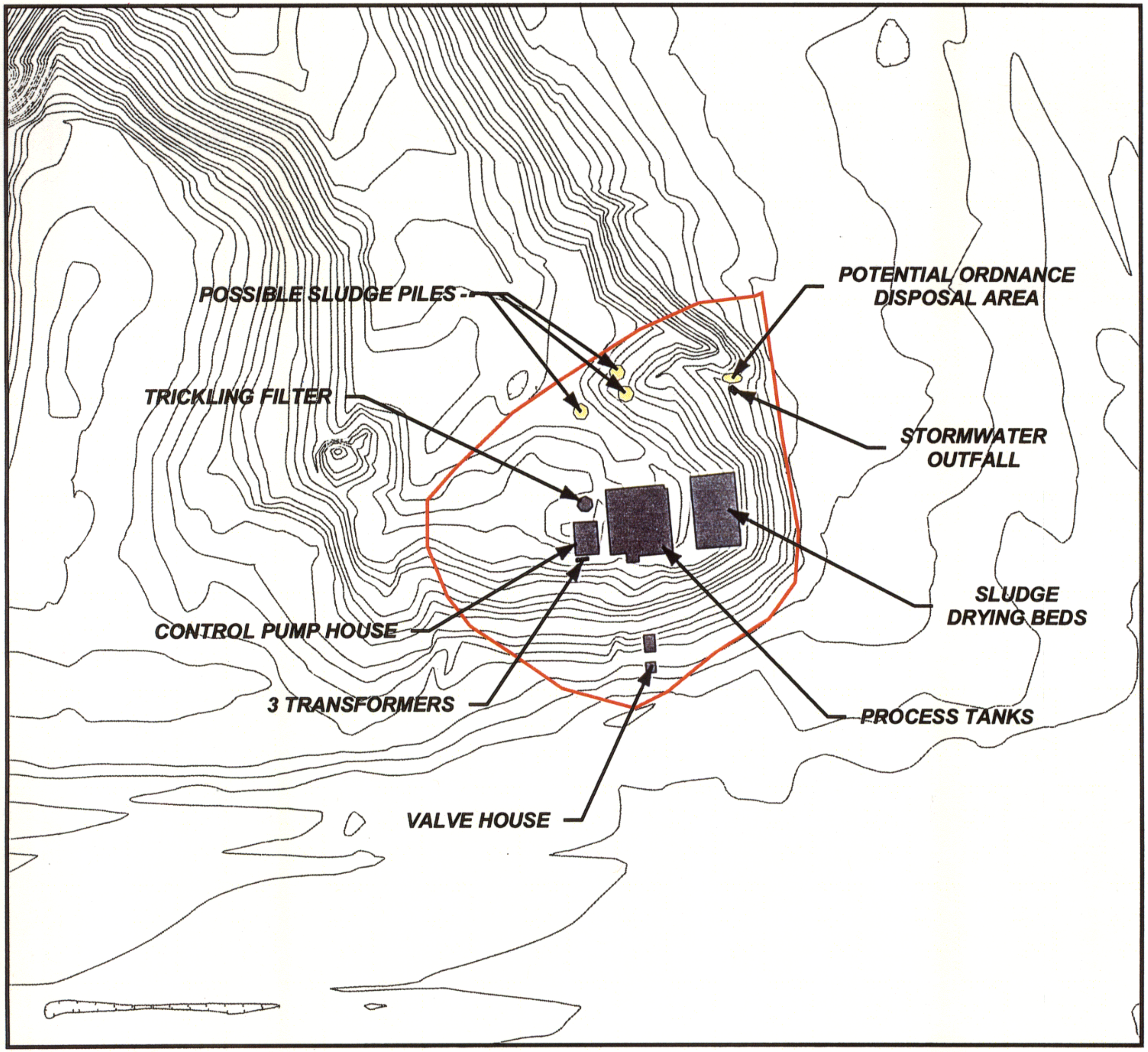
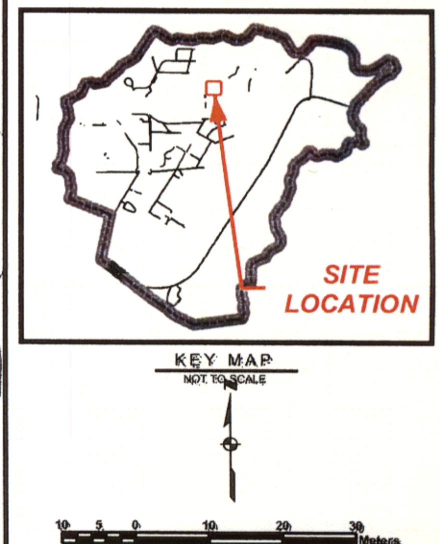



Legend
CONTOURS
SITE BOUNDARY




US Army Corps of Engineers.
SAIC An Employee-Owned Company

SITE 1
OLD WASTEWATER TREATMENT PLANT
SITE CONDITIONS

WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

G:\GIS_DATA\Wallops\Projects\Sites\Site-WWP_Conditions.mxd

FIGURE: 5.1-1 | DATE: 11-06-02

0120AB34

**Figure 5.1-2. Site 1 – Old Wastewater Treatment Plant – Photograph of Site Conditions Wallops Flight Facility, Accomack County, Virginia**

During the April 2002 site visit, personnel from the Virginia Department of Environmental Quality (VDEQ) stated that based on past experience, trickling filters such as that at the Old WWTP sometimes contain mercury. However, the presence or absence of a mercury seal could not be positively determined during that time and the presence of a mercury containing seal would be addressed in a separate procedure.

The hydrologic conditions at the Old WWTP have not been characterized based on data collected previously at the site. Unfortunately, no soil boring lithologic data has been identified during the review of the site-specific data, so a lithologic description of the subsurface soil greater than 4 feet below land surface (BLS) could not be included in this LSI.

### 5.1.1.3 Background and Previous Site Investigation Activities

In November 1990, an Environmental Site Survey (ESS) Report provided an overview of sites known to have impacted the environment, their investigation status, and identified additional sites for future investigation. The Old WWTP was identified as 1 of 14 sites that had not been investigated prior to completion of the report and indicated that no information currently was available for the site. As a result, the ESS concluded that additional investigation at Site 1 was warranted.

In July 1993, a preliminary report (Metcalf & Eddy 1993a) presented the findings of an unexploded ordnance (UXO) and magnetometer survey conducted at Site 1. The report summarizes structures observed at the Old WWTP and references a NASA memorandum regarding the potential for past use of this area as an ordnance disposal site. During the UXO/magnetometer survey, three areas (A, B, and C) were investigated to determine the presence of buried tanks, process piping, and UXO. The results of the UXO/magnetometer survey are summarized below:

- Area A – Immediate area surrounding the Old WWTP (10 possible subsurface contacts located)
- Area B – Possible sludge disposal area (30 subsurface contacts located)
- Area C – Possible ordnance disposal area (50 subsurface contacts located).

The subsurface objects were not identified during the investigation and all subsurface contacts were characterized as less than 2 feet in diameter. Based on the results of the UXO/magnetometer survey, the recommendation was made to record Area C as a possible ordnance disposal area on the Facilities Master Plan. The ESS also concluded that additional subsurface investigations (UXO survey) should be conducted prior to any intrusive activity at this site. The ESS indicates that the site would be forwarded to USACE for further evaluation. Areas identified during the UXO/magnetometer survey are presented in Figure 5.1-3.

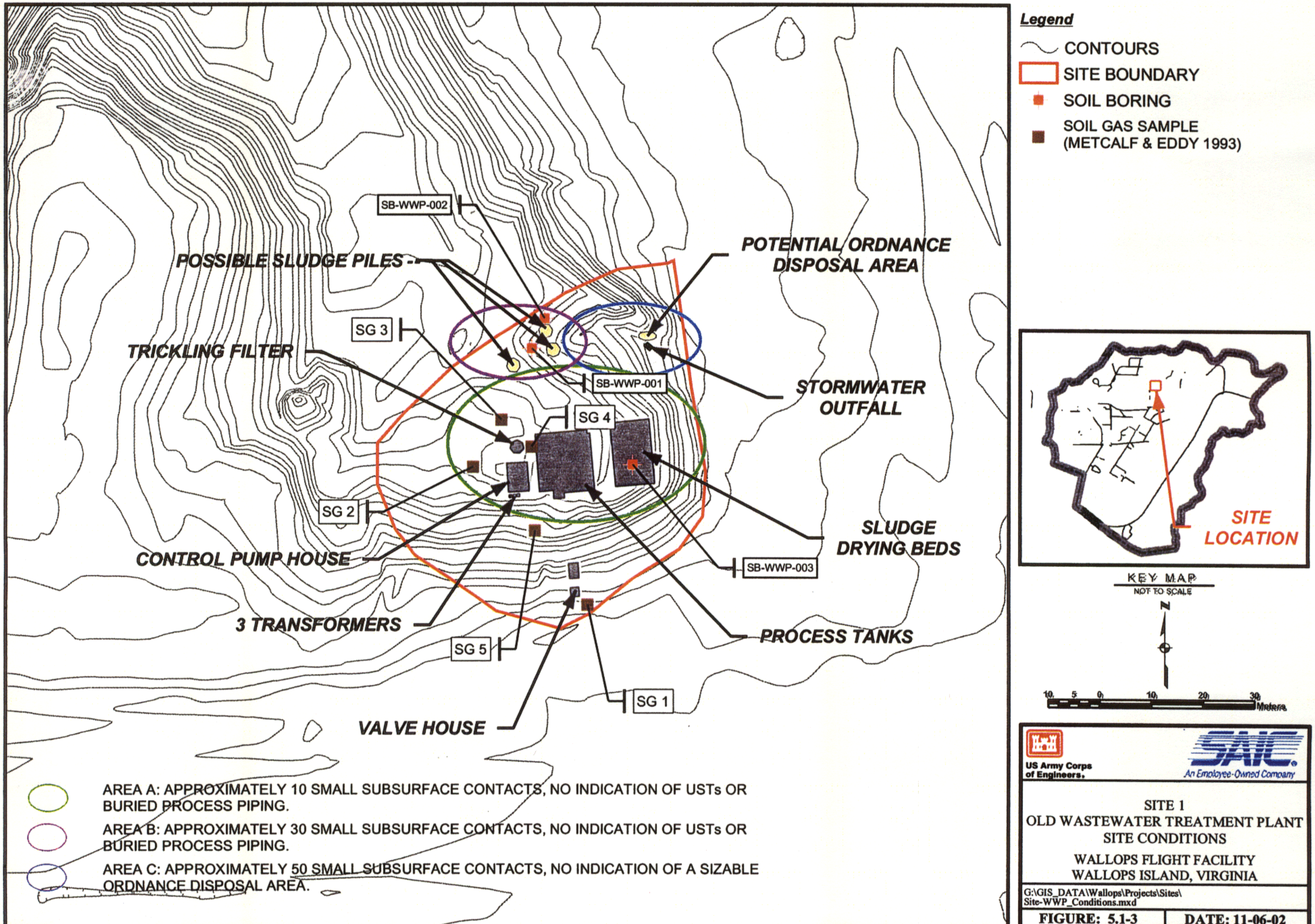
In conjunction with the UXO/magnetometer survey, a preliminary report to NASA (Metcalf & Eddy 1993b) presented the findings of a soil gas survey conducted at the Old WWTP. The report states that six soil gas samples (WFF1-SG1 through WFF1-SG6) were collected during the March 1993 soil gas survey in the vicinity of the Old WWTP. Soil gas sampling was not performed in areas of suspected UXO due to the potential safety hazard.

Field investigation screening procedures using a photoionization detector (PID) indicated that volatile organic compound (VOC) concentrations of 7 and 200 parts per million (ppm) were present in the subsurface soil at soil gas sample locations WFF1-SG1 and WFF1-SG6, respectively. The organic vapor analyzer (OVA) detected no VOCs at either of these sample locations. However, the OVA registered a concentration of >1,000 ppm at soil gas location WFF1-SG3. This measurement was repeated with a filter tip, confirming that the subsurface soils at WFF1-SG3 probably contained methane, a common anaerobic degradation product.

The soil gas survey report recommended collection of subsurface soil samples at three locations: soil gas sample location WFF1-SG2, the sludge piles located north of WFF1-SG2, and soil gas sample location WFF1-SG6. The report indicated that additional evaluation of Site 1 would be conducted by USACE. Soil gas survey results are presented in Table 5.1-1. Soil gas survey locations are presented in Figure 5.1-3.

In March 1996, a Site Investigation (SI) Report evaluating 15 separate sites (sites identified as being environmentally significant in the ESS) (Metcalf & Eddy 1996) was submitted to NASA. The Old WWTP was 1 of 15 sites addressed during the SI. Site 1 was included in the SI evaluation based on a 1988 NASA memorandum to USACE that indicated that a drainage swale located near the Old WWTP potentially had been used as an ordnance disposal site. The SI report reiterates the findings of the preliminary reports that no evidence of ordnance was noted during the initial phases of the investigation. However, NASA discontinued field investigation of Site 1 in 1993 after completion of the magnetometer/UXO and soil gas surveys because the site was associated with former Navy activities (prior to 1959) and, therefore, falls under the jurisdiction of USACE FUDS Program.

In January 2000, Earth Tech, Inc. submitted a letter report to NASA (Earth Tech, Inc. 2000) for work conducted at the WFF. The report identified potential environmental impacts at the subject FUDS site and evaluated the need for future environmental studies. Work performed at this site as part of this effort included: a site visit, personnel interviews, direct push technology (DPT) soil sample collection (one boring), and laboratory analysis. A relative risk evaluation (RRE) performed using existing data found the relative risk to be high. In May 1999, a status summary report was submitted to USACE for the sampling activities performed at sites located on the Main Base (Earth Tech, Inc. 2001). Sampling activities were performed as part of this investigation involved several sites, including the Old WWTP. One groundwater sample was collected at Site 1 (location W-05) and results of that sampling indicated that aluminum, iron, and manganese exceeded their respective secondary maximum contaminant levels (MCLs). The analytical results for constituents detected in the groundwater at Site 1 that exceeded Region III risk-based concentrations (RBCs) or secondary MCLs during the previous sampling activities are summarized in Table 5.1-2.



Legend
CONTOURS
SITE BOUNDARY
SOIL BORING
SOIL GAS SAMPLE (METCALF & EDDY 1993)
SB-WWP-002
POSSIBLE SLUDGE PILES
POTENTIAL ORDNANCE DISPOSAL AREA
SG 3
TRICKLING FILTER
SB-WWP-001
STORMWATER OUTFALL
SG 4
SG 2
SLUDGE DRYING BEDS
CONTROL PUMP HOUSE
SB-WWP-003
3 TRANSFORMERS
PROCESS TANKS
SG 5
SG 1
VALVE HOUSE
AREA A: APPROXIMATELY 10 SMALL SUBSURFACE CONTACTS, NO INDICATION OF USTs OR BURIED PROCESS PIPING.
AREA B: APPROXIMATELY 30 SMALL SUBSURFACE CONTACTS, NO INDICATION OF USTs OR BURIED PROCESS PIPING.
AREA C: APPROXIMATELY 50 SMALL SUBSURFACE CONTACTS, NO INDICATION OF A SIZABLE ORDNANCE DISPOSAL AREA.
SITE LOCATION
KEY MAP
NOT TO SCALE
N
10 5 0 10 20 30 Meters
US Army Corps of Engineers
SAIC
An Employee-Owned Company
SITE 1
OLD WASTEWATER TREATMENT PLANT
SITE CONDITIONS
WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA
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FIGURE: 5.1-3
DATE: 11-06-02

**Table 5.1-1. Soil Gas Survey Results**
**Site 1 – Old Wastewater Treatment Plant**
**Wallops Flight Facility, Accomack County, Virginia**

| Soil Gas Sample I.D. | Collection Date | Sample Depth (feet) | PID Screening Results (ppm) | OVA Screening Results (ppm)* | Comments |
|---|---|---|---|---|---|
| WFF1-SG1 | 3/11/93 | 5 | 7 | ND | |
| WFF1-SG2 | 3/11/93 | 3 | ND | ND | Concentration >1,000 ppm for methane detected |
| WFF1-SG3 | 3/11/93 | 5 | ND | ND | |
| WFF1-SG4 | 3/11/93 | 4 | ND | ND | |
| WFF1-SG5 | 3/11/93 | 2.5 | ND | ND | |
| WFF1-SG6 | 3/11/93 | 5 | 200 | ND | |

* OVA concentrations depicted do not include concentrations of methane detected.

**Table 5.1-2. Inorganic Constituents Detected at Concentrations Greater than Secondary MCLs**
**Site 1 – Old Wastewater Treatment Plant**
**Wallops Flight Facility, Accomack County, Virginia**

| Sample I.D. | Parameter | Result (mg/L) | Secondary MCLs (mg/L)* |
|---|---|---|---|
| W-05 | Aluminum (Total) | 32.90 | 0.053 to 0.23 |
| | Iron (Total) | 21.00 | 0.33 |
| | Manganese (Total) | 0.145 | 0.053 |

*Secondary Maximum Contaminant Levels (SMCLs) are unenforceable Federal guidelines regarding taste, odor, color, and certain other non-aesthetic effects of drinking water. EPA recommends them to the states as reasonable goals, but Federal law does not require water systems to comply with them.

Results of the previous investigation activities at Site 1 indicated that additional sampling activities were required to confirm that the Old WWTP had not received or released hazardous substances or petroleum products as a result of historical activities. Supplemental soil sampling was required to characterize site conditions at locations identified as anomalies during the soil gas investigation and was required to characterize residual soils present at the "sludge piles" and in the abandoned sludge drying beds. Laboratory analysis included constituents commonly associated with activities conducted at the Old WWTP and included VOCs, SVOCs, and metals.

### *5.1.2 Field Investigation*

The LSI field activities followed site-specific project plans that included field sampling and laboratory analyses conducted under project-specific quality assurance/quality control (QA/QC) and health and safety protocols. The following paragraphs present the objectives, approach, and field activities conducted during the field investigation of the Old WWTP. The rationale for sampling, the analyte selection, and a discussion of the sampling methodologies also are included.

#### 5.1.2.1 SAIC Field Investigation

As a result of previous investigation activities, additional evaluation of the Old WWTP for potential environmental concerns was warranted based on results of the previous soil gas sampling, the presence of residual sludge mounds, and concern regarding residual materials in the Old WWTP sludge drying beds. The objective of the LSI at the Old WWTP was to investigate the potential presence of chemical constituents at the Old WWTP as a result of past disposal practices and to determine if chemical constituents exist in the soils at concentrations that exceed human health screening criteria for soils.

To assess whether contamination had been released at the Old WWTP, the site-specific sampling plan included in the Field Sampling Plan (FSP) (SAIC 2002a) proposed the collection of samples from three soil boring locations (SB-WWP-01 through SB-WWP-03) to characterize current conditions present at the Old WWTP and to confirm results of previous investigation activities. Based on soil gas survey results, surface and subsurface soil samples were collected at soil gas sample location WFF1-SG2, the sludge piles located north of WFF1-SG2, and soil gas sample location WFF1-SG6. Two samples (surface and shallow subsurface) and the appropriate QC samples (duplicates) were collected from each of the three soil borings. Soil samples were analyzed for chemical constituents potentially associated with the materials discarded at Site 1 (VOCs, SVOCs, and metals). Table 5.1-3 summarizes the samples collected during the LSI. Figure 5.1-3 shows the LSI soil boring locations at Site 1.

**Table 5.1-3. LSI Soil Boring Samples**
**Site 1 – Old Wastewater Treatment Plant**
**Wallops Flight Facility, Accomack County, Virginia**

| Borehole I.D. | Borehole Depth (feet) | Field Sample Number | Sample Interval (feet) |
|---|---|---|---|
| SB-WWP-01 | 4 | SAIC01 | 0 – 0.5 |
| | | SAIC01R | 0 – 0.5 |
| | | SAIC02 | 0.5 – 1.0 |
| | | SAIC02R | 0.5 – 1.0 |
| SB-WWP-02 | 4 | SAIC 01 | 0 – 0.5 |
| | | SAIC01R | 0 – 0.5 |
| | | SAIC01D | 0 – 0.5 |
| | | SAIC01DR | 0 – 0.5 |
| | | SAIC 02 | 3.5 – 4.0 |
| | | SAIC 02R | 3.5 – 4.0 |
| SB-WWP-03 | 0.5 | SAIC 01 | 0 – 0.5 |
| | | SAIC01R | 0 – 0.5 |
| | | SAIC 02 | 0.5 – 1.0 |
| | | SAIC 02R | 0.5 – 1.0 |

Notes:
All soil samples collected from the old WWTP were analyzed for VOCs, SVOCs, and metals. QA/QC sampling followed protocols specified in the FSP (SAIC 2002a).
Duplicate samples were identified using a "D." A second round of VOC samples was recollected at Site 1 due to a mix-up of sample I.D.s during the analysis process. Recollected samples are identified with an "R."

### *5.1.3 Investigation Results and Nature and Extent*

This section presents the results of the LSI sampling and analysis. The data collected during the LSI were used to provide a basis for evaluating the magnitude and extent of contamination and conducting the human health screen. Complete analytical results for the soil samples are presented in Appendix G and summarized in Table 5.1-4.

# Table 5.1-4. Data Summary: Soil Boring Results, Site 1 - Old Wastewater Treatment Plant
## Wallops Flight Facility, Accomack County, Virginia

| Site ID | | | SB-WWP-01 | SB-WWP-01 | SB-WWP-01 | SB-WWP-01 | SB-WWP-02 | SB-WWP-02 | SB-WWP-02 |
|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | SAIC01R | SAIC02 | SAIC02R | SAIC01 | SAIC01D | SAIC01DR |
| Site Type | | | BORE | BORE | BORE | BORE | BORE | BORE | BORE |
| Collection Date | | | 08/08/02 | 08/16/02 | 08/08/02 | 08/16/02 | 08/08/02 | 08/08/02 | 08/16/02 |
| Depth (ft) | | | 0.00 | 0.00 | 0.50 | 0.50 | 0.00 | 0.00 | 0.00 |
| ***METALS(6010)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Aluminum | MG/KG | 20 | 5110 | N/A | 5630 | N/A | 4770 | 4520 | N/A |
| Antimony | MG/KG | 0.6 | 0.25 UJ | N/A | 0.23 UJ | N/A | 1.2 UJ | 1.1 UJ | N/A |
| Arsenic | MG/KG | 1 | 2.2 | N/A | 2.4 | N/A | 2.3 B | 2.3 B | N/A |
| Barium | MG/KG | 20 | 24.1 | N/A | 19.1 | N/A | 37.7 | 36.8 | N/A |
| Beryllium | MG/KG | 0.5 | 0.2 | N/A | 0.18 | N/A | 0.18 B | 0.18 B | N/A |
| Cadmium | MG/KG | 0.5 | 0.09 B | N/A | 0.02 U | N/A | 4 | 4 | N/A |
| Calcium | MG/KG | 100 | 541 | N/A | 224 | N/A | 6240 | 9750 | N/A |
| Chromium | MG/KG | 1 | 5.3 | N/A | 5 | N/A | 8.1 | 7.7 | N/A |
| Cobalt | MG/KG | 5 | 1.2 | N/A | 1 | N/A | 1.4 U | 1.2 U | N/A |
| Copper | MG/KG | 1 | 2.6 | N/A | 1.7 | N/A | 14.9 | 14.5 | N/A |
| Iron | MG/KG | 10 | 3850 | N/A | 3300 | N/A | 3870 | 3750 | N/A |
| Lead | MG/KG | 0.3 | 8.2 | N/A | 2.7 | N/A | 36.2 | 35.3 | N/A |
| Magnesium | MG/KG | 100 | 450 | N/A | 300 | N/A | 564 | 558 | N/A |
| Manganese | MG/KG | 1.5 | 113 | N/A | 53.6 | N/A | 73.5 | 73.5 | N/A |
| Nickel | MG/KG | 1 | 2.7 J | N/A | 2 J | N/A | 4.6 J | 4.2 J | N/A |
| Potassium | MG/KG | 100 | 281 | N/A | 203 | N/A | 231 U | 219 U | N/A |
| Selenium | MG/KG | 0.5 | 0.25 U | N/A | 0.23 U | N/A | 1.2 U | 1.1 U | N/A |
| Silver | MG/KG | 1 | 0.06 U | N/A | 0.05 U | N/A | 2 | 2.1 | N/A |
| Sodium | MG/KG | 100 | 67.9 UJ | N/A | 64.2 UJ | N/A | 95.1 UJ | 110 UJ | N/A |
| Vanadium | MG/KG | 5 | 10.9 | N/A | 7.2 | N/A | 8.6 | 8.2 | N/A |
| Zinc | MG/KG | 2 | 16.1 | N/A | 5.8 | N/A | 775 | 762 | N/A |
| ***METALS(7471)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Mercury | MG/KG | 0.1 | 0.2 | N/A | 0.04 | N/A | 2.3 | 2.8 | N/A |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| 1,4-Dichlorobenzene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 32 J | N/A |
| 2,4-Dinitrotoluene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 2-Methylnaphthalene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Acenaphthene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Acenaphthylene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Anthracene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Benzo(a)anthracene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Benzo(a)pyrene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 34 J | 350 U | N/A |
| Benzo(b)fluoranthene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Benzo(g,h,i)perylene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Benzo(k)fluoranthene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| bis(2-Ethylhexyl)phthalate | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Carbazole | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Chrysene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 55 J | 86 J | N/A |
| Dibenzofuran | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Di-n-butyl phthalate | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Fluoranthene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Fluorene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |

Created on 5/27/2003

## Table 5.1-4. Data Summary: Soil Boring Results, Site 1 - Old Wastewater Treatment Plant
## Wallops Flight Facility, Accomack County, Virginia

| Site ID | | | SB-WWP-01 | SB-WWP-01 | SB-WWP-01 | SB-WWP-01 | SB-WWP-02 | SB-WWP-02 | SB-WWP-02 |
|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | SAIC01R | SAIC02 | SAIC02R | SAIC01 | SAIC01D | SAIC01DR |
| Site Type | | | BORE | BORE | BORE | BORE | BORE | BORE | BORE |
| Collection Date | | | 08/08/02 | 08/16/02 | 08/08/02 | 08/16/02 | 08/08/02 | 08/08/02 | 08/16/02 |
| Depth (ft) | | | 0.00 | 0.00 | 0.50 | 0.50 | 0.00 | 0.00 | 0.00 |
| Indeno(1,2,3-cd)pyrene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| N-Nitrosodiphenylamine | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Phenanthrene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| Pyrene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Acetone | ug/kg | 10 | N/A | 37 UJ | N/A | 61 UJ | N/A | N/A | 68 UJ |
| Methyl ethyl ketone | ug/kg | 10 | N/A | 10 J | N/A | 6.6 J | N/A | N/A | 15 U |
| Methylene Chloride | ug/kg | 5 | N/A | 5.3 U | N/A | 5.2 U | N/A | N/A | 7.4 U |
| Toluene | ug/kg | 5 | N/A | 5.3 U | N/A | 5.2 U | N/A | N/A | 7.4 U |

Created on 5/27/2003

# Table 5.1-4. Data Summary: Soil Boring Results, Site 1 - Old Wastewater Treatment Plant
## Wallops Flight Facility, Accomack County, Virginia

| Site ID | | | SB-WWP-02 | SB-WWP-02 | SB-WWP-02 | SB-WWP-03 | SB-WWP-03 | SB-WWP-03 | SB-WWP-03 |
|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01R | SAIC02 | SAIC02R | SAIC01 | SAIC01R | SAIC02 | SAIC02R |
| Site Type | | | BORE | BORE | BORE | BORE | BORE | BORE | BORE |
| Collection Date | | | 08/16/02 | 08/08/02 | 08/16/02 | 08/08/02 | 08/16/02 | 08/08/02 | 08/16/02 |
| Depth (ft) | | | 0.00 | 3.50 | 3.50 | 0.00 | 0.00 | 0.50 | 0.50 |
| ***METALS(6010)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Aluminum | MG/KG | 20 | N/A | 14300 | N/A | 6700 | N/A | 6220 | N/A |
| Antimony | MG/KG | 0.6 | N/A | 0.26 UJ | N/A | 10.8 UJ | N/A | 7.2 J | N/A |
| Arsenic | MG/KG | 1 | N/A | 11.9 | N/A | 7.7 B | N/A | 3.4 | N/A |
| Barium | MG/KG | 20 | N/A | 81.8 | N/A | 453 | N/A | 285 | N/A |
| Beryllium | MG/KG | 0.5 | N/A | 0.68 | N/A | 0.49 B | N/A | 0.37 | N/A |
| Cadmium | MG/KG | 0.5 | N/A | 0.17 B | N/A | 6.4 | N/A | 5.1 | N/A |
| Calcium | MG/KG | 100 | N/A | 1110 | N/A | 8460 | N/A | 4090 | N/A |
| Chromium | MG/KG | 1 | N/A | 13.8 | N/A | 61.3 | N/A | 38.2 | N/A |
| Cobalt | MG/KG | 5 | N/A | 4.1 | N/A | 4.9 | N/A | 2.7 | N/A |
| Copper | MG/KG | 1 | N/A | 6.9 | N/A | 221 | N/A | 146 | N/A |
| Iron | MG/KG | 10 | N/A | 9920 | N/A | 53200 | N/A | 18800 | N/A |
| Lead | MG/KG | 0.3 | N/A | 14.3 | N/A | 883 | N/A | 586 | N/A |
| Magnesium | MG/KG | 100 | N/A | 1330 | N/A | 1450 | N/A | 1080 | N/A |
| Manganese | MG/KG | 1.5 | N/A | 115 | N/A | 632 | N/A | 237 | N/A |
| Nickel | MG/KG | 1 | N/A | 7.9 J | N/A | 16.8 J | N/A | 10.9 J | N/A |
| Potassium | MG/KG | 100 | N/A | 485 | N/A | 486 | N/A | 308 | N/A |
| Selenium | MG/KG | 0.5 | N/A | 0.26 U | N/A | 2.5 B | N/A | 1.1 B | N/A |
| Silver | MG/KG | 1 | N/A | 0.06 U | N/A | 144 | N/A | 103 | N/A |
| Sodium | MG/KG | 100 | N/A | 126 UJ | N/A | 118 UJ | N/A | 82.8 UJ | N/A |
| Vanadium | MG/KG | 5 | N/A | 20.9 | N/A | 23.4 | N/A | 11.6 | N/A |
| Zinc | MG/KG | 2 | N/A | 58.2 | N/A | 1180 | N/A | 746 | N/A |
| ***METALS(7471)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Mercury | MG/KG | 0.1 | N/A | 0.21 | N/A | 32.2 | N/A | 24.3 | N/A |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| 1,4-Dichlorobenzene | ug/kg | 330 | N/A | 370 U | N/A | 240 J | N/A | 480 | N/A |
| 2,4-Dinitrotoluene | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 82 J | N/A |
| 2-Methylnaphthalene | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 51 J | N/A |
| Acenaphthene | ug/kg | 330 | N/A | 370 U | N/A | 89 J | N/A | 400 U | N/A |
| Acenaphthylene | ug/kg | 330 | N/A | 370 U | N/A | 150 J | N/A | 400 U | N/A |
| Anthracene | ug/kg | 330 | N/A | 370 U | N/A | 810 | N/A | 420 | N/A |
| Benzo(a)anthracene | ug/kg | 330 | N/A | 370 U | N/A | 3200 | N/A | 1700 | N/A |
| Benzo(a)pyrene | ug/kg | 330 | N/A | 370 U | N/A | 3100 | N/A | 1500 | N/A |
| Benzo(b)fluoranthene | ug/kg | 330 | N/A | 370 U | N/A | 4300 | N/A | 2300 | N/A |
| Benzo(g,h,i)perylene | ug/kg | 330 | N/A | 370 U | N/A | 2000 | N/A | 1100 | N/A |
| Benzo(k)fluoranthene | ug/kg | 330 | N/A | 370 U | N/A | 1300 | N/A | 600 | N/A |
| bis(2-Ethylhexyl)phthalate | ug/kg | 330 | N/A | 370 U | N/A | 67 J | N/A | 400 U | N/A |
| Carbazole | ug/kg | 330 | N/A | 370 U | N/A | 420 J | N/A | 300 J | N/A |
| Chrysene | ug/kg | 330 | N/A | 370 U | N/A | 3100 | N/A | 1500 | N/A |
| Dibenzofuran | ug/kg | 330 | N/A | 370 U | N/A | 76 J | N/A | 61 J | N/A |
| Di-n-butyl phthalate | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |
| Fluoranthene | ug/kg | 330 | N/A | 370 U | N/A | 4700 | N/A | 2700 | N/A |
| Fluorene | ug/kg | 330 | N/A | 370 U | N/A | 160 J | N/A | 96 J | N/A |

Created on 5/27/2003

## Table 5.1-4. Data Summary: Soil Boring Results, Site 1 - Old Wastewater Treatment Plant
## Wallops Flight Facility, Accomack County, Virginia

| Site ID | | | SB-WWP-02 | SB-WWP-02 | SB-WWP-02 | SB-WWP-03 | SB-WWP-03 | SB-WWP-03 | SB-WWP-03 |
|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01R | SAIC02 | SAIC02R | SAIC01 | SAIC01R | SAIC02 | SAIC02R |
| Site Type | | | BORE | BORE | BORE | BORE | BORE | BORE | BORE |
| Collection Date | | | 08/16/02 | 08/08/02 | 08/16/02 | 08/08/02 | 08/16/02 | 08/08/02 | 08/16/02 |
| Depth (ft) | | | 0.00 | 3.50 | 3.50 | 0.00 | 0.00 | 0.50 | 0.50 |
| Indeno(1,2,3-cd)pyrene | ug/kg | 330 | N/A | 370 U | N/A | 1800 | N/A | 1000 | N/A |
| N-Nitrosodiphenylamine | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 30 J | N/A |
| Phenanthrene | ug/kg | 330 | N/A | 370 U | N/A | 2500 | N/A | 1300 | N/A |
| Pyrene | ug/kg | 330 | N/A | 370 U | N/A | 4200 | N/A | 2000 | N/A |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Acetone | ug/kg | 10 | 45 UJ | N/A | 25 UJ | N/A | 65 UJ | N/A | 84 UJ |
| Methyl ethyl ketone | ug/kg | 10 | 8.9 J | N/A | 4.8 J | N/A | 14 | N/A | 17 |
| Methylene Chloride | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Toluene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |

# Table 5.1-4. Data Summary: Soil Boring Results, Site 1 - Old Wastewater Treatment Plant
## Wallops Flight Facility, Accomack County, Virginia (continued)

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit but greater than or equal to the instrument detection limit.
B – Organics: Analyte was found in the associated method blank. Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25% difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. For SW846 methods, the samples are reported down to the method detection limits (MDL). For metals, the samples are reported down to the instrument detection limit (IDL).
MDL – Method Detection Limit.
SAICXXR – An SAIC field sample number followed by an "R" designates a recollected sample.

The LSI included a screening-level evaluation in which soil data collected from Site 1 were subject to a human health toxicity screen. The toxicity screen is used to evaluate human health effects by comparing site-specific soil data to screening criteria (e.g., RBCs, soil screening levels [SSLs] for protection of groundwater).

The following paragraphs summarize the chemical constituents detected in the soils at Site 1 and the results of the screening-level evaluation. Screening criteria comparisons for the inorganic and organic constituents detected in the soil at Site 1 are presented in Table 5.1-5 and 5.1-6, respectively.

#### 5.1.3.1 Soil Boring Results and Nature and Extent

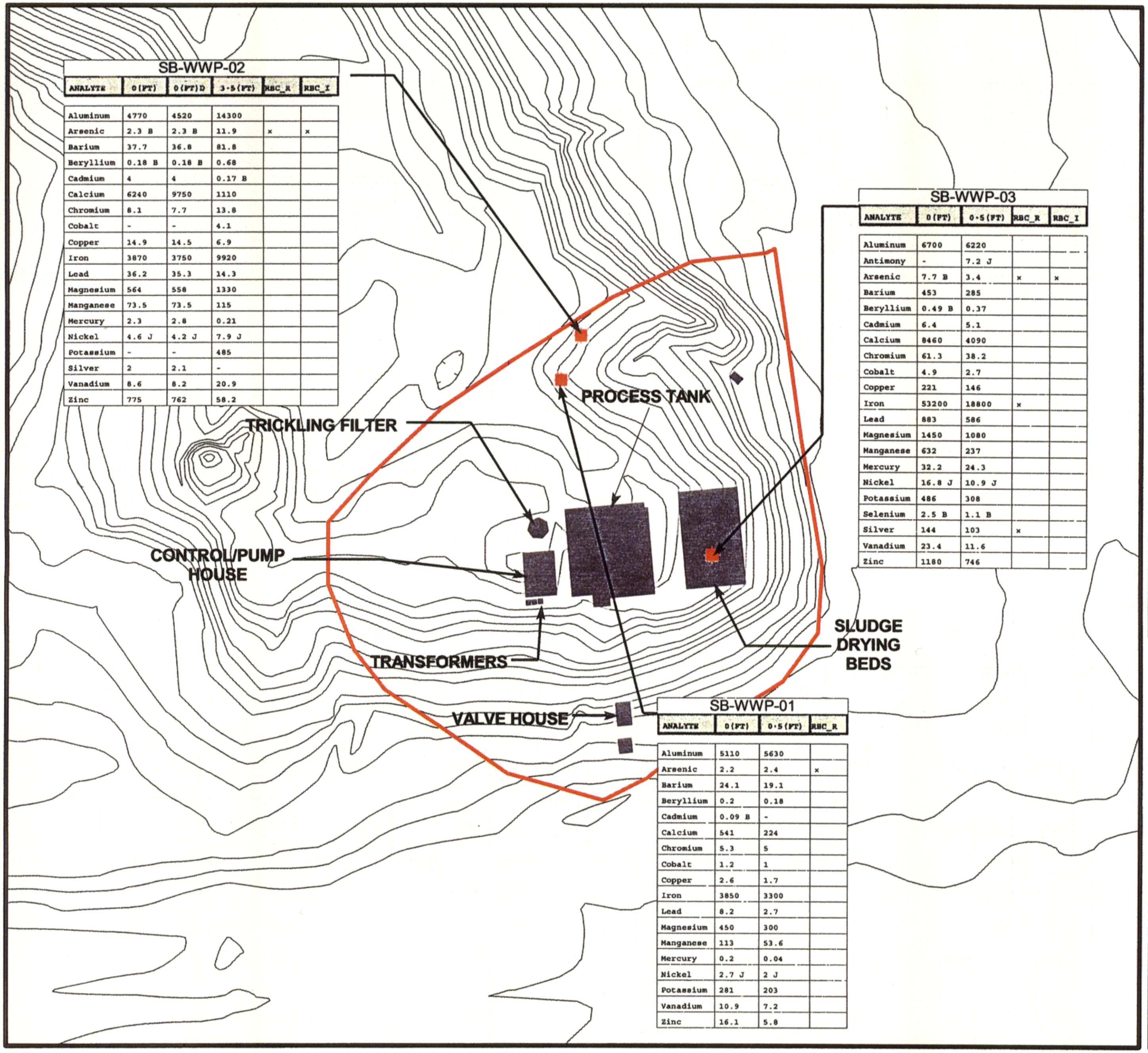
Seven soil samples (two from each boring and one duplicate) were collected during the installation of three soil borings (SB-WWP-01 through SB-WWP-03) at the Old WWTP. The inorganic (metals) and organic (VOCs and SVOCs) constituents detected at Site 1 are summarized below.

***Inorganic Constituents***—Twenty inorganic constituents were detected in the surface soil (0 to <0.5 feet BLS) and 21 inorganic constituents were detected in the shallow subsurface soils (0.5 to 5 feet BLS). Soil boring depth was limited to the shallow subsurface soils; therefore, no deep subsurface soil samples (>15 feet BLS) were collected at the site. The following paragraphs identify the metals that exceed the industrial, residential, and protection of groundwater RBCs in the different soil horizons:

- Surface soil (0 to <0.5 feet BLS)
  - Industrial – arsenic
  - Residential – arsenic and iron
  - Migration to groundwater – arsenic and silver
- Shallow subsurface soil (0.5 to 15 feet BLS)
  - Industrial – arsenic
  - Residential – arsenic
  - Migration to groundwater – arsenic and silver.

The concentrations and distribution of inorganic constituents detected in the soil at Site 1 are presented in Figure 5.1-4. Table 5.1-5 presents the inorganic constituents detected in the soil samples that exceed the human health screening criteria and lists the soil boring (sample identification [I.D.] and depth) where the constituent concentration exceeds the screening criteria in the surface and subsurface soil, the concentrations that exceed the screening criteria, and the screening criteria that the detected concentration exceeds. The following sections summarize the results of the toxicity screen and characterize the distribution of the inorganic constituents that exceed the human health screening criteria at Site 1.

Arsenic was detected in all samples collected from the surface soil at concentrations that exceeded the human health Region III RBCs for residential land use (0.426 mg/kg) and migration to groundwater (0.03 mg/kg). The maximum concentration of arsenic (7.7 mg/kg) was detected in the surface soil sample collected at SB-WWP-03, located in the western portion of the sludge beds. Arsenic concentrations detected at this location exceeded the human health Region III RBC for industrial land use (4 mg/kg). Concentrations of arsenic detected in the surface soil at Site 1 are consistent (i.e., same order of magnitude) throughout the site (2.2 to 7.7 mg/kg).




**SB-WWP-02**

| ANALYTE | 0(FT) | 0(FT)D | 3-5(FT) | RBC_R | RBC_I |
|---|---|---|---|---|---|
| Aluminum | 4770 | 4520 | 14300 | | |
| Arsenic | 2.3 B | 2.3 B | 11.9 | x | x |
| Barium | 37.7 | 36.8 | 81.8 | | |
| Beryllium | 0.18 B | 0.18 B | 0.68 | | |
| Cadmium | 4 | 4 | 0.17 B | | |
| Calcium | 6240 | 9750 | 1110 | | |
| Chromium | 8.1 | 7.7 | 13.8 | | |
| Cobalt | - | - | 4.1 | | |
| Copper | 14.9 | 14.5 | 6.9 | | |
| Iron | 3870 | 3750 | 9920 | | |
| Lead | 36.2 | 35.3 | 14.3 | | |
| Magnesium | 564 | 558 | 1330 | | |
| Manganese | 73.5 | 73.5 | 115 | | |
| Mercury | 2.3 | 2.8 | 0.21 | | |
| Nickel | 4.6 J | 4.2 J | 7.9 J | | |
| Potassium | - | - | 485 | | |
| Silver | 2 | 2.1 | - | | |
| Vanadium | 8.6 | 8.2 | 20.9 | | |
| Zinc | 775 | 762 | 58.2 | | |

**SB-WWP-03**

| ANALYTE | 0(FT) | 0-5(FT) | RBC_R | RBC_I |
|---|---|---|---|---|
| Aluminum | 6700 | 6220 | | |
| Antimony | - | 7.2 J | | |
| Arsenic | 7.7 B | 3.4 | x | x |
| Barium | 453 | 285 | | |
| Beryllium | 0.49 B | 0.37 | | |
| Cadmium | 6.4 | 5.1 | | |
| Calcium | 8460 | 4090 | | |
| Chromium | 61.3 | 38.2 | | |
| Cobalt | 4.9 | 2.7 | | |
| Copper | 221 | 146 | | |
| Iron | 53200 | 18800 | x | |
| Lead | 883 | 586 | | |
| Magnesium | 1450 | 1080 | | |
| Manganese | 632 | 237 | | |
| Mercury | 32.2 | 24.3 | | |
| Nickel | 16.8 J | 10.9 J | | |
| Potassium | 486 | 308 | | |
| Selenium | 2.5 B | 1.1 B | | |
| Silver | 144 | 103 | x | |
| Vanadium | 23.4 | 11.6 | | |
| Zinc | 1180 | 746 | | |

**SB-WWP-01**

| ANALYTE | 0(FT) | 0-5(FT) | RBC_R |
|---|---|---|---|
| Aluminum | 5110 | 5630 | |
| Arsenic | 2.2 | 2.4 | x |
| Barium | 24.1 | 19.1 | |
| Beryllium | 0.2 | 0.18 | |
| Cadmium | 0.09 B | - | |
| Calcium | 541 | 224 | |
| Chromium | 5.3 | 5 | |
| Cobalt | 1.2 | 1 | |
| Copper | 2.6 | 1.7 | |
| Iron | 3850 | 3300 | |
| Lead | 8.2 | 2.7 | |
| Magnesium | 450 | 300 | |
| Manganese | 113 | 53.6 | |
| Mercury | 0.2 | 0.04 | |
| Nickel | 2.7 J | 2 J | |
| Potassium | 281 | 203 | |
| Vanadium | 10.9 | 7.2 | |
| Zinc | 16.1 | 5.8 | |

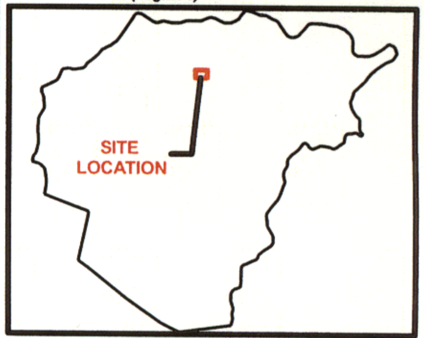
LEGEND:

- BUILDING
- SITE BOUNDARY
- ROADS
- CONTOURS
- SOIL BORING

TABLE DEFINITIONS

*Units = mg/Kg*

- *X = Constituent Failing Screen*
- *— = Non-Detect*
- *J = Value was estimated*
- *B = Value < CRDL but >= IDL*
- *RBC-I = Risk Based Concentration (Industrial Land Use)*
- *RBC-R = Risk Based Concentration (Residential Land Use)*
- *EDQL = Ecological Data Quality Levels (Region V)*




KEY MAP
NOT TO SCALE

10 0 10 20 Meters

US Army Corps of Engineers

SAIC

**Site 1 - Old Wastewater Treatment Plant**
**Metal Constituents**
**Exceeding Soil Screening Criteria**

Wallops Flight Facility
Wallops Island, Virginia

| FIGURE | Project: G:\GIS_DATA\WALLOPS\Projects\Sites\wallops_wtp_gis1.apr Layout: lo_Site-WTP_IO | DATE |
|---|---|---|
| 5.1-4 | | 05/08/03 |

## Table 5.1-5. Site 1 - Old Wastewater Treatment Plant
## Site-related Metal Constituents Detected Above Screening Criteria in Soil
## Wallops Flight Facility, Accomack County, Virginia

| Sample Interval (Depth) | Constituent | Sample ID | Field Sample Number | Depth (BLS) | Concentration [a] | Units | Protection of Human Health: Concentration Exceeds Region III RBC Residential Screening Value b,c | Protection of Human Health: Concentration Exceeds Region III RBC Industrial Screening Value b,c | Migration to Groundwater: Concentration Exceeds Region III RBC Screening Value b,c |
|---|---|---|---|---|---|---|---|---|---|
| Surface Soil (0 to <0.5 feet BLS) | Arsenic | SB-WWP-01 | BORE | 0 | 2.2 | MG/KG | X | | X |
| | | SB-WWP-02 | BORE | 0 | 2.3 | MG/KG | X | | X |
| | | SB-WWP-02 | BORE | 0 | 2.3 | MG/KG | X | | X |
| | | SB-WWP-03 | BORE | 0 | 7.7 | MG/KG | X | X | X |
| | Barium | SB-WWP-01 | BORE | 0 | 24.1 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 36.8 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 37.7 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0 | 453 | MG/KG | | | |
| | Cadmium | SB-WWP-01 | BORE | 0 | 0.09 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 4 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 4 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0 | 6.4 | MG/KG | | | |
| | Chromium | SB-WWP-01 | BORE | 0 | 5.3 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 7.7 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 8.1 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0 | 61.3 | MG/KG | | | |
| | Cobalt | SB-WWP-01 | BORE | 0 | 1.2 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0 | 4.9 | MG/KG | | | |
| | Copper | SB-WWP-01 | BORE | 0 | 2.6 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 14.5 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 14.9 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0 | 221 | MG/KG | | | |
| | Iron | SB-WWP-03 | BORE | 0 | 53200 | MG/KG | X | | |
| | Lead | SB-WWP-01 | BORE | 0 | 8.2 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 35.3 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 36.2 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0 | 883 | MG/KG | | | |
| | Mercury | SB-WWP-01 | BORE | 0 | 0.2 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 2.3 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 2.8 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0 | 32.2 | MG/KG | | | |
| | Nickel | SB-WWP-03 | BORE | 0 | 16.8 | MG/KG | | | |
| | Selenium | SB-WWP-03 | BORE | 0 | 2.5 | MG/KG | | | |
| | Silver | SB-WWP-03 | BORE | 0 | 144 | MG/KG | | | X |
| | Vanadium | SB-WWP-02 | BORE | 0 | 8.2 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 8.6 | MG/KG | | | |
| | | SB-WWP-01 | BORE | 0 | 10.9 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0 | 23.4 | MG/KG | | | |
| | Zinc | SB-WWP-01 | BORE | 0 | 16.1 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 762 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 0 | 775 | MG/KG | | | |

## Table 5.1-5. Site 1 - Old Wastewater Treatment Plant
## Site-related Metal Constituents Detected Above Screening Criteria in Soil
## Wallops Flight Facility, Accomack County, Virginia

| Sample Interval (Depth) | Constituent | Sample ID | Field Sample Number | Depth (BLS) | Concentration [a] | Units | Protection of Human Health | | Migration to Groundwater |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Concentration Exceeds Region III RBC Residential Screening Value b,c | Concentration Exceeds Region III RBC Industrial Screening Value b,c | Concentration Exceeds Region III RBC Screening Value b,c |
| | | SB-WWP-03 | BORE | 0 | 1180 | MG/KG | | | |
| Subsurface Soil (0.5 to 15 feet BLS) | Antimony | SB-WWP-03 | BORE | 0.5 | 7.2 | MG/KG | | | |
| | Arsenic | SB-WWP-01 | BORE | 0.5 | 2.4 | MG/KG | X | | X |
| | | SB-WWP-03 | BORE | 0.5 | 3.4 | MG/KG | X | | X |
| | | SB-WWP-02 | BORE | 3.5 | 11.9 | MG/KG | X | X | X |
| | Barium | SB-WWP-01 | BORE | 0.5 | 19.1 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 3.5 | 81.8 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0.5 | 285 | MG/KG | | | |
| | Cadmium | SB-WWP-02 | BORE | 3.5 | 0.17 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0.5 | 5.1 | MG/KG | | | |
| | Chromium | SB-WWP-01 | BORE | 0.5 | 5 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 3.5 | 13.8 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0.5 | 38.2 | MG/KG | | | |
| | Cobalt | SB-WWP-01 | BORE | 0.5 | 1 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0.5 | 2.7 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 3.5 | 4.1 | MG/KG | | | |
| | Copper | SB-WWP-01 | BORE | 0.5 | 1.7 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 3.5 | 6.9 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0.5 | 146 | MG/KG | | | |
| | Lead | SB-WWP-01 | BORE | 0.5 | 2.7 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 3.5 | 14.3 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0.5 | 586 | MG/KG | | | |
| | Mercury | SB-WWP-02 | BORE | 3.5 | 0.21 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0.5 | 24.3 | MG/KG | | | |
| | Selenium | SB-WWP-03 | BORE | 0.5 | 1.1 | MG/KG | | | |
| | Silver | SB-WWP-03 | BORE | 0.5 | 103 | MG/KG | | | X |
| | Vanadium | SB-WWP-01 | BORE | 0.5 | 7.2 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0.5 | 11.6 | MG/KG | | | |
| | | SB-WWP-02 | BORE | 3.5 | 20.9 | MG/KG | | | |
| | Zinc | SB-WWP-02 | BORE | 3.5 | 58.2 | MG/KG | | | |
| | | SB-WWP-03 | BORE | 0.5 | 746 | MG/KG | | | |

[a] Constituent concentrations that exceed screening criteria are listed in ascending order (lowest to highest).
[b] X indicates detected concentration exceeds the screening criteria.
[c] EPA Region III RBCs.

Arsenic concentrations detected in the subsurface soil also exceeded the Region III RBCs for residential land use and migration to groundwater in all samples collected. The maximum concentration (11.9 mg/kg) of arsenic in the subsurface soil was detected at 3.5 feet BLS, in the sample collected at SB-WWP-02, located beneath the Old WWTP sludge piles while the highest arsenic concentrations detected in the surface soil was in the sludge drying beds (SB-WWP-03). Arsenic concentrations detected in the subsurface soil also exceeded the Region III RBC for industrial land use and again were relatively consistent throughout the site (2.4 to 11.9 mg/kg).

The remaining metals (iron and silver) detected in the soil at concentrations that exceeded screening criteria were detected in the soil of the sludge drying bed sample location (SB-WWP-03). Iron was detected in the sludge drying bed surface soil at a concentration (53,200 mg/kg) that exceeded the Region III RBC for residential land use (23,464 mg/kg). Silver was detected in surface soil sample SB-WWP-03 at a concentration (144 mg/kg) that exceeded the Region III RBC for migration to groundwater (4 mg/kg). Silver also was the only metal detected in the subsurface soil at concentrations that exceeded human health regulatory screening criteria. A silver concentration of 103 mg/kg was detected in the subsurface soil of SB-WWP-03 at 0.5 feet BLS. Data collected during the LSI indicate that metals have been released to the sludge drying bed soils. The conclusions associated with the distribution of the metals are summarized in Section 5.1.5

***Organic Constituents***—Nineteen organic constituents were detected in the surface soil (0 to <0.5 feet BLS) and 19 organic constituents were detected in the shallow subsurface soils (0.5 to 15 feet BLS). Soil boring depth was limited to the shallow subsurface soils; therefore, no deep subsurface soil samples (>15 feet BLS) were collected at the site. The following paragraphs identify the organic compounds that exceed the industrial, residential, and protection of groundwater RBCs in the different soil horizons:

- Surface soil (0 to <0.5 feet BLS)
  - Industrial – benzo(a)pyrene
  - Residential – benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno-(1,2,3-cd)pyrene
  - Migration to groundwater – benzo(a)anthracene, benzo(a)pyrene, and 1,4-dichlorobenzene
- Shallow subsurface soil (0.5 to 15 feet BLS)
  - Industrial – benzo(a)pyrene
  - Residential – benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene
  - Migration to groundwater – benzo(a)anthracene, benzo(a)pyrene, and 1,4-dichlorobenzene.

The concentrations and distribution of organic constituents detected in the soil at Site 1 are presented in Figure 5.1-5. Table 5.1-6 presents the organic constituents detected in the soil that exceed the human health screening criteria and lists the soil (sample I.D. and depth) where the constituent concentration exceeds the screening criteria in the surface and subsurface soil, the detected concentrations that exceed the screening criteria, and the screening criteria that the detected concentration exceeds. The following sections summarize the results of the toxicity screen and characterize the distribution of the organic constituents that were detected at concentrations that exceed the human health screening criteria at Site 1.

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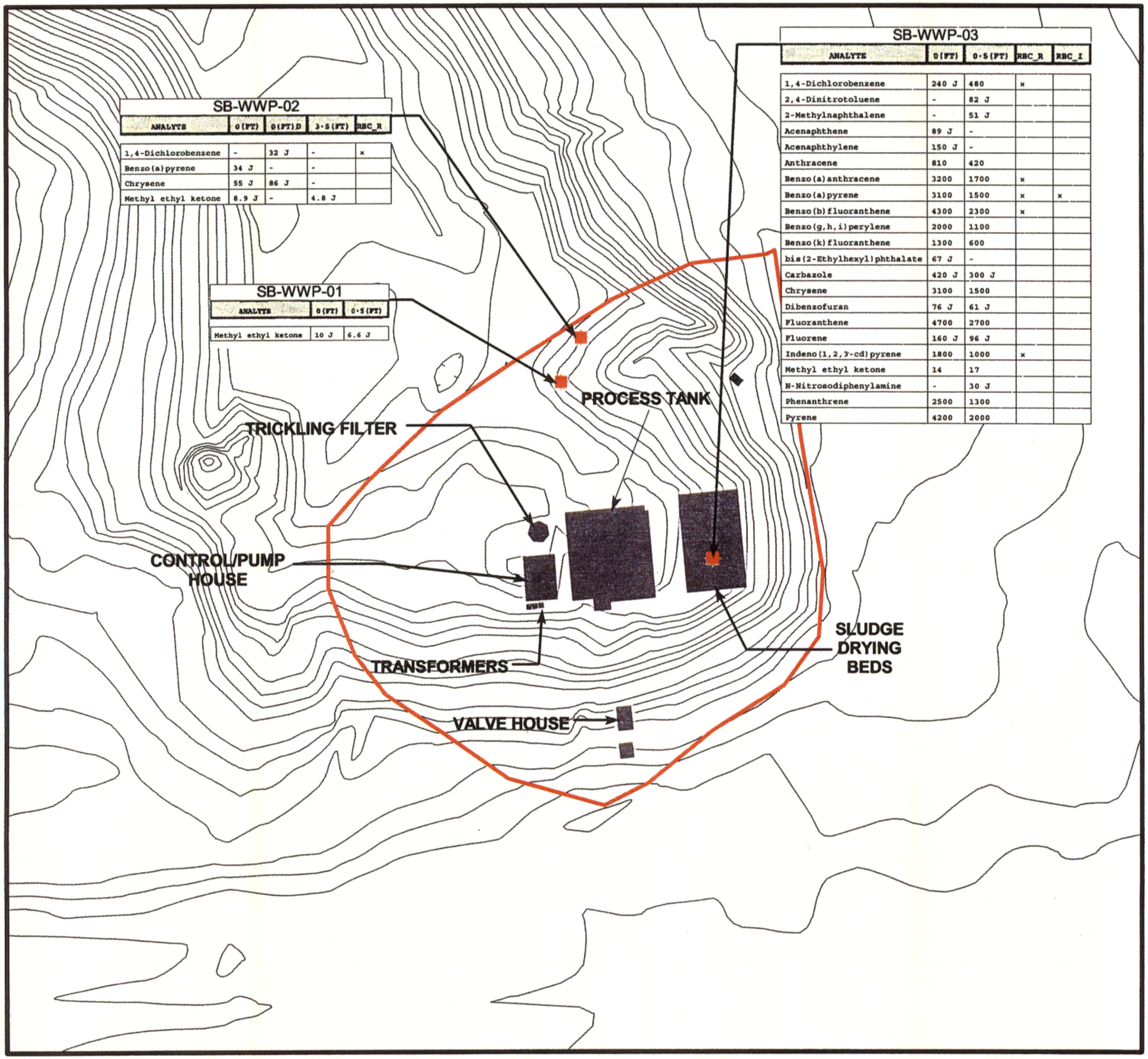



**SB-WWP-03**

| ANALYTE | 0 (FT) | 0-5 (FT) | RBC_R | RBC_I |
|---|---|---|---|---|
| 1,4-Dichlorobenzene | 240 J | 480 | x | |
| 2,4-Dinitrotoluene | - | 82 J | | |
| 2-Methylnaphthalene | - | 51 J | | |
| Acenaphthene | 89 J | - | | |
| Acenaphthylene | 150 J | - | | |
| Anthracene | 810 | 420 | | |
| Benzo(a)anthracene | 3200 | 1700 | x | |
| Benzo(a)pyrene | 3100 | 1500 | x | x |
| Benzo(b)fluoranthene | 4300 | 2300 | x | |
| Benzo(g,h,i)perylene | 2000 | 1100 | | |
| Benzo(k)fluoranthene | 1300 | 600 | | |
| bis(2-Ethylhexyl)phthalate | 67 J | - | | |
| Carbazole | 420 J | 300 J | | |
| Chrysene | 3100 | 1500 | | |
| Dibenzofuran | 76 J | 61 J | | |
| Fluoranthene | 4700 | 2700 | | |
| Fluorene | 160 J | 96 J | | |
| Indeno(1,2,3-cd)pyrene | 1800 | 1000 | x | |
| Methyl ethyl ketone | 14 | 17 | | |
| N-Nitrosodiphenylamine | - | 30 J | | |
| Phenanthrene | 2500 | 1300 | | |
| Pyrene | 4200 | 2000 | | |

**SB-WWP-02**

| ANALYTE | 0 (FT) | 0 (FT) D | 3-5 (FT) | RBC_R |
|---|---|---|---|---|
| 1,4-Dichlorobenzene | - | 32 J | - | x |
| Benzo(a)pyrene | 34 J | - | - | |
| Chrysene | 55 J | 86 J | - | |
| Methyl ethyl ketone | 8.9 J | - | 4.8 J | |

**SB-WWP-01**

| ANALYTE | 0 (FT) | 0-5 (FT) |
|---|---|---|
| Methyl ethyl ketone | 10 J | 6.6 J |

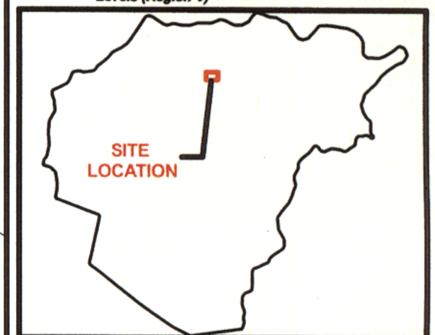
LEGEND:

- BUILDING
- SITE BOUNDARY
- ROADS
- CONTOURS
- SOIL BORING

TABLE DEFINITIONS

*Units = µg/Kg*

- *X = Constituent Failing Screen*
- *— = Non-Detect*
- *J = Value was estimated*
- *B = Value < CRDL but >= IDL*
- *RBC-I = Risk Based Concentration (Industrial Land Use)*
- *RBC-R = Risk Based Concentration (Residential Land Use)*
- *EDQL = Ecological Data Quality Levels (Region V)*




KEY MAP
NOT TO SCALE

10 0 10 20 Meters

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**Site 1 - Old Wastewater Treatment Plant**
**Organic Constituents**
**Exceeding Soil Screening Criteria**

Wallops Flight Facility
Wallops Island, Virginia

| FIGURE | Project | DATE |
|---|---|---|
| 5.1-5 | Project: G:\GIS_DATA\WALLOPS\Projects\Sites\wallops_wtp_gis1.apr<br>Layout: lo_Site-WTP_O | 05/08/03 |

## Table 5.1-6. Site 1 - Old Wastewater Treatment Plant
## Site-related non-Metal Constituents Detected Above Screening Criteria in Soil
## Wallops Flight Facility, Accomack County, Virginia

| Sample Interval (Depth) | Constituent | Sample ID | Field Sample Number | Depth (BLS) | Concentration [a] | Units | Protection of Human Health | | Migration to Groundwater |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Concentration Exceeds Region III RBC Residential Screening Value [b,c] | Concentration Exceeds Region III RBC Industrial Screening Value [b,d] | Concentration Exceeds Region III RBC Screening Value [b,c] |
| Surface Soil (0 to <0.5 feet BLS) | 1,4-Dichlorobenzene | SB-WWP-02 | BORE | 0 | 32 | µg/kg | | | X |
| | | SB-WWP-03 | BORE | 0 | 240 | µg/kg | | | X |
| | Benzo(a)anthracene | SB-WWP-03 | BORE | 0 | 3200 | µg/kg | X | | X |
| | Benzo(a)pyrene | SB-WWP-03 | BORE | 0 | 3100 | µg/kg | X | X | X |
| | Benzo(b)fluoranthene | SB-WWP-03 | BORE | 0 | 4300 | µg/kg | X | | |
| | Indeno(1,2,3-cd)pyrene | SB-WWP-03 | BORE | 0 | 1800 | µg/kg | X | | |
| Subsurface Soil (0.5 to 15 feet BLS) | 1,4-Dichlorobenzene | SB-WWP-03 | BORE | 0.5 | 480 | µg/kg | | | X |
| | Benzo(a)anthracene | SB-WWP-03 | BORE | 0.5 | 1700 | µg/kg | X | | X |
| | Benzo(a)pyrene | SB-WWP-03 | BORE | 0.5 | 1500 | µg/kg | X | X | X |
| | Benzo(b)fluoranthene | SB-WWP-03 | BORE | 0.5 | 2300 | µg/kg | X | | |
| | Indeno(1,2,3-cd)pyrene | SB-WWP-03 | BORE | 0.5 | 1000 | µg/kg | X | | |

[a] Constituent concentrations that exceed screening criteria are listed in ascending order (lowest to highest).
[b] X indicates detected concentration exceeds the screening criteria.
[c] EPA Region III RBCs.

One organic compound (benzo[a]pyrene) was detected in the soils at Site 1 at concentrations that exceed the Region III RBC for industrial land use (784 μg/kg). This polynuclear aromatic hydrocarbon (PAH) was detected in both the surface and subsurface soils at concentrations (3,100 and 1,500 μg/kg, respectively); however, detected concentrations of the compound above the criteria were limited to the soils in the sludge drying beds (SB-WWP-03).

Four PAHs (benzo[a]anthracene, benzo(a)pyrene, benzo[b]fluoranthene, and indeno[1,2,3-cd]pyrene) were detected in the soils at the Old WWTP at concentrations that exceed the Region III RBC for residential land use. All four of these compounds also were detected in the surface and subsurface soils of the sludge drying beds (SB-WWP-03) at concentrations that exceed the residential screening criteria and, again, detected concentrations above the regulatory criteria for these PAHs were limited to the sludge drying bed soils.

Organic compounds detected in the soils at Site 1 at concentrations that exceed the migration to groundwater screening criteria included 1,4-dichlorobenzene, benzo(a)anthracene, and benzo(a)pyrene. Concentrations of 1,4-dichlorobenzene greater than the migration to groundwater screening criteria were detected in the surface soil at SB-WWP-02 and SB-WWP-03. Concentrations of the two PAHs that exceeded the migration to groundwater screening criteria were detected only in the soils (surface and subsurface) at SB-WWP-03, the sludge beds. The conclusions associated with the distribution of the organic compounds are summarized in Section 5.1.4.

### *5.1.4 Conclusions and Recommendations*

This section presents the conclusions of the LSI for Site 1 – Old Wastewater Treatment Plant and summarizes recommendations for future site activities. Section 5.1.4.1 summarizes results and conclusions associated with completion of the LSI. Section 5.1.4.2 combines conclusions and site historical information to make recommendations for future site activities.

#### 5.1.4.1 Conclusions

Data collected during the LSI indicate that metals are present in the surface and shallow subsurface at concentrations that exceed the human health and migration to groundwater screening criteria. Of the detected metals, arsenic was detected most frequently above screening criteria. The maximum concentrations of arsenic (7.7 mg/kg [surface] and 11.9 mg/kg [subsurface]) detected in the soils at Site 1 are well below the background concentrations of arsenic detected in the Commonwealth of Virginia. The concentrations of arsenic detected at Site 1 are not greater than concentrations of arsenic detected in the surface and subsurface soil at other locations at the WFF (i.e., there is no evidence of a surface release [spill or leak] and there is no persistent source of arsenic at Site 1). Data suggest that arsenic detected is the result of natural conditions or minor releases of arsenic at the sludge beds.

The remaining metals (iron and silver) detected at concentrations that exceed regulatory criteria were detected only in the sludge bed soils and the distribution of the metals (maximum concentrations of all metals detected in the sludge bed soils) suggests that former wastewater treatment activities have released metals to the sludge drying beds, as would be expected. However, the distribution of the detected concentrations suggests that the presence of metals at concentrations that exceed screening criteria is limited to the sludge drying beds and that the concentrations are attenuating with depth.

The distribution of the concentrations of mercury detected during the LSI seems to indicate that the trickling filter process may be the source of mercury. Mercury in the sludge bed soils were detected at concentrations ranging from 24.3 to 32.2 mg/kg. Concentrations of mercury detected at other soil boring locations at Site 1 did not exceed 0.21 mg/kg.

Organic compounds detected at concentrations above regulatory screening criteria at Site 1 consisted of five different SVOCs (four PAHs and one non-PAH SVOC); no VOCs were detected at concentrations greater than screening criteria. Data indicate that the concentrations of the four PAHs detected above screening criteria were limited to the sludge drying beds and that the maximum concentrations of these compounds were detected in the surface soil of the sludge beds and were attenuating with depth. This information indicates that the wastewater treatment plant process was the source of the PAHs and that the elevated concentrations of PAHs should be limited to locations containing residual sludge.

Concentrations of 1,4-dichlorobenzene greater than the migration to groundwater screening criteria were detected in the surface soil at SB-WWP-02 (sludge pile boring) and SB-WWP-03 (sludge bed boring). The compound was not detected in the subsurface soil at SB-WWP-02 (3.5 feet BLS), indicating that the compound has attenuated with depth (is present only in the residual sludge pile material). The presence of this compound in the sludge drying beds seems to indicate that these "sludge piles" probably are residual sludge materials from the sludge drying bed.

The distribution of the concentrations of the organic compounds detected during the LSI seems to indicate that the wastewater is the source of organic compounds and that concentrations greater than the regulatory screening criteria are limited to the areas containing the former sludge (sludge piles and sludge drying beds).

#### 5.1.4.2 Recommendations

Based on information obtained during the completion of the LSI, future Old WWTP activities should address the following:

- Sludge piles and sludge bed concentrations exceeding screening criteria
  - Additional soil sampling adjacent to or beneath the sludge bed is recommended to confirm that concentrations exceeding screening criteria do not exist in the subsurface horizon or have been removed during remediation activities.
  - Installation and sampling of Hydropunch® also are recommended based upon the potential for contaminants detected in the soil to migrate to the groundwater.

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## 5.2 SITE 3 – TWO 600,000-GALLON FUEL TANKS, BUILDINGS A-46A AND A-46B

This section presents the results of the LSI for the Two 600,000-Gallon Fuel Tanks, Buildings A-46A and A-46B (Site 3). A description and history of the site, a summary of the site conditions and environmental setting, and an overview of the environmental investigation activities previously conducted at Site 3 are provided in Section 5.2.1. Section 5.2.2 discusses the LSI activities conducted at Site 3. Section 5.2.3 presents the laboratory analytical results of the LSI field investigation and summarizes the nature and extent of contamination identified during the investigation of the Two 600,000-Gallon Fuel Tanks. The results of the human health toxicological screening assessment also are presented in Section 5.2.3. Conclusions and recommendations for Site 3 are summarized in Section 5.2.4.

### *5.2.1 Site Description, History, and Environmental Setting*

Information pertinent to the physical description of Site 3, the operational history, and the environmental setting for the site was obtained from historical site maps, aerial photographs, anecdotal evidence, site visual inspections, and information and data presented in previous site investigations and studies. Topographic information was obtained from the EG&G, Inc. digital base map.

#### 5.2.1.1 Site Description and History

During Navy ownership, two 600,000-gallon USTs were constructed north of runway 10-28 (the abandoned flight line). These tanks were constructed of reinforced concrete and were used to store JP-4 fuel for aircraft operations. Fuel stored in the USTs was delivered via an underground pipeline to the Pump House (Building A-44) next to runway 10-28. NASA records indicate that the USTs have not been used since NASA obtained ownership of the land and indicate that the Navy removed residual fuel from the tanks and filled them with salt water prior to their departure. The location of Site 3 is presented in Figure 5.2-1.

#### 5.2.1.2 Site Conditions and Environmental Setting

Site 3 is located at the top of a moderate hill at an elevation of approximately 40 feet above mean sea level (msl). The defined site, as shown in Figure 5.2-1, is approximately 1.6 acres and the elevation surrounding the USTs decreases in all directions. The USTs are secured within a fenced area that is overgrown with woodland brush, young trees, and dense vegetative cover. A dirt road allows access to the fence gate along the southern edge of the site.

The hydrologic conditions at Site 3 have not been characterized during previous investigation activities at the site. Unfortunately, no soil boring lithologic data has been identified during the review of the site-specific data, so a lithologic description of the subsurface soil greater than 4 feet BLS could not be included in this LSI. A photograph depicting the current site conditions at Site 3 is presented in Figure 5.2-2.

#### 5.2.1.3 Background and Previous Site Investigation Activities

Preliminary characterization of Site 3, USTs and the associated pipeline, was conducted as part of the June 1990 remote sensing report (Ebasco Services, Inc. 1990a). Geophysical surveys of the area identified a linear anomaly, the fuel pipeline, extending from the USTs approximately 600 feet to the south, toward the Pump House (Building A-44). Figure 5.2-1 shows the location of the two 600,000-gallon USTs and the approximate location of the associated underground pipeline.

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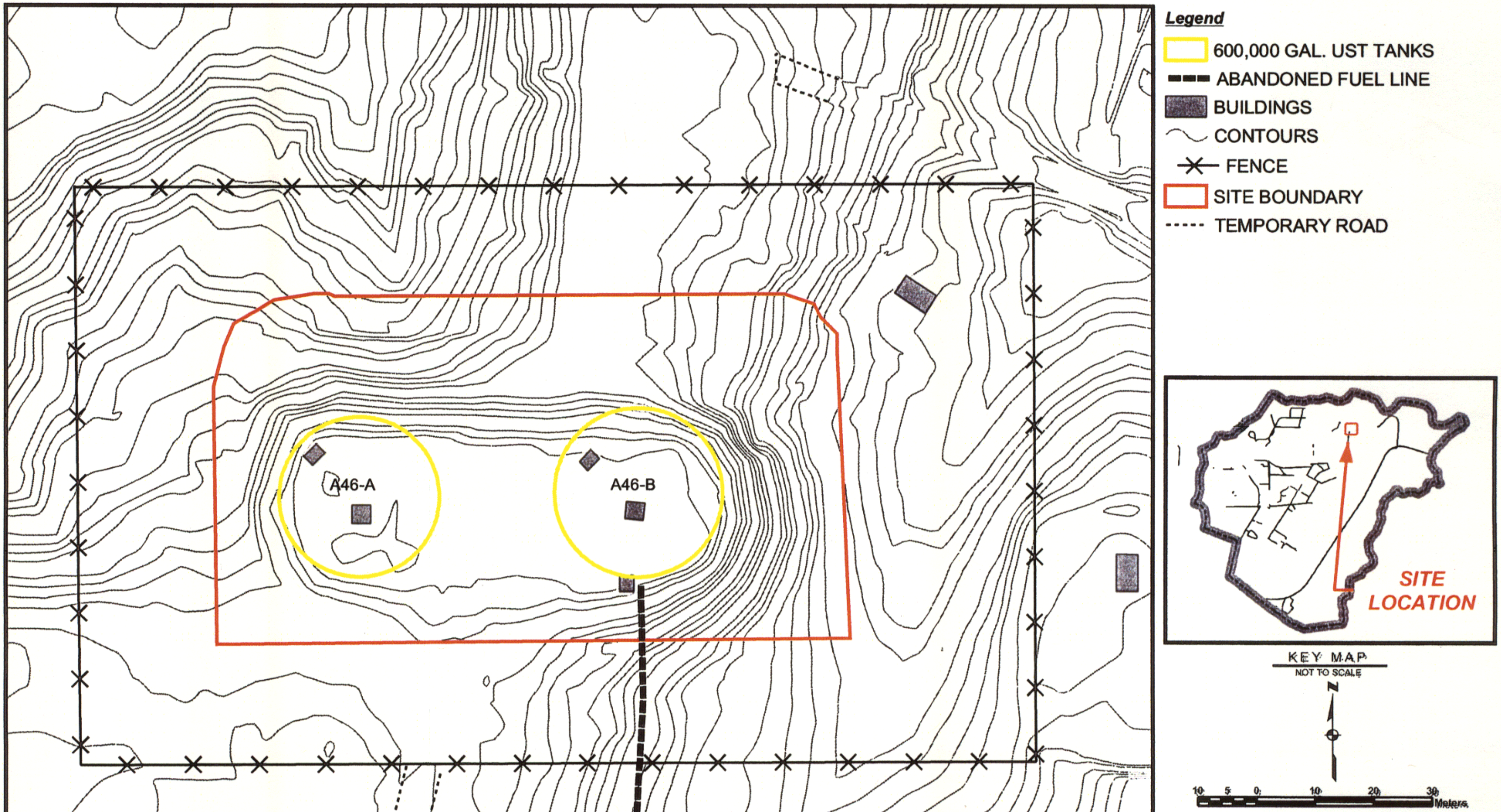


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SITE 3 - 600,000-GALLON FUEL TANKS
BUILDING A46-A AND A46-B
SITE LOCATION MAP

WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

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| FIGURE: 5.2-1 | DATE: 11-06-02 |
| --- | --- |

**Figure 5.2-2. Site 3 – Two 600,000-Gallon Fuel Tanks – Site Conditions Photograph Wallops Flight Facility, Accomack County, Virginia**

The November 1990 ESS identified Site 3 as 1 of 14 WFF sites that had not been investigated during previous activities (Ebasco Services, Inc. 1990b). Supplemental information included in this report indicated that a geophysical survey conducted in conjunction with the evaluation of the Aviation Fuel Tank Farm (AFTF) had detected a pipeline connecting Tank E-77 (at the AFTF) to Pump House (A-46) located north of Runway 10-28 (across the runway).

Thirteen soil gas samples (WFF3-SG1 through WFF3-SG13) were collected and analyzed during the March 1993 soil gas survey (Metcalf & Eddy 1993b) at Site 3. Soil gas samples were collected from variable depths (4 to 6 feet BLS) from locations surrounding the two USTs and along the abandoned pipeline. Soil gas results indicate that concentrations of <5 ppm were obtained at 11 of the 12 locations sampled. OVA readings obtained during the installation of the soil gas probes indicate that 37.4 ppm total volatile hydrocarbons were detected during the installation of the soil gas sample (WFF3-SG1) near MW-41. Soil gas survey results are presented in Table 5.2-1.

The 1993 soil gas survey report (Metcalf & Eddy 1993b) provides a summary description of the site and stated that petroleum byproducts recently had been detected in one groundwater sample from MW-41 and indicated that petroleum odors had been noted during a 1993 site survey of the area near Building A-46A. The document also reported that, during the 1991 excavation of the AFTF, an abandoned pipe connected to the two USTs was found to contain product. This pipe reportedly was allowed to drain and was then capped. It is not known whether the line was completely drained.

**Table 5.2-1. Soil Gas Survey Results[a]**
**Site 3 – Two 600,000-Gallon Fuel Tanks**
**Wallops Flight Facility, Accomack County, Virginia**

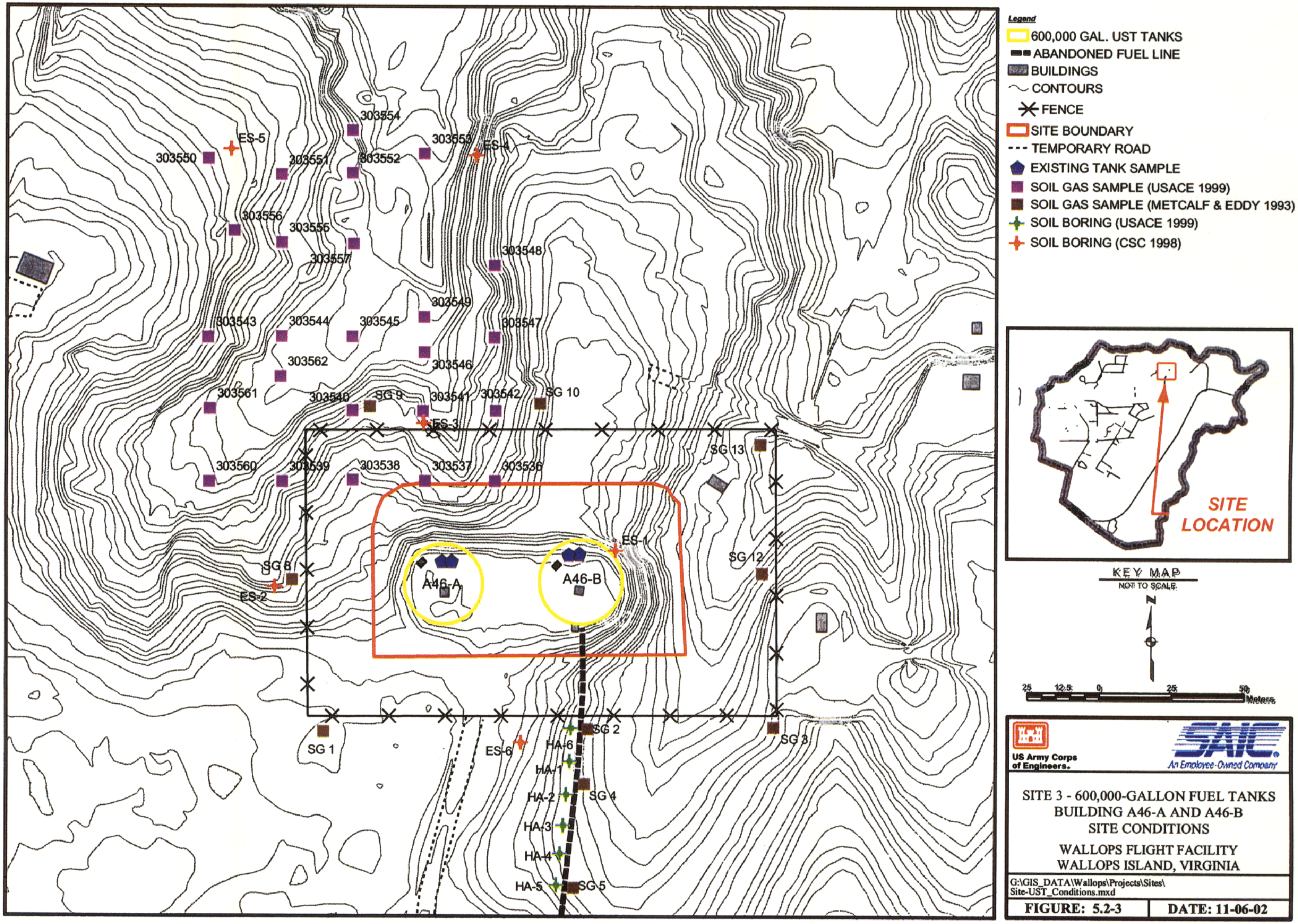
| Soil Gas Sample I.D. | Collection Date | Sample Depth (feet) | PID Screening Results (ppm) | OVA Screening Results (ppm)[b] | Comments |
|---|---|---|---|---|---|
| WFF3-SG1 | 3/20/93 | 6 | 2.6 | 37.4 | 0.6 ppm methane detected |
| WFF3-SG2 | 3/20/93 | 5 | 1.2 | ND | — |
| WFF3-SG3 | 3/20/93 | 6 | 1.2 | 4.9 | 1.5 ppm methane detected |
| WFF3-SG4 | 3/20/93 | 5 | 0.2 | ND | — |
| WFF3-SG5 | 3/20/93 | 6 | 0.7 | ND | — |
| WFF3-SG6 | 3/20/93 | 5 | 0.5 | ND | — |
| WFF3-SG7 | 3/20/93 | 6 | 0.5 | 1.2 | — |
| WFF3-SG8 | 3/21/93 | 4 | 0.5 | 1.0 | 0.8 ppm methane detected |
| WFF3-SG9 | 3/21/93 | 5 | 0.7 | ND | — |
| WFF3-SG10 | 3/21/93 | 4 | 0.5 | 0.6 | 0.2 ppm methane detected |
| WFF3-SG11 | 3/21/93 | 4 | 0.5 | ND | — |
| WFF3-SG12 | 3/22/93 | 4 | ND | ND | — |
| WFF3-SG13 | 3/22/93 | 5 | 0.1 | ND | — |

ND – Not Detected
[a] Data obtained from Preliminary Report #1, Metcalf & Eddy, Inc. (1993a)
[b] OVA concentrations depicted do not include concentrations of methane detected.

This information, combined with groundwater sampling data (monitoring well data for MW-41 indicating that concentrations of petroleum-related compounds had been detected), suggests that the integrity of the tanks or the associated piping may have been breached and a release of fuel-related compounds may have occurred in the vicinity of the tanks and/or associated piping. As a result of this information, NASA discontinued investigation of Site 3 in March 1993 because the site was associated with former Navy activities (prior to 1959); at that time, Site 3 came under the jurisdiction of USACE for further evaluation.

Currently, Site 3 and adjacent property is being leased to the National Oceanic and Atmospheric Administration (NOAA). NOAA planned to construct several antennas and a roadway in the vicinity of the abandoned Navy USTs and underground pipeline. However, during a 1998 subsurface investigation for the proposed access road, the contractor detected a petroleum-like odor in two samples. CSC Environmental was contracted by NASA to confirm the presence or absence of petroleum contamination. Their activities included the drilling and sampling of six soil borings and the sampling of groundwater at those six locations. Figure 5.2-3 shows the location of the soil and groundwater samples collected during the CSC investigation activities. Table 5.2-2 presents the soil and groundwater analytical results associated with the CSC investigation activities.

Although the environmental sampling performed by NASA was sufficient to confirm the presence or absence of contamination, it was not designed to delineate the extent of petroleum contamination or locate all of the hot spots. As a result, VDEQ requested that USACE conduct additional characterization of the land being leased by NOAA to delineate the extent of potential contamination identified in previous sampling activities.




SITE 3 - 600,000-GALLON FUEL TANKS
BUILDING A46-A AND A46-B
SITE CONDITIONS

WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

FIGURE: 5.2-3 | DATE: 11-06-02

**Table 5.2-2. Summary of Soil and Groundwater Analytical Results**
**Site 3 – Two 600,000-Gallon Fuel Tanks, Buildings A-46A and A-46B**
**Wallops Flight Facility, Accomack County, Virginia**

| Sample Location | Sample Matrix | Analytical Results (ppm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Benzene | Toluene | Ethylbenzene | Xylenes | BTEX (Total) | TPH-GRO | TPH-DRO |
| ES-1 | Soil | <0.03 | <0.03 | <0.03 | <0.03 | <0.12 | <6.52 | <21.8 |
| | Groundwater | <2 | <2 | <2 | <2 | <8 | <0.5 | <0.5 |
| ES-2 | Soil | <0.02 | <0.02 | <0.02 | <0.02 | <0.08 | <5.53 | <18.5 |
| | Groundwater | <2 | <2 | <2 | <2 | <8 | <0.5 | <0.5 |
| ES-3 | Soil | <0.02 | <0.02 | 2.48 | 1.73 | 4.21 | 867 | 822 |
| | Groundwater | <10 | <10 | 3.05 | 8.95 | 12.0 | 0.041 | |
| ES-4 | Soil | <0.02 | <0.02 | <0.02 | <0.02 | <0.08 | <5.65 | <18.9 |
| | Groundwater | <2 | <2 | <2 | <2 | <8 | <0.5 | <0.5 |
| ES-5 | Soil | <0.03 | <0.03 | <0.03 | 0.06 | 0.06 | <6.53 | <21.8 |
| | Groundwater | <2 | <2 | <2 | <2 | <8 | <0.5 | <0.5 |
| ES-6 | Soil | <0.02 | <0.02 | <0.02 | 0.18 | 0.18 | 6.39 | <21.4 |
| | Groundwater | <2 | <2 | <2 | <2 | <8 | <0.5 | <0.5 |

USACE and VDEQ agreed on the following two-phase approach for the limited site characterization for the area being leased by NOAA:

- *Phase 1* – Conduct a soil gas survey over the area leased by NOAA. Collect soil samples using hand auger techniques along the pipeline.
  - Delineate the extent of petroleum contamination and locate hot spots.
  - Compare previous analytical results with the results of the passive soil gas survey.
  - Identify supplemental sampling locations based on results.
- *Phase 2* – Collect soil and groundwater samples at identified hot spot locations, and at locations along the perimeter of the identified soil gas plume.
  - Compare analytical results to surface water and drinking water standards.
  - Finalize limited site characterization report.

The results of the Phase I soil gas survey indicated that numerous organic compounds were detected in the survey area (northwest) of the USTs. Figure 5.2-3 shows the location of the soil gas sampling grid at Site 3. Table 5.2-3 presents the results of the passive soil gas sampling at Site 3. A graphical representation of the soil gas plume (soil gas isoconcentration maps for benzene, toluene, ethylbenzene, and xylenes [BTEX]; total petroleum hydrocarbons [TPH]; and undecane, tridecane, and pentadecane) are presented in Appendix B.

Analytical results for the five soil boring samples (HA-1, HA-2, HA-3, HA-6, and HA-7) collected in the vicinity of the underground pipeline (south of Site 3) using hand-auger techniques indicated that BTEX or TPH compounds were not detected during analysis. Figure 5.2-3 shows the location of the hand-auger boring samples collected in conjunction with the limited site characterization (USACE 1999).

Based on BTEX data from the passive soil gas survey, USACE identified four hot spots based on BTEX results, one based on diesel range alkanes, and one based on TPH. Results obtained for the low-lying area downgradient from the tanks indicated the presence of all of the above-mentioned compounds. The passive soil gas report noted that the plume appeared to extend beyond the boundaries

## Table 5.2-3. Summary of Passive Soil Gas Survey Results
## Limited Site Characterization Report (USACE 1999)
## Site 3 – Two 600,000-Gallon Fuel Tanks, Buildings A-46A and A-46B
## Wallops Flight Facility, Accomack County, Virginia

| Sample I.D. | TPH | Toluene | m-xylene, p-xylene | o-xylene | Undecane, Tridecane and Pentadecane | 1,3,5-TMB and 1,2,4-TMB | Naphthalene | 2-Methyl-naphthalene | Octane |
|---|---|---|---|---|---|---|---|---|---|
| 303536 | 1.76 | 0.23 | ND | ND | 0.19 | ND | 0.1 | 0.23 | ND |
| 303537 | 1.54 | ND | ND | ND | 0.09 | ND | ND | 0.11 | ND |
| 303538 | 4.03 | 0.55 | ND | ND | 0.05 | ND | ND | ND | ND |
| 303540 | 1.06 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303541 | 4.95 | 0.34 | ND | ND | 0.48 | ND | ND | ND | ND |
| 303542 | 1.06 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303543 | 0.99 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303544 | 0.9 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303545 | 1.11 | 0.03 | ND | ND | ND | ND | ND | ND | ND |
| 303546 | 0.95 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303547 | 0.85 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303548 | 0.89 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303549 | 0.85 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303550 | 1.49 | 0.1 | ND | ND | ND | ND | ND | ND | ND |
| 303551 | 0.9 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303552 | 0.78 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303553 | 0.75 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303554 | 0.67 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303555 | 0.78 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303556 | 0.77 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303557 | 1026.38 | 0.25 | 0.07 | 0.04 | 38.21 | 0.07 | ND | ND | 1.3 |
| 303560 | 1.88 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303561 | 1.21 | ND | ND | ND | ND | ND | ND | ND | ND |
| 303562 | 0.89 | ND | ND | ND | ND | ND | ND | ND | ND |

ND – Not Detected

of the soil gas survey, and additional sample points would be required in order to fully delineate its areal extent. USACE recommended the collection of soil and groundwater samples from each of the hot spots and a few locations around the perimeter of the plume. This sampling activity had not been conducted when the limited site characterization report was completed.

In December 1999, an analytical summary report was submitted to USACE for the sampling activities performed at Site 3 (Earth Tech, Inc. 1999). This report provided site information, a discussion of site activities, laboratory analysis and results, and recommendations for the UST site near the NOAA roadway. Earth Tech advanced two hand-auger borings and contracted Tidewater, Inc. to perform six DPT soil borings. Five soil samples and four groundwater samples were collected from locations north of the UST site. Three soil and three groundwater samples were collected to the south of the UST site along the underground JP-4 fuel pipeline. Sample locations were selected based on the soil gas survey results (USACE 1999). All soil samples were screened using a PID. Petroleum odors were noted in UST-04 and UST-06. Analytical results for UST-01 through UST-08 detected TPH-GRO at concentrations ranging from non-detect to 5,690 mg/kg in soil, and TPH-Gasoline Range Organics (GRO) in groundwater from non-detect to 10,800 μg/L. Analytical results for the soil and groundwater samples collected are presented in Tables 5.2-4 and 5.2-5.

## Table 5.2-4. Summary of Soil Boring Analytical Results (Earth Tech, Inc., 1999) Site 3 – Two 600,000-Gallon Fuel Tanks, Buildings A-46A and A-46B Wallops Flight Facility, Accomack County, Virginia

| Sample I.D. | Parameter | Analytical Method | Depth (feet BLS) | Results (mg/kg) | Reporting Limits (mg/kg) |
|---|---|---|---|---|---|
| UST-01 | TPH (gasoline) | 8015M/5030 | 14 | 60.0 | 5.0 |
| UST-02 | TPH (diesel) | 8015B/3550 | 16 | 10.6 | 9.96 |
| UST-04 | TPH (gasoline) | 8015M/5030 | 23 | 5.690 | 500 |
| | TPH (diesel) | 8015B/3550 | 23 | 225 | 4916 |
| | sec-Butylbenzene | 8260B | 23 | 0.26 | 0.1 |
| | Isopropylbenzene | 8260B | 23 | 0.1950 | 0.1 |
| | 4-Isopropyltoluene | 8260B | 23 | 0.3350 | 0.1 |
| | Naphthalene | 8260B | 23 | 0.5350 | 0.1 |
| | n-Propylbenzene | 8260B | 23 | 0.280 | 0.1 |
| | 1,2,4-Trimethylbenzene | 8260B | 23 | 2.058 | 0.1 |
| | 1,3,5-Trimethylbenzene | 8260B | 23 | 1.0 | 0.1 |
| | Xylenes | 8260B | 23 | 0.74 | 0.1 |
| UST-05 | TPH (gasoline) | 8015M/5030 | 12 | 41.7 | 5.0 |
| UST-06 | TPH (gasoline) | 8015M/5030 | 18 | 4,760 | 500 |
| | TPH (diesel) | 8015M/5030 | 18 | 344 | 98.8 |
| | Ethylbenzene | 8260B | 18 | 0.145 | 0.1 |
| | Isopropylbenzene | 8260B | 18 | 0.120 | 0.1 |
| | 4-Isopropyltoluene | 8260B | 18 | 0.37 | 0.1 |
| | n-Propylbenzene | 8260B | 18 | 0.125 | 0.1 |
| | 1,2,4-Trimethylbenzene | 8260B | 18 | 0.435 | 0.1 |
| | 1,3,5-Trimethylbenzene | 8260B | 18 | 0.38 | 0.1 |
| | Xylenes | 8260B | 18 | 0.45 | 0.1 |
| UST-07 | TPH (gasoline) | 8015M/5030 | 3 | 12.3 | 5.0 |

## Table 5.2-5. Summary of Groundwater Analytical Results (Earth Tech, Inc., 1999) Site 3 – Two 600,000-Gallon Fuel Tanks, Buildings A-46A and A-46B Wallops Flight Facility, Accomack County, Virginia

| Sample I.D. | Parameter | Analytical Method | Results (µg/kg) | Reporting Limits (µg/kg) |
|---|---|---|---|---|
| UST-04 | TPH (gasoline) | 8015M/5030 | 5,090 | 100 |
| | Ethylbenzene | 8260B | 71.3 | 2.0 |
| | Isopropylbenzene | 8260B | 49.0 | 2.0 |
| | Naphthalene | 8260B | 74.1 | 2.0 |
| | n-Propylbenzene | 8260B | 46.7 | 2.0 |
| | 1,2,4-Trimethylbenzene | 8260B | 190 | 2.0 |
| | 1,3,5-Trimethylbenzene | 8260B | 60.9 | 2.0 |
| | Xylenes | 8260B | 399 | 2.0 |
| UST-06 | TPH (gasoline) | 8015M/5030 | 10,800 | 2,000 |
| | Ethylbenzene | 8260B | 493 | 20.0 |
| | Isopropylbenzene | 8260B | 45 | 20.0 |
| | Naphthalene | 8260B | 116 | 20.0 |
| | n-Propylbenzene | 8260B | 41.0 | 20.0 |
| | 1,2,4-Trimethylbenzene | 8260B | 255 | 20.0 |
| | 1,3,5-Trimethylbenzene | 8260B | 84.0 | 20.0 |
| | Xylenes | 8260B | 1,920 | 20.0 |
| UST-08 | TPH (gasoline) | 8015M/5030 | 250 | 100 |
| | Ethylbenzene | 8260B | 3.8 | 2.0 |
| | 1,2,4-Trimethylbenzene | 8260B | 2.1 | 2.0 |
| | Xylenes | 8260B | 15.4 | 2.0 |

Results of the previous investigation activities at Site 3 indicated that additional sampling activities were required to characterize the liquids currently present in the USTs and to determine if residual petroleum products are present in the USTs as a result of historical activities. The following section summarize LSI field investigation activities conducted to characterize site conditions at Site 3 and to sample liquids present in the USTs.

### *5.2.2 Field Investigation*

The LSI field activities followed site-specific project plans that included field sampling and laboratory chemical analyses conducted under project-specific QA/QC and health and safety protocols. The following paragraphs identify the objectives, approach, and field activities conducted during the field investigation of the Two 600,000-Gallon Fuel Tanks, Buildings A-46A and A-46B (Site 3). The rationale for sampling, the analyte selection, and a discussion of the sampling methodologies are included below.

#### 5.2.2.1 SAIC Field Investigation

As a result of previous investigation activities, additional evaluation of the liquids in the USTs at Site 3 is required to better characterize these liquids. The objective of the LSI at Site 3 was to investigate the potential presence of chemical constituents (hydrocarbons) in the UST liquids as a result of past disposal practices and to determine if chemical constituents exist in the liquids at concentrations that exceed human health screening criteria for water.

To assess the current conditions, the site-specific sampling plan included in the FSP (SAIC 2002a) proposed the collection of two samples (at the top and bottom of the water column) from each of the two USTs (Buildings A-46A and A-46B). In accordance with this approach, two samples (WA-UST-01 [surface] and WA-UST-02 [bottom]) were collected from Building A-46A (western UST) and two samples (WA-UST-03 [surface] and WA-UST-04 [bottom]) were collected from Building A-46B (eastern UST). All samples were collected using a stainless steel bomb sampler. Samples collected from the surface of the UST liquids (WA-UST-01 and WA-UST-03) were collected from approximately 1 foot below the surface of the water. Samples collected from the bottom of the water column were collected from directly above the base of the structures. All samples were analyzed for chemical constituents potentially associated with past fuel storage at the USTs (VOCs, SVOCs, and metals). Table 5.2-6 summarizes the samples collected from the Site 3 USTs. Figure 5.2-3 shows the LSI UST sampling locations at Site 3.

**Table 5.2-6. LSI UST Samples**
**Site 3 – Two 600,000-Gallon Fuel Tanks, Buildings A-46A and A-46B**
**Wallops Flight Facility, Accomack County, Virginia**

| Sample I.D. | Depth Below Water Surface (feet) | Field Sample Number | Sample Interval (Depth) |
|---|---|---|---|
| WA-UST-01 | 1 | SAIC01 | 0 – 0.5 |
| WA-UST-01 | 13 | SAIC 01 | 12.5 – 13.0 |
| WA-UST-01 | 1 | SAIC 01 | 0 – 0.5 |
| WA-UST-01 | 11 | SAIC 01 | 10.5 – 11.0 |

Note:
All UST samples collected from Site 3 were analyzed for VOCs, SVOCs, and metals.

### 5.2.3 *Investigation Results and Nature and Extent*

This section presents the results of the LSI sampling and analysis. The data collected during the LSI were used to provide a basis for evaluating the magnitude and extent of contamination and conducting the human health screen. Complete analytical results for the liquid samples collected at Site 3 are presented in Appendix G and summarized in Table 5.2-7.

The LSI included a screening-level evaluation in which sample data collected from Site 3 were subject to a human health toxicity screen. The toxicity screen is used to evaluate human health effects by comparing site data to screening criteria (e.g., Region III RBC for tap water and MCLs).

The following paragraphs summarize the chemical constituents detected in the USTs at Site 3 and the results of the screening-level evaluation of the detected constituents. Screening criteria comparisons for the inorganic and organic constituents detected in the USTs at Site 3 are presented in Tables 5.2-8 and 5.2-9.

#### 5.2.3.1 UST Sample Results and Nature and Extent

Four samples (two from each UST) were collected during the investigation of Site 3. Within each UST, one sample was collected from the surface interval (top foot of water in tank) and one sample was collected from the bottom of the tank (bottom foot of water in tank). The inorganic (metals) and organic (VOCs and SVOCs) constituents detected at Site 3 are summarized below.

*Inorganic Constituents*—Ten inorganic constituents were detected in the liquids present in the USTs. The following paragraphs identify the metals that exceed the Region III RBCs or MCLs in the UST liquids:

- EPA Region III RBC tap water – thallium
- MCL – thallium.

The concentrations and distribution of inorganic constituents detected in the USTs at Site 3 are presented in Figure 5.2-4. Table 5.2-8 presents the inorganic constituents detected in the USTs at Site 3 that exceed the Region III RBCs for tap water or Federal MCLs criteria and lists the UST sample location where the constituent concentration exceed the screening criteria in the water, the detected concentrations that exceed the screening criteria, and the screening criteria that the detected concentration exceeds. The following sections summarize the results of the toxicity screen and characterize the distribution of the inorganic constituents that were detected at concentrations that exceed the human health screening criteria at Site 3.

Thallium was detected at concentrations greater than the Region III RBC for tap water (2.6 µg/L) and the MCL (2.0 µg/L) at sample location WA-UST-03 (surface water of UST A-46B). No other inorganic constituents detected in either of the two 600,000-gallon USTs exceeded either the Region III RBC for tap water or the MCLs.

*Organic Constituents*—Seven organic compounds (two SVOCs and five VOCs) were detected in the USTs at Site 3. None of these compounds was detected in samples collected from the western UST (Building A-46A). Five of the compounds (di-N-butyl phthalate [DNBP], benzene, xylenes [meta and/or para], xylene [ortho], and toluene) were detected in the surface sample (WA-UST-03) collected from the eastern UST (A-46B), and three compounds (2-methylnaphthalene, ethylbenzene and xylenes [meta and/or para]) were detected in the sample (WA-UST-04) collected from the bottom of the eastern UST (A-46B). The following paragraph list the type of organic constituents detected and identifies the organic compounds that exceed the Region III RBCs for tap water and MCLs:

- EPA Region III RBC for tap water – benzene, ethylbenzene, and 2-methylnaphthalene
- MCL – benzene.

**Table 5.2-7. Data Summary: UST Liquids Results, Site 3 - Two 600,000-Gallon Fuel Tanks**
**Wallops Flight Facility, Accomack County, Virginia**

| Site ID | | | WA-UST-01 | | WA-UST-02 | | WA-UST-03 | | WA-UST-04 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01 | | SAIC01 | | SAIC01 | |
| Site Type | | | SWTR | | SWTR | | SWTR | | SWTR | |
| Collection Date | | | 08/08/02 | | 08/08/02 | | 08/08/02 | | 08/08/02 | |
| Depth (ft) | | | 0.00 | | 13.00 | | 0.00 | | 11.00 | |
| ***METALS(6010)*** | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | |
| Arsenic | ug/L | 10 | 3.6 | U | 3.4 | U | 3.4 | U | 4.1 | U |
| Barium | ug/L | 200 | 3.3 | B | 2.9 | B | 16.1 | | 13.5 | |
| Calcium | ug/L | 1000 | 8160 | | 7640 | | 8490 | | 8230 | |
| Cobalt | ug/L | 50 | 0.6 | UJ | 0.6 | UJ | 0.6 | UJ | 0.83 | J |
| Copper | ug/L | 10 | 2.5 | U | 2.9 | U | 2 | U | 3.2 | U |
| Iron | ug/L | 100 | 40.1 | B | 817 | | 2110 | | 5070 | |
| Magnesium | ug/L | 1000 | 5400 | | 5180 | | 5930 | | 5760 | |
| Manganese | ug/L | 15 | 72.8 | | 123 | | 335 | | 367 | |
| Nickel | ug/L | 10 | 1.1 | U | 2 | B | 1.1 | U | 1.5 | B |
| Potassium | ug/L | 1000 | 3740 | | 3910 | | 3920 | | 3910 | |
| Sodium | ug/L | 1000 | 12300 | | 12300 | | 14100 | | 13900 | |
| Thallium | ug/L | 10 | 2.7 | U | 3.6 | U | 2.8 | B | 2.8 | U |
| Zinc | ug/L | 20 | 5.2 | U | 5 | U | 4 | U | 4 | U |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | |
| 2-Methylnaphthalene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 1000 | J |
| Di-n-butyl phthalate | ug/L | 10 | 250 | U | 130 | U | 1.7 | J | 2900 | U |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | |
| Acetone | ug/L | 5 | 25 | U | 25 | U | 5 | U | 140 | UJ |
| Benzene | ug/L | 1 | 5 | U | 5 | U | 8.7 | | 25 | UJ |
| Carbon disulfide | ug/L | 1 | 5 | U | 5 | U | 1 | U | 42 | UJ |
| Ethylbenzene | ug/L | 1 | 5 | U | 5 | U | 1 | U | 28 | J |
| m-and/or p-Xylene | ug/L | 1 | 5 | U | 5 | U | 4.1 | | 33 | J |
| Methylene Chloride | ug/L | 1 | 7.4 | U | 6.4 | U | 1.1 | U | 31 | UJ |
| o-xylene | ug/L | 1 | 5 | U | 5 | U | 1.5 | | 25 | UJ |
| Toluene | ug/L | 1 | 5 | U | 5 | U | 5.1 | | 25 | UJ |

Created on 5/27/2003

## Table 5.2-7. Data Summary: UST Liquids Results, Site 3 - Two 600,000-Gallon Fuel Tanks Wallops Flight Facility, Accomack County, Virginia (continued)

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit but greater than or equal to the instrument detection limit.
B – Organics: Analyte was found in the associated method blank. Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25% difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. For SW846 methods, the samples are reported down to the method detection limits (MDL). For metals, the samples are reported down to the instrument detection limit (IDL).
MDL – Method Detection Limit.
SAICXXR – An SAIC field sample number followed by an "R" designates a recollected sample.
1,2-Dichlorobenzene; 1,3-Dichlorobenzene; 1,4-Dichlorobenzene; and 1,2,4-Trichlorobenzene - For samples analyzed prior to February 2000, these four compounds are reported as part of the semivolatile organic compound list. For samples analyzed after February 2000, these four compounds are reported as part of the volatile organic compound list.
1,2-Dichloroethene (total); Cis-1,2-Dichloroethene and Trans-1,2-Dichloroethene – For samples analyzed prior to February 2000, cis-1,2-dichloroethene and trans-1,2-dichloroethene (not 1,2-dichloroethene [total]) are reported as part of the volatile organic compound list. For samples analyzed after February 2000, 1,2-dichloroethene (total) (not cis-1,2-dichloroethene and trans-1,2-dichloroethene) is reported as part of the volatile organic compound list.

## Table 5.2-8. Site 3 - Two 600,000-Gallon Fuel Tanks
## Metal Constituents Detected Above Screening Criteria in UST Liquids
## Wallops Flight Facility, Accomack County, Virginia

| Constituent | Sample ID | Field Sample Number | Depth (BLS) | Concentration [a] | Units | Protection of Human Health | |
|---|---|---|---|---|---|---|---|
| | | | | | | Concentration Exceeds Region III RBC Screening Value [b,c] | Concentration Exceeds Federal MCL Value [b,d] |
| Thallium | WA-UST-03 | SWTR | 0 | 2.8 | µg/L | 2.6 | 2 |

[a] Constituent concentrations that exceed screening criteria are listed in ascending order (lowest to highest).

[b] Concentration listed is applicable screening criteria.

[c] EPA Region III RBCs.

[d] Federal MCL.

## Table 5.2-9. Site 3 - Two 600,000-Gallon Fuel Tanks
## Metal Constituents Detected Above Screening Criteria in UST Liquids
## Wallops Flight Facility, Accomack County, Virginia

| Constituent | Sample ID | Field Sample Number | Depth (BLS) | Concentration [a] | Units | Protection of Human Health | |
|---|---|---|---|---|---|---|---|
| | | | | | | Concentration Exceeds Region III RBC Screening Value [b,c] | Concentration Exceeds Federal MCL Value [b,d] |
| 2-Methylnaphthalene | WA-UST-04 | SWTR | 11 | 1000 | µg/L | X | |
| Benzene | WA-UST-03 | SWTR | 0 | 8.7 | µg/L | X | X |
| Ethylbenzene | WA-UST-04 | SWTR | 11 | 28 | µg/L | X | |

[a] Constituent concentrations that exceed screening criteria are listed in ascending order (lowest to highest).

[b] X indicates detected concentration exceeds the screening criteria.

[c] EPA Region III RBCs.

[d] Federal MCL

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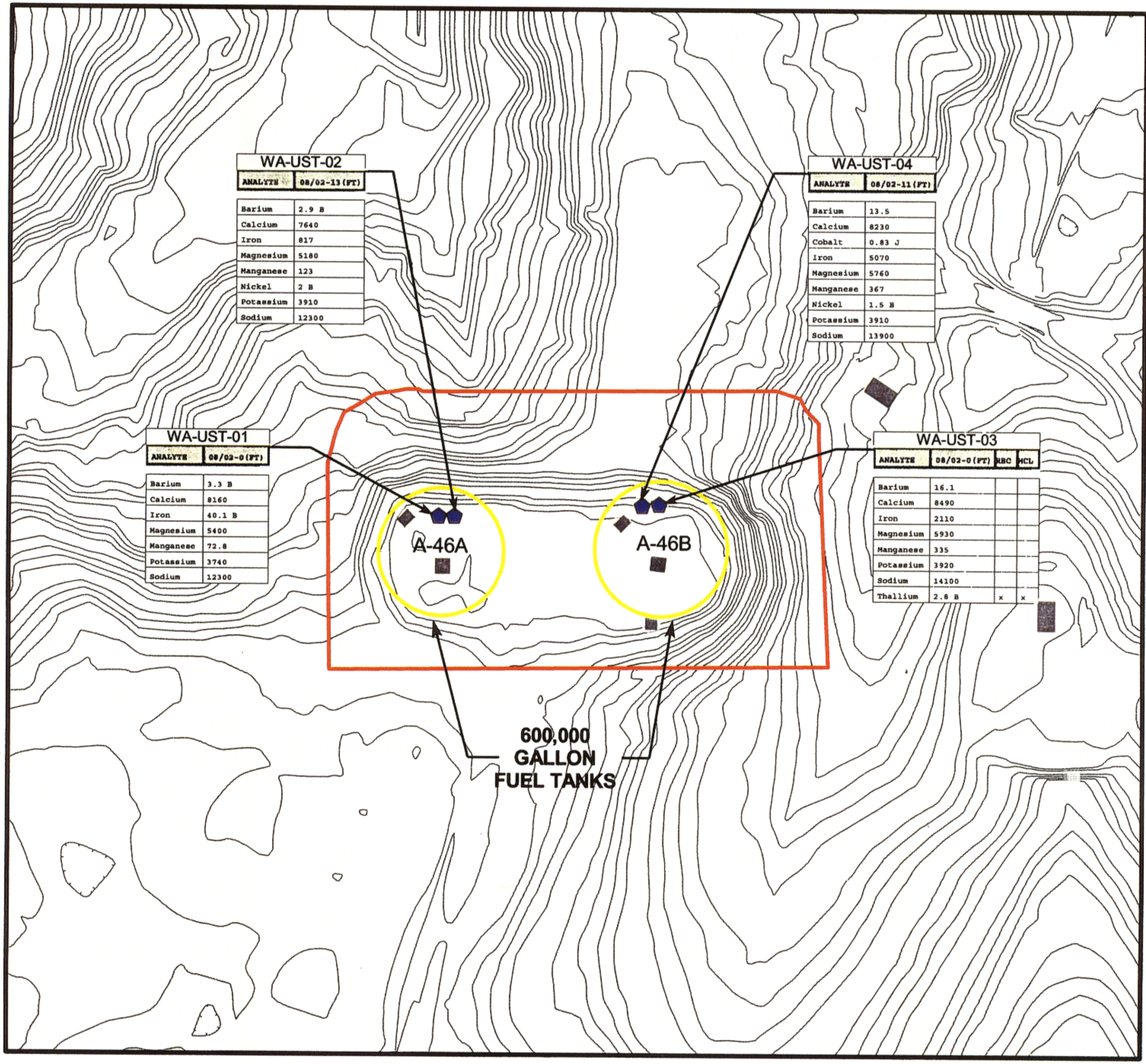



WA-UST-01

| ANALYTE | 08/02-0 (FT) |
|---|---|
| Barium | 3.3 B |
| Calcium | 8160 |
| Iron | 40.1 B |
| Magnesium | 5400 |
| Manganese | 72.8 |
| Potassium | 3740 |
| Sodium | 12300 |

WA-UST-02

| ANALYTE | 08/02-13 (FT) |
|---|---|
| Barium | 2.9 B |
| Calcium | 7640 |
| Iron | 817 |
| Magnesium | 5180 |
| Manganese | 123 |
| Nickel | 2 B |
| Potassium | 3910 |
| Sodium | 12300 |

WA-UST-03

| ANALYTE | 08/02-0 (FT) | RBC | MCL |
|---|---|---|---|
| Barium | 16.1 | | |
| Calcium | 8490 | | |
| Iron | 2110 | | |
| Magnesium | 5930 | | |
| Manganese | 335 | | |
| Potassium | 3920 | | |
| Sodium | 14100 | | |
| Thallium | 2.8 B | x | x |

WA-UST-04

| ANALYTE | 08/02-11 (FT) |
|---|---|
| Barium | 13.5 |
| Calcium | 8230 |
| Cobalt | 0.83 J |
| Iron | 5070 |
| Magnesium | 5760 |
| Manganese | 367 |
| Nickel | 1.5 B |
| Potassium | 3910 |
| Sodium | 13900 |

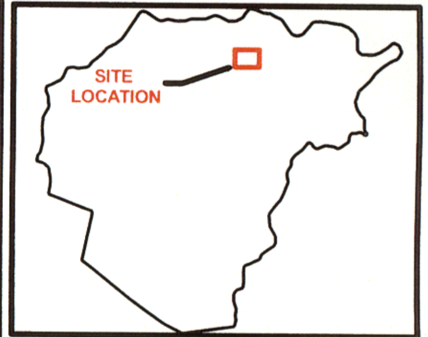
LEGEND:

- BUILDING
- SITE BOUNDARY
- UST LOCATION
- ROADS
- CONTOURS
- UST SAMPLE

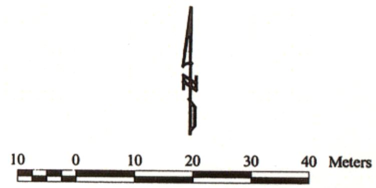
TABLE DEFINITIONS

*Units = µg/L*

- *X = Constituent Failing Phase I Screen*
- *— = Non-Detect*
- *J = Value was estimated*
- *B = Value < CRDL but >= IDL*
- *RBC = Risk Based Concentration (Region III Tap Water)*
- *MCL = Maximum Concentration Limit*




KEY MAP
NOT TO SCALE




US Army Corps of Engineers

SAIC

**Site 3 - 600,000-Gallon Fuel Tanks**
**Building A46-A and A46-B**
**Metal Constituents**
**Exceeding Water Screening Criteria**

Wallops Flight Facility
Wallops Island, Virginia

| FIGURE 5.2-4 | Project: G:\GIS_DATA\WALLOPS\Projects\Sites\wallops_ust_gis1.apr<br>Layout: lo_Site-UST_SD_IO | DATE 05/08/03 |
|---|---|---|

The concentrations and distribution of organic constituents detected in the USTs at Site 3 are presented in Figure 5.2-5. Table 5.2-9 presents the organic constituents detected in the USTs that exceed the Region III RBC for tap water or MCL screening criteria and lists the sample location where the constituent concentration exceeds the screening criteria, the detected concentrations that exceed the screening criteria, and the screening criteria that the detected concentration exceeds. The following sections summarize the results of the toxicity screen and characterize the distribution of the organic constituents that were detected at concentrations that exceed the screening criteria at Site 3.

Benzene was detected in the surface water sample (WA-UST-03) collected from the eastern UST at a concentration (8.7 μg/L) that exceeds both the Region III RBC for tap water (0.32 μg/L) and the MCL (5 μg/L), but was not detected in any of the other samples collected from the USTs. An SVOC (2-methylnaphthalene) and a VOC (ethylbenzene) were detected in the water sample (WA-UST-04) collected from the base of the eastern UST (A-46B) at concentrations that exceeded the Region III RBC for tap water. 2-Methylnaphthalene was detected at an estimated concentration of 1,000 μg/L (Region III RBC tap water criteria = 121.7 μg/L) and ethylbenzene was detected at 28 μg/L (Region III RBC tap water criteria = 3.3 μg/L).

### *5.2.4 Conclusions and Recommendations*

This section presents the conclusions and recommendations of the LSI for Site 3. Section 5.2.4.1 summarizes results and conclusions of the LSI. Section 5.2.4.2 combines conclusions and historical information to make recommendations for future site activities.

#### 5.2.4.1 Conclusions

Data collected during the LSI investigation indicates that residual fuel related compounds are still present in the waters contained in the Site 3 USTs. Sampling and analysis of the liquids present in the USTs indicated that the primary contaminants present are metals (thallium), VOCs (benzene and ethylbenzene) and an SVOC (2-methylnaphthalene). Sample results indicate that concentrations of benzene are greater than the Region III RBCs and MCLs in the eastern UST (Building A-46B) and that concentrations of 2-methylnaphthalene and ethylbenzene are greater than the Region III RBCs for Tap Water in that UST. Site-specific observations made during the sampling of the USTs and PID monitoring results indicate that the western UST also contains residual fuel related compounds.

#### 5.2.4.2 Recommendations

Future efforts at Site 3 should focus on the closure of the tanks following the UST or CERCLA regulations. Additional site-specific tasks should include:

- Collect a second round of samples from USTs to confirm analytical results (presence and absence of contamination in USTs) and characterize liquids for disposal.
- Remove liquids and abandon tanks in accordance with Commonwealth of Virginia regulations.
- Review and consolidate data to ensure soil and groundwater data are sufficient to support recommendation of no further action.
- Evaluate the source of contamination identified by soil gas, soil, and groundwater sampling. If required, collect additional samples to fill data gaps. If sufficient soil and groundwater are available, no further sampling is recommended at this site.

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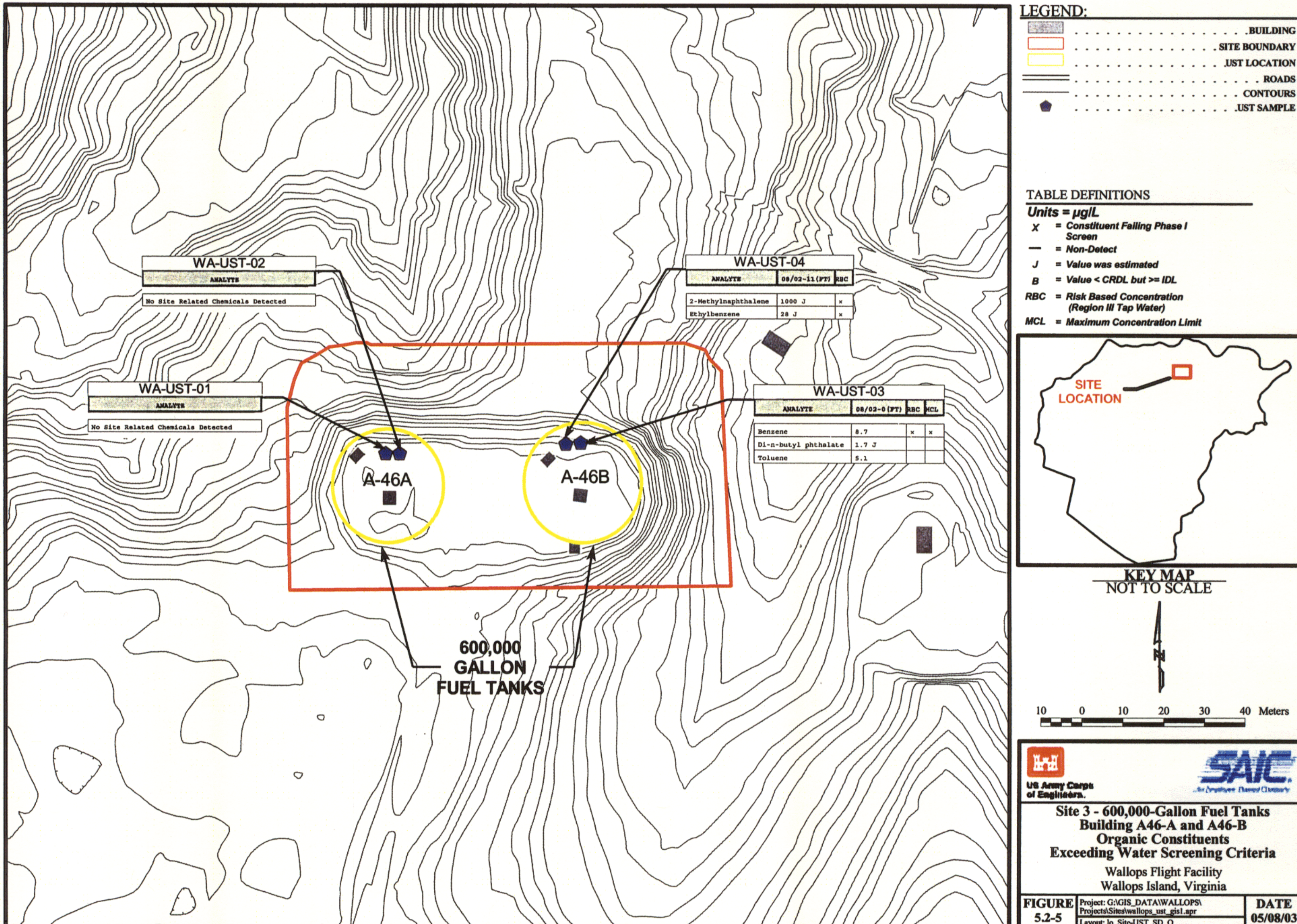
LEGEND:
BUILDING
SITE BOUNDARY
UST LOCATION
ROADS
CONTOURS
UST SAMPLE
TABLE DEFINITIONS
Units = µg/L
X = Constituent Failing Phase I Screen
— = Non-Detect
J = Value was estimated
B = Value < CRDL but >= IDL
RBC = Risk Based Concentration (Region III Tap Water)
MCL = Maximum Concentration Limit
WA-UST-02
ANALYTE
No Site Related Chemicals Detected
WA-UST-01
ANALYTE
No Site Related Chemicals Detected
WA-UST-04
ANALYTE | 08/02-11(FT) | RBC
2-Methylnaphthalene | 1000 J | x
Ethylbenzene | 28 J | x
WA-UST-03
ANALYTE | 08/02-0(FT) | RBC | MCL
Benzene | 8.7 | x | x
Di-n-butyl phthalate | 1.7 J | |
Toluene | 5.1 | |
A-46A
A-46B
600,000 GALLON FUEL TANKS
SITE LOCATION
KEY MAP
NOT TO SCALE
N
10 0 10 20 30 40 Meters
US Army Corps of Engineers
SAIC
Site 3 - 600,000-Gallon Fuel Tanks
Building A46-A and A46-B
Organic Constituents
Exceeding Water Screening Criteria
Wallops Flight Facility
Wallops Island, Virginia
FIGURE 5.2-5
Project: G:\GIS_DATA\WALLOPS\Projects\Sites\wallops_ust_gis1.apr
Layout: lo_Site-UST_SD_O
DATE 05/08/03

## 5.3 INDUSTRIAL WASTE/SANITARY LANDFILL

This section presents the results of the LSI for the IWL. A description and history of the site, a summary of the site conditions and environmental setting, and an overview of environmental investigation activities conducted at the site during previous investigations is provided in Section 5.3.1. Section 5.3.2 discusses the LSI activities conducted at the IWL. Section 5.3.3 presents the laboratory analytical results of the LSI field investigation, the nature and extent of detected contamination at the IWL, and the results of the human health toxicological screen associated with the constituents identified during the investigation. Conclusions and recommendations for the IWL are summarized in Section 5.3.4.

### *5.3.1 Site Description, History, and Environmental Setting*

Information pertinent to the physical description of the IWL and the environmental setting for the site was obtained from historical site maps, aerial photographs, anecdotal evidence, site visual inspections, and information and data presented in previous site investigations and studies. Topographic information was obtained from the EG&G, Inc. digital base map.

#### 5.3.1.1 Site Description and History

Little historical information about the IWL is available and the information that is available seems to be limited to interpretation of historical aerial photographs by the EPA Environmental Photographic Interpretation Center (EPIC). The IWL site features initially were identified as an area of potential concern (Area of Concern [AOC] A) after reviewing historical aerial photographs. During the assessment of the October 14, 1957 aerial photograph, EPIC identified AOC A as a probable landfill and determined that the site was active. Review of the photographs indicated that much of the surface area appeared to have been filled and graded and that two trenches, several piles of mounded material, and a probable pit existed at this location.

Review of the 1959 photograph (October 5, 1959 Aerial Photograph) indicated that the trenches, mound and probable pit evident in 1957 were no longer visible. In the photograph, the site appears to have been filled in and graded. In addition, the area contained more vegetation than in 1957 and the dirt access road is less apparent.

Transfer of ownership of this property to the U.S. Department of the Interior (DOI), U.S. Fish and Wildlife Service (USFWS) took place on July 10, 1975. Employees of the Wallops Island National Wildlife Refuge currently use the site as a maintenance operations facility and storage yard. The landfill features are indistinguishable from the existing terrain. Figure 5.3-1 shows the location of the IWL at the WFF.

#### 5.3.1.2 Site Conditions and Environmental Setting

The IWL is located along the southern extreme of the WFF adjacent to the southern side of State Route 175. The site is approximately 15 acres with little topographic relief. A dirt road travels along the eastern edge and center of the IWL and provides access to a large portion of the site. The site is surrounded by woodland brush, young trees, and dense vegetative cover. The photograph presented in Figure 5.3-2 shows the current conditions of the IWL and the physical features of the surrounding area.

The hydrologic conditions at the IWL have not been characterized based on data previously collected at the site. No soil boring lithologic data have been identified during the review of the site-specific data, so the lithologic description of the subsurface soil is based only on data obtained during this field investigation.

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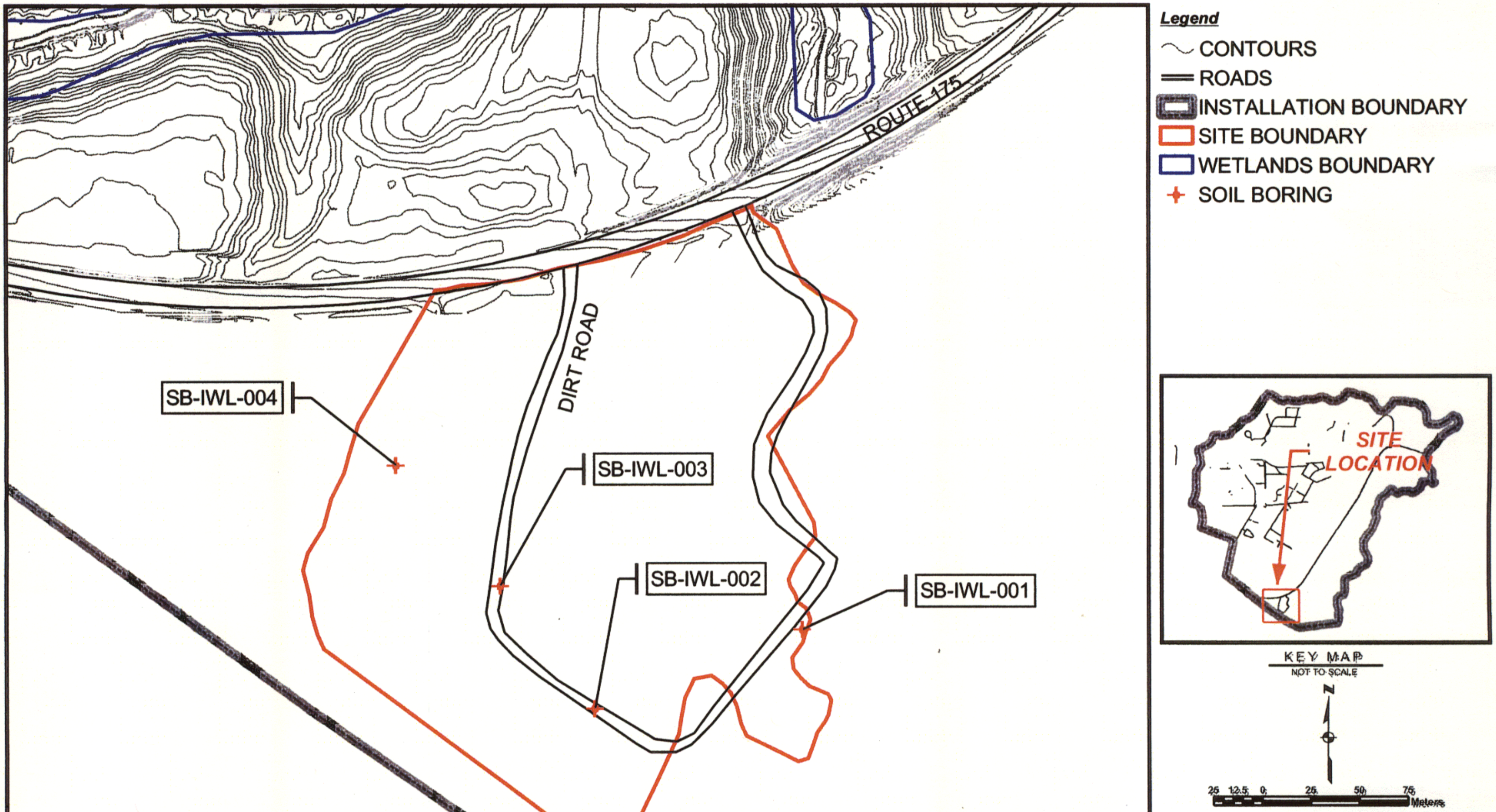



US Army Corps of Engineers.

SAIC
An Employee-Owned Company

INDUSTRIAL WASTE/
SANITARY LANDFILL
SITE LOCATION MAP

WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

G:\GIS_DATA\Wallops\Projects\Sites\
Site-IWL_Conditions.mxd

FIGURE: 5.3-1 | DATE: 11-07-02



0120AB9Y

**Figure 5.3-2. Industrial Waste/Sanitary Landfill – Site Conditions Photograph**

### 5.3.1.3 Background and Previous Site Investigation Activities

In January 2000, Earth Tech, Inc. submitted a summary report to NASA (Earth Tech, Inc. 2000) for work conducted at the WFF. The report identified potential environmental impacts at the identified FUDS sites and evaluated the need for future environmental studies. Work performed at the IWL as part of this report included: a site visit, personnel interviews, drilling and sampling of one DPT soil boring, and laboratory analysis of soil and groundwater samples collected during the investigation. An RRE performed using existing data found the relative risk to be high. Tables 5.3-1 and 5.3-2 present the laboratory analytical results for soil and groundwater samples collected during the EarthTech investigation.

In December 2001, a status summary report in letter format was submitted to USACE for the sampling activities performed at sites located on the Main Base (Earth Tech, Inc. 2001). Sampling activities performed as part of this investigation involved several sites, including the IWL. As shown in Table 5.3-1, arsenic was detected in soil and groundwater sample W-01 at 3.85 mg/kg and 0.201 mg/L, respectively. The detected arsenic concentration in soil exceeds the Region III RBC for residential land use (0.426 mg/kg) and the Region III RBC for migration to groundwater (DAF 20) (0.03 mg/kg). In addition, laboratory analytical results for the groundwater sample (W-01) collected at the IWL indicated that aluminum, arsenic, iron, lead, and manganese were detected at concentrations that exceed their respective secondary MCLs. The analytical results for constituents detected in the groundwater at the IWL that exceeded secondary MCLs during the previous sampling activities are summarized in Table 5.3-2.

## Table 5.3-1. Summary of Soil Analytical Results – Soil Boring Sample Location W-01[a] Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia

| Parameter[b] | Detected Concentration (mg/kg) |
|---|---|
| Aluminum | 5,560 |
| Arsenic | 3.85[c] |
| Barium | 12.2 |
| Calcium | 148 |
| Chromium | 12.2 |
| Copper | 2.64 |
| Iron | 10,200 |
| Lead | 19.1 |
| Magnesium | 63.3 |
| Manganese | 1.62 |
| Mercury | 0.21 |
| Potassium | 258 |
| Vanadium | 19.9 |
| 4,4-DDE | 0.1565 |
| 4,4-DDT | 0.01032 |

[a] W-01 is soil boring sampled during Earth Tech environmental investigation of the IWL.
[b] Laboratory analysis for total metals was conducted using Method 6010B, analysis for pesticides was conducted using Method 8081A.
[c] Detected arsenic concentration in soil exceeds Region III RBC for residential land use (0.426 mg/kg) and Region III RBC for migration to groundwater (DAF 20) (0.03 mg/kg).

## Table 5.3-2. Summary of Groundwater Analytical Results – Sample Location W-01[a] Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia

| Parameter[b] (Total Metals) | Detected Concentration (mg/kg) |
|---|---|
| Aluminum[c] | 64.3 |
| Arsenic[c] | 0.201 |
| Barium | 0.401 |
| Calcium | 24.8 |
| Chromium | 0.094 |
| Copper | 0.058 |
| Iron[c] | 75.4 |
| Lead[c] | 0.033 |
| Magnesium | 6.96 |
| Manganese[c] | 0.513 |
| Nickel | 0.022 |
| Potassium | 3.76 |
| Sodium | 18.4 |
| Vanadium | 0.093 |
| Zinc | 0.177 |

[a] W-01 is groundwater sample identification for groundwater sample collected during Earth Tech environmental investigation of the Industrial Waste Landfill.
[b] Laboratory analysis for metals was conducted using Method 6010B.
[c] Analytical results for the groundwater sample detected at concentrations that exceed their respective secondary MCLs.

### 5.3.2 *Field Investigation*

The LSI field activities followed site-specific project plans that include field sampling and laboratory chemical analyses conducted under project-specific QA/QC and health and safety protocols. The following paragraphs identify the objectives, approach, and field activities conducted during the field investigation of the IWL. The rationale for sampling, the analyte selection, and a discussion of the sampling methodologies are included below.

#### 5.3.2.1 SAIC Field Investigation

Based on the lack of information associated with the IWL, additional evaluation of the IWL for potential environmental concerns was warranted. The objective of the LSI at the IWL was to investigate the potential presence of chemical constituents at the IWL as a result of past disposal practices and to determine if chemical constituents exist in the soils or groundwater at concentrations that exceed human health screening criteria for soils or groundwater.

To assess whether contamination had been released at the IWL, the site-specific sampling plan included in the FSP (SAIC 2002a) proposed the collection of samples from four soil boring locations to characterize current conditions at the IWL. Based on a review of the aerial photographs, surface and subsurface soil samples were collected throughout the IWL at four discrete locations.

Two soil samples, one groundwater sample (using the Hydropunch® technique), and the appropriate QC samples (duplicates) were collected from each of the four soil borings. Soil samples were analyzed for chemical constituents potentially associated with the materials discarded at the IWL (VOCs, SVOCs, and metals). Figure 5.3-1 shows the LSI soil boring locations at the IWL. Tables 5.3-3 and 5.3-4 summarize the soil and groundwater samples collected from the IWL during the LSI field investigation activities.

### 5.3.3 *Investigation Results and Nature and Extent*

This section presents the results of the LSI sampling and analysis. The data collected during the LSI were used to provide a basis for evaluating the magnitude and extent of contamination and conducting the human health screen. Complete analytical results for the soil and groundwater (Hydropunch®) samples collected during the LSI are presented in Appendix G and summarized in Tables 5.3-5 and 5.3-6, respectively.

The LSI included a screening-level evaluation in which soil data collected from the IWL were subject to a human health toxicity screen. The toxicity screen was used to evaluate potential human health effects by comparing site soil data to screening criteria (e.g., RBCs and SSLs for protection of groundwater).

The following paragraphs summarize the chemical constituents detected in the soil and groundwater at the IWL and the results of the screening-level evaluation of the detected constituents. Results of the screening criteria comparisons for the inorganic constituents detected in the soil at the IWL are presented in Table 5.3-7.

#### 5.3.3.1 Soil Boring Results and Nature and Extent

Eight samples (two from each boring) were collected from four soil borings (SB-IWL-01 through SB-IWL-04) at the IWL. Surface soil samples were collected at three of the soil boring locations (SB-IWL-01 through SB-IWL-03) and five subsurface soil samples (≥13 feet BLS) were collected from the four soil borings. The inorganic (metals) and organic (VOCs and SVOCs) constituents detected at the IWL are summarized below.

**Table 5.3-3. Industrial Waste/Sanitary Landfill LSI Soil Boring Samples Wallops Flight Facility, Accomack County, Virginia**

| Borehole I.D. | Borehole Depth (feet) | Field Sample Number | Sample Interval (feet) |
|---|---|---|---|
| SB-IWL-01 | 20 | SAIC01 | 0.0 – 0.5 |
| | | SAIC02 | 16.5 – 17.0 |
| SB-IWL-02 | 20 | SAIC 01 | 0 – 0.5 |
| | | SAIC 02 | 16.0 – 16.5 |
| SB-IWL-03 | 20 | SAIC 01 | 0 – 0.5 |
| | | SAIC 02 | 19.0 – 19.5 |
| SB-IWL-04 | 20 | SAIC 01 | 13.0 – 13.5 |
| | | SAIC 02 | 19.0 – 19.5 |

Notes:
All soil samples collected from the IWL were analyzed for VOCs, SVOCs, and metals. QA/QC sampling followed protocols specified in the FSP (SAIC 2002a).

**Table 5.3-4. Industrial Waste/Sanitary Landfill LSI Hydropunch® Samples Wallops Flight Facility, Accomack County, Virginia**

| Borehole (Hydropunch®) I.D. | Borehole Depth (feet) | Field Sample Number | Screened Interval (feet) |
|---|---|---|---|
| SB-IWL-01 (HP-IWL-01) | 20 | SAIC01 SAIC01D | 16.5 – 20.0 |
| SB-IWL-02 (HP-IWL-02) | 20 | SAIC01 | 16.0 – 20.0 |
| SB-IWL-03 (HP-IWL-03) | 20 | SAIC01 | 19.0 to 20.0 |
| SB-IWL-04 (HP-IWL-04) | 20 | SAIC01 | 19.0 to 20.0 |

Notes:
All groundwater samples collected from the IWL were analyzed for VOCs, SVOCs, and metals. QA/QC sampling followed protocols specified in the FSP (SAIC 2002a).
Duplicate samples were identified using a "D."

# Table 5.3-5. Data Summary: Soil Boring Results, Industrial Waste/Sanitary Landfill
## Wallops Flight Facility, Accomack County, Virginia

| Site ID | | | SB-IWL-01 | | SB-IWL-01 | | SB-IWL-02 | | SB-IWL-02 | | SB-IWL-03 | | SB-IWL-03 | | SB-IWL-04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC02 | | SAIC01 | | SAIC02 | | SAIC01 | | SAIC02 | | SAIC01 | |
| Site Type | | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | |
| Collection Date | | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/07/02 | |
| Depth (ft) | | | 0.00 | | 16.50 | | 0.00 | | 16.00 | | 0.00 | | 19.00 | | 13.00 | |
| ***METALS(6010)*** | | | | | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | | | | | |
| Aluminum | MG/KG | 20 | 4450 | | 2440 | | 3980 | | 6590 | | 3350 | | 608 | | 2610 | |
| Antimony | MG/KG | 0.6 | 0.25 | UJ | 0.22 | UJ | 0.2 | UJ | 0.2 | UJ | 0.2 | UJ | 0.2 | UJ | 0.23 | UJ |
| Arsenic | MG/KG | 1 | 1.8 | | 2 | | 1.5 | | 2 | | 1.1 | B | 0.7 | B | 1.2 | B |
| Barium | MG/KG | 20 | 10.5 | | 3.3 | | 9.5 | | 18.3 | | 4.3 | | 1.1 | | 4.4 | |
| Beryllium | MG/KG | 0.5 | 0.11 | B | 0.06 | B | 0.09 | B | 0.12 | B | 0.08 | B | 0.02 | B | 0.07 | B |
| Cadmium | MG/KG | 0.5 | 0.02 | B | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U |
| Calcium | MG/KG | 100 | 97.8 | | 101 | | 48.1 | B | 144 | | 59.2 | B | 23.3 | B | 108 | |
| Chromium | MG/KG | 1 | 4.2 | | 2.1 | | 3.3 | | 4.2 | | 3.6 | | 0.8 | U | 11.2 | |
| Cobalt | MG/KG | 5 | 1 | J | 0.19 | UJ | 0.6 | J | 0.9 | J | 0.7 | J | 0.08 | UJ | 0.62 | |
| Copper | MG/KG | 1 | 3.1 | | 0.5 | B | 3.2 | | 1 | | 2.7 | | 0.38 | B | 2 | |
| Iron | MG/KG | 10 | 2900 | | 1110 | | 1900 | | 1710 | | 2010 | | 683 | | 2020 | |
| Lead | MG/KG | 0.3 | 3.5 | | 0.7 | | 2.8 | | 2.1 | | 4.5 | | 0.5 | B | 1.4 | |
| Magnesium | MG/KG | 100 | 253 | | 145 | | 145 | | 205 | | 180 | | 30.8 | | 143 | |
| Manganese | MG/KG | 1.5 | 34.4 | | 5.8 | | 21.9 | | 28 | | 18.7 | | 4 | | 38.3 | |
| Nickel | MG/KG | 1 | 2.3 | J | 0.62 | J | 1.3 | J | 1 | J | 2.1 | J | 0.2 | J | 1.7 | J |
| Potassium | MG/KG | 100 | 162 | | 146 | | 114 | | 204 | | 118 | | 29 | U | 131 | |
| Silver | MG/KG | 1 | 0.1 | B | 0.06 | U | 0.06 | B | 0.06 | U | 0.06 | U | 0.06 | U | 0.05 | U |
| Sodium | MG/KG | 100 | 51.3 | UJ | 55 | UJ | 46.3 | UJ | 57.4 | UJ | 45.9 | UJ | 42.6 | UJ | 75.3 | UJ |
| Vanadium | MG/KG | 5 | 6.7 | J | 2.6 | J | 4.6 | J | 4.9 | J | 4.7 | J | 0.8 | J | 3.2 | |
| Zinc | MG/KG | 2 | 7.1 | | 3.8 | | 4.9 | | 3.9 | | 6.7 | | 1.7 | | 3.3 | |
| ***METALS(7471)*** | | | | | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | | | | | |
| Mercury | MG/KG | 0.1 | 0.02 | B | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | | | | | |
| bis(2-Ethylhexyl)phthalate | ug/kg | 330 | 340 | U | 33 | J | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | | | | | |
| 2-Hexanone | ug/kg | 10 | 12 | U | 12 | U | 13 | U | 10 | U | 20 | | 12 | U | 10 | U |
| Acetone | ug/kg | 10 | 12 | U | 12 | U | 14 | U | 10 | U | 32 | U | 12 | U | 41 | U |
| Methyl ethyl ketone | ug/kg | 10 | 12 | UJ | 12 | UJ | 13 | UJ | 10 | UJ | 14 | UJ | 12 | UJ | 5.7 | J |
| Methylene Chloride | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Trichloroethene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |

Created on 5/27/2003

# Table 5.3-5. Data Summary: Soil Boring Results, Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia

| | |
|---|---|
| Site ID | SB-IWL-04 |
| Field Sample Number | SAIC02 |
| Site Type | BORE |
| Collection Date | 08/07/02 |
| Depth (ft) | 19.00 |

***METALS(6010)***

| Parameter | Units | RL | | |
|---|---|---|---|---|
| Aluminum | MG/KG | 20 | 1080 | |
| Antimony | MG/KG | 0.6 | 0.2 | UJ |
| Arsenic | MG/KG | 1 | 1.3 | |
| Barium | MG/KG | 20 | 1.2 | |
| Beryllium | MG/KG | 0.5 | 0.03 | B |
| Cadmium | MG/KG | 0.5 | 0.02 | U |
| Calcium | MG/KG | 100 | 33 | B |
| Chromium | MG/KG | 1 | 1.3 | |
| Cobalt | MG/KG | 5 | 0.24 | U |
| Copper | MG/KG | 1 | 0.42 | U |
| Iron | MG/KG | 10 | 641 | |
| Lead | MG/KG | 0.3 | 0.41 | B |
| Magnesium | MG/KG | 100 | 68.6 | |
| Manganese | MG/KG | 1.5 | 13.4 | |
| Nickel | MG/KG | 1 | 0.49 | J |
| Potassium | MG/KG | 100 | 34.4 | U |
| Silver | MG/KG | 1 | 0.05 | U |
| Sodium | MG/KG | 100 | 51 | UJ |
| Vanadium | MG/KG | 5 | 1.6 | |
| Zinc | MG/KG | 2 | 1.6 | |

***METALS(7471)***

| Parameter | Units | RL | | |
|---|---|---|---|---|
| Mercury | MG/KG | 0.1 | 0.01 | U |

***SEMIVOLATILE ORGANIC COMPOUNDS(8270)***

| Parameter | Units | RL | | |
|---|---|---|---|---|
| bis(2-Ethylhexyl)phthalate | ug/kg | 330 | 380 | U |

***VOLATILE ORGANIC COMPOUNDS(8260)***

| Parameter | Units | RL | | |
|---|---|---|---|---|
| 2-Hexanone | ug/kg | 10 | 10 | U |
| Acetone | ug/kg | 10 | 10 | U |
| Methyl ethyl ketone | ug/kg | 10 | 10 | UJ |
| Methylene Chloride | ug/kg | 5 | 5.2 | U |
| Trichloroethene | ug/kg | 5 | 5.2 | U |

## Table 5.3-5. Data Summary: Soil Boring Results, Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit but greater than or equal to the instrument detection limit.
B – Organics: Analyte was found in the associated method blank. Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25% difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. For SW846 methods, the samples are reported down to the method detection limits (MDL). For metals, the samples are reported down to the instrument detection limit (IDL).
MDL – Method Detection Limit.
SAICXXR – An SAIC field sample number followed by an "R" designates a recollected sample.

# Table 5.3-6. Data Summary: Groundwater Results, Industrial Waste/Sanitary Landfill
## Wallops Flight Facility, Accomack County, Virginia

| Site ID | | | HP-IWL-01 | | HP-IWL-01 | | HP-IWL-02 | | HP-IWL-03 | | HP-IWL-04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01D | | SAIC01 | | SAIC01 | | SAIC01 | |
| Site Type | | | PNCH | | PNCH | | PNCH | | PNCH | | PNCH | |
| Collection Date | | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/07/02 | |
| Depth (ft) | | | 16.50 | | 16.50 | | 16.00 | | 19.00 | | 19.00 | |
| ***METALS(6010)*** | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | |
| Barium | ug/L | 200 | 14.5 | | 14.1 | | 8.6 | | 12.6 | | 19.3 | |
| Calcium | ug/L | 1000 | 26600 | N | 26800 | J | 11500 | J | 15000 | J | 29300 | |
| Cobalt | ug/L | 50 | 1 | B | 0.8 | U | 1.8 | B | 0.8 | B | 0.6 | UJ |
| Copper | ug/L | 10 | 1.5 | U | 1.4 | U | 1 | U | 1.7 | U | 2.8 | U |
| Iron | ug/L | 100 | 187 | | 116 | B | 660 | | 952 | | 568 | |
| Magnesium | ug/L | 1000 | 5210 | | 5250 | | 3460 | | 5160 | | 7820 | |
| Manganese | ug/L | 15 | 128 | | 80.8 | | 91.7 | | 35.8 | | 52.3 | |
| Nickel | ug/L | 10 | 1.1 | U | 1.1 | U | 2.8 | B | 3.9 | B | 1.5 | B |
| Potassium | ug/L | 1000 | 4360 | | 4240 | | 1560 | | 1730 | | 2190 | |
| Sodium | ug/L | 1000 | 12900 | J | 12800 | UJ | 7420 | J | 6290 | J | 7300 | |
| Zinc | ug/L | 20 | 4.2 | U | 4 | U | 7.2 | U | 26.6 | U | 8.6 | U |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | |
| Acetone | ug/L | 5 | 7.1 | UJ | 5 | UJ | 5 | UJ | 5 | UJ | 5 | UJ |
| Carbon disulfide | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| m-and/or p-Xylene | ug/L | 1 | 1 | UJ | 1 | UJ | 0.7 | J | 1 | UJ | 1 | UJ |
| Methylene Chloride | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 2.3 | UJ |
| Toluene | ug/L | 1 | 0.6 | J | 1 | UJ | 1.7 | J | 1.2 | J | 1 | UJ |

Created on 5/27/2003

## Table 5.3-6. Data Summary: Groundwater Results, Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit but greater than or equal to the instrument detection limit.
B – Organics: Analyte was found in the associated method blank. Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25% difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. For SW846 methods, the samples are reported down to the method detection limits (MDL). For metals, the samples are reported down to the instrument detection limit (IDL).
MDL – Method Detection Limit.
SAICXXR – An SAIC field sample number followed by an "R" designates a recollected sample.

# Table 5.3-7. Industrial Waste/Sanitary Landfill
## Metal Constituents Detected Above Screening Criteria in Soil
## Wallops Flight Facility, Accomack County, Virginia

| Sample Interval (Depth) | Constituent | Sample ID | Field Sample Number | Depth (BLS) | Concentration [a] | Units | Protection of Human Health: Concentration Exceeds Residential RBCs Screening Value [b,c] | Protection of Human Health: Concentration Exceeds Industrial RBCs Screening Value [b,c] | Migration to Groundwater: Concentration Exceeds Region III RBC Screening Value [b,c] |
|---|---|---|---|---|---|---|---|---|---|
| Surface Soil (0 to <0.5 feet BLS) | Arsenic | SB-IWL-03 | BORE | 0 | 1.1 | MG/KG | X | | X |
| | | SB-IWL-02 | BORE | 0 | 1.5 | MG/KG | X | | X |
| | | SB-IWL-01 | BORE | 0 | 1.8 | MG/KG | X | | X |
| | Barium | SB-IWL-03 | BORE | 0 | 4.3 | MG/KG | | | |
| | | SB-IWL-02 | BORE | 0 | 9.5 | MG/KG | | | |
| | | SB-IWL-01 | BORE | 0 | 10.5 | MG/KG | | | |
| | Cadmium | SB-IWL-01 | BORE | 0 | 0.02 | MG/KG | | | |
| | Chromium | SB-IWL-02 | BORE | 0 | 3.3 | MG/KG | | | |
| | | SB-IWL-03 | BORE | 0 | 3.5 | MG/KG | | | |
| | | SB-IWL-01 | BORE | 0 | 4.2 | MG/KG | | | |
| | Cobalt | SB-IWL-02 | BORE | 0 | 0.6 | MG/KG | | | |
| | | SB-IWL-03 | BORE | 0 | 0.7 | MG/KG | | | |
| | | SB-IWL-01 | BORE | 0 | 1 | MG/KG | | | |
| | Copper | SB-IWL-03 | BORE | 0 | 2.7 | MG/KG | | | |
| | | SB-IWL-01 | BORE | 0 | 3.1 | MG/KG | | | |
| | | SB-IWL-02 | BORE | 0 | 3.2 | MG/KG | | | |
| | Lead | SB-IWL-02 | BORE | 0 | 2.8 | MG/KG | | | |
| | | SB-IWL-01 | BORE | 0 | 3.5 | MG/KG | | | |
| | | SB-IWL-03 | BORE | 0 | 4.5 | MG/KG | | | |
| | Vanadium | SB-IWL-02 | BORE | 0 | 4.6 | MG/KG | | | |
| | | SB-IWL-03 | BORE | 0 | 4.7 | MG/KG | | | |
| | | SB-IWL-01 | BORE | 0 | 6.7 | MG/KG | | | |
| | Zinc | SB-IWL-03 | BORE | 0 | 6.7 | MG/KG | | | |
| | | SB-IWL-01 | BORE | 0 | 7.1 | MG/KG | | | |
| Subsurface Soil (0.5 to 20 feet BLS) | Arsenic | SB-IWL-03 | BORE | 19 | 0.7 | MG/KG | X | | X |
| | | SB-IWL-04 | BORE | 13 | 1.2 | MG/KG | X | | X |
| | | SB-IWL-04 | BORE | 19 | 1.3 | MG/KG | X | | X |
| | | SB-IWL-01 | BORE | 16.5 | 2 | MG/KG | X | | X |
| | | SB-IWL-02 | BORE | 16 | 2 | MG/KG | X | | X |
| | Barium | SB-IWL-03 | BORE | 19 | 1.1 | MG/KG | | | |
| | | SB-IWL-04 | BORE | 19 | 1.2 | MG/KG | | | |
| | | SB-IWL-01 | BORE | 16.5 | 3.3 | MG/KG | | | |
| | | SB-IWL-04 | BORE | 13 | 4.4 | MG/KG | | | |
| | | SB-IWL-02 | BORE | 16 | 18.3 | MG/KG | | | |
| | Chromium | SB-IWL-04 | BORE | 19 | 1.3 | MG/KG | | | |
| | | SB-IWL-01 | BORE | 16.5 | 2.1 | MG/KG | | | |
| | | SB-IWL-02 | BORE | 16 | 4.2 | MG/KG | | | |
| | | SB-IWL-04 | BORE | 13 | 11.2 | MG/KG | | | |
| | Cobalt | SB-IWL-04 | BORE | 13 | 0.62 | MG/KG | | | |
| | | SB-IWL-02 | BORE | 16 | 0.9 | MG/KG | | | |

## Table 5.3-7. Industrial Waste/Sanitary Landfill
## Metal Constituents Detected Above Screening Criteria in Soil
## Wallops Flight Facility, Accomack County, Virginia

| Sample Interval (Depth) | Constituent | Sample ID | Field Sample Number | Depth (BLS) | Concentration [a] | Units | Protection of Human Health: Concentration Exceeds Residential RBCs Screening Value [b,c] | Protection of Human Health: Concentration Exceeds Industrial RBCs Screening Value [b,c] | Migration to Groundwater: Concentration Exceeds Region III RBC Screening Value [b,c] |
|---|---|---|---|---|---|---|---|---|---|
| | Copper | SB-IWL-03 | BORE | 19 | 0.38 | MG/KG | | | |
| | | SB-IWL-01 | BORE | 16.5 | 0.5 | MG/KG | | | |
| | | SB-IWL-02 | BORE | 16 | 1 | MG/KG | | | |
| | | SB-IWL-04 | BORE | 13 | 2 | MG/KG | | | |
| | Lead | SB-IWL-04 | BORE | 19 | 0.41 | MG/KG | | | |
| | | SB-IWL-03 | BORE | 19 | 0.5 | MG/KG | | | |
| | | SB-IWL-01 | BORE | 16.5 | 0.7 | MG/KG | | | |
| | | SB-IWL-04 | BORE | 13 | 1.4 | MG/KG | | | |
| | | SB-IWL-02 | BORE | 16 | 2.1 | MG/KG | | | |
| | Vanadium | SB-IWL-01 | BORE | 16.5 | 2.6 | MG/KG | | | |
| | | SB-IWL-04 | BORE | 13 | 3.2 | MG/KG | | | |
| | | SB-IWL-02 | BORE | 16 | 4.9 | MG/KG | | | |

[a] Constituent concentrations that exceed screening criteria are listed in ascending order (lowest to highest).
[b] X indicates detected concentration exceeds the screening criteria.
[c] EPA Region III RBCs.

***Inorganic Constituents***—Nineteen inorganic constituents were detected in the surface soil (0 to <0.5 feet BLS) and 16 inorganic constituents were detected in the shallow subsurface soils (>13 to 20 feet BLS) at the IWL. The following paragraphs identify the metals that exceed the industrial, residential, and protection of groundwater RBCs in the different soil horizons:

- Surface soil (0 to <0.5 feet BLS)
  - Industrial – none
  - Residential – arsenic
  - Migration to groundwater – arsenic
- Shallow subsurface soil (0.5 to 29 feet BLS)
  - Industrial – none
  - Residential – arsenic
  - Migration to groundwater – arsenic.

The concentrations and distribution of inorganic constituents detected in the soil at the IWL are presented in Figure 5.3-3. Table 5.3-7 presents the inorganic constituents detected in the soil borings at the IWL that exceed the human health screening criteria and lists the soil boring (sample identification [I.D.] and depth) where the constituent concentration exceeds the screening criteria in the surface and subsurface soil, the detected concentrations that exceed the screening criteria, and the screening criteria that the detected concentration exceeds. The following sections summarize the results of the toxicity screen and characterize the distribution of the inorganic constituents that were detected at concentrations that exceed the human health screening criteria at the IWL.

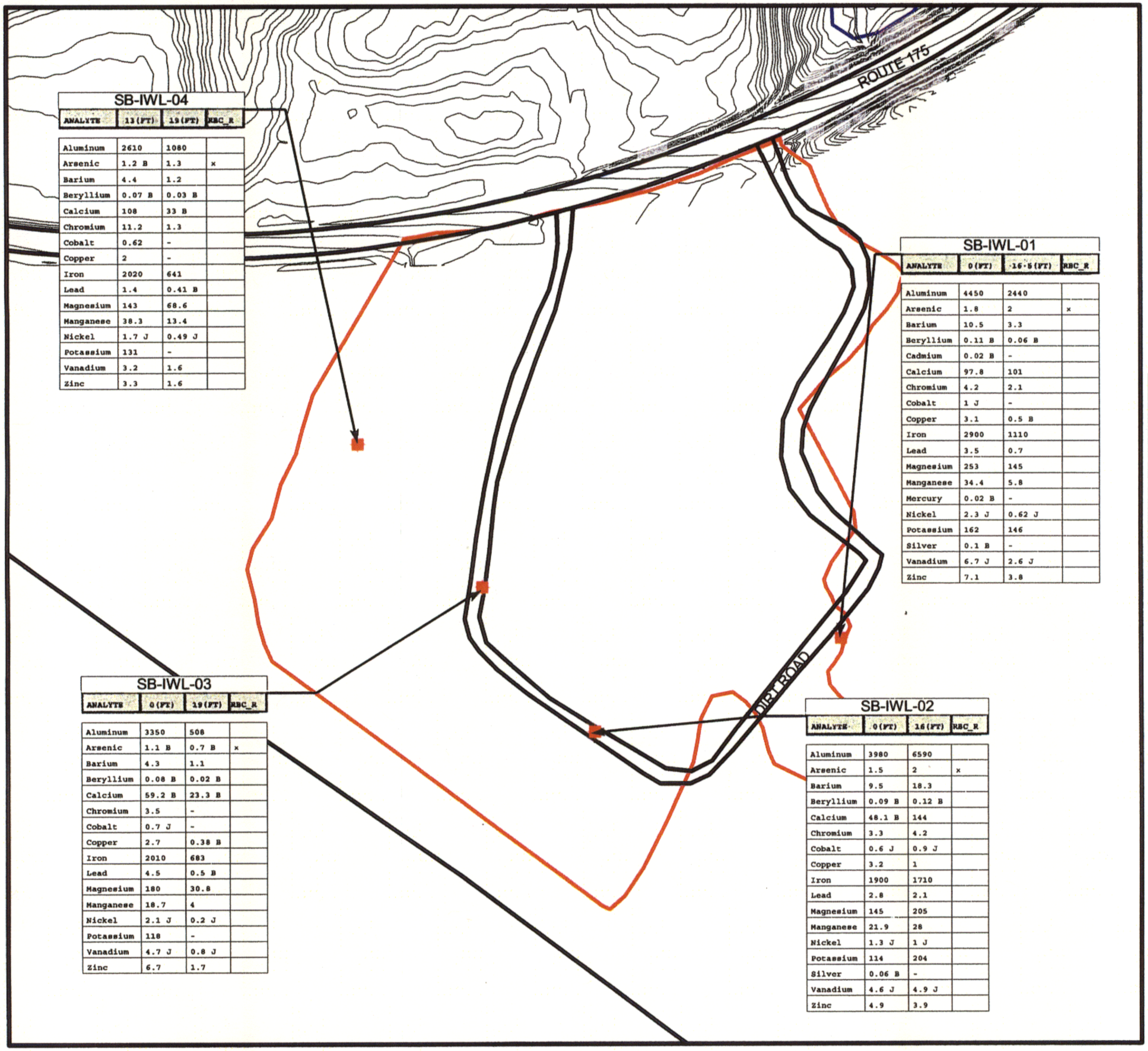
Arsenic was detected in all samples collected from the IWL surface soil at concentrations that exceeded the human health Region III RBCs for residential land use (0.426 mg/kg) and migration to groundwater (0.03 mg/kg). The maximum concentration of arsenic (1.8 mg/kg) detected in the surface soil was detected in the sample collected at SB-IWL-01. Concentrations of arsenic detected in the surface soil at the IWL are consistent, ranging from 1.1 to 1.8 mg/kg.

Arsenic concentrations detected in the subsurface soil also exceeded the Region III RBCs for residential land use and migration to groundwater at all soil boring locations and in all samples collected from the subsurface soils. The maximum concentration (2 mg/kg) of arsenic in the subsurface soil was detected at 16 feet BLS or greater, in samples collected from SB-IWL-01 and SB-IWL-02. No other inorganic constituents were detected at concentrations that exceeded the Region III RBCs for the protection of human health.

***Organic Constituents***—Surface and shallow subsurface soil samples at the IWL were analyzed for VOCs and SVOCs. The following presents the organic constituents that were detected and the screening criteria that were exceeded:

- Surface soil (0 to <0.5 feet BLS)
  - Industrial – none
  - Residential – none
  - Migration to groundwater – none
- Shallow subsurface soil (0.5 to 20 feet BLS)
  - Industrial – none
  - Residential – none
  - Migration to groundwater – none.

The concentrations and distribution of organic constituents detected in the soil at the IWL are presented in Figure 5.3-4.




**SB-IWL-04**

| ANALYTE | 13 (FT) | 19 (FT) | RBC_R |
|---|---|---|---|
| Aluminum | 2610 | 1080 | |
| Arsenic | 1.2 B | 1.3 | x |
| Barium | 4.4 | 1.2 | |
| Beryllium | 0.07 B | 0.03 B | |
| Calcium | 108 | 33 B | |
| Chromium | 11.2 | 1.3 | |
| Cobalt | 0.62 | - | |
| Copper | 2 | - | |
| Iron | 2020 | 641 | |
| Lead | 1.4 | 0.41 B | |
| Magnesium | 143 | 68.6 | |
| Manganese | 38.3 | 13.4 | |
| Nickel | 1.7 J | 0.49 J | |
| Potassium | 131 | - | |
| Vanadium | 3.2 | 1.6 | |
| Zinc | 3.3 | 1.6 | |

**SB-IWL-01**

| ANALYTE | 0 (FT) | 16.5 (FT) | RBC_R |
|---|---|---|---|
| Aluminum | 4450 | 2440 | |
| Arsenic | 1.8 | 2 | x |
| Barium | 10.5 | 3.3 | |
| Beryllium | 0.11 B | 0.06 B | |
| Cadmium | 0.02 B | - | |
| Calcium | 97.8 | 101 | |
| Chromium | 4.2 | 2.1 | |
| Cobalt | 1 J | - | |
| Copper | 3.1 | 0.5 B | |
| Iron | 2900 | 1110 | |
| Lead | 3.5 | 0.7 | |
| Magnesium | 253 | 145 | |
| Manganese | 34.4 | 5.8 | |
| Mercury | 0.02 B | - | |
| Nickel | 2.3 J | 0.62 J | |
| Potassium | 162 | 146 | |
| Silver | 0.1 B | - | |
| Vanadium | 6.7 J | 2.6 J | |
| Zinc | 7.1 | 3.8 | |

**SB-IWL-03**

| ANALYTE | 0 (FT) | 19 (FT) | RBC_R |
|---|---|---|---|
| Aluminum | 3350 | 508 | |
| Arsenic | 1.1 B | 0.7 B | x |
| Barium | 4.3 | 1.1 | |
| Beryllium | 0.08 B | 0.02 B | |
| Calcium | 59.2 B | 23.3 B | |
| Chromium | 3.5 | - | |
| Cobalt | 0.7 J | - | |
| Copper | 2.7 | 0.38 B | |
| Iron | 2010 | 683 | |
| Lead | 4.5 | 0.5 B | |
| Magnesium | 180 | 30.8 | |
| Manganese | 18.7 | 4 | |
| Nickel | 2.1 J | 0.2 J | |
| Potassium | 118 | - | |
| Vanadium | 4.7 J | 0.8 J | |
| Zinc | 6.7 | 1.7 | |

**SB-IWL-02**

| ANALYTE | 0 (FT) | 16 (FT) | RBC_R |
|---|---|---|---|
| Aluminum | 3980 | 6590 | |
| Arsenic | 1.5 | 2 | x |
| Barium | 9.5 | 18.3 | |
| Beryllium | 0.09 B | 0.12 B | |
| Calcium | 48.1 B | 144 | |
| Chromium | 3.3 | 4.2 | |
| Cobalt | 0.6 J | 0.9 J | |
| Copper | 3.2 | 1 | |
| Iron | 1900 | 1710 | |
| Lead | 2.8 | 2.1 | |
| Magnesium | 145 | 205 | |
| Manganese | 21.9 | 28 | |
| Nickel | 1.3 J | 1 J | |
| Potassium | 114 | 204 | |
| Silver | 0.06 B | - | |
| Vanadium | 4.6 J | 4.9 J | |
| Zinc | 4.9 | 3.9 | |

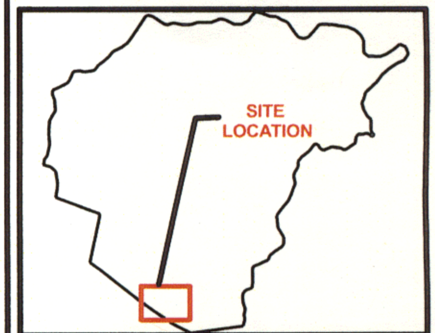
**LEGEND:**

- INSTALLATION BOUNDARY
- SITE BOUNDARY
- ROADS
- WETLAND BOUNDARY
- CONTOURS
- SOIL BORING

**TABLE DEFINITIONS**

***Units = mg/Kg***

- *X = Constituent Failing Screen*
- *— = Non-Detect*
- *J = Value was estimated*
- *B = Value < CRDL but >= IDL*
- *RBC-I = Risk Based Concentration (Industrial Land Use)*
- *RBC-R = Risk Based Concentration (Resdential Land Use)*




KEY MAP
NOT TO SCALE

25 0 25 50 75 Meters

US Army Corps of Engineers

SAIC

**Industrial Waste/Sanitary Landfill Metal Constituents Exceeding Soil Screening Criteria**

Wallops Flight Facility
Wallops Island, Virginia

| FIGURE 5.3-3 | Project: G:\GIS_DATA\WALLOPS\Projects\Sites\wallops_iwl_gis1.apr<br>Layout: Io_Site-WIL_SB_IO | DATE 05/08/03 |
|---|---|---|



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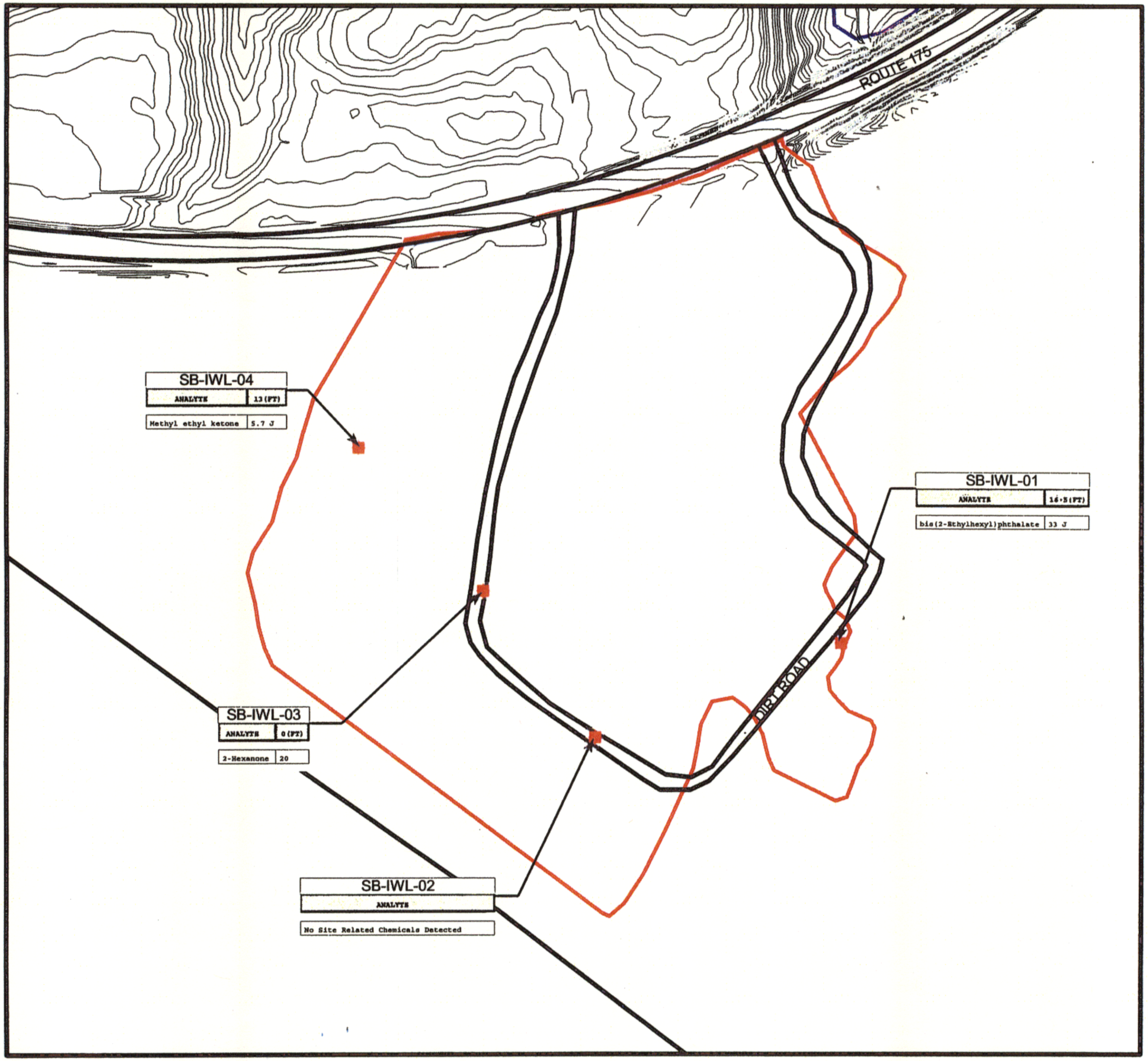


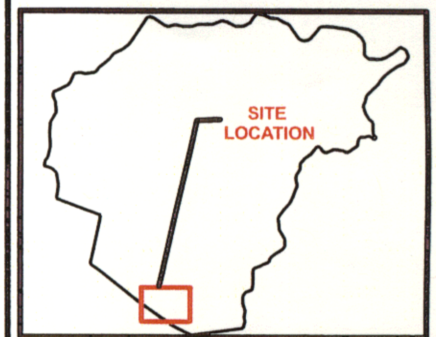

**LEGEND:**

| | |
|---|---|
| (black outline) | INSTALLATION BOUNDARY |
| (red outline) | SITE BOUNDARY |
| (double line) | ROADS |
| (blue line) | WETLAND BOUNDARY |
| (thin line) | CONTOURS |
| (red square) | SOIL BORING |

**TABLE DEFINITIONS**

*Units = µg/Kg*

| | |
|---|---|
| X | = Constituent Failing Screen |
| — | = Non-Detect |
| J | = Value was estimated |
| B | = Value < CRDL but >= IDL |
| RBC-I | = Risk Based Concentration (Industrial Land Use) |
| RBC-R | = Risk Based Concentration (Resdential Land Use) |




KEY MAP
NOT TO SCALE

25 0 25 50 75 Meters

US Army Corps of Engineers.

SAIC.

**Industrial Waste/Sanitary Landfill Organic Constituents Exceeding Soil Screening Criteria**

Wallops Flight Facility
Wallops Island, Virginia

| FIGURE | Project: G:\GIS_DATA\WALLOPS\Projects\Sites\wallops_iwl_gis1.apr<br>Layout: lo_Site-WIL_SB_O | DATE |
|---|---|---|
| 5.3-4 | | 05/08/03 |

#### 5.3.3.2 Groundwater Results and Nature and Extent

As discussed in Section 5.3.2, four Hydropunch® probes (HP-IWL-01 through HP-IWL-04) were installed and sampled at the IWL soil boring sample locations during the WFF LSI. All samples were analyzed for VOCs, SVOCs, and metals. The following sections present the Hydropunch® laboratory analytical results and summarize the nature and extent of constituents detected in the groundwater at the IWL.

*Detected Groundwater Constituents*—Nine inorganic and two organic constituents were detected in the groundwater at the IWL. However, none of these metal or organic constituents detected exceeded the Region III RBCs for tap water or the MCL screening criteria. The concentrations and distribution of inorganic and organic constituents detected in the groundwater at the IWL are presented in Figure 5.3-5.

### 5.3.4 Conclusions and Recommendations

This section presents the conclusions of the LSI for the Industrial Waste/Sanitary Landfill and summarizes recommendations for future site activities. Section 5.3.4.1 summarizes results and conclusions associated with completion of the LSI. Section 5.3.4.2 combines conclusions and site historical information to make recommendations for future site activities.

#### 5.3.4.1 Conclusions

Data collected during the LSI investigation does not indicate that metals or organic compounds have been released to the soils at the IWL. The maximum concentrations of arsenic (2.0 mg/kg) detected in the soils at the IWL are well below the background concentrations of arsenic detected in the State of Virginia. Analytical results for organic compounds detected at the IWL indicate that no organic compounds were detected in the soils at concentrations that exceed the screening criteria.

LSI investigation data also does not indicate that metals or organic compounds have been released to the groundwater at the IWL. The concentrations of metals or organic compounds detected at the IWL are not greater than concentrations of metals or organic compounds detected in the groundwater at other locations at WFF (i.e., there is no evidence that past IWL activities have affected the groundwater quality in any way). Data suggest that concentrations of metals detected in the groundwater are the result of natural conditions. Only two organic compounds (toluene and xylenes) were detected in the groundwater at the IWL and maximum concentrations of these compounds were 1.7J and 0.7 µg/L at HP-IWL-02.

#### 5.3.4.2 Recommendations

Constituent concentrations show few exceedances of human health screening criteria. However, based on information presented in the Draft Desktop Audit Summary Report, limited information is available about historical activities conducted at the site. Therefore, the following activities are recommended at the IWL:

- The final Desktop Audit Summary Report should be reviewed to ensure all relevant historical information associated with the IWL is presented.
- The existing and new soil data should be re-evaluated by comparing analytical results to a site-specific background database.

If no additional sampling is required, based on review of the Final Desktop Audit Summary Report and completion of the background comparison, No Further Action should be recommended.

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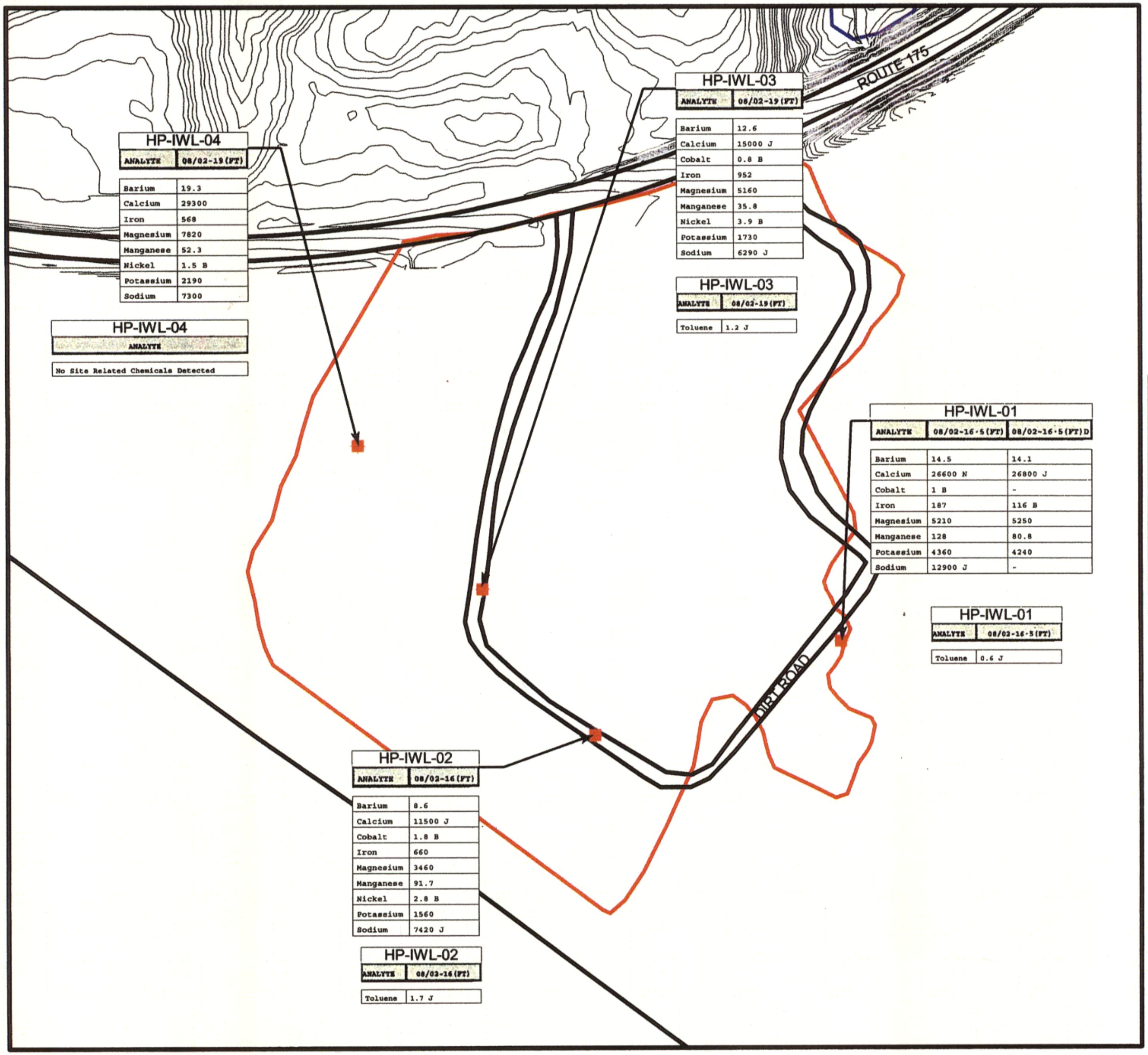



**HP-IWL-04**

| ANALYTE | 08/02-19 (FT) |
|---|---|
| Barium | 19.3 |
| Calcium | 29300 |
| Iron | 568 |
| Magnesium | 7820 |
| Manganese | 52.3 |
| Nickel | 1.5 B |
| Potassium | 2190 |
| Sodium | 7300 |

**HP-IWL-04**

| ANALYTE |
|---|
| No Site Related Chemicals Detected |

**HP-IWL-03**

| ANALYTE | 08/02-19 (FT) |
|---|---|
| Barium | 12.6 |
| Calcium | 15000 J |
| Cobalt | 0.8 B |
| Iron | 952 |
| Magnesium | 5160 |
| Manganese | 35.8 |
| Nickel | 3.9 B |
| Potassium | 1730 |
| Sodium | 6290 J |

**HP-IWL-03**

| ANALYTE | 08/02-19 (FT) |
|---|---|
| Toluene | 1.2 J |

**HP-IWL-01**

| ANALYTE | 08/02-16.5 (FT) | 08/02-16.5 (FT) D |
|---|---|---|
| Barium | 14.5 | 14.1 |
| Calcium | 26600 N | 26800 J |
| Cobalt | 1 B | - |
| Iron | 187 | 116 B |
| Magnesium | 5210 | 5250 |
| Manganese | 128 | 80.8 |
| Potassium | 4360 | 4240 |
| Sodium | 12900 J | - |

**HP-IWL-01**

| ANALYTE | 08/02-16.5 (FT) |
|---|---|
| Toluene | 0.6 J |

**HP-IWL-02**

| ANALYTE | 08/02-16 (FT) |
|---|---|
| Barium | 8.6 |
| Calcium | 11500 J |
| Cobalt | 1.8 B |
| Iron | 660 |
| Magnesium | 3460 |
| Manganese | 91.7 |
| Nickel | 2.8 B |
| Potassium | 1560 |
| Sodium | 7420 J |

**HP-IWL-02**

| ANALYTE | 08/02-16 (FT) |
|---|---|
| Toluene | 1.7 J |

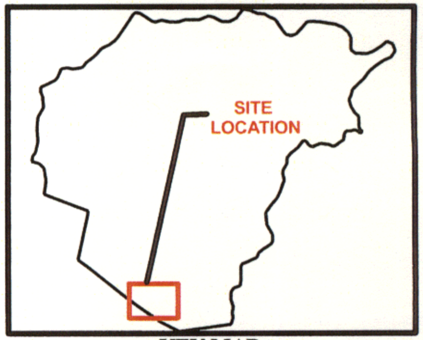
LEGEND:

- SITE BOUNDARY
- ROADS
- WETLAND BOUNDARY
- CONTOURS
- ▲ HYDROPUNCH

TABLE DEFINITIONS

*Units = µg/L*

- *X = Constituent Failing Screen*
- *— = Non-Detect*
- *J = Value was estimated*
- *B = Value < CRDL but >= IDL*
- *RBC = Risk Based Concentration (Region III Tap Water)*
- *MCL = Maximum Concentration Limit*




KEY MAP
NOT TO SCALE

25 0 25 50 75 Meters

US Army Corps of Engineers.

SAIC

**Industrial Waste/Sanitary Landfill**
**Hydropunch Chemical Constituents**
**Exceeding Water Screening Criteria**

Wallops Flight Facility
Wallops Island, Virginia

| FIGURE | Project: G:\GIS_DATA\WALLOPS\Projects\Sites\wallops_iwl_gis1.apr | DATE |
|---|---|---|
| 5.3-5 | Layout: Io_Site-WIL_Hydropunch | 05/08/03 |

0120A114

## 5.4 CONSTRUCTION DEBRIS LANDFILL

This section presents the results of the LSI for the CDL. A description and history of the site, a summary of the site conditions and environmental setting, and an overview of previous environmental investigations conducted at the site are provided in Section 5.4.1. Section 5.4.2 discusses the LSI activities conducted at the CDL. Section 5.4.3 presents the laboratory analytical results of the LSI field investigation and the nature and extent of contamination at the CDL. The results of the human health toxicological screen associated with the constituents identified during the investigation are presented in Section 5.4.4. Conclusions and recommendations for the CDL are summarized in Section 5.4.5.

### *5.4.1 Site Description, History, and Environmental Setting*

Information pertinent to the physical description of the CDL and the environmental setting for the site was obtained from historical site maps, aerial photographs, anecdotal evidence, site visual inspections, and information and data presented in previous site investigations and studies. Topographic information was obtained from the EG&G, Inc. digital base map. Relevant site-specific data and information were very limited because former investigation activities were not conducted within the area currently identified as the CDL.

#### 5.4.1.1 Site Description and History

The current area identified as the CDL was identified during a recent review of historical aerial EPIC photographs (EPA 1996). Those photographs indicated that a possible dump site/burning dump disposal area may have existed along the northeastern boundary of the WFF. The map also depicts various ground features present in the vicinity of the CDL in 1954. The PRP Analysis (NASA 2001) concluded that DOD and USACE should assume responsibility for the CDL under the FUDS program. Figure 5.4-1 shows the location of the current CDL at the WFF.

#### 5.4.1.2 Site Conditions and Environmental Setting

The CDL is located along the northeastern boundary of the WFF. The former landfill is situated along the northeastern slope of a hillside that grades into the tidal marshes. The change in topographic relief, approximately 30 feet, is greatest along the northern portion of the site. A man-made channel skirts the northern boundary of the site. The site is approximately 6 acres and is overgrown by dense woodland brush, young trees, and dense vegetative cover. A temporary access road was created through the central portion of the site by WFF personnel prior to the arrival of the SAIC sampling team. The photograph presented in Figure 5.4-2 shows the current conditions of the CDL and the physical features of the surrounding area.

The hydrologic conditions at the CDL have not been characterized based on data collected previously at the site. No soil boring lithologic data have been identified during the review of the site-specific data, so a lithologic description of the subsurface soil is limited to data collected during this LSI.

#### 5.4.1.3 Background and Previous Site Investigation Activities

In November 1990, an ESS Report provided an overview of sites known to have impacted the environment, their investigation status, and identified additional sites for future investigation. The ESS identified 24 separate sites with the potential to have been affected by past activities. The CDL was identified as 1 of 14 sites that had not been investigated to date and the report indicated that no information currently was available for the site. As a result, the ESS concluded that additional investigation at the CDL was warranted.

In January 2000, Earth Tech, Inc. submitted a summary report to NASA (Earth Tech, Inc. 2000) for work conducted at the WFF. The report identified potential environmental impacts at the identified FUDS sites and evaluated the need for future environmental studies. Work performed at the CDL as part of this report included: a site visit, personnel interviews, drilling and sampling of one DPT soil boring, and laboratory analysis on a soil and groundwater sample collected during the investigation. An RRE performed using existing data found the relative risk to be high. Tables 5.4-1 and 5.4-2 present the laboratory analytical results for soil and groundwater samples collected from soil boring W-02 during the investigation, respectively.

In December 2001, a status summary report was submitted to USACE for the sampling activities performed at sites located on the Main Base (Earth Tech, Inc. 2001). Sampling activities performed as part of this investigation involved several sites, including the CDL. As shown in Table 5.4-1, arsenic was detected in soil sample W-02 at 2.7 mg/kg. The detected concentration exceeds the Region III RBC of 0.426 mg/kg for residential land use. In addition, laboratory analytical results for the groundwater sample (W-02) collected at the CDL indicated that aluminum, iron, and manganese were detected at concentrations that exceed their respective secondary MCLs. The analytical results for constituents detected in the groundwater at the CDL that exceeded Region III RBCs or secondary MCLs during the previous sampling activities are summarized in Table 5.4-2.

### *5.4.2 Field Investigation*

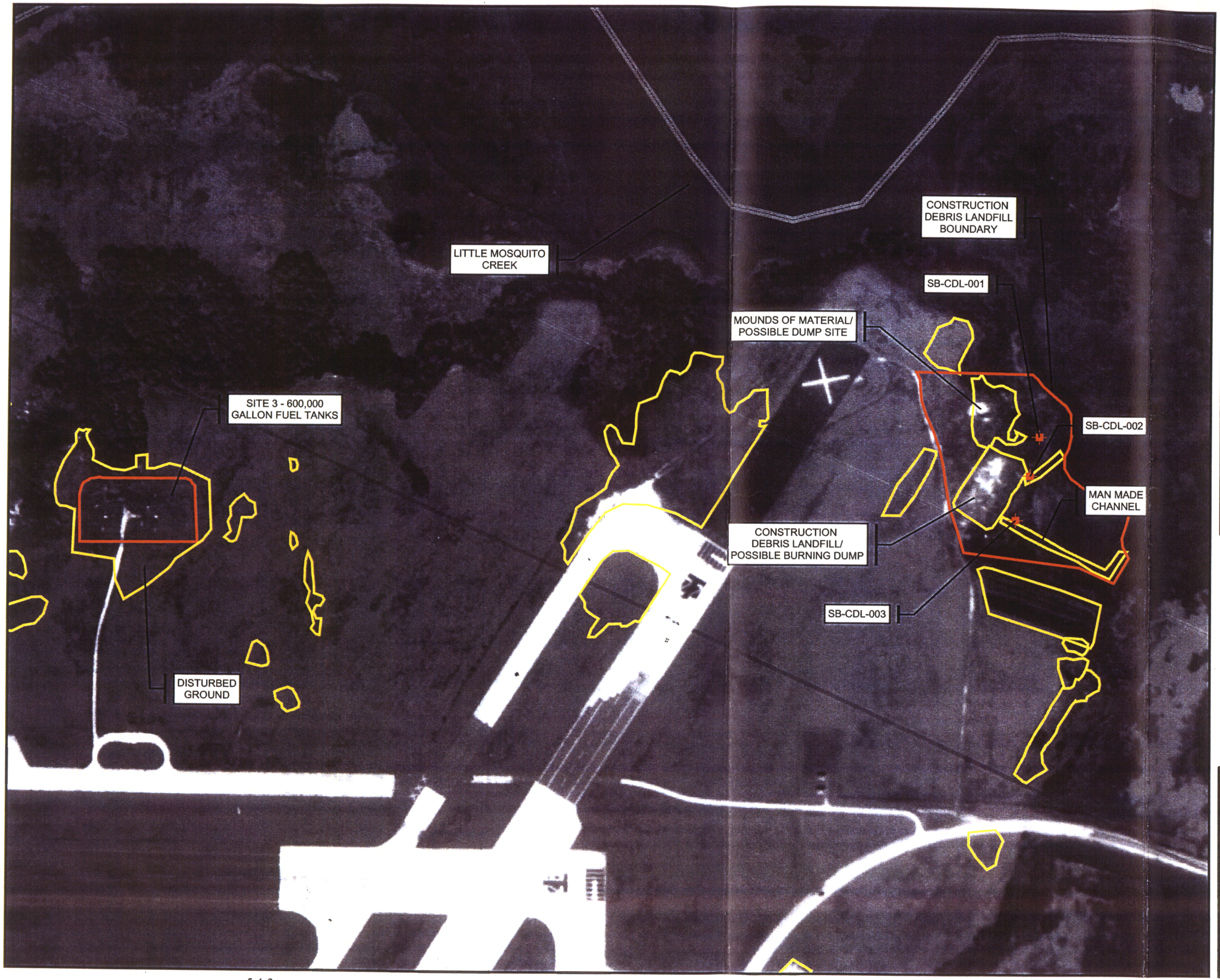
The LSI field activities followed site-specific project plans that include field sampling and laboratory chemical analyses conducted under project-specific QA/QC and health and safety protocols. The following paragraphs identify the objectives, approach, and field activities conducted during the field investigation of the CDL. The rationale for sampling, the analyte selection, and a discussion of the sampling methodologies also are included.

#### 5.4.2.1 SAIC Field Investigation

Because of the lack of information associated with the possible dump site/burning dump disposal area, environmental evaluation of the site for potential environmental concerns was required. The objective of the LSI was to investigate the potential presence of chemical constituents at the CDL as a result of past disposal practices and to determine if chemical constituents exist in the soils or groundwater at concentrations that exceed human health screening criteria.

To assess whether contamination had been released at the CDL, the site-specific sampling plan included in the FSP (SAIC 2002a) proposed the collection of samples from three soil boring locations to characterize current conditions at the CDL. Based on a review of the aerial photographs, surface and subsurface soil samples were collected at three discrete locations. One soil boring (SB-CDL-01) was located directly downslope (downgradient) from the area identified as the former disposal area. One boring (SB-CDL-02) was located adjacent to the northern man-made channel and one soil boring (SB-CDL-03) was located adjacent to the southern man-made channel. Two soil samples, one groundwater sample (Hydropunch® sample), and the appropriate QC samples (duplicates) were collected from each of the three soil borings. Soil samples were analyzed for chemical constituents potentially associated with the materials discarded at the CDL (VOCs, SVOCs, and metals). Figure 5.4-1 shows the LSI soil boring locations at the CDL. Tables 5.4-3 and 5.4-4 summarize the soil and groundwater samples, respectively, collected from the CDL during the LSI field investigation activities.

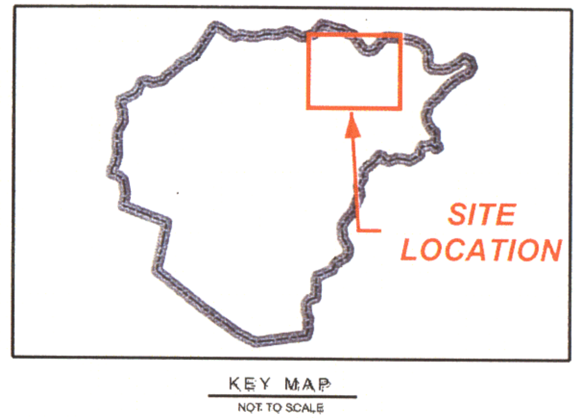
During the drilling of SB-CDL-01, a zone of black, saturated sand was encountered at approximately 7.5 feet BLS. The material generated a very strong hydrocarbon odor and registered elevated PID reading, resulting in the instruments alarm to sound during the monitoring of the interval of greatest discoloration, 7.5 to 8 feet BLS. During the collection of the next core barrel (8 to 12 feet BLS),




**Legend**

- 1954 GROUND FEATURES
- INSTALLATION BOUNDARY
- SITE BOUNDARY
- SOIL BORING

Notes: NAD 1983 UTM Zone 18N
Aerial Photo taken 10/5/1959





US Army Corps of Engineers.

SAIC An Employee-Owned Company

CONSTRUCTION DEBRIS LANDFILL
SITE LOCATION MAP

WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

PROJECT: \GIS_DATA\Wallops\Projects\General\Wallops_CDL_Location_Map.mxd

| FIGURE: 5.4-1 | DATE: 11/06/02 |
|---|---|

Figure 5.4-2. Construction Debris Landfill – Site Conditions Photograph

**Table 5.4-1. Soil Boring Location W-2[a]**
**Summary of Soil Boring Analytical Results – Construction Debris Landfill**
**Wallops Flight Facility, Accomack County, Virginia**

| Parameter[b] | Detected Concentration (mg/kg) |
|---|---|
| Aluminum | 2,740 |
| Arsenic | 2.7[c] |
| Barium | 3.67 |
| Calcium | 18.9 |
| Chromium | 15.3 |
| Copper | 2.32 |
| Iron | 12,800 |
| Lead | 9.65 |
| Magnesium | 12.9 |
| Manganese | 3.28 |
| Potassium | 143 |
| Vanadium | 15.8 |

[a] W-02 is soil boring identification for boring installed during Earth Tech environmental investigation of the CDL.

[b] Laboratory analysis for total metals was conducted using Method 6010B.

[c] Detected arsenic concentration in soil exceeds Region III RBC for residential land use (0.426 mg/kg) and Region III RBC for migration to groundwater (DAF 20) (0.03 mg/kg).

## Table 5.4-2. Groundwater Sample Location W-02[a]
## Summary of Groundwater Analytical Results – Construction Debris Landfill
## Wallops Flight Facility, Accomack County, Virginia

| Parameter[b] | Detected Concentration (mg/kg) |
|---|---|
| Aluminum (Total) | 35.3[c] |
| Barium (Total) | 0.053 |
| Calcium (Total) | 32.7 |
| Chromium (Total) | 0.047 |
| Copper (Total) | 0.035 |
| Iron (Total) | 8.65[c] |
| Lead (Total) | 0.01 |
| Magnesium (Total) | 1.91 |
| Manganese (Total) | 0.073[c] |
| Nickel (Total) | 0.013 |
| Sodium (Total) | 4.43 |
| Zinc (Total) | 0.027 |

a W-02 is groundwater sample identification for groundwater sample collected during Earth Tech environmental investigation of the CDL.

b Laboratory analysis for total metals was conducted using Method 6010B.

c Analytical results for the groundwater sample detected at concentrations that exceed their respective secondary MCLs.

## Table 5.4-3. Construction Debris Landfill Soil Boring Samples
## Wallops Flight Facility, Accomack County, Virginia

| Borehole I.D. | Borehole Depth (feet) | Field Sample Number | Sample Interval (feet) |
|---|---|---|---|
| SB-CDL-01 | 16 | SAIC01 | 6.5 – 7.0 |
| | | SAIC02 | 9.0 – 9.5 |
| SB-CDL-02 | 8 | SAIC 01 | 0 – 0.5 |
| | | SAIC01D | 0 – 0.5 |
| | | SAIC 02 | 7.0 – 7.5 |
| SB-CDL-03 | 4 | SAIC 01 | 0 – 0.5 |
| | | SAIC 02 | 4.0 – 4.5 |

Notes:

All soil samples collected from the CDL were analyzed for VOCs, SVOCs, and metals. QA/QC sampling followed protocols specified in the FSP (SAIC 2002a).

Duplicate samples were identified using a "D."

## Table 5.4-4. Construction Debris Landfill Hydropunch® Samples
## Wallops Flight Facility, Accomack County, Virginia

| Borehole (Hydropunch®) I.D. | Borehole Depth (feet) | Field Sample Number | Screened Interval (feet) |
|---|---|---|---|
| SB-CDL-01 (HP-CDL-01) | 16 | SAIC01 | 14 – 16 |
| SB-CDL-02 (HP-CDL-02) | 8 | SAIC 01 | 6 – 8 |
| SB-CDL-03 (HP-CDL-03) | 4 | SAIC 01 | 2 – 4 |

Notes:

All groundwater samples collected from the CDL were analyzed for VOCs, SVOCs, and metals. QA/QC sampling followed protocols specified in the FSP (SAIC 2002a).

Duplicate samples were identified using a "D."

the water table was encountered and the discoloration of the soils became more pronounced. In an effort to determine the vertical extent of the discolored material, a fourth Geoprobe® sample (12 to 16 feet BLS) was collected from SB-CDL-01; however the sands remained discolored to the total depth of the boring. Because of these results, a surface soil was not collected at SB-CDL-01. Instead, a sample was collected from the soil groundwater interface at the interval directly above the discolored soil (zone of transition above contamination) and an interval of complete discoloration and saturation (greatest contamination) at approximately 9 feet BLS. Additional information about the site conditions at SB-CDL-01 is presented in the soil boring logs (Appendix A).

### 5.4.3 Investigation Results and Nature and Extent

This section presents the results of the LSI sampling and analysis. The data collected during the LSI were used to provide a basis for evaluating the magnitude and extent of contamination at the site and to conduct the human health screen to determine if constituent concentrations are present that could pose a risk to human receptors. Complete analytical results for the soil and groundwater samples are presented in Appendix G and summarized in Tables 5.4-5 and 5.4-6, respectively, at the end of Section 5.4.

The LSI included a screening-level evaluation in which soil and groundwater data collected from the CDL were subject to a human health toxicity screen. The soil toxicity screen was used to evaluate potential human health effects by comparing site soil data to screening criteria (e.g., RBCs and SSLs for protection of groundwater). A groundwater toxicity screen was used to evaluate potential effects to human health by comparing constituent concentrations detected in the groundwater at the CDL against EPA Region III RBCs for tap water and the Federal MCLs.

The following paragraphs summarize the chemical constituents detected in the soil and groundwater at the CDL and the results of the screening-level evaluation of the detected constituents. Results of the screening criteria comparisons for the soil (inorganic and organic) and groundwater (inorganic and organic) constituents at the CDL are presented in Tables 5.4-7 through 5.4-10, respectively

#### 5.4.3.1 Soil Boring Results and Nature and Extent

Seven soil samples (two from each boring and one duplicate) were collected during the installation of three soil borings (SB-CDL-01 through SB-CDL-03) at the CDL. The inorganic (metals) and organic (VOCs and SVOCs) constituents detected at the CDL are summarized below.

***Inorganic Constituents***—Twenty-one inorganic constituents were detected in the surface soil (0 to <0.5 feet BLS) and shallow subsurface soils (0.5 to 15 feet BLS) at the CDL. No samples were collected from the deep subsurface soils (>15 feet BLS) during the investigation of the CDL. Soil boring depth was limited to <16 feet BLS; therefore, no deep subsurface soil samples were collected at the site. The following paragraphs identify the metals that exceed the industrial, residential, and protection of groundwater RBCs in the different soil horizons:

- Surface soil (0 to <0.5 feet BLS)
  - Industrial – arsenic
  - Residential – arsenic and iron
  - Migration to groundwater – arsenic and silver
- Shallow subsurface soil (0.5 to 15 feet BLS)
  - Industrial – arsenic
  - Residential – arsenic and iron
  - Migration to groundwater – arsenic

# Table 5.4-5. Data Summary: Soil Boring Results, Construction Debris Landfill
## Wallops Flight Facility, Accomack County, Virginia

| Site ID | | | SB-CDL-01 | SB-CDL-01 | SB-CDL-02 | SB-CDL-02 | SB-CDL-02 | SB-CDL-03 | SB-CDL-03 |
|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | SAIC02 | SAIC01 | SAIC01D | SAIC02 | SAIC01 | SAIC02 |
| Site Type | | | BORE | BORE | BORE | BORE | BORE | BORE | BORE |
| Collection Date | | | 08/07/02 | 08/07/02 | 08/07/02 | 08/07/02 | 08/07/02 | 08/07/02 | 08/07/02 |
| Depth (ft) | | | 6.50 | 9.00 | 0.00 | 0.00 | 7.00 | 0.00 | 4.00 |
| ***METALS(6010)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Aluminum | MG/KG | 20 | 7170 | 4140 | 29100 | 31200 | 6770 | 44400 | 11000 |
| Antimony | MG/KG | 0.8 | 0.21 UJ | 0.22 UJ | 1.2 UJ | 1.7 UJ | 0.24 UJ | 23.5 J | 3.4 UJ |
| Arsenic | MG/KG | 1 | 1.6 | 0.54 B | 5 B | 6.9 B | 1.9 | 5.3 B | 6.9 |
| Barium | MG/KG | 20 | 15.9 | 5.2 | 371 | 325 | 30.6 | 240 | 55.3 |
| Beryllium | MG/KG | 0.5 | 0.17 | 0.15 | 0.41 B | 0.4 B | 0.34 | 0.4 B | 0.28 |
| Cadmium | MG/KG | 0.5 | 0.03 B | 0.02 U | 25.9 | 29.7 | 0.04 B | 23.9 | 4.9 |
| Calcium | MG/KG | 100 | 3480 | 546 | 2940 | 2710 | 626 | 1750 | 871 |
| Chromium | MG/KG | 1 | 7.6 | 3.7 | 26.8 | 29.7 | 6.7 | 53 | 19.7 |
| Cobalt | MG/KG | 5 | 1.3 | 1.2 | 3 | 3.8 | 1.6 | 3.6 | 4.3 |
| Copper | MG/KG | 1 | 3.5 | 1.5 U | 1110 | 1240 | 2.5 | 2660 | 155 |
| Iron | MG/KG | 10 | 3740 | 2100 | 7740 | 34300 | 4420 | 10700 | 39200 |
| Lead | MG/KG | 0.3 | 9.8 | 12.4 | 266 | 253 | 4 | 947 | 141 |
| Magnesium | MG/KG | 100 | 288 | 134 | 1450 | 1390 | 660 | 1950 | 843 |
| Manganese | MG/KG | 1.5 | 30.8 | 6.7 | 407 | 642 | 45.3 | 387 | 185 |
| Nickel | MG/KG | 1 | 4.2 J | 2.2 J | 10.8 J | 12.7 J | 3.9 J | 110 U | 15.4 J |
| Potassium | MG/KG | 100 | 179 | 99 | 565 | 518 | 256 | 389 | 387 |
| Selenium | MG/KG | 0.5 | 0.23 B | 0.22 U | 1.2 U | 1.3 B | 0.37 B | 2 B | 1 B |
| Silver | MG/KG | 1 | 0.05 U | 0.05 U | 0.29 U | 0.33 B | 0.06 U | 16.8 | 1.6 |
| Sodium | MG/KG | 100 | 73.5 UJ | 62.4 UJ | 163 UJ | 113 UJ | 76.4 UJ | 150 UJ | 39.6 UJ |
| Thallium | MG/KG | 1 | 0.47 U | 0.49 U | 2.8 U | 2.8 U | 0.53 U | 2.7 U | 1.4 B |
| Vanadium | MG/KG | 5 | 7.5 | 3.9 | 14.1 | 14.7 | 9.7 | 13.2 | 15.6 |
| Zinc | MG/KG | 2 | 14.5 | 3.2 | 1400 | 1420 | 15.9 | 1030 | 258 |
| ***METALS(7471)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Mercury | MG/KG | 0.1 | 0.04 | 0.02 U | 0.33 | 0.08 | 0.02 B | 0.32 | 0.04 |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| 2-Methylnaphthalene | ug/kg | 330 | 370 U | 2500 | 360 U | 360 U | 400 U | 380 U | 410 U |
| Acenaphthene | ug/kg | 330 | 72 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Anthracene | ug/kg | 330 | 150 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Benzo(a)anthracene | ug/kg | 330 | 270 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Benzo(a)pyrene | ug/kg | 330 | 220 J | 400 U | 360 U | 360 U | 400 U | 37 J | 410 U |
| Benzo(b)fluoranthene | ug/kg | 330 | 260 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Benzo(g,h,i)perylene | ug/kg | 330 | 150 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Benzo(k)fluoranthene | ug/kg | 330 | 94 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| bis(2-Ethylhexyl)phthalate | ug/kg | 330 | 370 U | 400 U | 360 U | 25 J | 400 U | 65 J | 410 U |
| Carbazole | ug/kg | 330 | 79 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Chrysene | ug/kg | 330 | 210 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Dibenzofuran | ug/kg | 330 | 44 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Di-n-butyl phthalate | ug/kg | 330 | 370 U | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Fluoranthene | ug/kg | 330 | 430 | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Fluorene | ug/kg | 330 | 78 J | 95 J | 360 U | 360 U | 400 U | 380 U | 410 U |
| Indeno(1,2,3-cd)pyrene | ug/kg | 330 | 110 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Naphthalene | ug/kg | 330 | 55 J | 830 | 360 U | 360 U | 400 U | 380 U | 410 U |

## Table 5.4-5. Data Summary: Soil Boring Results, Construction Debris Landfill
## Wallops Flight Facility, Accomack County, Virginia

| Site ID | | | SB-CDL-01 | SB-CDL-01 | SB-CDL-02 | SB-CDL-02 | SB-CDL-02 | SB-CDL-03 | SB-CDL-03 |
|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | SAIC02 | SAIC01 | SAIC01D | SAIC02 | SAIC01 | SAIC02 |
| Site Type | | | BORE | BORE | BORE | BORE | BORE | BORE | BORE |
| Collection Date | | | 08/07/02 | 08/07/02 | 08/07/02 | 08/07/02 | 08/07/02 | 08/07/02 | 08/07/02 |
| Depth (ft) | | | 6.50 | 9.00 | 0.00 | 0.00 | 7.00 | 0.00 | 4.00 |
| ***METALS(6010)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Aluminum | MG/KG | 20 | 7170 | 4140 | 29100 | 31200 | 6770 | 44400 | 11000 |
| Antimony | MG/KG | 0.6 | 0.21 UJ | 0.22 UJ | 1.2 UJ | 1.7 UJ | 0.24 UJ | 23.5 J | 3.4 UJ |
| Arsenic | MG/KG | 1 | 1.6 | 0.54 B | 5 B | 6.9 B | 1.9 | 5.3 B | 6.9 |
| Barium | MG/KG | 20 | 15.9 | 5.2 | 371 | 325 | 30.6 | 240 | 55.3 |
| Beryllium | MG/KG | 0.5 | 0.17 | 0.15 | 0.41 B | 0.4 B | 0.34 | 0.4 B | 0.28 |
| Cadmium | MG/KG | 0.5 | 0.03 B | 0.02 U | 25.9 | 29.7 | 0.04 B | 23.9 | 4.9 |
| Calcium | MG/KG | 100 | 3480 | 546 | 2940 | 2710 | 626 | 1750 | 871 |
| Chromium | MG/KG | 1 | 7.6 | 3.7 | 26.8 | 29.7 | 6.7 | 53 | 19.7 |
| Cobalt | MG/KG | 5 | 1.3 | 1.2 | 3 | 3.8 | 1.6 | 3.6 | 4.3 |
| Copper | MG/KG | 1 | 3.5 | 1.5 U | 1110 | 1240 | 2.5 | 2660 | 155 |
| Iron | MG/KG | 10 | 3740 | 2100 | 7740 | 34300 | 4420 | 10700 | 39200 |
| Lead | MG/KG | 0.3 | 9.8 | 12.4 | 266 | 253 | 4 | 947 | 141 |
| Magnesium | MG/KG | 100 | 288 | 134 | 1450 | 1390 | 660 | 1950 | 843 |
| Manganese | MG/KG | 1.5 | 30.8 | 6.7 | 407 | 642 | 45.3 | 387 | 185 |
| Nickel | MG/KG | 1 | 4.2 J | 2.2 J | 10.8 J | 12.7 J | 3.9 J | 110 U | 15.4 J |
| Potassium | MG/KG | 100 | 179 | 99 | 565 | 518 | 255 | 389 | 387 |
| Selenium | MG/KG | 0.5 | 0.23 B | 0.22 U | 1.2 U | 1.3 B | 0.37 B | 2 B | 1 B |
| Silver | MG/KG | 1 | 0.05 U | 0.05 U | 0.29 U | 0.33 B | 0.06 U | 16.8 | 1.6 |
| Sodium | MG/KG | 100 | 73.5 UJ | 62.4 UJ | 163 UJ | 113 UJ | 76.4 UJ | 150 UJ | 39.6 UJ |
| Thallium | MG/KG | 1 | 0.47 U | 0.49 U | 2.8 U | 2.8 U | 0.53 U | 2.7 U | 1.4 B |
| Vanadium | MG/KG | 5 | 7.5 | 3.9 | 14.1 | 14.7 | 9.7 | 13.2 | 15.6 |
| Zinc | MG/KG | 2 | 14.5 | 3.2 | 1400 | 1420 | 15.9 | 1030 | 258 |
| ***METALS(7471)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Mercury | MG/KG | 0.1 | 0.04 | 0.02 U | 0.33 | 0.08 | 0.02 B | 0.32 | 0.04 |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| 2-Methylnaphthalene | ug/kg | 330 | 370 U | 2500 | 360 U | 360 U | 400 U | 380 U | 410 U |
| Acenaphthene | ug/kg | 330 | 72 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Anthracene | ug/kg | 330 | 150 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Benzo(a)anthracene | ug/kg | 330 | 270 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Benzo(a)pyrene | ug/kg | 330 | 220 J | 400 U | 360 U | 360 U | 400 U | 37 J | 410 U |
| Benzo(b)fluoranthene | ug/kg | 330 | 260 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Benzo(g,h,i)perylene | ug/kg | 330 | 150 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Benzo(k)fluoranthene | ug/kg | 330 | 94 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| bis(2-Ethylhexyl)phthalate | ug/kg | 330 | 370 U | 400 U | 360 U | 25 J | 400 U | 65 J | 410 U |
| Carbazole | ug/kg | 330 | 79 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Chrysene | ug/kg | 330 | 210 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Dibenzofuran | ug/kg | 330 | 44 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Di-n-butyl phthalate | ug/kg | 330 | 370 U | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Fluoranthene | ug/kg | 330 | 430 | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Fluorene | ug/kg | 330 | 78 J | 95 J | 360 U | 360 U | 400 U | 380 U | 410 U |
| Indeno(1,2,3-cd)pyrene | ug/kg | 330 | 110 J | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| Naphthalene | ug/kg | 330 | 55 J | 830 | 360 U | 360 U | 400 U | 380 U | 410 U |

## Table 5.4-5. Data Summary: Soil Boring Results, Construction Debris Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | SB-CDL-01 | SB-CDL-01 | SB-CDL-02 | SB-CDL-02 | SB-CDL-02 | SB-CDL-03 | SB-CDL-03 |
|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | SAIC02 | SAIC01 | SAIC01D | SAIC02 | SAIC01 | SAIC02 |
| Site Type | | | BORE | BORE | BORE | BORE | BORE | BORE | BORE |
| Collection Date | | | 08/07/02 | 08/07/02 | 08/07/02 | 08/07/02 | 08/07/02 | 08/07/02 | 08/07/02 |
| Depth (ft) | | | 6.50 | 9.00 | 0.00 | 0.00 | 7.00 | 0.00 | 4.00 |
| Phenanthrene | ug/kg | 330 | 530 | 63 J | 360 U | 360 U | 400 U | 380 U | 410 U |
| Pyrene | ug/kg | 330 | 510 | 400 U | 360 U | 360 U | 400 U | 380 U | 410 U |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| 1,2-Dichloropropane | ug/kg | 5 | 5.5 U | 2000 J | 6 U | 6.4 U | 4.8 U | 9.5 U | 5.7 U |
| Acetone | ug/kg | 10 | 12 U | 4100 UJ | 36 U | 55 U | 9.5 U | 55 U | 15 U |
| Carbon disulfide | ug/kg | 5 | 5.5 U | 2100 U | 6 U | 6.4 U | 4.8 U | 9.5 U | 5.7 U |
| Chloromethane | ug/kg | 5 | 5.5 U | 2100 U | 6 U | 6.4 U | 4.8 U | 87 | 5.7 U |
| Ethylbenzene | ug/kg | 5 | 5.5 U | 12000 J | 6 U | 6.4 U | 4.8 U | 9.5 U | 5.7 U |
| m-and/or p-Xylene | ug/kg | 5 | 5.5 U | 9600 J | 6 U | 6.4 U | 4.8 U | 9.5 U | 5.7 U |
| Methylene Chloride | ug/kg | 5 | 5.6 U | 2200 U | 6 U | 6.4 U | 4.8 U | 9.7 UJ | 5.7 U |
| Tetrachloroethene | ug/kg | 5 | 5.5 U | 1100 J | 6 U | 6.4 U | 4.8 U | 9.5 U | 5.7 U |
| Trichloroethene | ug/kg | 5 | 5.5 U | 2100 U | 6 U | 6.4 U | 4.8 U | 9.5 U | 5.7 U |

## Table 5.4-5. Data Summary: Soil Boring Results, Construction Debris Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit but greater than or equal to the instrument detection limit.
B – Organics: Analyte was found in the associated method blank. Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25% difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. For SW846 methods, the samples are reported down to the method detection limits (MDL). For metals, the samples are reported down to the instrument detection limit (IDL).
MDL – Method Detection Limit.
SAICXXR – An SAIC field sample number followed by an "R" designates a recollected sample.

## Table 5.4-6. Data Summary: Groundwater Results, Construction Debris Landfill Wallops Flight Facility, Accomack County, Virginia

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Site ID | | | HP-CDL-01 | | HP-CDL-02 | | HP-CDL-03 | |
| Field Sample Number | | | SAIC01 | | SAIC01 | | SAIC01 | |
| Site Type | | | PNCH | | PNCH | | PNCH | |
| Collection Date | | | 08/07/02 | | 08/07/02 | | 08/07/02 | |
| Depth (ft) | | | 10.00 | | 8.00 | | 4.00 | |
| ***METALS(6010)*** | | | | | | | | |
| Parameter | Units | RL | | | | | | |
| Arsenic | ug/L | 10 | 12.7 | U | 3.4 | U | 3.4 | U |
| Barium | ug/L | 200 | **28** | | **18.7** | | **315** | |
| Cadmium | ug/L | 5 | **0.35** | B | 0.3 | U | 0.3 | U |
| Calcium | ug/L | 1000 | **17000** | | **33600** | | **54000** | |
| Chromium | ug/L | 10 | 1.3 | U | 1.3 | U | **3.4** | B |
| Copper | ug/L | 10 | 2.2 | U | 5.6 | U | 3 | U |
| Iron | ug/L | 100 | **28600** | | 24.3 | U | **359** | |
| Lead | ug/L | 3 | **13.6** | | 1.6 | U | 1.6 | U |
| Magnesium | ug/L | 1000 | **1110** | | **8500** | | **6210** | |
| Manganese | ug/L | 15 | **791** | | **105** | | **451** | |
| Nickel | ug/L | 10 | 1.1 | U | 1.1 | U | **14.3** | |
| Potassium | ug/L | 1000 | **2220** | | **2360** | | **4300** | |
| Sodium | ug/L | 1000 | **9040** | | **9670** | | **9530** | |
| Vanadium | ug/L | 50 | **3.1** | B | **0.79** | B | 0.7 | U |
| Zinc | ug/L | 20 | 9.3 | U | 4.5 | U | **87.4** | |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | | | |
| Parameter | Units | RL | | | | | | |
| 2,4-Dimethylphenol | ug/L | 10 | **10.4** | J | 14 | U | 13 | U |
| 2-Methylnaphthalene | ug/L | 10 | **49** | | 14 | U | 13 | U |
| 2-Methylphenol | ug/L | 10 | **27** | | 14 | U | 13 | U |
| 4-Methylphenol | ug/L | 10 | **46** | | 14 | U | 13 | U |
| Naphthalene | ug/L | 10 | **120** | | 14 | U | 13 | U |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | |
| Parameter | Units | RL | | | | | | |
| Acetone | ug/L | 5 | 5 | UJ | **5.2** | | 5 | UJ |
| Benzene | ug/L | 1 | 500 | UJ | **0.54** | J | 1 | UJ |
| Chloromethane | ug/L | 1 | **0.7** | J | 1 | U | 1 | UJ |
| cis-1,2-Dichloroethene | ug/L | 1 | **12** | J | 1 | U | **2.3** | J |
| Ethylbenzene | ug/L | 1 | **920** | J | 1 | U | 1 | UJ |
| m-and/or p-Xylene | ug/L | 1 | **3700** | J | 1 | U | 1 | UJ |
| Methylene Chloride | ug/L | 1 | 1 | UJ | 2.2 | UJ | 2 | UJ |
| o-xylene | ug/L | 1 | **1700** | J | 1 | U | 1 | UJ |
| Styrene | ug/L | 1 | **22** | J | 1 | U | 1 | UJ |
| Tetrachloroethene | ug/L | 1 | **12** | J | 1 | U | 1 | UJ |
| Toluene | ug/L | 1 | **12000** | J | **1.1** | | 1 | UJ |
| Trichloroethene | ug/L | 1 | **1.1** | J | 1 | U | 1 | UJ |

Created on 5/27/2003

# Table 5.4-6. Data Summary: Groundwater Results, Construction Debris Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit but greater than or equal to the instrument detection limit.
B – Organics: Analyte was found in the associated method blank. Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25% difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. For SW846 methods, the samples are reported down to the method detection limits (MDL). For metals, the samples are reported down to the instrument detection limit (IDL).
MDL – Method Detection Limit.
SAICXXR – An SAIC field sample number followed by an "R" designates a recollected sample.
1,2-Dichlorobenzene; 1,3-Dichlorobenzene; 1,4-Dichlorobenzene; and 1,2,4-Trichlorobenzene - For samples analyzed prior to February 2000, these four compounds are reported as part of the semivolatile organic compound list. For samples analyzed after February 2000, these four compounds are reported as part of the volatile organic compound list.
1,2-Dichloroethene (total); Cis-1,2-Dichloroethene and Trans-1,2-Dichloroethene – For samples analyzed prior to February 2000, cis-1,2-dichloroethene and trans-1,2-dichloroethene (not 1,2-dichloroethene (total)) are reported as part of the volatile organic compound list. For samples analyzed after February 2000, 1,2-dichloroethene (total) (not cis-1,2-dichloroethene and trans-1,2-dichloroethene) is reported as part of the volatile organic compound list.

## Table 5.4-7. Construction Debris Landfill
## Metal Constituents Detected Above Screening Criteria in Soil
## Wallops Flight Facility, Accomack County, Virginia

| Sample Interval (Depth) | Constituent | Sample ID | Field Sample Number | Depth (BLS) | Concentration [a] | Units | Protection of Human Health: Concentration Exceeds Region III RBCs Residential Screening Value [b,c] | Protection of Human Health: Concentration Exceeds Region III RBC Industrial Screening Value [b,c] | Migration to Groundwater: Concentration Exceeds Region III RBC Screening Value [b,c] |
|---|---|---|---|---|---|---|---|---|---|
| Surface Soil (0 to <0.5 feet BLS) | Antimony | SB-CDL-03 | BORE | 0 | 23.5 | MG/KG | | | X |
| | Arsenic | SB-CDL-02 | BORE | 0 | 5 | MG/KG | X | X | X |
| | | SB-CDL-03 | BORE | 0 | 5.3 | MG/KG | X | X | X |
| | | SB-CDL-02 | BORE | 0 | 6.9 | MG/KG | X | X | X |
| | Barium | SB-CDL-03 | BORE | 0 | 240 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 0 | 325 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 0 | 371 | MG/KG | | | |
| | Cadmium | SB-CDL-03 | BORE | 0 | 23.9 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 0 | 25.9 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 0 | 29.7 | MG/KG | | | |
| | Chromium | SB-CDL-02 | BORE | 0 | 26.8 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 0 | 29.7 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 0 | 53 | MG/KG | | | |
| | Cobalt | SB-CDL-02 | BORE | 0 | 3 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 0 | 3.6 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 0 | 3.8 | MG/KG | | | |
| | Copper | SB-CDL-02 | BORE | 0 | 1110 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 0 | 1240 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 0 | 2660 | MG/KG | | | |
| | Iron | SB-CDL-02 | BORE | 0 | 34300 | MG/KG | X | | |
| | Lead | SB-CDL-02 | BORE | 0 | 253 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 0 | 266 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 0 | 947 | MG/KG | | | |
| | Mercury | SB-CDL-03 | BORE | 0 | 0.32 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 0 | 0.33 | MG/KG | | | |
| | Selenium | SB-CDL-02 | BORE | 0 | 1.3 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 0 | 2 | MG/KG | | | |
| | Silver | SB-CDL-03 | BORE | 0 | 16.8 | MG/KG | | | |
| | Vanadium | SB-CDL-03 | BORE | 0 | 13.2 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 0 | 14.1 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 0 | 14.7 | MG/KG | | | |
| | Zinc | SB-CDL-03 | BORE | 0 | 1030 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 0 | 1400 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 0 | 1420 | MG/KG | | | |
| Subsurface Soil (0.5 to 15 feet BLS) | Arsenic | SB-CDL-01 | BORE | 9 | 0.54 | MG/KG | X | | X |
| | | SB-CDL-01 | BORE | 6.5 | 1.6 | MG/KG | X | | X |
| | | SB-CDL-02 | BORE | 7 | 1.9 | MG/KG | X | | X |
| | | SB-CDL-03 | BORE | 4 | 6.9 | MG/KG | X | X | X |
| | Barium | SB-CDL-01 | BORE | 9 | 5.2 | MG/KG | | | |
| | | SB-CDL-01 | BORE | 6.5 | 15.9 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 7 | 30.6 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 4 | 55.3 | MG/KG | | | |

## Table 5.4-7. Construction Debris Landfill
## Metal Constituents Detected Above Screening Criteria in Soil
## Wallops Flight Facility, Accomack County, Virginia

| Sample Interval (Depth) | Constituent | Sample ID | Field Sample Number | Depth (BLS) | Concentration [a] | Units | Protection of Human Health: Concentration Exceeds Region III RBCs Residential Screening Value [b,c] | Protection of Human Health: Concentration Exceeds Region III RBC Industrial Screening Value [b,c] | Migration to Groundwater: Concentration Exceeds Region III RBC Screening Value [b,c] |
|---|---|---|---|---|---|---|---|---|---|
| | Cadmium | SB-CDL-01 | BORE | 6.5 | 0.03 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 7 | 0.04 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 4 | 4.9 | MG/KG | | | |
| | Chromium | SB-CDL-01 | BORE | 9 | 3.7 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 7 | 6.7 | MG/KG | | | |
| | | SB-CDL-01 | BORE | 6.5 | 7.6 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 4 | 19.7 | MG/KG | | | |
| | Cobalt | SB-CDL-01 | BORE | 9 | 1.2 | MG/KG | | | |
| | | SB-CDL-01 | BORE | 6.5 | 1.3 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 7 | 1.6 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 4 | 4.3 | MG/KG | | | |
| | Copper | SB-CDL-02 | BORE | 7 | 2.5 | MG/KG | | | |
| | | SB-CDL-01 | BORE | 6.5 | 3.5 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 4 | 155 | MG/KG | | | |
| | Iron | SB-CDL-03 | BORE | 4 | 39200 | MG/KG | X | | |
| | Lead | SB-CDL-02 | BORE | 7 | 4 | MG/KG | | | |
| | | SB-CDL-01 | BORE | 6.5 | 9.8 | MG/KG | | | |
| | | SB-CDL-01 | BORE | 9 | 12.4 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 4 | 141 | MG/KG | | | |
| | Nickel | SB-CDL-03 | BORE | 4 | 15.4 | MG/KG | | | |
| | Selenium | SB-CDL-01 | BORE | 6.5 | 0.23 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 7 | 0.37 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 4 | 1 | MG/KG | | | |
| | Thallium | SB-CDL-03 | BORE | 4 | 1.4 | MG/KG | | | |
| | Vanadium | SB-CDL-01 | BORE | 9 | 3.9 | MG/KG | | | |
| | | SB-CDL-01 | BORE | 6.5 | 7.5 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 7 | 9.7 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 4 | 15.6 | MG/KG | | | |
| | Zinc | SB-CDL-01 | BORE | 6.5 | 14.5 | MG/KG | | | |
| | | SB-CDL-02 | BORE | 7 | 15.9 | MG/KG | | | |
| | | SB-CDL-03 | BORE | 4 | 258 | MG/KG | | | |

[a] Constituent concentrations that exceed screening criteria are listed in ascending order (lowest to highest).
[b] X indicates detected concentration exceeds the screening criteria.
[c] EPA Region III RBCs.

# Table 5.4-8. Construction Debris Landfill
## Non-Metal Constituents Detected Above Screening Criteria in Soil
## Wallops Flight Facility, Accomack County, Virginia

| Sample Interval (Depth) | Constituent | Sample ID | Field Sample Number | Depth (BLS) | Concentration [a] | Units | Protection of Human Health: Concentration Exceeds Region III RBCs Residential Screening Value [b,c] | Protection of Human Health: Concentration Exceeds Region III RBC Industrial Screening Value [b,c] | Migration to Groundwater: Concentration Exceeds Region III RBC Screening Value [b,c] |
|---|---|---|---|---|---|---|---|---|---|
| Surface Soil (0 to <0.5 feet BLS) | Chloromethane | SB-CDL-03 | BORE | 0 | 87 | µg/kg | | | X |
| Subsurface Soil (0.5 to 15 feet BLS) | 1,2-Dichloropropane | SB-CDL-01 | BORE | 9 | 2000 | µg/kg | | | X |
| | Benzo(a)pyrene | SB-CDL-01 | BORE | 6.5 | 220 | µg/kg | X | | |
| | Ethylbenzene | SB-CDL-01 | BORE | 9 | 12000 | µg/kg | | | X |
| | Naphthalene | SB-CDL-01 | BORE | 9 | 830 | µg/kg | | | X |
| | Tetrachloroethene | SB-CDL-01 | BORE | 9 | 1100 | µg/kg | | | X |

[a] Constituent concentrations that exceed screening criteria are listed in ascending order (lowest to highest).
[b] X indicates detected concentration exceeds the screening criteria.
[c] EPA Region III.

## Table 5.4-9. Construction Debris Landfill
## Metal Constituents Detected Above Screening Criteria in Groundwater
## Wallops Flight Facility, Accomack County, Virginia

| Constituent | Sample ID | Field Sample Number | Depth (BLS) | Concentration [a] | Units | Protection of Human Health | |
|---|---|---|---|---|---|---|---|
| | | | | | | Concentration Exceeds Region III RBC Screening Value [b,c] | Concentration Exceeds Federal MCL Screening Value [b,d] |
| Iron | HP-CDL-01 | PNCH | 10 | 28600 | µg/L | X | |
| Manganese | HP-CDL-01 | PNCH | 10 | 791 | µg/L | X | |

[a] Constituent concentrations that exceed screening criteria are listed in ascending order (lowest to highest).

[b] X indicates detected concentration exceeds the screening criteria.

[c] EPA Region III RBCs.

[d] MCL.

## Table 5.4-10. Construction Debris Landfill
## Non-Metal Constituents Detected Above Screening Criteria in Groundwater
## Wallops Flight Facility, Accomack County, Virginia

| Constituent | Sample ID | Field Sample Number | Depth (BLS) | Concentration [a] | Units | Protection of Human Health | |
|---|---|---|---|---|---|---|---|
| | | | | | | Concentration Exceeds Region III RBC Screening Value [b,c] | Concentration Exceeds Federal MCL Screening Value [b,d] |
| Benzene | HP-CDL-02 | PNCH | 8 | 0.54 | µg/L | X | |
| Ethylbenzene | HP-CDL-01 | PNCH | 10 | 920 | µg/L | X | X |
| Naphthalene | HP-CDL-01 | PNCH | 10 | 120 | µg/L | X | |
| Tetrachloroethene | HP-CDL-01 | PNCH | 10 | 12 | µg/L | X | X |
| Toluene | HP-CDL-01 | PNCH | 10 | 12000 | µg/L | X | X |
| Trichloroethene | HP-CDL-01 | PNCH | 10 | 1.1 | µg/L | X | |

[a] Constituent concentrations that exceed screening criteria are listed in ascending order (lowest to highest).

[b] X indicates detected concentration exceeds the screening criteria.

[c] EPA Region III RBCs.

[d] MCL.

The concentrations and distribution of inorganic constituents detected in the soil at the CDL are presented in Figure 5.4-3. Table 5.4-7 presents the inorganic constituents detected in the soil borings at the CDL that exceed the human health screening criteria and lists the soil boring (sample I.D. and depth) where the constituent concentration exceeds the screening criteria in the surface and subsurface soil, the detected concentrations that exceed the screening criteria, and the screening criteria that the detected concentration exceeds. The following sections summarize the results of the toxicity screen and characterize the distribution of the inorganic constituents that were detected at concentrations that exceed the human health screening criteria at the CDL.

Arsenic was detected in all samples collected from the surface soil at SB-CDL-02 and SB-CDL-03 at concentrations that exceeded the human health Region III RBCs for industrial land use (4 mg/kg), residential land use (0.426 mg/kg), and migration to groundwater (0.03 mg/kg). The maximum concentration of arsenic (6.9 mg/kg) in the surface soil was detected in the sample collected at SB-CDL-02, located adjacent to the southern channel. Arsenic concentrations detected at this location exceeded the human health Region III RBC for industrial land use (4 mg/kg). Concentrations of arsenic detected in the surface soil at the CDL are relatively consistent (i.e., same order of magnitude) throughout the site (<6.9 mg/kg).

Arsenic concentrations detected in the subsurface soil exceeded the Region III RBCs for residential land use and migration to groundwater at all soil boring locations and in all samples collected from the subsurface soils. The maximum concentration (6.9 mg/kg) of arsenic in the subsurface soil was detected at 4 feet BLS, in the sample collected at SB-CDL-03, located adjacent to the southern channel. Arsenic concentrations detected in the subsurface soil at SB-CDL-03 also exceeded the Region III RBC for industrial land use. Concentrations of arsenic detected in the subsurface soils were relatively consistent throughout the site (0.54 to 6.9 mg/kg).

Antimony and iron were the only other metals detected in the CDL soil at concentrations that exceeded screening criteria. Antimony was detected in the surface soil at SB-CDL-03, adjacent to the southern channel, at a concentration (23.5 mg/kg) that exceeded the Region III RBC for migration to groundwater (13 mg/kg). Iron was detected in the surface soil at SB-CDL-02 (34,300 mg/kg) and in the subsurface soil at SB-CDL-03 (39,200 mg/kg) at concentrations that exceeded the Region III RBC for residential land use (23,464 mg/kg).

Although arsenic, antimony, and iron were the only metal constituents detected at concentrations that exceed the screening criteria in the CDL soils, the maximum concentration of lead (947 mg/kg) detected at SB-CDL-03 may result in potential elevated risk.

***Organic Constituents***—Surface and shallow subsurface soil samples at the CDL were analyzed for VOCs and SVOCs. The following presents the organic constituents that were detected and the screening criteria that were exceeded:

- Surface soil (0 to <0.5 feet BLS)
  - Industrial – none
  - Residential – none
  - Migration to groundwater – chloromethane
- Shallow subsurface soil (0.5 to 15 feet BLS)
  - Industrial – none
  - Residential – benzo(a)pyrene
  - Migration to groundwater – 1,2-dichloropropane, benzo(a)pyrene, ethylbenzene, naphthalene, and tetrachloroethene (PCE).

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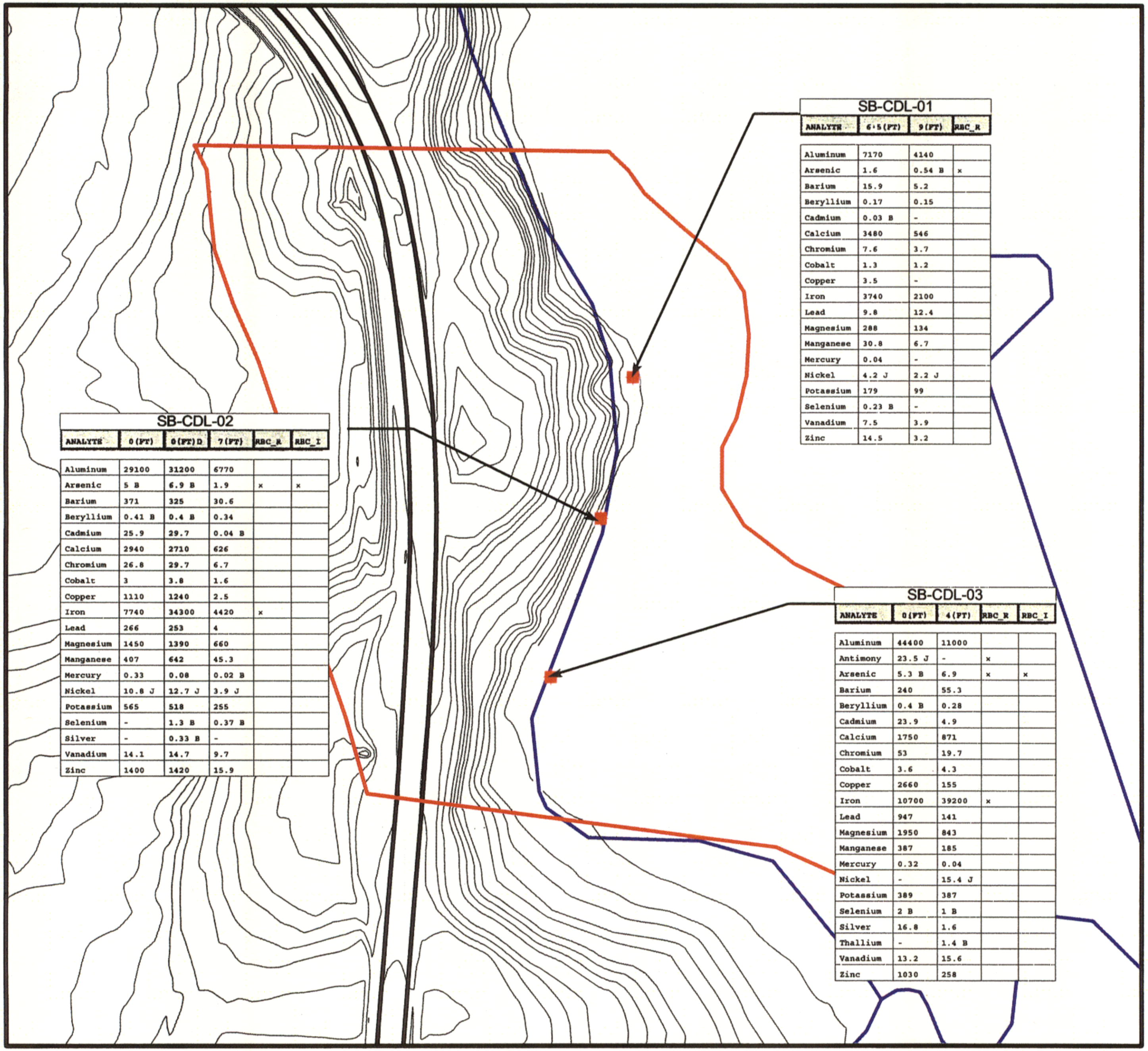


### SB-CDL-01

| ANALYTE | 6.5 (FT) | 9 (FT) | RBC_R |
|---|---|---|---|
| Aluminum | 7170 | 4140 | |
| Arsenic | 1.6 | 0.54 B | x |
| Barium | 15.9 | 5.2 | |
| Beryllium | 0.17 | 0.15 | |
| Cadmium | 0.03 B | - | |
| Calcium | 3480 | 546 | |
| Chromium | 7.6 | 3.7 | |
| Cobalt | 1.3 | 1.2 | |
| Copper | 3.5 | - | |
| Iron | 3740 | 2100 | |
| Lead | 9.8 | 12.4 | |
| Magnesium | 288 | 134 | |
| Manganese | 30.8 | 6.7 | |
| Mercury | 0.04 | - | |
| Nickel | 4.2 J | 2.2 J | |
| Potassium | 179 | 99 | |
| Selenium | 0.23 B | - | |
| Vanadium | 7.5 | 3.9 | |
| Zinc | 14.5 | 3.2 | |

### SB-CDL-02

| ANALYTE | 0 (FT) | 0 (FT) D | 7 (FT) | RBC_R | RBC_I |
|---|---|---|---|---|---|
| Aluminum | 29100 | 31200 | 6770 | | |
| Arsenic | 5 B | 6.9 B | 1.9 | x | x |
| Barium | 371 | 325 | 30.6 | | |
| Beryllium | 0.41 B | 0.4 B | 0.34 | | |
| Cadmium | 25.9 | 29.7 | 0.04 B | | |
| Calcium | 2940 | 2710 | 626 | | |
| Chromium | 26.8 | 29.7 | 6.7 | | |
| Cobalt | 3 | 3.8 | 1.6 | | |
| Copper | 1110 | 1240 | 2.5 | | |
| Iron | 7740 | 34300 | 4420 | x | |
| Lead | 266 | 253 | 4 | | |
| Magnesium | 1450 | 1390 | 660 | | |
| Manganese | 407 | 642 | 45.3 | | |
| Mercury | 0.33 | 0.08 | 0.02 B | | |
| Nickel | 10.8 J | 12.7 J | 3.9 J | | |
| Potassium | 565 | 518 | 255 | | |
| Selenium | - | 1.3 B | 0.37 B | | |
| Silver | - | 0.33 B | - | | |
| Vanadium | 14.1 | 14.7 | 9.7 | | |
| Zinc | 1400 | 1420 | 15.9 | | |

### SB-CDL-03

| ANALYTE | 0 (FT) | 4 (FT) | RBC_R | RBC_I |
|---|---|---|---|---|
| Aluminum | 44400 | 11000 | | |
| Antimony | 23.5 J | - | x | |
| Arsenic | 5.3 B | 6.9 | x | x |
| Barium | 240 | 55.3 | | |
| Beryllium | 0.4 B | 0.28 | | |
| Cadmium | 23.9 | 4.9 | | |
| Calcium | 1750 | 871 | | |
| Chromium | 53 | 19.7 | | |
| Cobalt | 3.6 | 4.3 | | |
| Copper | 2660 | 155 | | |
| Iron | 10700 | 39200 | x | |
| Lead | 947 | 141 | | |
| Magnesium | 1950 | 843 | | |
| Manganese | 387 | 185 | | |
| Mercury | 0.32 | 0.04 | | |
| Nickel | - | 15.4 J | | |
| Potassium | 389 | 387 | | |
| Selenium | 2 B | 1 B | | |
| Silver | 16.8 | 1.6 | | |
| Thallium | - | 1.4 B | | |
| Vanadium | 13.2 | 15.6 | | |
| Zinc | 1030 | 258 | | |

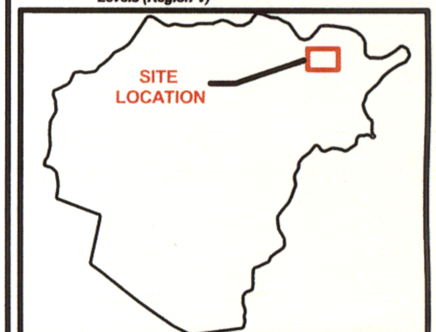
**LEGEND:**

- BUILDING
- SITE BOUNDARY
- ROADS
- WETLAND BOUNDARY
- CONTOURS
- SOIL BORING

**TABLE DEFINITIONS**

*Units = mg/Kg*

- *X = Constituent Failing Screen*
- *— = Non-Detect*
- *J = Value was estimated*
- *B = Value < CRDL but >= IDL*
- *RBC-I = Risk Based Concentration (Industrial Land Use)*
- *RBC-R = Risk Based Concentration (Residential Land Use)*
- *EDQL = Ecological Data Quality Levels (Region V)*




KEY MAP
NOT TO SCALE

10 0 10 20 30 40 Meters

US Army Corps of Engineers

SAIC

**Construction Debris Landfill**
**Metal Constituents**
**Exceeding Soil Screening Criteria**

Wallops Flight Facility
Wallops Island, Virginia

| FIGURE | | DATE |
|---|---|---|
| 5.4-3 | Project: G:\GIS_DATA\WALLOPS\Projects\Sites\wallops_cdl_gis1.apr<br>Layout: lo_Site-CDL_IO | 05/08/03 |

0120A13Y

The concentrations and distribution of organic constituents detected in the soil at the CDL are presented in Figure 5.4-4. Table 5.4-8 presents the organic constituents detected in the soil borings at the CDL that exceed the human health screening criteria and lists the soil boring (sample I.D. and depth) where the constituent concentration exceeds the screening criteria in the surface and subsurface soil, the detected concentrations that exceed the screening criteria, and the screening criteria that the detected concentration exceeds. The following sections summarize the results of the toxicity screen and characterize the distribution of the organic constituents that were detected at concentrations that exceed the human health screening criteria at the CDL.

One organic compound (benzo[a]pyrene) was detected in the soils at the CDL at concentrations (220 μg/kg) that exceed the Region III RBC for residential land use (87 μg/kg). This PAH was detected only in the subsurface soils at concentrations that exceed the residential RBC and detected concentrations of the compound above the criteria were limited to the shallow subsurface soils (6.6 feet BLS) at SB-CDL-01.

Five organic compounds (chloromethane, 1,2-dichloropropane, ethylbenzene, naphthalene, and PCE) were detected in the soils at the CDL at concentrations that exceed the Region III RBC for migration to groundwater. One compound (chloromethane) was detected in the surface soils at SB-CDL-03 at concentrations that exceed the migration to groundwater screening criteria. The remaining four compounds were detected at concentrations greater than the migration to groundwater screening criteria in the shallow subsurface soil at SB-CDL-01 (9 feet BLS).

### 5.4.3.2 Groundwater Results and Nature and Extent

As discussed in Section 5.4.2, three Hydropunch® groundwater probes (HP-CDL-01 through HP-CDL-03) were installed and sampled at the CDL soil boring sample locations during the WFF LSI. All samples were analyzed for VOCs, SVOCs, and metals. The following sections present the Hydropunch® laboratory analytical results and summarize the nature and extent of constituents detected in the groundwater at the CDL.

***Inorganic Constituents***—Thirteen inorganic constituents were detected in the groundwater. The following paragraphs identify the metals that exceed the Region III RBCs for tap water or the MCL:

- EPA Region III RBC for tap water – iron and manganese
- MCL – none.

The concentrations and distribution of inorganic constituents detected in the groundwater at the CDL are presented in Figure 5.4-5. Table 5.4-9 presents the inorganic constituents detected in the groundwater at the CDL that exceed the Region III or MCL human health screening criteria and lists the Hydropunch® location where the constituent concentration exceeds the screening criteria in the groundwater, the detected concentrations that exceed the screening criteria, and the screening criteria that the detected concentration exceeds. The following sections summarize the results of the toxicity screen and characterize the distribution of the inorganic constituents that were detected at concentrations that exceed the human health screening criteria at the CDL.

Iron and manganese were detected at concentrations greater than the Region III RBCs for tap water at HP-CDL-01. At HP-CDL-01 iron was detected at 28,600 μg/L (Region III RBC [10,950 μg/L]) and manganese was detected at 791 μg/L (Region III RBC [730 μg/L]). No inorganic constituents exceeded the MCL criteria.

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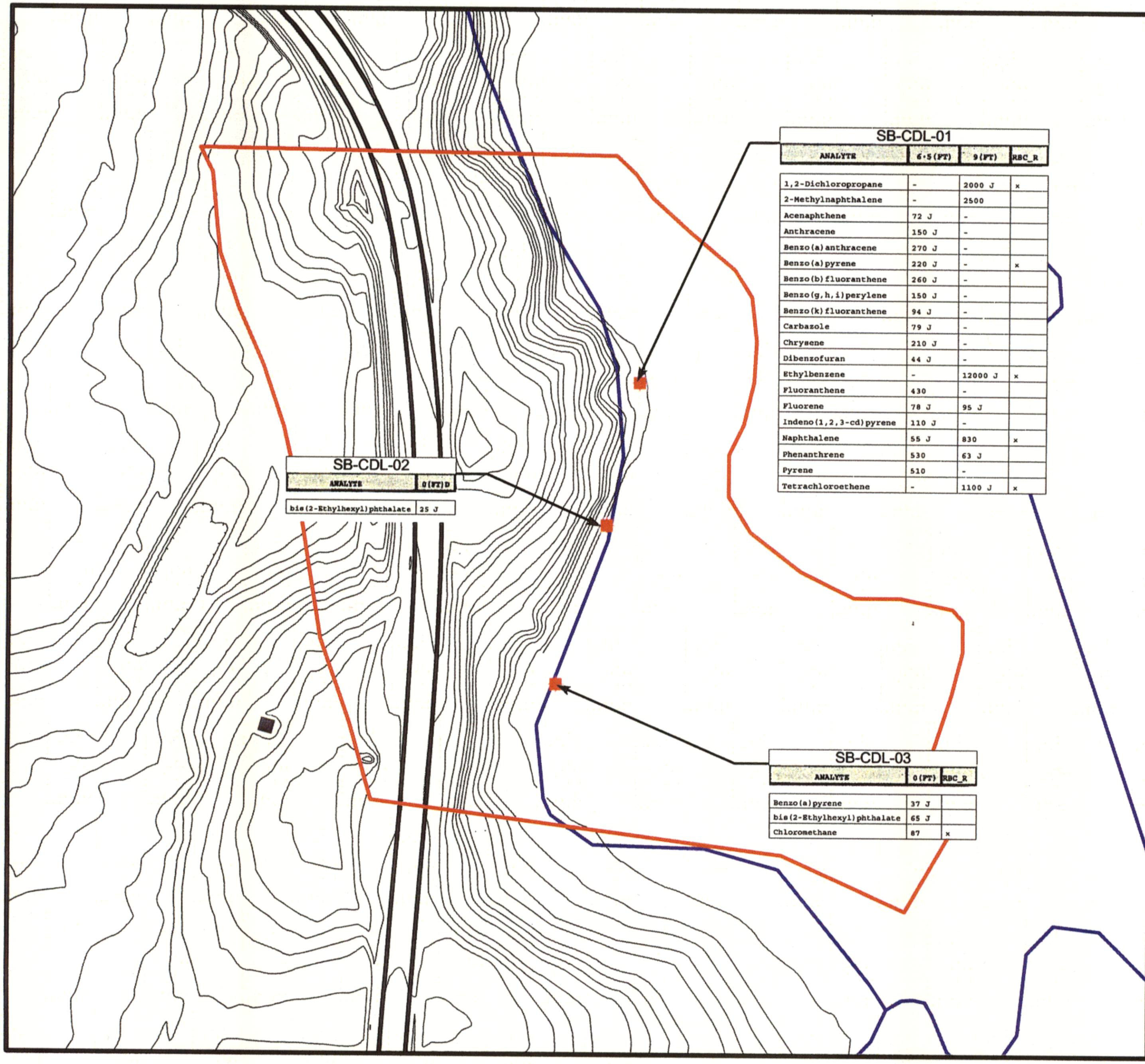


### SB-CDL-01

| ANALYTE | 6.5 (FT) | 9 (FT) | RBC_R |
|---|---|---|---|
| 1,2-Dichloropropane | - | 2000 J | x |
| 2-Methylnaphthalene | - | 2500 | |
| Acenaphthene | 72 J | - | |
| Anthracene | 150 J | - | |
| Benzo(a)anthracene | 270 J | - | |
| Benzo(a)pyrene | 220 J | - | x |
| Benzo(b)fluoranthene | 260 J | - | |
| Benzo(g,h,i)perylene | 150 J | - | |
| Benzo(k)fluoranthene | 94 J | - | |
| Carbazole | 79 J | - | |
| Chrysene | 210 J | - | |
| Dibenzofuran | 44 J | - | |
| Ethylbenzene | - | 12000 J | x |
| Fluoranthene | 430 | - | |
| Fluorene | 78 J | 95 J | |
| Indeno(1,2,3-cd)pyrene | 110 J | - | |
| Naphthalene | 55 J | 830 | x |
| Phenanthrene | 530 | 63 J | |
| Pyrene | 510 | - | |
| Tetrachloroethene | - | 1100 J | x |

### SB-CDL-02

| ANALYTE | 0 (FT) D |
|---|---|
| bis(2-Ethylhexyl)phthalate | 25 J |

### SB-CDL-03

| ANALYTE | 0 (FT) | RBC_R |
|---|---|---|
| Benzo(a)pyrene | 37 J | |
| bis(2-Ethylhexyl)phthalate | 65 J | |
| Chloromethane | 87 | x |

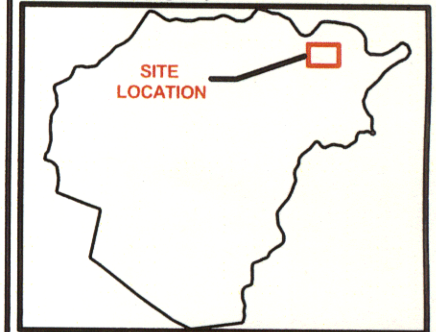
**LEGEND:**

- BUILDING
- SITE BOUNDARY
- ROADS
- WETLAND BOUNDARY
- CONTOURS
- SOIL BORING

**TABLE DEFINITIONS**

*Units = µg/Kg*

- *X = Constituent Failing Screen*
- *— = Non-Detect*
- *J = Value was estimated*
- *B = Value < CRDL but >= IDL*
- *RBC-I = Risk Based Concentration (Industrial Land Use)*
- *RBC-R = Risk Based Concentration (Residential Land Use)*
- *EDQL = Ecological Data Quality Levels (Region V)*




KEY MAP
NOT TO SCALE

N

10 0 10 20 30 40 Meters

US Army Corps of Engineers.

SAIC

**Construction Debris Landfill**
**Organic Constituents**
**Exceeding Soil Screening Criteria**

Wallops Flight Facility
Wallops Island, Virginia

| FIGURE | Project: G:\GIS_DATA\WALLOPS\Projects\Sites\wallops_cdl_gis1.apr Layout: lo_Site-CDL_O | DATE |
|---|---|---|
| 5.4-4 | | 05/08/03 |

*Organic Constituents*—Sixteen organic compounds (5 SVOCs and 11 VOCs) were detected in the groundwater at the CDL. The following paragraphs list the type of organic constituents detected and identifies the organic compounds that exceed the Region III RBCs and the MCLs:

- EPA Region III RBC for tap water – benzene, ethylbenzene, naphthalene, PCE, toluene, and trichloroethene (TCE)
- MCL – ethylbenzene, PCE, and toluene.

The concentrations and distribution of organic constituents detected in the groundwater at the CDL are presented in Figure 5.4-5. Table 5.4-10 presents the organic constituents detected in the groundwater at the CDL that exceed the Region III RBC or MCL screening criteria and lists the Hydropunch® location where the constituent concentration exceeds the screening criteria, the detected concentrations that exceed the screening criteria, and the screening criteria that the detected concentration exceeds. The following sections summarize the results of the toxicity screen and characterize the distribution of the organic constituents that were detected at concentrations that exceed the groundwater screening criteria at the CDL.

Three VOCs (ethylbenzene, PCE, and toluene) were detected at HP-CDL-01 at concentrations that exceeded the EPA Region III RBC for tap water and the MCL. Two additional organic compounds (naphthalene and TCE) also were detected at HP-CDL-01 at concentrations that exceed the Region III RBC for tap water.

### 5.4.4 Conclusions and Recommendations

This section presents the conclusions of the LSI for the Construction Debris Landfill and summarizes recommendations for future site activities. Section 5.4.4.1 summarizes results and conclusions associated with completion of the LSI. Section 5.4.4.2 combines conclusions and site historical information to make recommendations for future site activities.

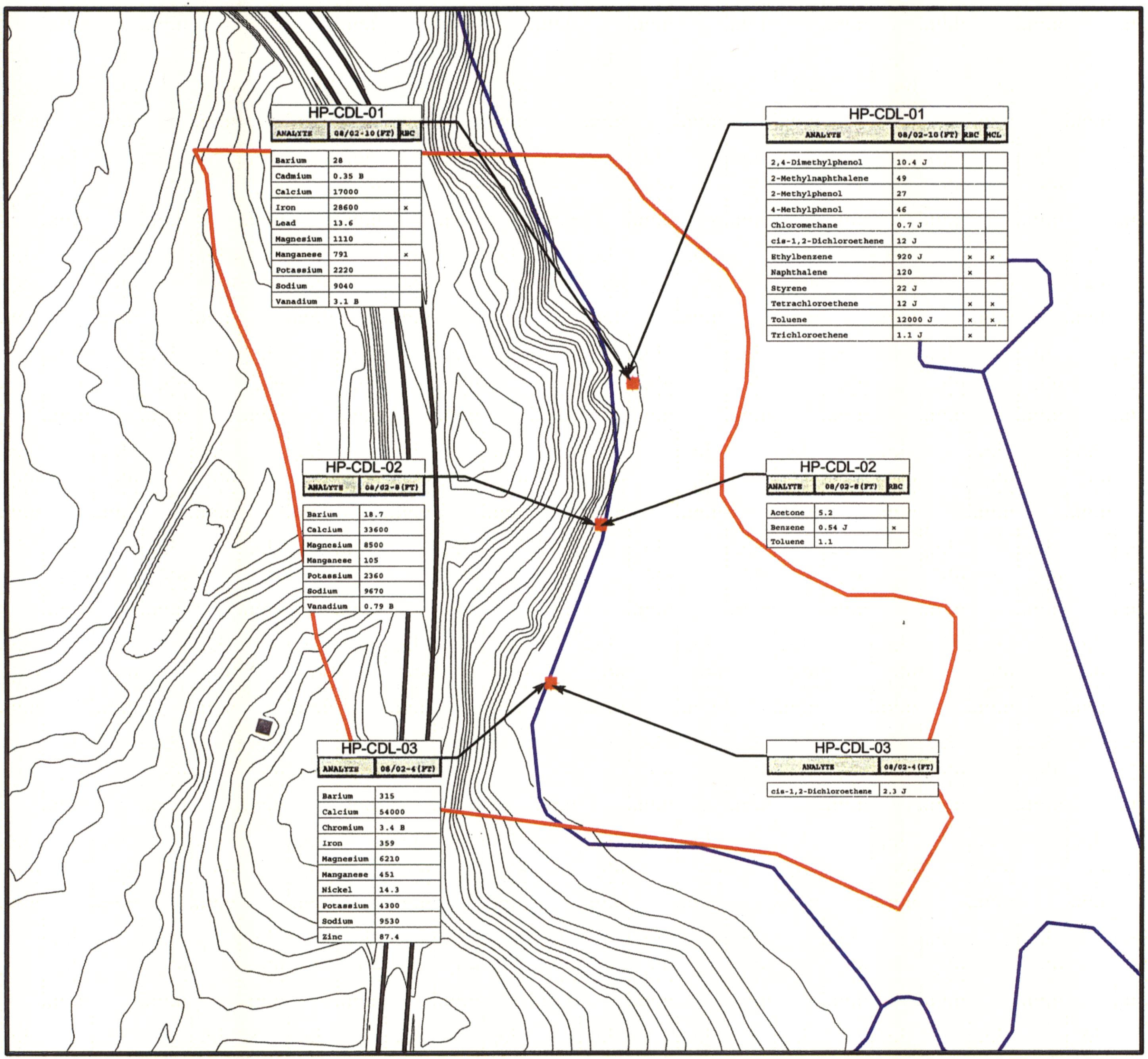
#### 5.4.4.1 Conclusions

This following paragraphs summarize the nature of the contamination identified in the soil and groundwater and discusses the inorganic and organic constituents present in each sample media (soil and groundwater).

#### *Soils – Inorganic Constituents*

Data collected during the LSI investigation does not indicate that metals concentrations exceeding screening criteria have been released to the soils at the CDL. The maximum concentrations of arsenic (6.9 mg/kg) detected in the soils at the CDL is well below the naturally occurring background concentrations of arsenic detected in the State of Virginia. The concentrations of arsenic detected at the CDL are not greater than concentrations of arsenic detected in the surface and subsurface soil at other locations at WFF (i.e., there is no evidence of a surface release [spill or leak] and there is no persistent source of arsenic at the CDL. Data suggest that concentrations of arsenic detected are the result of natural conditions and that these concentrations would be screened out during the completion of a background comparison.

The distribution of metal constituents detected at concentrations that exceed screening criteria does not indicate a potential source for these constituents. Concentration of the metals (antimony and iron) detected in the soils do not seem to be risk drivers (present at concentrations that greatly influence potential risk).




**HP-CDL-01**

| ANALYTE | 08/02-10 (FT) | RBC |
|---|---|---|
| Barium | 28 | |
| Cadmium | 0.35 B | |
| Calcium | 17000 | |
| Iron | 28600 | x |
| Lead | 13.6 | |
| Magnesium | 1110 | |
| Manganese | 791 | x |
| Potassium | 2220 | |
| Sodium | 9040 | |
| Vanadium | 3.1 B | |

**HP-CDL-01**

| ANALYTE | 08/02-10 (FT) | RBC | MCL |
|---|---|---|---|
| 2,4-Dimethylphenol | 10.4 J | | |
| 2-Methylnaphthalene | 49 | | |
| 2-Methylphenol | 27 | | |
| 4-Methylphenol | 46 | | |
| Chloromethane | 0.7 J | | |
| cis-1,2-Dichloroethene | 12 J | | |
| Ethylbenzene | 920 J | x | x |
| Naphthalene | 120 | x | |
| Styrene | 22 J | | |
| Tetrachloroethene | 12 J | x | x |
| Toluene | 12000 J | x | x |
| Trichloroethene | 1.1 J | x | |

**HP-CDL-02**

| ANALYTE | 08/02-8 (FT) |
|---|---|
| Barium | 18.7 |
| Calcium | 33600 |
| Magnesium | 8500 |
| Manganese | 105 |
| Potassium | 2360 |
| Sodium | 9670 |
| Vanadium | 0.79 B |

**HP-CDL-02**

| ANALYTE | 08/02-8 (FT) | RBC |
|---|---|---|
| Acetone | 5.2 | |
| Benzene | 0.54 J | x |
| Toluene | 1.1 | |

**HP-CDL-03**

| ANALYTE | 08/02-4 (FT) |
|---|---|
| Barium | 315 |
| Calcium | 54000 |
| Chromium | 3.4 B |
| Iron | 359 |
| Magnesium | 6210 |
| Manganese | 451 |
| Nickel | 14.3 |
| Potassium | 4300 |
| Sodium | 9530 |
| Zinc | 87.4 |

**HP-CDL-03**

| ANALYTE | 08/02-4 (FT) |
|---|---|
| cis-1,2-Dichloroethene | 2.3 J |

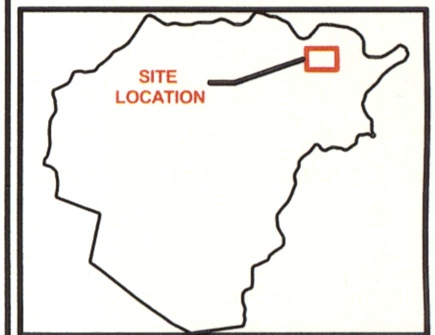
LEGEND:

- BUILDING
- SITE BOUNDARY
- ROADS
- WETLAND BOUNDARY
- CONTOURS
- HYDROPUNCH

TABLE DEFINITIONS

*Units = µg/L*

- *X = Constituent Failing Screen*
- *— = Non-Detect*
- *J = Value was estimated*
- *B = Value < CRDL but >= IDL*
- *RBC = Risk Based Concentration (Region III Tap Water)*
- *MCL = Maximum Contaminant Limit*




KEY MAP
NOT TO SCALE

10 0 10 20 30 40 Meters

US Army Corps of Engineers

SAIC

**Construction Debris Landfill**
**Hydropunch Constituents**
**Exceeding Water Screening Criteria**

Wallops Flight Facility
Wallops Island, Virginia

| FIGURE | Project: G:\GIS_DATA\WALLOPS\Projects\Sites\wallops_cdl_gis1.apr | DATE |
|---|---|---|
| 5.4-5 | Layout: lo_Site-CDL_Hydropunch | 05/08/03 |

A120A15Y

### *Soils-Organic Constituents*

Data collected during the LSI investigation indicates that organic compounds have been released to the shallow subsurface soils at the CDL. Conclusions associated with the distribution of the organic compounds are summarized below.

Organic compounds detected at concentrations above regulatory screening criteria at the CDL consisted of 5 different organic compounds. Data indicates that the concentrations of the organic compounds detected above screening criteria were limited to the surface soils at SB-CDL-03 and to the shallow subsurface soils at SB-CDL-01.

Concentrations of the compound, chloromethane, were detected at concentrations that exceed the migration to groundwater screening criteria at SB-CDL-03. However, concentrations above this criteria at SB-CDL-03 was only detected in the surface soil sample and was not detected at depth, suggesting that the compound has either migrated away from the location or has attenuated with depth.

The distribution of the concentrations of the other organic compounds detected during the LSI at the CDL seems to indicate that a residual source of organic compounds is present in the subsurface soils at SB-CDL-01. Results indicate that various classes (VOCs, PAHs and chlorinated solvents) of organic compounds are present in the area identified as the "possible dump site" and that concentrations greater than the regulatory screening criteria were detected in both samples collected from the boring. In addition, observations made during the drilling of the soil boring indicate that organic compounds are being released to the groundwater at the CDL and that the subsurface soil is visibly stained and discolored to a depth of at least 16 feet BLS.

### *Groundwater – Inorganics*

Data collected during the LSI investigation indicates that metals have been released to the groundwater at the CDL. The concentrations of iron and manganese detected at the CDL are greater than concentrations of iron and manganese detected in the groundwater at other WFF locations The distribution of metal constituents detected at concentrations that exceed screening criteria indicates that the area at SB-CDL-01 could be a potential source for these constituents.

### *Groundwater – Organics*

Data collected during the LSI investigation indicates that organic compounds (VOCs and SVOCs) have been released to the groundwater at the CDL. The concentrations of these compounds detected at the CDL are greater than concentrations of these compounds detected in the groundwater at other WFF locations. The distribution of organic constituents detected at concentrations that exceed screening criteria indicates that the area at SB-CDL-01 is a potential source for these constituents.

### 5.4.4.2 Recommendations

Based on information obtained during the completion of the LSI, future CDL activities should include the following:

- Historical documents, such as maps and photos, should be obtained to help identify and locate information about the CDL and indicate what activities occurred and/or how the property was used. Historical records identifying physical structures present at the site, potential of hazards or contamination, known sources of information, and historical activities should be documented. An inspection of the site should be conducted to confirm or deny presence of structures, potential contamination.

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# APPENDIX A

# SOIL BORING LOGS

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SAIC

# Field Boring Log



| | | | |
|---|---|---|---|
| Site File No. | County ACCOMACK | Boring No. SB-IWL-01 | Monitor Well No. N/A |
| Site File Name | | Surface Elev. | Completion Depth |
| Fed ID No. | | Auger Depth N/A | Rotary Depth N/A |
| State Planar Coordinates: N. | E. | Date: Start 8/6/02 Time 0915 | Finish 8/6/02 Time 1300 |
| Borehole status (BSTAT)*: Borehole Abandoned Bentonite | | Ground water Depth: 15.25 | Method (See back): |
| Drilling Equipment: Geoprobe | | Surface (Circle one): Bare (Grassy) Wooded | |

*Refer to back of page

Personnel:
G- J. Pendleton
D- T. Bumgardner
H- B. Henry
H- G. Wears U.S. ACE (NORFOLK)

| USCS | DESCRIPTION* | Depth in feet | MOIST* | Sample No. | Sample Recovery | Lab Anal Y/N | N Values (Blows) | F.I.D. or P.I.D/ LEL Readings | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | Brownish Yellow 10YR 6/6 SAND medium to coarse grained, moderate to poorly sorted, subrounded to rounded with trace pebbles. Sand becomes coarser & better sorted at ~2' BLS | 0–4 | | | SAIC01 3'2" | Y | N/A | Background 0.2 ppm | Collect SB-IWL-01 (SAIC01) 0-0.5 BLS 3encore, 1 metals, 1 SVOC 1 moisture |
| | (SAND BECOMING FINE GRAINED) AT ~7' BLS | 4–8 | | | 3'9" | N | N/A | Background 0.3 ppm | SAND BECOMING FINER W DEPTH |
| | Very Pale Brown 10YR 7/3 Sand with white 10YR 8/2. Fine to medium grained, moderate to well sorted, subrounded to rounded coarse, subrounded pebbles intermixed. | 8–12 | | | 3'10" | N | N/A | Background 0.2 ppm | |
| | White 10YR 8/2 sand with Yellowish Brown 10YR 5/4 banding pattern (possibly due to $H_2O$ fluctuations). Fine to coarse grained sand, subangular to subrounded, well sorted. (High energy bands of pebbles up to ~1 cm in diameter) Pebbles are subrounded & well sorted. | 12–16 | | | 4' | N | N/A | Background 0.2 ppm | BANDING PATTERN PROBABLY ASSOCIATED WITH FLUCTUATIONS OF GROUNDWATER |
| | HYDROPUNCH HP-IWL-01 COLLECTED FROM 16-20' BLS | 16–20 | | | SAIC02 4' | Y | N/A | Background 0.2 ppm | Collect SB-IWL-01 (SAIC02) at 16.5' BLS 3encore, 1 metals, 1 SVOC & moisture |

# Field Boring Log



| Site File No. | County ACCOMACK | Boring No. SB-IWL-02 | Monitor Well No. N/A |
|---|---|---|---|
| Site File Name | | Surface Elev. | Completion Depth 20 |
| Fed ID No. | | Auger Depth N/A | Rotary Depth N/A |
| State Planar Coordinates: N. | E. | Date: Start 8/6/02 Time 1300 | Finish 8/6/02 Time 1515 |

Borehole status (BSTAT)*: Borehole Abandoned Bentonite

Ground water Depth: 15 Method (See back):

Drilling Equipment: Geoprobe

Surface (Circle one): Bare (Grassy) Wooded

Refer to back of page

Personnel:
G- J. Pendleton
D- T. Bumgardner
H- B. Henry
H- G. Mears U.S. ACE (Norfolk)

| USCS | DESCRIPTION* | Depth in feet | MOIST* | Sample No. | Sample Recovery | Lab Anal Y/N | N Valves (Blows) | F.I.D. or P.I.D/ LEL Readings | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | BROWNISH YELLOW 10YR6/6 SAND FINE TO V. COARSE GRAINED, ANGULAR TO SUBROUNDED, MODERATE SORTING | 0–4 | | SAIC01 | 3.4 | Y | N/A | Background | |
| | | 4–8 | | | | Y | N/A | Background | 15 TO 20% ANGULAR TO SUBROUNDED PEBBLE |
| | WHITE 10YR 8/2 TO YELLOWISH BROWN 10YR 5/4 VARIATIONS FROM V. FINE TO COARSE GRAINED, SUBANGULAR TO SUBROUNDED, WELL SORTED | 8–12 | | | | Y | N/A | Background | LARGE AMOUNT OF BANDING (OXIDATION ZONES). BANDS OF LOW & HIGH ENERGY |
| | | 12–16 | | | | Y | N/A | Background | |
| | COLLECT HP-IWL-02 (HYDROPUNCH SAMPLE) 3 40ml VOAs, 2 1l AMBER (SVOCs), 1 1l POLY (METALS) | 16–20 | | SAIC02 | 3.4 | Y | N/A | Background | |

SAIC

# Field Boring Log



| | | | |
|---|---|---|---|
| Site File No. | County ACCOMACK | Boring No. SB-IWL-03 | Monitor Well No. N/A |
| Site File Name | | Surface Elev. | Completion Depth 20 |
| Fed ID No. | | Auger Depth N/A | Rotary Depth N/A |
| State Planar Coordinates: N. | E. | Date: Start 8/6/02 Time 1530 | Finish 8/6/02 Time 1730 |

Borehole status (BSTAT)*: Borehole Abandoned Bentonite

Ground water Depth: 19' Method (See back):

Drilling Equipment: Geoprobe

Surface (Circle one): Bare Grassy **Wooded** (circled)

Refer to back of page

Personnel:
G- J. Pendleton
D- T. Bumgardner
H- B. Henry
H- G. Mears U.S. ACE (Norfolk)

| USCS | DESCRIPTION* | Depth in feet | MOIST* | Sample No. | Sample Recovery | Lab Anal Y/N | N Valves (Blows) | F.I.D. or P.I.D/ LEL Readings | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | Yellowish brown 10YR 5/4 SAND medium to coarse grained, subrounded to subangular, moderate sorting | 0–4 | | | | SAIC01 | N/A | Background | BAND OF OXIDATION (DARK BROWN TO BLACK) |
| | | 4–8 | | | | | N/A | Background | |
| | Yellowish brown 10YR 5/4 with white 10YR 8/2 (at ~10' BLS) Sand. moderate to coarse grained, becoming finer w. depth, modeling associated with oxidation | 8–12 | | | | | N/A | Background | |
| | | 12–16 | | | | | N/A | Background | SAND BECOMES V. COARSE |
| | BROWNISH YELLOW 10YR 6/6 MODERATE TO COARSE GRAINED (modeled/banded) very coarse grain ~18-20, angular to subangular ▼ | 16–20 | | | | SAIC02 | N/A | Background | H2O AT ~19' BLS |
| | COLLECT HP-IWL-03 | | | | | | | | |

SAIC

# Field Boring Log



| | | | |
|---|---|---|---|
| Site File No. | County ACCOMACK | Boring No. SB-IWL-04 | Monitor Well No. N/A |
| Site File Name | | Surface Elev. | Completion Depth |
| Fed ID No. | | Auger Depth N/A | Rotary Depth N/A |
| State Planar Coordinates: N. | E. | Date: Start 8/7/02 Time 0800 | Finish 8/7/02 Time 0930 |

Borehole status (BSTAT)*: Borehole Abandoned Bentonite

Ground water Depth: 19' Method (See back):

Drilling Equipment: Geoprobe

Surface (Circle one): Bare Grassy **(Wooded)**

Refer to back of page

Personnel:
G- J. Pendleton
D- T. Bumgardner
H- B. Henry
H- G. Mears U.S. ACE (Norfolk)

| USCS | DESCRIPTION* | Depth in feet | MOIST* | Sample No. | Sample Recovery | Lab Anal Y/N | N Valves (Blows) | F.I.D. or P.I.D/ LEL Readings | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | Dark grayish brown 10YR 4/2 silty sand (moderate organics in top 8") medium to coarse grained sand, subrounded to angular, well sorted | 0–4 | | | | | N/A | Background | Becoming finer with depth |
| | Brownish yellow 10YR 6/4 SAND, medium grained sand, subrounded to subangular, very uniform with modeling | 4–8 | | | | | N/A | Background | |
| | Dark yellowish brown 10YR 4/4 Sand with trace organics | 8–12 | | | | | N/A | 7.2 | Color change to darker brown at ~8 1/2' Higher energy trace gravel |
| | Dark gray 10YR 4/1 SAND (FROM 12 - 13.2' BLS) medium to coarse grained, subrounded to angular, more uniform with depth (better sorting) | 12–16 | | | | SAIC01 | N/A | 37 | High PID Reading at 37 at 13' BLS. |
| | MEDIUM TO COARSE GRAINED SAND. QUARTZITE PEBBLES AT DEPTH. | 16–20 | | | | SAIC02 | N/A | 3.7 30 | SCREEN FOR HYDROPUNCH AT 18-20' BLS |

# Field Boring Log



| | | | |
|---|---|---|---|
| Site File No. | County ACCOMACK | Boring No. SB-CDL-01 | Monitor Well No. N/A |
| Site File Name | | Surface Elev. | Completion Depth |
| Fed ID No. | | Auger Depth N/A | Rotary Depth N/A |
| State Planar Coordinates: N. | E. | Date: Start 8/7/02 Time 1100 Finish | Time |

Borehole status (BSTAT)*: Borehole Abandoned Bentonite

Ground water Depth: 8'. Method (See back):

Drilling Equipment: Geoprobe

Surface (Circle one): Bare Grassy (Wooded)

Personnel:
G- J. Pendleton
D- T. Bumgardner
H- B. Henry
H- G. Wears U.S. ACE (Norfolk)

* Refer to back of page

| USCS | DESCRIPTION* | Depth in feet | MOIST* | Sample No. | Sample Recovery | Lab Anal Y/N | N Valves (Blows) | F.I.D. or P.I.D/ LEL Readings | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | Dark brown 7.5YR 4/2 silty sand, very fine, rounded to subrounded, well sorted. Silt is firm, dense. (40% silt 60% sand) INTERMIXED RUST BROWN SILTY/SAND, VERY FINE GRAINED | 0–4 | | | | | N/A | | COLLECT SAIC01 from 6.5–7.0' BLS |
| | Intermixed white sand, medium to coarse grained, subrounded to angular, moderate sorting. Black, uniform, saturated sand strong hydrocarbon odor. | 4–8 | | | | SAIC01 | N/A | 0 30 Alarm | AT BOTTOM OF SHOE STRONG DIESEL ODOR WITH RECOVER OF 2ND Auger |
| | BLACK 7.5YR 2/0 SAND COMPLETELY SATURATED, VERY STRONG HYDROCARBON ODOR, DENSE, THICK, FIRM | 8–12 | | | | SAIC02 | N/A | | Alarm of instrument sounding at depths greater than 7.5' BLS |
| | (Zone is completely saturated with water and organic material) | 12–16 | | | | | N/A | | Bottom of Borehole |
| | SAIC02 COLLECTED FROM ~9' BLS. APPEARS TO BE | 16–20 | | | | | N/A | | |

# Field Boring Log



| | | | |
|---|---|---|---|
| Site File No. | County ACCOMACK | Boring No. SB-QOL-02 | Monitor Well No. |
| Site File Name | | Surface Elev. | Completion Depth 12' |
| Fed ID No. | | Auger Depth N/A | Rotary Depth N/A |
| State Planar Coordinates: N. | E. | Date: Start 8/7/02 Time 1400 | Finish 8/7/02 Time 1630 |

Borehole status (BSTAT)*: ABANDONED W BENTONITE

Ground water Depth: 8' Method (See back):

Drilling Equipment: GEOPROBE

Surface (Circle one): Bare Grassy (Wooded) — circled: Wooded

Personnel:
G- John Pendleton
D- Terry Bumgardner
H- Brad Henry
H- George Meers (USACE)

Refer to back of page

| USCS | DESCRIPTION* | Depth in feet | MOIST* | Sample No. | Sample Recovery | Lab Anal Y/N | N Valves (Blows) | F.I.D. or P.I.D/ LEL Readings | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | Yellowish brown 10YR 5/4 sandy silty ~~sand~~ with organics (~20-30%). Silt is firm, dense very dry (0-8" BLS) 10YR 5/6 Yellowish brown (RUST) color intermixed with various debris, glass, metal. | 0–4 | | SAIC01 | | Y | | BACKGROUND | 0-8" 8-14" 14-20" ZONE OF DEBRIS AT ~ 14-20" BLS (METAL, GLASS, ~50% DEBRIS) |
| | DARK OLIVE GRAY 5Y 3/2 CLAYEY SILT (20% SAND, 30% CLAY, 50% SILT). FIRM, DENSE MOIST | 4–8 | | SAIC02 | — | — Y | | BACKGROUND | DEBRIS ENDS ~ 5' BLS TRANSITION FROM SAND TO MORE CLAY |
| | BROWNISH YELLOW 10YR 6/8 CLAYEY SILT (10% SAND, 20% CLAY, 70% SILT) FIRM, UDENSE MOIST | 8–12 | | | | | | BACKGROUND | WATER ENCOUNTERED AT ~ 8' BLS |
| | Bottom of Borehole | 12 | | | | | | | SCREEN FOR HYDROPUNCH SET AT 8-10' BLS, |

# Field Boring Log



| | | | |
|---|---|---|---|
| Site File No. | County ACCOMACK | Boring No. SB-CDL-03 | Monitor Well No. N/A |
| Site File Name | | Surface Elev. | Completion Depth |
| Field ID No. | | Auger Depth | Rotary Depth |
| State Planar Coordinates: N. | E. | Date: Start 8/7/02 Time 1630 Finish | Time 1700 |
| Borehole status (BSTAT)*: | Ground water Depth: | Method (See back): | |
| Drilling Equipment: GEOPROBE | Surface (Circle one): Bare Grassy (Wooded) | | |

Refer to back of page

Personnel:
G- J. Pendleton
D- T. Baumgardner
H- B. Henry
H- G. Meers (USACE)

| USCS | DESCRIPTION* | Depth in feet | MOIST* | Sample No. | Sample Recovery | Lab Anal Y/N | N Valves (Blows) | F.I.D. or P.I.D/ LEL Readings | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | DARK BROWN 10YR 4/3 SILTY SAND (~30% SILT). SAND FINE - MED. GRAINED SUBROUNDED TO SUBANGULAR, MODERATE SORTING<br>SMALL STRINGER OF MOTTLED CLAY | 1–4 | | ~~SAIC01~~ | SAIC01 | Y | | BACKGROUND | |
| | DARK BROWN 10YR 4/4 SILTY SAND. DENSE, FIRM SOFT & WET. (ENCOUNTERED H2O | 4–8 | | ~~SAIC02~~ | SAIC02 | Y | | BACKGROUND | |

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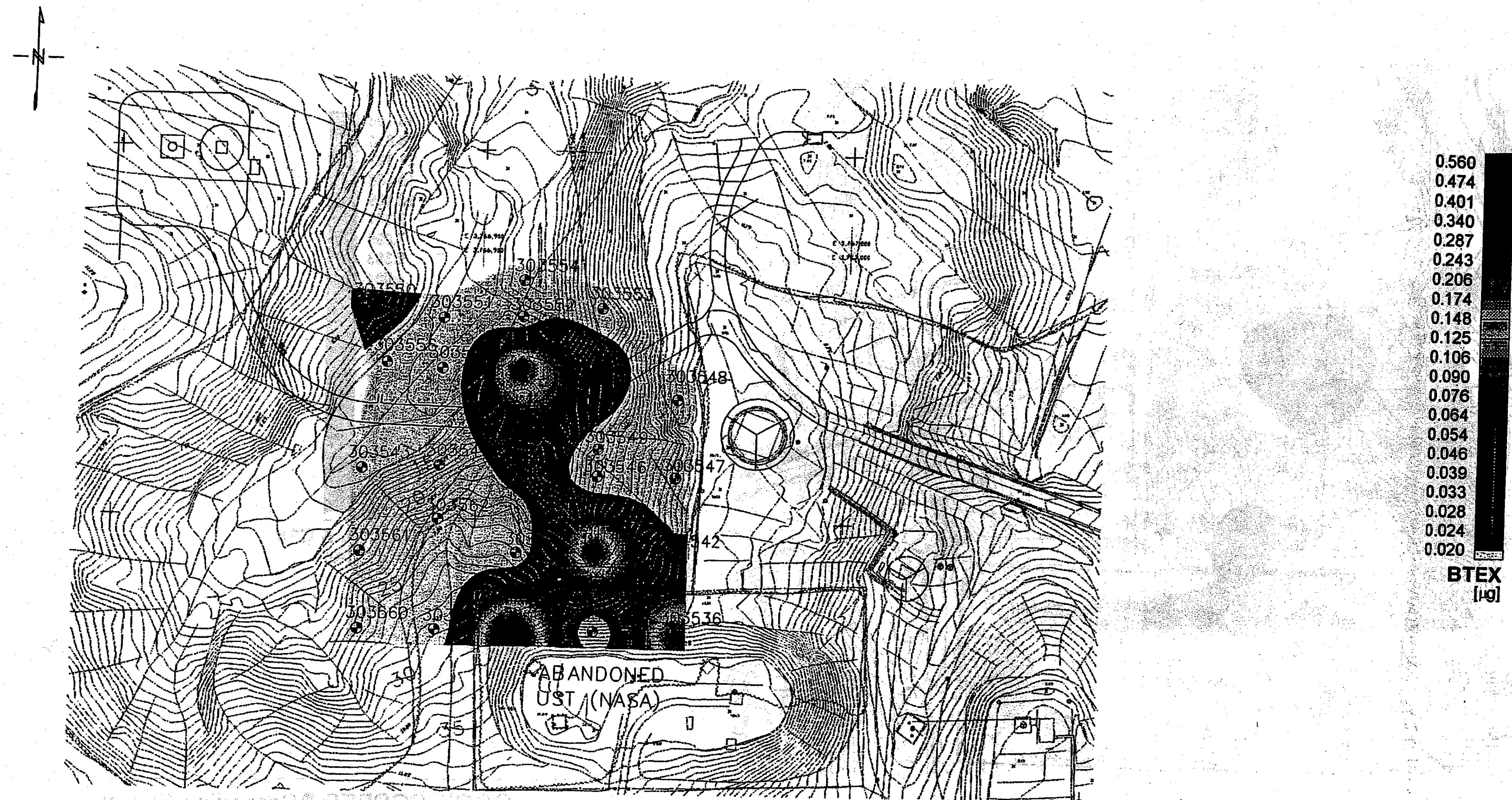
## APPENDIX B

## SOIL GAS MAPS




GORE-SORBER® Screening Survey

GORE Creative Technologies Worldwide
W.L. GORE & ASSOCIATES, INC.
100 CHESAPEAKE BOULEVARD
ELKTON, MD, USA 21921
USA
(410) 392-7600

US Army Corps of Engineers, Norfolk, VA
Wallop Island, VA Site
BTEX

Scale 1:1320

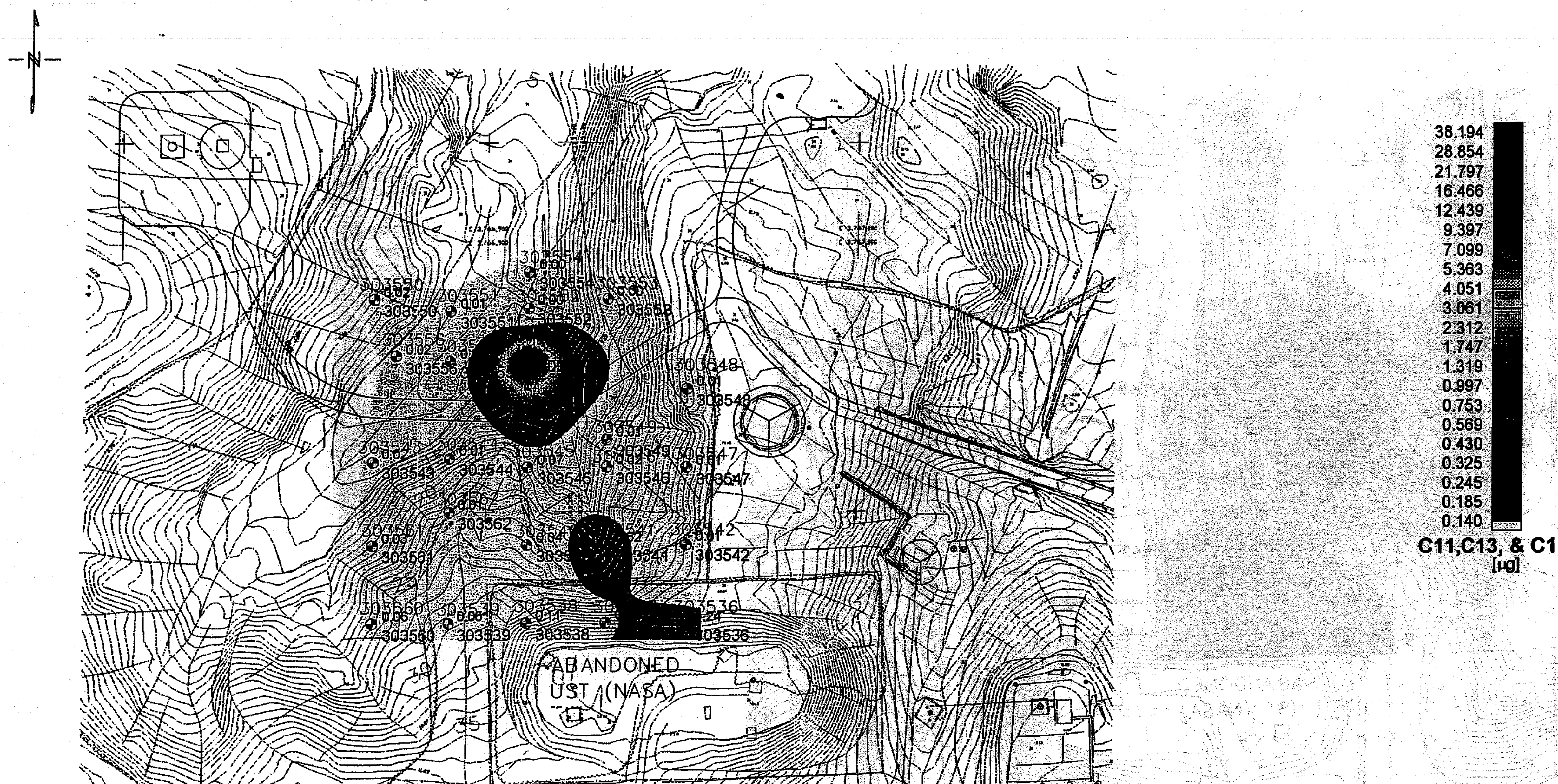
50 0 50 100 150 200 250
foot

| | | | |
|---|---|---|---|
| DATE DRAWN: 18 MARCH 1999 | DRAWN BY: JH | ORIG. CAD: Passivesample.dwg | SITE CODE: AXC |
| REV. DATE: | REV. #: | PROJECT NUMBER: 10061543 | FIGURE 1 |





0120AB162




Scale 1:1320

50 0 50 100 150 200 250

foot

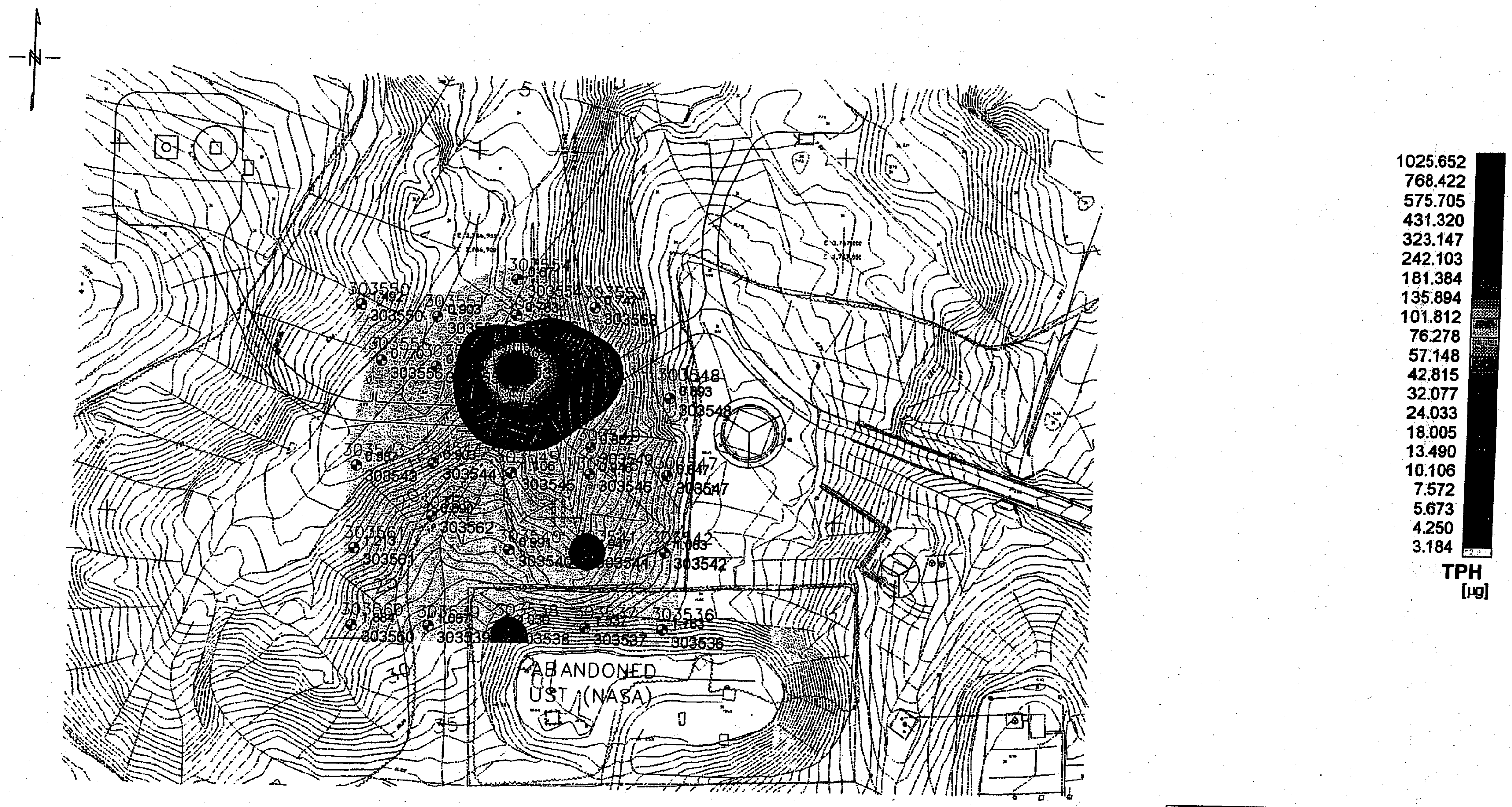
## GORE-SORBER® Screening Survey

W.L. GORE & ASSOCIATES, INC.
100 CHESAPEAKE BOULEVARD
ELKTON, MD, USA 21921
USA
(410) 392-7600

GORE Creative Technologies Worldwide

## US Army Corps of Engineers, Norfolk, VA
## Wallop Island, VA Site
## Undecane, Tridecane, & Pentadecane

| DATE DRAWN: 18 MARCH 1999 | DRAWN BY: JH | ORIG. CAD: Passivesample.dwg | SITE CODE: AXC |
|---|---|---|---|
| REV. DATE: | REV. #: | PROJECT NUMBER: 10061543 | FIGURE 2 |




## GORE-SORBER® Screening Survey

W.L. GORE & ASSOCIATES, INC.
100 CHESAPEAKE BOULEVARD
ELKTON, MD, USA 21921
USA
(410) 392-7600

GORE Creative Technologies Worldwide

## US Army Corps of Engineers, Norfolk, VA
## Wallop Island, VA Site
## Total Petroleum Hydrocarbons

Scale 1:1320

50 0 50 100 150 200 250

foot

| DATE DRAWN: 18 MARCH 1999 | DRAWN BY: JH | ORIG. CAD: Passivesample.dwg | SITE CODE: AXC |
|---|---|---|---|
| REV. DATE: | REV. #: | PROJECT NUMBER: 10061543 | FIGURE 3 |

# APPENDIX C

# CHAIN-OF-CUSTODY FORMS

**SAIC** Science Applications International Corporation
An Employee Owned Company

CO[illegible]: [illegible]01

 Date: 8/16/02

Name Science Applications International Corporation
Address 11251 Roger Bacon Dr., Reston, VA 20190
Phone Number (703) 318-4759
Project Manager John Pendleton
Project Name Wallops Island
Job/P.O. No. 01-0827-04-2164-
Sampler (Signature) John D. Pendleton (Printed Name) John D. Pendleton

Laboratory Name GPL Environmental
Address 202 Perry Parkway
Gaithersburg, Md 20877
Phone (301)-926-6802
Fax (301)-840-1209
Contact LAURA PETRIK

Requested Parameters

| Samp. Collector | Site ID | Field Sample # | Site Type | Depth | Date | Time | Matrix | VOC-SO(A) | VOC-WA(B) | Temperature | Moisture/Solids | No. of Containers | Observations, Comments, Special Instructions |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SB-WWP-01 | SAIC01R | BORE | 0 | 8/16/02 | 1120 | SO | 3 | | | 1 | 4 ~~3~~ | JP 8/16/02 |
| | SB-WWP-01 | SAIC02R | BORE | 0.5 | 8/16/02 | 1130 | SO | 3 | | | 1 | 4 ~~3~~ | JP 8/16/02 |
| | SB-WWP-02 | SAIC01R | BORE | 0 | 8/16/02 | 1145 | SO | 3 | | | 1 | 4 ~~3~~ | JP 8/16/02 |
| | SB-WWP-02 | SAIC02R | BORE | 3.5 | 8/16/02 | 1200 | SO | 3 | | | 1 | 4 ~~3~~ | JP 8/16/02 |
| | SB-WWP-02 | SAIC01DR | BORE | 0 | 8/16/02 | 1145 | SO | 3 | | | 1 | 4 ~~3~~ | JP 8/16/02 |
| | SB-WWP-03 | SAIC01R | BORE | 0 | 8/16/02 | 1230 | SO | 3 | | | 1 | 4 ~~3~~ | JP 8/16/02 |
| | SB-WWP-03 | SAIC02R | BORE | 0.5 | 8/16/02 | 1245 | SO | 3 | | | 1 | 4 ~~3~~ | JP 8/16/02 |
| | | | | | | | | | | | | | |
| | SB-WWP-01 | SAIC01MR | BORE | 0 | 8/16/02 | 1120 | SO | 3 | | | 1 | 4 ~~3~~ | JP 8/16/02 |
| | SB-WWP-01 | SAIC01MDR | BORE | 0 | 8/16/02 | 1120 | SO | 3 | | | 1 | 4 ~~3~~ | JP 8/16/02 |
| | SB-WWP-01 | SAICTB04 | TRIP | 0 | 8/16/02 | 1030 | WA | | 2 | | | 2 | |
| | COOLANT | | | | | | | | ~~2~~ | 1 | | 1 | |
| | | | | | | | 8/16/02 JP | | | | | | |

Relinquished by: John D. Pendleton (Signature)
Date: 8/16/02
Received by: L. Petrik (Signature)
Date: 8/16/02
Printed Name: John D. Pendleton
Time: 1810
Printed Name: Laura Petrik
Time: 18:10
Company: SAIC
Company: GPL

Relinquished by:
Signature:
Printed Name:
Company:
Date:
Time:
Received by:
Signature:
Printed Name:
Company:
Date:
Time:

Notes: SOLIDS/MOISTURE BOTTLES LABELED ON TOP OF BOTTLE. BOTTLES COLLECTED W. SAMPLE IN ZIP-LOCK BAG

Total Number of Containers: ~~30~~ 39 JP 8/16/02

Shipment Method: DELIVERY
Airbill No.:
Custody Seal 1 No.:
Custody Seal 2 No.:
Field COC No.s:

Temperature Blank
Field: 4°C
Lab:

SAIC Location
Reston, Virginia
11251 Roger Bacon Dr., Reston, VA 20190
(703) 318-4753

Science Applications International Corporation

White: Laboratory  Pink: Project Manager  Yellow: Project QAO  Goldenrod: Field Project Manager

208126

*GPL Laboratories, LLLP*

## Figure 1
## SAMPLE RECEIPT CHECKLIST

..O. No: 208126

Client Name: Saic

Date Received: 8/16/02

Time Received: 18:10

Received By: Laura

Carrier Name: Client

Prepared (Logged In) By: / 8/19/02 (Initials, Date)

Project:

Site:

VOA Holding Blank I.D. No:

| | YES | NO |
|---|---|---|
| Airbill/Manifest Present? | | ✓ |
| No. | | |
| Shipping Container in Good Condition? | ✓ | |
| Custody Seals Present on Shipping Container? | ✓ | |
| Condition: Broken ___ | | |
| Intact-not dated or signed ___ | | |
| Intact-dated and signed ✓ | | |
| Usage of Tamper Evident Type | ✓ | |
| Chain-of-Custody Present? | ✓ | |
| Chain-of-Custody Agrees with Sample Labels? | ✓ | |
| Chain-of-Custody Signed? | ✓ | |
| Packing Present in Shipping Container? | | ✓ |
| Type of Packing | | |
| Custody seals on Sample Bottles? | | ✓ |
| Condition: Good ___ Broken ___ | | |
| Total Number of Sample Bottles ___ | | |
| Total Number of Samples ___ | | |
| Samples Intact? | ✓ | |
| Sufficient Sample Volume for Indicated Test? | ✓ | |

| | YES | NO |
|---|---|---|
| Trip Blanks: No. of Sets 1 | ✓ | |
| Field Blanks: No. of Sets | | ✓ |
| Equip. Blank: No. of Sets | | ✓ |
| Field Duplicate: No. of Sets | | ✓ |
| MS/MSD: No of Sets | | ✓ |
| VOA Vials Have Zero Headspace? | ✓ | |
| Preservatives Added to Sample? | ✓ | |
| pH Check Required? | | NA |
| Performed By? | | NA |
| Ice Present in Shipping Container? | ✓ | |

| Container # | Temp. | Container # | Temp. |
|---|---|---|---|
| 1 | 20 | | |

Chris 8/19/02

Project Manager Contacted?
Name: Laura
Date Contacted: 8/19/02

Any NO response must be detailed in the comments section below. If items are not applicable to particular samples or contracts, they should be marked N/A/

COMMENTS:

Checklist Completed By: Chris

Date: 8/19/02

SOP No: F.2V11

**SAIC** Science Applications International Corporation
An Employee Owned Company



COC No.: ~~W10002-GP~~

Date: 8/8/02 JP 8/8/02

Name Science Applications International Corporation
Address 11251 Roger Bacon Dr., Reston, VA 20190
Phone Number (703) 318-4759
Project Manager John Pendleton
Project Name Wallops Island
Job/P.O. No. 01-0827-04-2164-
~~Sampler (Signature)~~ (Printed Name) John D. Pendleton

Laboratory Name GPL Environmental
Address 202 Perry Parkway
Gaithersburg, Md 20877
Phone (301)-926-6802
Fax (301)-840-1209
Contact

Requested Parameters

| Samp. Collected | Site ID | Field Sample # | Site Type | Depth | Date | Time | Matrix | METALS-SO (A)(17) | VOC-SO (A)(39) | SVOC-SO (A)(39) | VOC-WA (B)(73) | SVOC-WA (A)(73) | METALS-WA (C)(3) | | MOISTURE | TEMPERATURE | | NO. OF CONTAINERS | OBSERVATIONS, COMMENTS SPECIAL INSTRUCTIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SB-WWP-01 | SAIC01 | BORE | 0 | 8/8/02 | 1020 | SO | 1 | ~~1~~3 | 1 | JP 8/8/02 | | | | 1 | | 6 | ~~3~~ | |
| | SB-WWP-01 | SAIC02 | BORE | 0.5 | 8/8/02 | 1044 | SO | 1 | ~~1~~3 | 1 | | | | | 1 | | 6 | ~~3~~ | |
| | SB-WWP-02 | SAIC01 | BORE | 0 | 8/8/02 | 1100 | SO | 1 | ~~1~~3 | 1 | | | | | 1 | | 6 | ~~3~~ | |
| | SB-WWP-02 | SAIC01D | BORE | 0 | 8/8/02 | 1100 | SO | 1 | ~~1~~3 | 1 | | | | | 1 | | 6 | ~~3~~ | Duplicate |
| | SB-WWP-02 | SAIC02 | BORE | 3.5 | 8/8/02 | 1125 | SO | 1 | ~~1~~3 | 1 | | | | | 1 | | 6 | ~~3~~ | |
| | SB-WWP-03 | SAIC01 | BORE | 0 | 8/8/02 | 1200 | SO | 1 | ~~1~~3 | 1 | | | | | 1 | | 6 | ~~3~~ | |
| | SB-WWP-03 | SAIC02 | BORE | 0.5 | 8/9/02 | 1220 | SO | 1 | ~~1~~3 | 1 | | | | | 1 | | 6 | ~~3~~ | |
| | SB-WWP-01 | SAICTB03 ~~SAICTB02~~ | TRIP | 0 | 8/8/02 | 1000 | WA | | | | 2 | | | | | | | 2 | Trip Blank |
| | SB-WWP-03 | SAICRB01 | RNSW | 0 | 8/9/02 | 1245 | WA | | | | 3 | 2 | 1 | | | | | 6 | Rinse Blank Soil Sampling |
| | SB-WWP-01 | SAIC01MS | BORE | 0 | 8/8/02 | 1020 | SO | 1 | 3 | 1 | | | | | 1 | | | 6 | MS |
| | SB-WWP-01 | SAIC01MSD | BORE | 0 | 8/8/02 | 1020 | SO | 1 | 3 | 1 | | | | | 1 | | | 6 | MSD |
| | Coolant | | | | | | | | | | | | | | | 1 | | 1 | |

| Relinquished by | Date | Received by | Date |
|---|---|---|---|
| Signature: John D. Pendleton | 8/9/02 | Signature: [illegible] | 8/09/02 |
| Printed Name: John D. Pendleton | Time: 1155 | Printed Name: [illegible] | Time: 3:35 |
| Company: SAIC | | Company: [illegible] | |

| Relinquished by | Date | Received by | Date |
|---|---|---|---|
| Signature: | | Signature: [illegible] | |
| Printed Name: | Time: | Printed Name: | Time: |
| Company: | | Company: | |

Notes:
A. Cool, 4° C
B. HCL to pH <2 Cool, 4° C
C. HNO3 to pH <2 Cool, 4° C

3. ILC03.1
17. ILM04.0
39. OLM04.2
73. OLC02.1

Total Number of Containers: ~~29~~ 63 JP 8/8/02

Shipment Method:
Airbill No.:
Custody Seal 1 No.:
Custody Seal 2 No.:
Field COC No.s:

Temperature Blank
4°C Field:
Lab:

SAIC Location
Reston, Virginia
11251 Roger Bacon Dr., Reston, VA 20190
(703) 318-4753



White: Laboratory Pink: Project Manager Yellow: Project QAO Goldenrod: Field Project Manager

208072

**SAIC** Science Applications International Corporation
An Employee Owned Company



COC No.: ~~WI0001-GP~~ JP 8/8/02
Date: 8/8/02

Name Science Applications International Corporation
Address 11251 Roger Bacon Dr., Reston, VA 20190
Phone Number (703) 318-4759
Project Manager John Pendleton
Project Name Wallops Island
Job/P.O. No. 01-0827-04-2164-
Sampler (Signature) John D. Pendleton (Printed Name) John D. Pendleton

Laboratory Name GPL Environmental
Address 202 Perry Parkway
Gaithersburg, Md 20877
Phone (301)-926-6802
Fax (301)-840-1209
Contact

Requested Parameters

| Samp. Collector | Site ID | Field Sample # | Site Type | Depth | Date | Time | Matrix | METALS-WA (C)(3) | SVOC-WA (A)(73) | VOC-WA (B)(73) | TEMPERATURE | NO. OF CONTAINERS | * OBSERVATIONS, COMMENTS SPECIAL INSTRUCTIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WA-UST-01 | SAIC01 | WTR | 0 | 8/8/02 | 1345 | WA | 1 | 2 | 3 | | 6 | CONTAMINATED (HIGHLY) |
| | WA-UST-02 | SAIC01 | WTR | 13 | 8/8/02 | 1400 | WA | 1 | 2 | 3 | | 6 | HNO3 Removed |
| | WA-UST-03 | SAIC01 | WTR | 0 | 8/8/02 | 1500 | WA | 1 | 2 | 3 | | 6 | HNO3 Removed |
| | WA-UST-04 | SAIC01 | WTR | 11 | 8/8/02 | 1515 | WA | 1 | 2 | 3 | | 6 | HNO3 Removed |
| | COOLANT | | TEMP | 0 | 8/8/02 | | | | | | 1 | 1 | |
| | SB-DL-03 | SAIC8802 | WTR | 0 | 8/7/02 | 1730 | WA | 1 | 2 | 3 | | 6 | HNO3 REMOVED FROM METALS SAMPLE |

| Relinquished by | Date | Received by | Date |
|---|---|---|---|
| John D. Pendleton (Signature) | 8/9/02 | Tarbryt (Signature) | 08/09/02 |
| John D. Pendleton (Printed Name) | Time 1155 | Tarbryt (Printed Name) | Time 3:35 |
| SAIC (Company) | | Tarbryt (Company) | |
| Relinquished by | Date | Received by | Date 3 |
| Signature | | Tarbryt (Signature) | |
| Printed Name | Time | Printed Name | Time |
| Company | | Company | |

Notes: Total Number of Containers: ~~24~~ 31 JP 8/8/02
A. Cool, 4° C
B. HCL to pH <2 Cool, 4° C
C. HNO3 to pH <2 Cool, 4° C

3. ILC03.1
73. OLC02.1

* USE EXTREME CAUTION WA-UST-01 02, 03 & 04 HIGHLY CONTAMINATED PROBABLY JP-4
HNO3 Removed from all of metal samples

Shipment Method: Delivery
Airbill No.:
Custody Seal 1 No.:
Custody Seal 2 No.:
Field COC No.s:

Temperature Blank 4°C Field:
Lab:

SAIC Location
Reston, Virginia
11251 Roger Bacon Dr., Reston, VA 20190
(703) 318-4753

**GPL Laboratories, LLLP**

SAMPLE RECEIPT CHECKLIST

GPL I.O. No: 208082
Client Name: SAIC
Date Received: 080902
Time Received: 3:35pm
Received By: [illegible] Tedros

Carrier Name: GPL Courier
Prepared (Logged In) By: [initials] 08/12/02 (Initials, Date)
Project: Wallops Island
Site:
VOA Holding Blank I.D. No:

| Item | YES | NO |
|---|---|---|
| Airbill/Manifest Present? | | ✓ |
| No. | | |
| Shipping Container in Good Condition? | | ✓ |
| Custody Seals Present on Shipping Container? | ✓ | ✗ |
| Condition: Broken | | |
| Intact-not dated or signed | | |
| Intact-dated and signed ✓ | | |
| Usage of Tamper Evident Type: Custody Tape | ✓ | |
| Chain-of-Custody Present? | ✓ | |
| Chain-of-Custody Agrees with Sample Labels? | ✓ | |
| Chain-of-Custody Signed? | ✓ | |
| Packing Present in Shipping Container? | | ✓ |
| Type of Packing | | |
| Custody seals on Sample Bottles? | | ✓ |
| Condition: Good ___ Broken ___ | | |
| Total Number of Sample Bottles: 86 | | |
| Total Number of Samples: 16 | | |
| Samples Intact? | ✓ | |
| Sufficient Sample Volume for Indicated Test? | ✓ | |

| Item | YES | NO |
|---|---|---|
| Trip Blanks: No. of Sets 1 | ✓ | |
| Field Blanks: No. of Sets | | ✓ |
| Equip. Blank: No. of Sets | | ✓ |
| Field Duplicate: No. of Sets | | ✓ |
| MS/MSD: No of Sets | | ✓ |
| VOA Vials Have Zero Headspace? | ✓ | |
| Preservatives Added to Sample? | ✓ | |
| pH Check Required? Performed By? | | ✓ |
| Ice Present in Shipping Container? | ✓ | |

| Container # | Temp. | Container # | Temp. |
|---|---|---|---|
| #1 | 5.9°C | | |
| #2 | 5.9°C | | |

080902

Project Manager Contacted?
Name: [illegible]
Date Contacted: 08/12/02

Any NO response must be detailed in the comments section below. If items are not applicable to particular samples or contracts, they should be marked N/A/

COMMENTS: Sample WA-UST-03-SAIC01 received one 32.0z SVOA Bottle. One bottle received unlabeled
8/12/02 per J. Pendleton - unlabeled 1L amber is spare SVOC for WA-UST-03-SAIC01
metals water samples filtered & preserved by lab lp

Checklist Completed By: [signature]

Date: 08/12/02

ɪPL
boratories

# Work Order Approval



rk Order #: 208057
> Laura Petrik
ject #: 10274
iect Nam Wallops Flight Facility

Date Received Aug-08-2002
Fax Due Date:
HC Due Date:Aug-27-2002
EDD Due ~~Date Aug-29-2002~~

APPROVED

Client: SAIC
Address: 11251 Roger Bacon Drive
Reston, VA 20190

Contact: John Pendleton
Phone: (703)318-4500
Fax: (703)709-1042
E-Mail:

nments: QC Level 3 (CLP-like) + CD, LIMS pages not required:
ERPIMS 4.0 EDD
See handouts for project specific QA/QC requirements
and RLs
Metals - report to MDL

**SAMPLES CONTAIN HIGH LEVELS OF HYDROCARBONS - SEE CoC**

b ID : 208057-001 Field ID : SBCDL01-SAIC01 Date Collected : 07-AUG-02

| thod Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| cury by SW-846 7471A | S | 6 | B-4D | COOL | 21D | |
| ent Solids by CLP | S | 6 | B-4D | COOL | 21D | |
| As TCL List by EPA 8270C | S | 6 | B-4D | COOL | 21D | |
| l Metals by EPA 6010B | S | 6 | B-4D | COOL | 21D | |
| tile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| tile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

ID : 208057-002 Field ID : SBCDL01-SAIC02 Date Collected : 07-AUG-02

| hod Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| ury by SW-846 7471A | S | 6 | B-4D | COOL | 21D | |
| ent Solids by CLP | S | 6 | B-4D | COOL | 21D | |
| As TCL List by EPA 8270C | S | 6 | B-4D | COOL | 21D | |
| Metals by EPA 6010B | S | 6 | B-4D | COOL | 21D | |
| tile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| tile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

ID : 208057-003 Field ID : SBCDL02-SAIC01 Date Collected : 07-AUG-02

| hod Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| ury by SW-846 7471A | S | 6 | B-4D | COOL | 21D | |
| nt Solids by CLP | S | 6 | B-4D | COOL | 21D | |
| s TCL List by EPA 8270C | S | 6 | B-4D | COOL | 21D | |
| Metals by EPA 6010B | S | 6 | B-4D | COOL | 21D | |
| le Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| le Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

ID : 208057-004 Field ID : SBCDL02-SAIC01D Date Collected : 07-AUG-02

| od Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| ry by SW-846 7471A | S | 6 | B-4D | COOL | 21D | |
| t Solids by CLP | S | 6 | B-4D | COOL | 21D | |
| s TCL List by EPA 8270C | S | 6 | B-4D | COOL | 21D | |
| Metals by EPA 6010B | S | 6 | B-4D | COOL | 21D | |
| c Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| e Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

Approved By: lp

Date and Time Approved : 8-8-02

PL
boratories

# Work Order Approval



Order #: 208057
Laura Petrik
ject #: 10274
t Nam Wallops Flight Facility

Date Received Aug-08-2002
Fax Due Date:
HC Due Date:Aug-27-2002
EDD Due Date Aug-29-2002

Client: SAIC
Address: 11251 Roger Bacon Drive
Reston, VA 20190

## APPROVED

ID : 208057-005 Field ID : SBCDL02-SAIC02 Date Collected : 07-AUG-02

| hod Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| rcury by SW-846 7471A | S | 6 | B-4D | COOL | 21D | |
| nt Solids by CLP | S | 6 | B-4D | COOL | 21D | |
| s TCL List by EPA 8270C | S | 6 | B-4D | COOL | 21D | |
| al Metals by EPA 6010B | S | 6 | B-4D | COOL | 21D | |
| tile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| le Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

ID : 208057-006 Field ID : SBCDL03-SAIC01 Date Collected : 07-AUG-02

| od Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| ry by SW-846 7471A | S | 6 | B-4D | COOL | 21D | |
| cent Solids by CLP | S | 6 | B-4D | COOL | 21D | |
| TCL List by EPA 8270C | S | 6 | B-4D | COOL | 21D | |
| Metals by EPA 6010B | S | 6 | B-4D | COOL | 21D | |
| tile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| tile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

D : 208057-007 Field ID : SBCDL03-SAIC02 Date Collected : 07-AUG-02

| hod Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| y by SW-846 7471A | S | 6 | B-4D | COOL | 21D | |
| Solids by CLP | S | 6 | B-4D | COOL | 21D | |
| As TCL List by EPA 8270C | S | 6 | B-4D | COOL | 21D | |
| etals by EPA 6010B | S | 6 | B-4D | COOL | 21D | |
| Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| tile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

: 208057-008 Field ID : HPCDL01-SAIC01 Date Collected : 07-AUG-02

| d Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| ury by EPA 7470A | W | 6 | B-4D | COOL | 21D | |
| TCL List by EPA 8270C | W | 6 | B-4D | COOL | 7D | (On Hold/Spare) |
| TCL List by EPA 8270C | W | 6 | B-4D | COOL | 7D | |
| Metals by EPA 6010B | W | 6 | B-4D | COOL | 7D | |
| L Compounds by SW8260 25mL Purge | W | 6 | A1-2 | HC | 21D | (On Hold/Spare) |
| L Compounds by SW8260 25mL Purge | W | 6 | A1-2 | HC | 21D | |

ID : 208057-009 Field ID : HPCDL02-SAIC01 Date Collected : 07-AUG-02

| Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| by EPA 7470A | W | 6 | B-4D | COOL | 21D | |
| s TCL List by EPA 8270C | W | 6 | B-4D | COOL | 7D | (On Hold/Spare) |
| CL List by EPA 8270C | W | 6 | B-4D | COOL | 7D | |
| tals by EPA 6010B | W | 6 | B-4D | COOL | 7D | |
| TCL Compounds by SW8260 25mL Purge | W | 6 | A1-2 | HC | 21D | (On Hold/Spare) |
| L Compounds by SW8260 25mL Purge | W | 6 | A1-2 | HC | 21D | |

Approved By: ____________________

Date and Time Approved : ____________________

GPL Laboratories

# Work Order Approval

rk Order #: 208057
P Laura Petrik
ject #: 10274
ject Nam Wallops Flight Facility

Date Received Aug-08-2002
Fax Due Date:
HC Due Date:Aug-27-2002
EDD Due Date Aug-29-2002

Client: SAIC
Address: 11251 Roger Bacon Drive
Reston, VA 20190

## APPROVED

**ab ID : 208057-010 Field ID : HPCDL03-SAIC01 Date Collected : 07-AUG-02**

| lethod Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| ercury by EPA 7470A | W | 6 | B-4D | COOL | 21D | |
| 'OAs TCL List by EPA 8270C | W | 6 | B-4D | COOL | 7D | (On Hold/Spare) |
| 'OAs TCL List by EPA 8270C | W | 6 | B-4D | COOL | 7D | |
| tal Metals by EPA 6010B | W | 6 | B-4D | COOL | 7D | |
| )C TCL Compounds by SW8260 25mL Purge | W | 6 | A1-2 | HC | 21D | (On Hold/Spare) |
| )C TCL Compounds by SW8260 25mL Purge | W | 6 | A1-2 | HC | 21D | |

**ıb ID : 208057-011 Field ID : HPIWL04-SAIC01 Date Collected : 07-AUG-02**

| ethod Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| rcury by EPA 7470A | W | 6 | B-4D | COOL | 21D | |
| OAs TCL List by EPA 8270C | W | 6 | B-4D | COOL | 7D | (On Hold/Spare) |
| OAs TCL List by EPA 8270C | W | 6 | B-4D | COOL | 7D | |
| al Metals by EPA 6010B | W | 6 | B-4D | COOL | 7D | |
| C TCL Compounds by SW8260 25mL Purge | W | 6 | A1-2 | HC | 21D | (On Hold/Spare) |
| C TCL Compounds by SW8260 25mL Purge | W | 6 | A1-2 | HC | 21D | |

**b ID : 208057-012 Field ID : SBIWL04-SAIC01 Date Collected : 07-AUG-02**

| thod Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| ury by SW-846 7471A | S | 6 | B-4D | COOL | 21D | |
| ent Solids by CLP | S | 6 | B-4D | COOL | 21D | |
| As TCL List by EPA 8270C | S | 6 | B-4D | COOL | 21D | |
| l Metals by EPA 6010B | S | 6 | B-4D | COOL | 21D | |
| tile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| tile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

**ID : 208057-013 Field ID : SBIWL04-SAIC02 Date Collected : 07-AUG-02**

| hod Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| ury by SW-846 7471A | S | 6 | B-4D | COOL | 21D | |
| nt Solids by CLP | S | 6 | B-4D | COOL | 21D | |
| As TCL List by EPA 8270C | S | 6 | B-4D | COOL | 21D | |
| Metals by EPA 6010B | S | 6 | B-4D | COOL | 21D | |
| ile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| ile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

**ID : 208057-014 Field ID : SBIWL04-SAICTB02 Date Collected : 07-AUG-02**

| od Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| TCL Compounds by SW8260 25mL Purge | W | 2 | A1-2 | HC | 21D | (On Hold/Spare) |
| TCL Compounds by SW8260 25mL Purge | W | 2 | A1-2 | HC | 21D | |

Approved By: ____________________

Date and Time Approved : ____________________

**SAIC** Science Applications International Corporation
An Employee Owned Company

# Chain of Custody Record

COC No.: ~~W10004-GP~~ 8/7/02 JP

Page 1 of 1    Date: 8/7/02

Name Science Applications International Corporation
Address 11251 Roger Bacon Dr., Reston, VA 20190
Phone Number (703) 318-4759
Project Manager John Pendleton
Project Name Wallops Island
Job/P.O. No. 01-0827-04-2164-
~~Sampler (Signature)~~ (Printed Name) John D. Pendleton

Laboratory Name GPL Environmental
Address 202 Perry Parkway
Gaithersburg, Md 20877
Phone (301)-926-6802
Fax (301)-840-1209
Contact

Requested Parameters: METALS-SO (A)(17); VOC-SO (A)(39); SVOC-SO (A)(39); METALS-WA (C)(3); SVOC-WA (A)(73); VOC-WA (B)(73); MAX STURE

| Site ID | Field Sample # | Site Type | Depth | Date | Time | Matrix | METALS-SO (A)(17) | VOC-SO (A)(39) | SVOC-SO (A)(39) | METALS-WA (C)(3) | SVOC-WA (A)(73) | VOC-WA (B)(73) | MAX STURE | | No. of Containers | Observations, Comments, Special Instructions |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SB-CDL-01 | SAIC01 | BORE | 6.5 | 8/7/02 | 1111 | SO | 1 | ~~1~~ | 1 | | | | 1 | 6 | ~~3~~ | * HIGHLY CONTAMINATED |
| SB-CDL-01 | SAIC02 | BORE | 9 | 8/7/02 | 1120 | SO | 1 | ~~1~~ | 1 | | | | 1 | 6 | ~~3~~ | HIGHLY CONTAMINATED |
| SB-CDL-02 | SAIC01 | BORE | 0 | 8/7/02 | 1410 | SO | 1 | ~~1~~ | 1 | | | | 1 | 6 | ~~3~~ | |
| SB-CDL-02 | SAIC01D | BORE | 0 | 8/7/02 | 1410 | SO | 1 | ~~1~~ | 1 | | | | 1 | 6 | ~~3~~ | Duplicate |
| SB-CDL-02 | SAIC02 | BORE | 7 | 8/7/02 | 1424 | SO | 1 | ~~1~~ | 1 | | | | 1 | 6 | ~~3~~ | |
| SB-CDL-03 | SAIC01 | BORE | 0 | 8/7/02 | 1432 | SO | 1 | ~~1~~ | 1 | | | | 1 | 6 | 3 | |
| SB-CDL-03 | SAIC02 | BORE | 4 | 8/7/02 | 1442 | SO | 1 | ~~1~~ | 1 | | | | 1 | 6 | 3 | * |
| HP-CDL-01 | SAIC01 | PNCH | 10 | 8/7/02 | 1210 | WA | | | | 1 | 2 | 3 | | | 6 | HNO3 REMOVED FROM SAMPLE |
| ~~HP-CDL-01~~ | ~~SAICTB04~~ | ~~TRIP~~ | | | | ~~WA~~ | | | | | | ~~2~~ | | | ~~2~~ | ~~Trip Blank~~ |
| HP-CDL-02 | SAIC01 | PNCH | 8 | 8/7/02 | 1600 | WA | | | | 1 | 2 | 3 | | | 6 | HNO3 REMOVED FROM SAMPLE |
| HP-CDL-03 | SAIC01 | PNCH | 4 | 8/7/02 | 1700 | WA | | | | 1 | 2 | 3 | | | 6 | HNO3 REMOVED FROM SAMPLE |
| ~~HP-CDL-03~~ | ~~SAICRB02~~ | ~~RNSW~~ | | | | ~~WA~~ | | | | ~~1~~ | ~~2~~ | ~~3~~ | | | ~~6~~ | ~~Rinse Blank~~ |
| ~~SB-CDL-01~~ | ~~SAICTB01~~ | ~~TRIP~~ | | | | ~~WA~~ | | | | | | ~~2~~ | | | ~~2~~ | ~~Trip Blank~~ |

Relinquished by: John D. Pendleton (Signature)
Printed Name: John D. Pendleton
Company: SAIC
Date: 8/7/02  Time: 1900
Received by: Signature / Printed Name / Company
Date / Time

Relinquished by: Signature / Printed Name / Company
Date / Time
Received by: (Signature) German
Printed Name / Company: GPL Labs
Date: 08/08/02  Time: 9:15 Am

Notes: Total Number of Containers: ~~40~~ 60 SDP 8/8/02
A. Cool, 4° C
B. HCL to pH <2 Cool, 4° C
C. HNO3 to pH <2 Cool, 4° C

3. ILC03.1
17. ILM04.0
39. OLM04.2
73. OLC02.1

HNO3 HAS BEEN REMOVED FROM METALS

* VERY HIGH PPM READINGS FROM SB-CDL-01 (SAIC02) DIESEL OR HYDROCARBON MATERIAL, ALL SAMPLES FROM SB CD-01 should be handled with care

Shipment Method: 8333 0878 9640
Airbill No.: 833 F0878 9639
Custody Seal 1 No.:
Custody Seal 2 No.:
Field COC No.s:

Temperature Blank 4°C
Field:
Lab:

SAIC Location
Reston, Virginia
11251 Roger Bacon Dr., Reston, VA. 20190
(703) 318-4753

Science Applications International Corporation

White: Laboratory  Pink: Project Manager  Yellow: Project QAO  Goldenrod: Field Project Manager

# Chain of Custody Record

Science Applications International Corporation
An Employee Owned Company

Page 1 of 1

COC No.: ~~WI0001-GP~~ WI0002-GP

Date: 8/7/02

Name Science Applications International Corporation
Address 11251 Roger Bacon Dr., Reston, VA 20190
Phone Number (703) 318-4759
Project Manager John Pendleton
Project Name Wallops Island
Job/P.O. No. 01-0827-04-2164-
Sampler (Signature) [signature] (Printed Name) John D. Pendleton

Laboratory Name GPL Environmental
Address 202 Perry Parkway
Gaithersburg, Md 20877
Phone (301)-926-6802
Fax (301)-840-1209
Contact

Requested Parameters

| Samp. Collected | Site ID | Field Sample # | Site Type | Depth | Date | Time | Matrix | Metals-WA (C) (3 | SVOC-WA (A) (73 | VOC-WA (B) (73 | MOISTURE | VOC-WA (B) (73 | Metals-SO (A) (P | VOC-SO (A) (39 | SVOC-SO (A) (39 | MOISTURE | NO. OF CONTAINERS | OBSERVATIONS, COMMENTS SPECIAL INSTRUCTIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | HP-IWL-04 | SAIC01 | PNCH | 19 | 8/7/02 | 0918 | WA | 1 | 2 | 3 | 1 | | | | | | 6 | HNO3 REMOVED, NEED TO FILTER |
| | SB-IWL-04 | SAIC01 | BORE | 13 | 8/7/02 | 0837 | SO | | | | | | 1 | 3 | 1 | 1 | 6 | |
| | SB-IWL-04 | SAIC02 | BORE | 19 | 8/7/02 | 0903 | SO | | | | | | 1 | 3 | 1 | 1 | 6 | |
| | SB-IWL-04 | SAICTB02 | TRIP | 0 | 8/7/02 | 0745 | WA | | | | | 2 | | | | | 2 | |
| | COOLANT | | | | | | | | | | | | | | | | 1 | |
| | COOLANT | | | | | | | | | | | | | | | | 1 | |

Relinquished by [signature]
Signature
John D. Pendleton
Printed Name
SAIC
Company
Date 8/7/02
Time 1900

Received by
Signature
Printed Name
Company
Date
Time

Notes: Total Number of Containers: 22

HNO3 REMOVED FROM HYDROPUNCH SAMPLE NEEDS TO BE FILTERED

Shipment Method: 8330878 9640
Airbill No.: 8334 0878 9639
Custody Seal 1 No.:
Custody Seal 2 No.:
Field COC No.s:

Relinquished by
Signature
Printed Name
Company
Date
Time

Received by [signature]
Signature
Gorman
Printed Name
GPL
Company
Date 8/8/02
Time 9:15

Temperature Blank
Field: 4C
Lab:

SAIC Location
Reston, Virginia
11251 Roger Bacon Dr., Reston, VA 20190
(703) 318-4753

GPL Laboratories, LLLP

SAMPLE RECEIPT CHECKLIST

| | | | |
|---|---|---|---|
| .D. No: | 208057 | Carrier Name: | Fed Ex |
| Client Name: | SAIC | Prepared (Logged In) By: Initials Date | 08/08/02 |
| Date Received: | 08/07/02 | Project: | Wallops Island |
| Time Received: | 9:15 Am | Site: | |
| Received By: | | VOA Holding Blank I.D. No: | |

| | YES | NO |
|---|---|---|
| Bill/Manifest Present? | ✓ | |
| No. | | |
| Shipping Container in Good Condition? | ✓ | |
| Custody Seals Present on Shipping Container? | ✓ | |
| Condition: Broken ___ Intact-not dated or signed ___ Intact-dated and signed ✓ | | |
| Custody Tape — Usage of Tamper Evident Type | ✓ | |
| Chain-of-Custody Present? | ✓ | |
| Chain-of-Custody Agrees with Sample Labels? | ✓ | |
| Chain-of-Custody Signed? | ✓ | |
| Packing Present in Shipping Container? Type of Packing: Bubble wrap | ✓ | |
| Custody seals on Sample Bottles? Condition: Good ___ Broken ___ | | ✓ |
| Total Number of Sample Bottles: 30 | | |
| Total Number of Samples: 14 | | |
| Samples Intact? | ✓ | |
| Sufficient Sample Volume for Indicated Test? | ✓ | |

| | YES | NO |
|---|---|---|
| Trip Blanks: No. of Sets 1 | ✓ | |
| Field Blanks: No. of Sets | | ✓ |
| Equip. Blank: No. of Sets | | ✓ |
| Field Duplicate: No. of Sets 1 | ✓ | ~~✓~~ lp |
| MS/MSD: No of Sets | | ✓ |
| VOA Vials Have Zero Headspace? | ✓ | |
| Preservatives Added to Sample? | ✓ | |
| pH Check Required? Performed By? | ✓ | |
| Ice Present in Shipping Container? | ✓ | |

| Container # | Temp. | Container # | Temp. |
|---|---|---|---|
| #1 | 3°C | | |
| #2 | 4°C | | |

08/08/02

Project Manager Contacted?
Name: Lisa Petrik
Date Contacted: 08/08/02

Any NO response must be detailed in the comments section below. If items are not applicable to particular samples or contracts, they should be marked N/A/

COMMENTS: Temperature by Temp Blank
water samples for metals filtered by lab 8-8-02 lp

Checklist Completed By: ____

Date: 08/08/02

JPL
aboratories

# Work Order Approval



ork Order #: 208040
I. P Laura Petrik
ject #: 10274
ject Nam Wallops Flight Facility

Date Received Aug-07-2002
Fax Due Date:
HC Due Date:Aug-26-2002
EDD Due Date Aug-28-2002

APPROVED

Client: SAIC
Address: 11251 Roger Bacon Drive
Reston, VA 20190

Contact: John Pendleton
Phone: (703)318-4500
Fax: (703)709-1042
E-Mail:

mments: QC Level 3 (CLP-like) + CD, do not include LIMS pages;
ERPIMS 4.0 EDD
See handouts for project specific QA/QC requirements and RLs

ab ID : 208040-001 Field ID : SBIWL01-SAIC01 Date Collected : 06-AUG-02

| ethod Name | x | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| rcury by SW-846 7471A | S | 6 | B-1D | COOL | 21D | |
| cent Solids by CLP | S | 6 | B-1D | COOL | 21D | |
| OAs TCL List by EPA 8270C | S | 6 | B-1D | COOL | 21D | |
| al Metals by EPA 6010B | S | 6 | B-1D | COOL | 21D | |
| atile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| atile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

b ID : 208040-002 Field ID : SBIWL01-SAIC02 Date Collected : 06-AUG-02

| thod Name | x | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| rcury by SW-846 7471A | S | 6 | B-1D | COOL | 21D | |
| cent Solids by CLP | S | 6 | B-1D | COOL | 21D | |
| OAs TCL List by EPA 8270C | S | 6 | B-1D | COOL | 21D | |
| Metals by EPA 6010B | S | 6 | B-1D | COOL | 21D | |
| atile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| atile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

ID : 208040-003 Field ID : SBIWL02-SAIC01 Date Collected : 06-AUG-02

| hod Name | x | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| cury by SW-846 7471A | S | 6 | B-1D | COOL | 21D | |
| ent Solids by CLP | S | 6 | B-1D | COOL | 21D | |
| As TCL List by EPA 8270C | S | 6 | B-1D | COOL | 21D | |
| Metals by EPA 6010B | S | 6 | B-1D | COOL | 21D | |
| ile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| ile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

ID : 208040-004 Field ID : SBIWL02-SAIC02 Date Collected : 06-AUG-02

| od Name | x | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| ury by SW-846 7471A | S | 6 | B-1D | COOL | 21D | |
| nt Solids by CLP | S | 6 | B-1D | COOL | 21D | |
| s TCL List by EPA 8270C | S | 6 | B-1D | COOL | 21D | |
| Metals by EPA 6010B | S | 6 | B-1D | COOL | 21D | |
| le Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| le Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

Approved By: lp

Date and Time Approved : 8-7-02

GPL
Laboratories

# Work Order Approval



Work Order #: 208040
PM: Laura Petrik
Project #: 10274
Project Nam Wallops Flight Facility

Date Received Aug-07-2002
Fax Due Date:
HC Due Date:Aug-26-2002
EDD Due Date Aug-28-2002

Client: SAIC
Address: 11251 Roger Bacon Drive
Reston, VA 20190

## APPROVED

Lab ID : 208040-005 Field ID : SBIWL03-SAIC01 Date Collected : 06-AUG-02

| Method Name | Mtx | Cont | Storage Loc | Presev Class | TAT | Comments |
|---|---|---|---|---|---|---|
| Mercury by SW-846 7471A | S | 6 | B-1D | COOL | 21D | |
| Percent Solids by CLP | S | 6 | B-1D | COOL | 21D | |
| SVOAs TCL List by EPA 8270C | S | 6 | B-1D | COOL | 21D | |
| Total Metals by EPA 6010B | S | 6 | B-1D | COOL | 21D | |
| Volatile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| Volatile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

Lab ID : 208040-006 Field ID : SBIWL03-SAIC02 Date Collected : 06-AUG-02

| Method Name | Mtx | Cont | Storage Loc | Presev Class | TAT | Comments |
|---|---|---|---|---|---|---|
| Mercury by SW-846 7471A | S | 6 | B-1D | COOL | 21D | |
| Percent Solids by CLP | S | 6 | B-1D | COOL | 21D | |
| SVOAs TCL List by EPA 8270C | S | 6 | B-1D | COOL | 21D | |
| Total Metals by EPA 6010B | S | 6 | B-1D | COOL | 21D | |
| Volatile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | (On Hold/Spare) |
| Volatile Organic Compounds by SW8260B TCL List | S | 6 | VOA FRIDGE | COOL | 21D | |

Lab ID : 208040-007 Field ID : HPIWL01-SAIC01 Date Collected : 06-AUG-02

| Method Name | Mtx | Cont | Storage Loc | Presev Class | TAT | Comments |
|---|---|---|---|---|---|---|
| Mercury by EPA 7470A | W | 6 | B-1D | NFC | 21D | |
| SVOAs TCL List by EPA 8270C | W | 6 | B-1D | COOL | 7D | (On Hold/Spare) |
| SVOAs TCL List by EPA 8270C | W | 6 | B-1D | COOL | 7D | |
| Total Metals by EPA 6010B | W | 6 | B-1D | NFC | 7D | |
| Volatile Organic Compounds by SW8260B TCL List | W | 6 | A1-2 | HC | 7D | (On Hold/Spare) |
| Volatile Organic Compounds by SW8260B TCL List | W | 6 | A1-2 | HC | 7D | |

Lab ID : 208040-008 Field ID : HPIWL01-SAIC01D Date Collected : 06-AUG-02

| Method Name | Mtx | Cont | Storage Loc | Presev Class | TAT | Comments |
|---|---|---|---|---|---|---|
| Mercury by EPA 7470A | W | 6 | B-1D | NFC | 21D | |
| SVOAs TCL List by EPA 8270C | W | 6 | B-1D | COOL | 7D | (On Hold/Spare) |
| SVOAs TCL List by EPA 8270C | W | 6 | B-1D | COOL | 7D | |
| Total Metals by EPA 6010B | W | 6 | B-1D | NFC | 7D | |
| Volatile Organic Compounds by SW8260B TCL List | W | 6 | A1-2 | HC | 7D | (On Hold/Spare) |
| Volatile Organic Compounds by SW8260B TCL List | W | 6 | A1-2 | HC | 7D | |

Lab ID : 208040-009 Field ID : HPIWL02-SAIC01 Date Collected : 06-AUG-02

| Method Name | Mtx | Cont | Storage Loc | Presev Class | TAT | Comments |
|---|---|---|---|---|---|---|
| Mercury by EPA 7470A | W | 6 | B-1D | NFC | 21D | |
| SVOAs TCL List by EPA 8270C | W | 6 | B-1D | COOL | 7D | (On Hold/Spare) |
| SVOAs TCL List by EPA 8270C | W | 6 | B-1D | COOL | 7D | |
| Total Metals by EPA 6010B | W | 6 | B-1D | NFC | 7D | |
| Volatile Organic Compounds by SW8260B TCL List | W | 6 | A1-2 | HC | 7D | (On Hold/Spare) |
| Volatile Organic Compounds by SW8260B TCL List | W | 6 | A1-2 | HC | 7D | |

Approved By: ____________________

Date and Time Approved :

GPL
Laboratories

# Work Order Approval



rk Order #: 208040
P Laura Petrik
ject #: 10274
ject Nam Wallops Flight Facility

Date Received Aug-07-2002
Fax Due Date:
HC Due Date:Aug-26-2002
EDD Due Date Aug-28-2002

Client: SAIC
Address: 11251 Roger Bacon Drive
Reston, VA 20190

## APPROVED

b ID : 208040-010 Field ID : SBIWL01 Date Collected : 06-AUG-02

| ethod Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| latile Organic Compounds by SW8260B TCL List | W | 2 | A1-2 | HC | 7D | (On Hold/Spare) |
| latile Organic Compounds by SW8260B TCL List | W | 2 | A1-2 | HC | 7D | |

b ID : 208040-011 Field ID : HPIWL03-SAIC01 Date Collected : 06-AUG-02

| thod Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| rcury by EPA 7470A | W | 6 | B-1D | NFC | 21D | |
| OAs TCL List by EPA 8270C | W | 6 | B-1D | COOL | 7D | (On Hold/Spare) |
| OAs TCL List by EPA 8270C | W | 6 | B-1D | COOL | 7D | |
| l Metals by EPA 6010B | W | 6 | B-1D | NFC | 7D | |
| tile Organic Compounds by SW8260B TCL List | W | 6 | A1-2 | HC | 7D | (On Hold/Spare) |
| tile Organic Compounds by SW8260B TCL List | W | 6 | A1-2 | HC | 7D | |

ID : 208040-012 Field ID : DIWATER-SAIC01 Date Collected : 06-AUG-02

| hod Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| ury by EPA 7470A | W | 6 | B-1D | NFC | 21D | |
| As TCL List by EPA 8270C | W | 6 | B-1D | COOL | 7D | (On Hold/Spare) |
| As TCL List by EPA 8270C | W | 6 | B-1D | COOL | 7D | |
| Metals by EPA 6010B | W | 6 | B-1D | NFC | 7D | |
| le Organic Compounds by SW8260B TCL List | W | 6 | A1-2 | HC | 7D | (On Hold/Spare) |
| le Organic Compounds by SW8260B TCL List | W | 6 | A1-2 | HC | 7D | |

ID : 208040-013 Field ID : GEOWATER-SAIC01 Date Collected : 06-AUG-02

| od Name | tx | Cont | torage Loc | resev Class | AT | omments |
|---|---|---|---|---|---|---|
| ry by EPA 7470A | W | 6 | B-1D | NFC | 21D | |
| s TCL List by EPA 8270C | W | 6 | B-1D | COOL | 7D | (On Hold/Spare) |
| TCL List by EPA 8270C | W | 6 | B-1D | COOL | 7D | |
| letals by EPA 6010B | W | 6 | B-1D | NFC | 7D | |
| : Organic Compounds by SW8260B TCL List | W | 6 | A1-2 | HC | 7D | (On Hold/Spare) |
| : Organic Compounds by SW8260B TCL List | W | 6 | A1-2 | HC | 7D | |

Approved By: ______________ Date and Time Approved : ______________

Science Applications International Corporation
An Employee Owned Company

Page ~~1~~ 2 of 2 COC No.: ~~WI0003~~-GP
Date: JP 8/6/02

Name Science Applications International Corporation
Address 11251 Roger Bacon Dr., Reston, VA 20190
Phone Number (703) 318-4759
Project Manager John Pendleton
Project Name Wallops Island
Job/P.O. No. 01-0827-04-2164-
~~Sampler (Signature)~~ (Printed Name) John D. Pendleton

Laboratory Name GPL Environmental
Address 202 Perry Parkway
Gaithersburg, Md 20877
Phone (301)-926-6802
Fax (301)-840-1209
Contact

Requested Parameters

| Site ID | Field Sample # | Site Type | Depth | Date | Time | Matrix | METALS-SO (A)(17) | VOC-SO (A)(39) | SVOC-SO (A)(39) | METALS-WA (C)(3) | SVOC-WA (A)(73) | VOC-WA (B)(73) | MOISTURE | NO. OF CONTAINERS | OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SB-IWL-01 | SAIC01 | BORE | 0 | 8/6/02 | 0938 | SO | 1 | ~~3~~ 4 | 1 | | | | 1 | ~~3~~ ~~6~~ 6 | |
| SB-IWL-01 | SAIC02 | BORE | 16.5 | 8/6/02 | 1034 | SO | 1 | ~~3~~ 4 | 1 | | | | 1 | ~~3~~ ~~6~~ 6 | JP 8/6/02 |
| SB-IWL-02 | SAIC01 | BORE | 0 | 8/6/02 | 1324 | SO | 1 | ~~3~~ 4 | 1 | | | | 1 | ~~3~~ ~~6~~ 6 | |
| SB-IWL-02 | SAIC02 | BORE | 16 | 8/6/02 | 1406 | SO | 1 | ~~3~~ 4 | 1 | | | | 1 | ~~3~~ ~~6~~ 6 | |
| SB-IWL-03 | SAIC01 | BORE | 0 | 8/6/02 | 1544 | SO | 1 | ~~3~~ 4 | 1 | | | | 1 | ~~3~~ ~~6~~ 6 | |
| SB-IWL-03 | SAIC02 | BORE | 19 | 8/6/02 | 1635 | SO | 1 | ~~3~~ 4 | 1 | | | | 1 | ~~3~~ ~~6~~ 6 | |
| ~~SB-IWL-04~~ | ~~SAIC01~~ | ~~BORE~~ | | | | ~~SO~~ | ~~1~~ | ~~3~~ | ~~1~~ | | | | ~~1~~ | ~~3~~ ~~6~~ | JP 8/6/02 |
| ~~SB-IWL-04~~ | ~~SAIC02~~ | ~~BORE~~ | | | | ~~SO~~ | ~~1~~ | ~~3~~ | ~~1~~ | | | | ~~1~~ | ~~3~~ | JP 8/6/02 |
| HP-IWL-01 | SAIC01 | PNCH | 16.5 | 8/6/02 | 1150 | WA | | | | 1 | 2 | 3 | | 6 | HNO3 REMOVED |
| HP-IWL-01 | SAIC01D | PNCH | 16.5 | 8/6/02 | 1150 | WA | | | | 1 | 2 | 3 | | 6 | Duplicate HNO3 REMOVED |
| HP-IWL-02 | SAIC01 | PNCH | 16 | 8/6/02 | 1450 | WA | | | | 1 | 2 | 3 | | 6 | |
| ~~HP-IWL-02~~ (SAIC01 SB-IWL-01 JP 8/6/02) | ~~SAICTB03~~ | TRIP | 0 | 8/6/02 | 0700 | WA | | | | | | 2 | | 2 | Trip Blank |
| HP-IWL-03 | SAIC01 | PNCH | 19 | 8/6/02 | 1700 | WA | | | | 1 | 2 | 3 | | 6 | |

Total Number of Containers: ~~58~~ 62 JP 8/6/02

Relinquished by: John D. Pendleton (signature) Date: 8/6/02
Printed Name: John D. Pendleton Time: 1730
Company: SAIC
Received by: Signature: Printed Name: Company: Date: Time:

Relinquished by: Signature: Printed Name: Company: Date: Time:
Received by: German (signature) Date: 8/7/02 Time: 9:15Am
Printed Name: GPL COC 181
Company:

Notes:
A. Cool 4° C
B. HCL to pH <2 Cool 4° C
C. HNO3 to pH <2 Cool 4° C
3. ILC03.1
17. ILM04.0
39. OLM04.2
73. OLC02.1

NITRIC ACID REMOVED AND BOTTLES WASHED OUT. NEEDS TO BE FILTERED FOR METALS

Shipment Method:
Airbill No.:
Custody Seal 1 No.:
Custody Seal 2 No.:
Field COC No.s:

Temperature Blank
Field: 4°C
Lab:

SAIC Location
Reston, Virginia
11251 Roger Bacon Dr., Reston, VA 20190
(703) 318-4753

Science Applications International Corporation
White: Laboratory Pink: Project Manager Yellow: Project QAO Goldenrod: Field Project Manager

SAIC. International Corporation
An Employee Owned Company

Page 1 of 1 COC No.: ~~WI0005-GP~~ Date: 8/6/02 JP

Name Science Applications International Corporation
Address 11251 Roger Bacon Dr., Reston, VA 20190
Phone Number (703) 318-4759
Project Manager John Pendleton
Project Name Wallops Island
Job/P.O. No. 01-0827-04-2164-
Sampler (Signature) [signature] (Printed Name) John D. Pendleton

Laboratory Name GPL Environmental
Address 202 Perry Parkway
Gaithersburg, Md 20877
Phone (301)-926-6802
Fax (301)-840-1209
Contact

Requested Parameters

| Lab No. | Site ID | Field Sample # | Site Type | Depth | Date | Time | Matrix | METALS-WA (C)(3) | SVOC-WA (A)(73) | VOC-WA (B)(73) | NO. OF CONTAINERS | OBSERVATIONS, COMMENTS SPECIAL INSTRUCTIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DIWATER | SAIC01 | FBLK | 0 | 8/6/02 | 1200 | WA | 1 | 2 | 3 | 6 | |
| | GEO-WATER | SAIC01 | FBLK | 0 | 8/6/02 | 1143 | WA | 1 | 2 | 3 | 6 | |
| | | | | | | | | | | | | ~~4°C~~ JP 8/6/02 |
| | COOLANT | | | 0 | 8/6/02 | 0900 | WA | | | | 1 | 4°C |
| | BIOCHANT | | | 0 | 8/6/02 | 0900 | WA | | | | 1 | 4°C |

Relinquished by: [signature] Signature; John D. Pendleton Printed Name; SAIC Company
Date: 8/6/02 Time: 1730
Received by: Signature; Printed Name; Company
Date: Time:

Notes: Total Number of Containers: ~~12~~ 14 JP 8/6/02
A. Cool, 4° C
B. HCL to pH <2 Cool, 4° C
C. HNO3 to pH <2 Cool, 4° C
3. ILC03.1
73. OLC02.1

Shipment Method:
Airbill No.:
Custody Seal 1 No.:
Custody Seal 2 No.:
Field COC No.s:

Relinquished by: Signature; Printed Name; Company
Date: Time:
Received by: Scott D. Gorman [signature] Signature; Printed Name; GPL courier Company
Date: 8/07/02 Time: 9:15 Am

Temperature Blank
Field: 4°C
Lab:

SAIC Location
Reston, Virginia
11251 Roger Bacon Dr., Reston, VA, 20190
(703) 318-4753

Science Applications International Corporation

White: Laboratory Pink: Project Manager Yellow: Project QAO Goldenrod: Field Project Manager

JJ0043

GPL Laboratories, LLLP

SAMPLE RECEIPT CHECKLIST

W.O. No: 208040

Client Name: SAIC

Date Received: 08/07/02

Time Received: 9:15 Am

Received By: [illegible]

Carrier Name: Fed Ex

Prepared (Logged In) By: [illegible] / 08/07/02
Initials Date

Project: Wallops Island

Site:

VOA Holding Blank I.D. No:

| | YES | NO |
|---|---|---|
| Airbill/Manifest Present? | ✓ | |
| No. 833408789444 / 833408789433 | | |
| Shipping Container in Good Condition? | ✓ | |
| Custody Seals Present on Shipping Container? | ✓ | |
| Condition: Broken ___ Intact-not dated or signed ___ Intact-dated and signed ✓ Custody tape | | |
| Usage of Tamper Evident Type | ✓ | |
| Chain-of-Custody Present? | ✓ | |
| Chain-of-Custody Agrees with Sample Labels? | ✓ | |
| Chain-of-Custody Signed? | ✓ | |
| Packing Present in Shipping Container? Type of Packing: Bubble wrap | ✓ | |
| Custody seals on Sample Bottles? Condition: Good ✓ Broken ___ Custody tape | ✓ | |
| Total Number of Sample Bottles: 74 | | |
| Total Number of Samples: 13 | | |
| Samples Intact? | ✓ | |
| Sufficient Sample Volume for Indicated Test? | ✓ | |

| | YES | NO |
|---|---|---|
| Trip Blanks: No. of Sets 1 | ✓ | |
| Field Blanks: No. of Sets 2 | ✓ | |
| Equip. Blank: No. of Sets ___ | | ✓ |
| Field Duplicate: No. of Sets ___ | | ✓ |
| MS/MSD: No of Sets ___ | | ✓ |
| VOA Vials Have Zero Headspace? | ✓ | |
| Preservatives Added to Sample? | ✓ | |
| pH Check Required? Performed By? ___ | ✓ | |
| Ice Present in Shipping Container? | ✓ | |

| Container # | Temp. | Container # | Temp. |
|---|---|---|---|
| #1 | 3.9°C | | |
| #2 | 3.9°C | | |

08/07/02

Project Manager Contacted?
Name: Laura Petrik
Date Contacted: 08/07/02

Any NO response must be detailed in the comments section below. If items are not applicable to particular samples or contracts, they should be marked N/A/

COMMENTS: water metals samples filtered & preserved by lab lp

Checklist Completed By: [illegible]

Date: 08/07/02

## APPENDIX D

## DATA QUALITY ASSESSMENT

# APPENDIX D. DATA QUALITY ASSESSMENT

## D.1 INTRODUCTION

A comprehensive quality assurance/quality control (QA/QC) program was followed during the Limited Site Investigation (LSI) conducted at the Wallops Flight Facility (WFF), Wallops Island, Virginia, to ensure that analytical results and the decisions based on these results are representative of the environmental conditions at Wallops Island. The objective of the LSI was to determine whether contaminants were present at the sites addressed in the Field Sampling Plan (FSP) prepared by Science Applications International Corporation (SAIC) (SAIC 2002). GPL Laboratories, Inc. (GPL), 202 Perry Parkway, Gaithersburg, Maryland, performed the analytical work in accordance with the U.S. Environmental Protection Agency (EPA) *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW846*. The following were used during the evaluation of the QC data: QC requirements contained within the guidelines and specifications presented in the Quality Assurance Project Plan (QAPP) submitted as Appendix A of the FSP; the EPA *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW846;* and the EPA *Contract Laboratory Program (CLP) National Functional Guidelines for Organic and Inorganic Data Review* (EPA 1994a and b) with modifications for non-CLP methods. All tables referenced throughout the text are presented at the end of this appendix.

## D.2 LABORATORY QUALITY CONTROL ASSESSMENT

All environmental samples (i.e., soil and groundwater) and field QC blanks (i.e., trip blank, equipment rinsate blanks, and field blanks) collected during the WFF LSI are presented in Tables D-1a and D-1b and were analyzed using EPA *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW846* (SW8260B for volatile organic compounds [VOCs], SW8270C for semivolatile organic compounds [SVOCs], and SW6010B/SW7470 for metals).

SAIC systematically reviewed 100 percent of the VOC, SVOC, and metals data (i.e., all analytical QC results and laboratory documentation) based on the guidelines and specifications in the *National Functional Guidelines for Organic and Inorganic Data Review* (EPA 1994a and b), with modifications for non-CLP methods, as well as the requirements specified in the QAPP (SAIC 2002).

### *D.2.1 Differences Between the Analytical Methods (SW8260B and SW8270C) and National Functional Guidelines that Resulted in the Qualification of Data*

Differences between the laboratory analytical criteria and data validation acceptance criteria (EPA 1994a) resulted in the application of data validation qualifiers for VOCs and SVOCs (see Sections D.2.2.3 and D.2.2.4). In all cases, GPL met the EPA method analytical requirements. The differences between the criteria are summarized below.

***Volatile Organic Compound Analysis (SW8260B)***—SW846 Method 8260B criteria require that the mean of the percent relative standard deviation (%RSD) values for all compounds in the initial calibration are less than or equal to 15 percent. In addition, only calibration check compounds (CCCs) must have a %RSD of less than or equal to 30 percent for the initial calibration and a percent difference (%D) of less than or equal to 20 percent for the continuing calibration verification (CCV). The CCCs are 1,1-dichloroethene (1,1-DCE), chloroform, 1,2-dichloropropane, toluene, ethylbenzene, and vinyl chloride. SW846 Method 8260B has the following minimum relative response factor (RRF) criteria for only these compounds: chloromethane (0.10); 1,1-dichloroethane (1,1-DCA) (0.10); bromoform (0.10); chlorobenzene (0.30); and 1,1,2,2-tetrachloroethane (1,1,2,2-PCA) (0.30). These criteria apply to both initial and continuing calibrations.

National Functional Guidelines (EPA 1994a) indicate that analytical results for any compounds with a %RSD greater than 30 percent in the initial calibration and a %D greater than 25 percent in the continuing calibration must be qualified as estimated "J" (detect) or "UJ" (nondetect). If the RRF criteria (≥ 0.05) are exceeded for any compound, all associated samples are qualified as estimated "J" (detect) or rejected "R"(nondetect).

***Semivolatile Organic Compound Analysis (SW8270C)***—SW846 Method 8270C criteria require that the %RSD value for all compounds in the initial calibration should be equal or less than 15 percent. In addition, only the CCCs (i.e., acenaphthene, 1,4-dichlorobenzene, n-nitrosodiphenylamine, di-n-octylphthalate, fluoranthene, benzo[a]pyrene, 4-chloro-3-methylphenol, 2,4-dichlorophenol, 2-nitrophenol, phenol, pentachlorophenol (PCP), and 2,4,6-trichlorophenol) must have a %RSD less than or equal to 30 percent for the initial calibration. The initial calibration is still acceptable if the mean of the %RSD value for all compounds in the initial calibration is less than or equal to 15 percent. The use of this approach is limited to the compounds that exceeded the 20 percent RSD but are less than a %RSD of 40 percent. A regression equation or a quaderatic model needs to be performed for those compounds that did not meet the above-mentioned %RSD criteria. Linearity is presumed acceptable if the correlation coefficient is equal to or greater than 0.995 or the coefficient of determination is equal to or greater than 0.99. System performance check compounds (SPCCs) (i.e., n-nitroso-di-n-propylamine, hexachlorocyclopentadiene, 2,4-dinitrophenol [24DNP], and 4-nitrophenol [4NP]) should have a minimum RRF of 0.05. All other compounds should have a minimum RRF of 0.01.

SW846 Method 8270C criteria require that the %D for CCCs in the continuing calibration be less than or equal to 20 percent. Non CCCs should have a %D less than 20 percent, but allows up to eight poor performing compounds to have a %D less than 40 percent. SPCCs in the continuing calibration should have a minimum RRF of 0.05. All other compounds should have a minimum RRF of 0.01.

The National Functional Guidelines (EPA 1994a) do not allow any failures of minimum RRF, %RSD, or %D criteria. In accordance with the National Functional Guidelines, any RRF less than 0.05, any %RSD greater than 30 percent, and any %D greater than 25 percent require qualification of the associated data.

### D.2.2 Data Validation Report

Soil, groundwater, and field QC samples collected at WFF were submitted to GPL for VOC analyses using SW846 Method 8260B, SVOC analyses using SW846 Method 8270C, and metals analysis using SW846 Methods 6010B/7470. Technical criteria identified in the National Functional Guidelines (EPA 1994a and 1994b) were used to validate the data. A data validation report was prepared for each GPL sample batch generated. This section summarizes these batch-specific (i.e., sample delivery group [SDG]) data validation reports.

The following data validation qualifiers were applied to the results:

- *B*—The reported metal value was obtained from a reading that was less than the contract required detection limit (CRDL), but greater than the instrument detection limit (IDL). These results are qualitatively acceptable and will be used in the risk assessment.
- *U*—The analyte was analyzed for, but was not detected above the reported sample quantitation limit. These results are qualitatively acceptable.
- *J*—The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. These results are qualitatively acceptable, but estimates.
- *N*—The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."

- *NJ*—The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- *UJ*—The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. These results are qualitatively acceptable, but estimates.
- *R*—The sample results were rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified.

All data validation qualifiers SAIC applied (i.e., detected and nondetected values) are identified in Table D-2. No data collected during the WWF LSI were rejected as a result of the data validation process.

#### D.2.2.1 Technical Holding Times

Based on an evaluation of the environmental samples and field QC blanks, all technical holding time criteria were met, with the exceptions summarized below and in Table D-2.

***Volatile Organic Compound Analysis***—All water sample reanalyses were analyzed outside the holding time by 2 to 9 days. As a result for all water reanalyses, all nondetect VOCs were qualified as estimated "UJ" and positive results were qualified as estimated "J."

***Semivolatile Organic Compound Analysis***—One water sample, analyzed in SDG 208082, was extracted outside the holding time by 1 day. As a result, all nondetect SVOCs in SB-CDL-03 (SAICRB02) were qualified as estimated "UJ." No positive results were reported.

#### D.2.2.2 Instrument Performance Checks

VOCs and SVOCs were tuned in accordance with SW846 Method criteria. Based on an evaluation of the tuning solutions, all criteria were met.

#### D.2.2.3 Initial Calibration Results

Initial calibration of each instrument was completed in accordance with all SW846 Method requirements for VOCs, SVOCs, and metals. Based on an evaluation of the initial calibration analyses, all criteria were met, with the exceptions summarized below and in Table D-2. Tables D-3, D-4, and D-7 summarize the initial calibration outliers for soil and water samples.

***Volatile Organic Compound Analysis***—For soils, two %RSDs (i.e., acetone and methylene chloride) exceeded the QC limit. Nondetected analytical results were qualified as estimated "UJ." Positive results were qualified as estimated "J."

2-Butanone (MEK) in the soil initial calibration analyzed on August 3, 2002 did not meet the technical data review acceptance criteria for the RRF. Therefore, MEK nondetected results were qualified as estimated "UJ" and positive results were qualified as estimated "J" for samples in the affected SDGs.

For waters, two %RSDs (i.e., acetone and trans-1,3-dichloropropene) exceeded the QC limit. Nondetected analytical results were qualified as estimated "UJ." Positive results were qualified as estimated "J."

Acetone in the water initial calibration analyzed on August 29, 2002 did not meet the technical data review acceptance criteria for the RRF. Therefore, acetone nondetected results were qualified as estimated "UJ" and positive results were qualified as estimated "J" for samples in the affected SDGs.

### D.2.2.4 Continuing Calibration Results

Continuing calibration of each instrument was completed in accordance with all SW846 Method requirements for VOCs, SVOCs, and metals. Based on an evaluation of the continuing calibrations conducted for all analyses, all criteria were met, with the exceptions summarized below and in Table D-2. Tables D-5 though D-7 summarize the continuing calibration outliers for soil and water samples.

***Volatile Organic Compound Analysis***—Three soil %Ds (of 140 reviewed values) met the SW846 Method criteria, but did not meet the National Functional Guidelines calibration criteria for three compounds (i.e., acetone, bromomethane, and 1,1,2,2-PCA). Nondetected analytical results were qualified as estimated "UJ" and positive results were qualified as estimated "J."

Two soil sample calibrations met all SW846 RRF requirements, but did not meet the National Functional Guidelines RRF acceptance criteria for MEK. Therefore, MEK nondetected results were qualified as estimated "UJ" and positive results were qualified as estimated "J" for samples in the affected SDGs.

Eleven water %Ds (of 175 reviewed values) met the SW846 Method criteria, but did not meet the National Functional Guidelines calibration criteria for eight compounds (i.e., acetone, bromomethane, MEK, cis-1,3-dichloropropene, chloromethane, methylene chloride, 4-methyl-2-pentanone [MIBK], and 2-hexanone [MNBK]). Nondetected analytical results were qualified as estimated "UJ" and positive results were qualified as estimated "J."

***Semivolatile Organic Compound Analysis***—For all of the SDGs, three SVOCs (i.e., 4-chloroaniline [4CA], 4NP, and pyrene) and two surrogate compounds (i.e., nitrobenzene-d5 [NBZ] and terphenyl-d14 [TPHD14]) exceeded the %D QC limits. As a result, 7 4CA and 6 4NP soil concentrations, as well as 11 pyrene, 6 4CA, and 4 4NP water concentrations, were qualified as estimated "UJ." No positive results were detected.

### D.2.2.5 Method Blank Results

Method blanks were analyzed with each SDG in accordance with all SW846 Method requirements for VOCs, SVOCs, and metals. The method blank results for soil and water were below the reporting limits with the exceptions listed below and in Table D-2. Tables D-8 through D-11 summarize the blank contamination for soil and water samples. Trip blank, equipment rinsate blank, and field blank analyses are discussed in Section D.3.

***Volatile Organic Compound Analysis***—Methylene chloride, acetone, and trichloroethene (TCE) were detected at concentrations and frequencies that might bias the analytical results. The data validation qualifier "U" was applied to 22 methylene chloride, 14 acetone, and 15 TCE soil concentrations, as well as 37 methylene chloride water concentrations, that were less than 10 or 5 times the concentration detected in the associated method blanks. These results may be biased high due to method blank contaminants and should be considered nondetect.

***Metals Analysis***—Calcium, copper, iron, magnesium, manganese, sodium, and zinc were detected above the IDL in the water method blanks. As a result, the data validation qualifier "U" was applied to 2 calcium, 2 copper, 1 iron, 2 magnesium, 1 manganese, 2 sodium, and 11 zinc water results that were less than 5 times the concentration detected in the associated method blanks. Arsenic, magnesium, thallium, and vanadium were detected above the IDL in the water initial calibration blanks (ICBs) or continuing calibration blanks (CCBs). As a result, the data validation qualifier "U" was applied to 4 arsenic, 1 magnesium, 3 thallium, and 1 vanadium water results that were less than 5 times that detected in the associated ICB or CCB.

Copper, sodium, and zinc were detected above the IDL in the soil method blanks. As a result, the data validation qualifier "U" was applied to 2 copper, 12 sodium, and 9 zinc soil results that were less than 5 times the concentration detected in the associated method blanks. A few soil ICBs/CCBs had negative results for antimony, cobalt, nickel, sodium, and vanadium greater than the absolute value of the IDL; therefore, 6 antimony, 5 cobalt, 22 nickel, 22 sodium, and 7 vanadium soil results were qualified as estimated "UJ" or "J." These qualified results may be biased high due to blank contamination and should be considered nondetect.

#### D.2.2.6 Surrogate Results

Surrogates for VOCs and SVOCs were analyzed in accordance with SW846 Method criteria. Tables D-12 through D-15 summarize all surrogate recovery results. Deviations are listed below and in Table D-2.

***Volatile Organic Compound Analysis***—Two soil percent recovery values (of 136 total values) were above the upper control limit (UCL). As a result, positive results in associated samples were qualified as estimated "J."

Three water percent recovery values (of 200 total values) were above the UCL. As a result, positive results in associated samples were qualified as estimated "J." Thirty-one percent recoveries were below the lower control limit (LCL). As a result, positive results in associated samples were qualified as estimated "J" and nondetect results were qualified as estimated "UJ."

***Semivolatile Organic Compound Analysis***—Six water surrogate percent recovery values (of 132 total values) were above the UCLs. No data validation qualifiers were applied based on surrogate results, since SVOCs were not detected in the associated water samples. One water surrogate recovery percent value was below the LCL. Data validation qualifiers were not applied due to surrogate recoveries outside the control limits, when only one percent recovery for a fraction was outside the QC limits.

#### D.2.2.7 Interference Check Sample Results

Interference check sample (ICS) criteria requirements are described in SW846 Method 6010B. Based on an evaluation of the ICS solution AB, all target recoveries were within the required control limits for all lots. All requirements were met.

#### D.2.2.8 Matrix Spike/Matrix Spike Duplicate Results

Matrix spike/matrix spike duplicate (MS/MSD) analyses were conducted to assess the accuracy and precision of the analytical system and to evaluate the matrix effect of the sample upon the analytical methodology based upon the percent recovery of each compound. The control limits for percent recoveries and relative percent differences (RPDs) in water samples are described in SW846 Method 8260B for VOCs, SW846 Method 8270C for SVOCs, and the QAPP (SAIC 2002). Because the National Functional Guidelines do not recommend the application of data validation qualifiers based solely on MS/MSD results, these results were used in conjunction with other QC indicators (i.e., surrogates, laboratory control samples [LCSs], and internal standards [ISs]) when qualifying the data. Tables D-16 through D-18 summarize MS/MSD results for soil and water samples. Recoveries and reproducibilities of the spiked compounds were within acceptable ranges with the exceptions listed below and in Table D-2.

***Semivolatile Organic Compound Analysis***—Six soil percent recovery values (of 36 total values) were outside the control limits. No data validation qualifiers were applied based only on MS/MSD results, since all other QC criteria were met.

### D.2.2.9 Matrix Spike Sample Results

Metals matrix spike sample (MSS) analyses were conducted in accordance with SW846 Methods 6010B and 7470 for metals and the QAPP (SAIC 2002). The control limits for percent recoveries of metals in water samples is 75 to 125 percent. Tables D-19 and D-20 summarize the MSS results for soil and water samples. Recoveries of the spiked compounds were within acceptable ranges with the exceptions listed below and in Table D-2.

***Metals Analysis***—Two soil MSS percent recovery values (of 46 total values) were outside the QC limits. As a result, antimony in 11 samples was qualified as estimated "UJ" or "J."

### D.2.2.10 Laboratory Duplicate Results

Laboratory duplicate analyses were conducted in accordance with SW846 Methods 6010B and 7470 for metals and the QAPP (SAIC 2002). The RPD is used when assessing precision between two samples. Tables D-19 and D-20 summarize the laboratory duplicate results for soil and water samples. The RPDs of the target analytes were within acceptable ranges.

### D.2.2.11 Laboratory Control Sample Results

The LCS monitors the overall accuracy and performance of all analytical steps, in accordance with SW846 Method 8260B for VOCs, SW846 Method 8270C for SVOCs, and SW846 Methods 6010B and 7470 for metals. Recoveries of the LCS compounds and analytes were within acceptable ranges with the following exceptions. Tables D-21 through D-26 summarize the LCS results for soil and water samples.

***Semivolatile Organic Compound Analysis***—4-Chloro-3-methylphenol, 4NP, and PCP each had an LCS recovery above the UCL in one water lot. 2,4-Dinitrotoluene (2,4-DNT) and phenol each had LCS recoveries above the UCLs in two soil lots. No data validation qualifiers were applied, since no positive results were identified in the associated soil and water samples.

### D.2.2.12 Internal Standard Results

ISs were added in all calibration standards, environmental samples, and QC blanks in accordance with SW846 Method 8260B for VOCs and SW846 Method 8270C for SVOCs. IS performance QC criteria were met.

### D.2.2.13 Serial Dilution Results

The frequency and difference criteria specified in SW846 Method 6010B for metals was met for all serial dilution analyses.

### D.2.2.14 Target Compound Identification

The target organic compounds reported as detects satisfied all qualitative and quantitative identification criteria specified in the SW846 Methods.

### D.2.2.15 Reporting Limits

All reporting limit criteria specified in the QAPP (SAIC 2002) were met.

### D.2.2.16 Tentatively Identified Compound Results

VOC and SVOC tentatively identified compounds (TICs) were identified in many soil and water samples. Many TICs were identified as hydrocarbons, alkanes, cycloalkane, alkene, alkyl benzene, carboxylic acids, polynuclear aromatic hydrocarbons (PAHs), and unknowns. The majority of TICs reported unknown organic chemical classes (e.g., unknown hydrocarbons, unknown PAH, unknown acid, unknown alkane, unknown alkanol) or only unknown. As such, these compounds were not specifically interpreted due to errors in library matching, variations in the initial gas chromatograph (GC) oven temperature, changes in the chemical nature of the stationary phase with extended use, and/or the unknown spectrum may not be that of a pure compound but of two coeluting compounds.

#### D.2.2.17 System Performance

Based on instrument performance indicators, all analytical systems remained within parameters throughout the duration of all of the soil and water sample analysis with the exceptions noted in Sections D.2.2.1 through D.2.2.16.

## D.3 FIELD QUALITY CONTROL ASSESSMENT

During the WFF LSI, QC samples were collected to gauge the impacts from various field activity components. Field QC samples were obtained to determine the degree of cross-contamination, document successful decontamination procedures, or determine the effects of media heterogeneity on results. Four trip blanks, two equipment rinsate blanks, and two field blanks were collected and analyzed for VOCs, SVOCs, and metals using the same laboratory techniques as those used for the environmental samples. Trip blanks, equipment rinsate blanks, and field blanks provide a measure of various cross-contamination, decontamination efficiency, and any other potential error that can be introduced from sources other than the sample. Table D-2 summarizes the data validation qualifiers applied to data due to field QC blank contamination.

### *D.3.1 Trip Blanks*

Methylene chloride, acetone, and carbon disulfide were not noted with any frequency or at concentrations of concern in the trip blanks. One carbon disulfide and seven acetone soil concentrations, as well as six carbon disulfide and four acetone water concentrations, were qualified "U" due to trip blank contamination. Therefore, carbon disulfide and acetone results qualified as "U" in these samples may be biased high due to trip blank contamination and should be considered nondetect. Table D-27 summarizes the concentrations of the compounds detected in the trip blanks collected during the WFF LSI.

### *D.3.2 Equipment Rinsate Blanks*

The following subsections summarize the compounds and elements detected in the equipment rinsate blanks and the impact of this interference on the environmental data quality. Table D-28 summarizes the concentrations of the compounds and elements detected in the equipment rinsate blanks collected during the WFF LSI.

***Volatile Organic Compound Analysis***—Toluene, carbon disulfide and acetone were detected in the equipment rinsate blanks at concentrations below the contract required quantitation limit (CRQL). The data validation qualifier "U" was applied to three toluene soil concentrations due to equipment rinsate blank contamination. Therefore, toluene results qualified as "U" in these samples may be biased high due to equipment rinsate blank contamination and should be considered nondetect.

***Semivolatile Organic Compound Analysis***—Di-n-butyl phthalate (DNBP) was detected in one equipment rinsate blank at a concentration below the CRQL. The data validation qualifier "U" was applied to four DNBP soil results that were less than 10 times the concentration detected in the associated equipment rinsate blank. Therefore, DNBP results qualified as "U" in these samples may be biased high due to equipment rinsate blank contamination and should be considered nondetect.

***Metals Analysis***—Antimony, chromium, cobalt, copper, and potassium were detected in the equipment rinsate blanks at concentrations that may bias the analytical results. As a result, the data validation qualifier "U" was applied to 4 antimony, 1 chromium, 4 cobalt, 2 copper, and 4 potassium soil concentrations, as well as 8 copper water concentrations. Therefore, results qualified as "U" in these samples may be biased high due to equipment rinsate blank contamination and should be considered nondetect.

### D.3.3 Field Blanks

Table D-29 summarizes the concentrations of the compounds and elements detected in the field blanks collected during the WFF LSI. No VOC, SVOC, or metals results were qualified based on field blank results.

## Table D-1a. Analytical Methods and Total Number of Water Samples Wallops Flight Facility, Accomack County, Virginia

| Parameters | Analytical Method | Detection Limit | Water Samples | Field Duplicates* | Trip Blanks | Equipment Rinsate Blanks | Field Blanks | MS/MSDs | Total Number of Analyses |
|---|---|---|---|---|---|---|---|---|---|
| VOCs | SW8260B | a | 11 | 2 | 4 | 2 | 2 | 1 | 22 |
| SVOCs | SW8270C | a | 11 | 2 | NA | 2 | 2 | 1 | 18 |
| Metals | SW6010B/SW7470 | a | 11 | 2 | NA | 2 | 2 | 1 | 18 |

a - Reporting limits (RLs) are matrix and sample specific. All detection limits are listed on the summary data tables.

## Table D-1b. Analytical Methods and Total Number of Soil Samples Wallops Flight Facility, Accomack County, Virginia

| Parameters | Analytical Method | Detection Limit | Soil Samples | Field Duplicates | Trip Blanks | Equipment Rinsate Blanks | Field Blanks | MS/MSDs | Total Number of Analyses |
|---|---|---|---|---|---|---|---|---|---|
| VOCs | SW8260B | a | 20 | 2 | b | c | d | 1 | 24 |
| SVOCs | SW8270C | a | 20 | 2 | NA | c | d | 1 | 24 |
| Metals | SW6010B/SW7470 | a | 20 | 2 | NA | c | d | 1 | 24 |

a - Reporting limits (RLs) are matrix and sample specific. All detection limits are listed on the summary tables.
b, c, d - Analyzed with water samples in Table D-1a.

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| DIWATER | SAIC01 | FBLK | W | Copper | 6010 | | U | 6 |
| DIWATER | SAIC01 | FBLK | W | Magnesium | 6010 | | U | 17 |
| DIWATER | SAIC01 | FBLK | W | Sodium | 6010 | | J | 17A |
| DIWATER | SAIC01 | FBLK | W | Vanadium | 6010 | | UJ | 6A |
| DIWATER | SAIC01 | FBLK | W | Zinc | 6010 | | U | 6 |
| DIWATER | SAIC01 | FBLK | W | 1,1,1-Trichloroethane | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | 1,1,2-Trichloroethane | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | 1,1-Dichloroethane | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | 1,1-Dichloroethene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | 1,2-Dichloroethane | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | 1,2-Dichloropropane | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | 2-Hexanone | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Acetone | 8260 | | UJ | 4,9 |
| DIWATER | SAIC01 | FBLK | W | Benzene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Bromodichloromethane | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Bromoform | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Bromomethane | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Carbon Disulfide | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Carbon Tetrachloride | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Chlorobenzene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Chloroethane | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Chloroform | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Chloromethane | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | cis-1,2-Dichloroethene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | cis-1,3-Dichloropropene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Dibromochloromethane | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Ethylbenzene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | m-and/or p-Xylene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Methyl Ethyl Ketone | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Methyl Isobutyl Ketone | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Methylene Chloride | 8260 | 1 | UJ | 6,9 |
| DIWATER | SAIC01 | FBLK | W | o-xylene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Styrene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Tetrachloroethene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Toluene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | trans-1,2-Dichloroethene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | trans-1,3-Dichloropropene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Trichloroethene | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Vinyl Chloride | 8260 | | UJ | 9 |
| DIWATER | SAIC01 | FBLK | W | Pyrene | 8270 | | UJ | 4 |
| GEOWATER | SAIC01 | FBLK | W | Manganese | 6010 | | U | 6 |
| GEOWATER | SAIC01 | FBLK | W | Sodium | 6010 | | J | 17A |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| GEOWATER | SAIC01 | FBLK | W | Vanadium | 6010 | | UJ | 6A |
| GEOWATER | SAIC01 | FBLK | W | 1,1,1-Trichloroethane | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | 1,1,2-Trichloroethane | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | 1,1-Dichloroethane | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | 1,1-Dichloroethene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | 1,2-Dichloroethane | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | 1,2-Dichloropropane | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | 2-Hexanone | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Acetone | 8260 | | UJ | 4,9 |
| GEOWATER | SAIC01 | FBLK | W | Benzene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Bromodichloromethane | 8260 | | J | 9 |
| GEOWATER | SAIC01 | FBLK | W | Bromoform | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Bromomethane | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Carbon Disulfide | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Carbon Tetrachloride | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Chlorobenzene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Chloroethane | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Chloroform | 8260 | | J | 9 |
| GEOWATER | SAIC01 | FBLK | W | Chloromethane | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | cis-1,2-Dichloroethene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | cis-1,3-Dichloropropene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Dibromochloromethane | 8260 | | J | 9 |
| GEOWATER | SAIC01 | FBLK | W | Ethylbenzene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | m-and/or p-Xylene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Methyl Ethyl Ketone | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Methyl Isobutyl Ketone | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Methylene Chloride | 8260 | 1 | UJ | 6,9 |
| GEOWATER | SAIC01 | FBLK | W | o-xylene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Styrene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Tetrachloroethene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Toluene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | trans-1,2-Dichloroethene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | trans-1,3-Dichloropropene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Trichloroethene | 8260 | | UJ | 9 |
| GEOWATER | SAIC01 | FBLK | W | Vinyl Chloride | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Aluminum | 6010 | | UJ | 17A |
| HP-CDL-01 | SAIC01 | PNCH | W | Antimony | 6010 | | UJ | 17A |
| HP-CDL-01 | SAIC01 | PNCH | W | Arsenic | 6010 | | U | 17 |
| HP-CDL-01 | SAIC01 | PNCH | W | Cobalt | 6010 | | UJ | 6A |
| HP-CDL-01 | SAIC01 | PNCH | W | Copper | 6010 | | U | 8 |
| HP-CDL-01 | SAIC01 | PNCH | W | Zinc | 6010 | | U | 6 |
| HP-CDL-01 | SAIC01 | PNCH | W | 1,1,1-Trichloroethane | 8260 | | UJ | 9 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| HP-CDL-01 | SAIC01 | PNCH | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | 1,1,2-Trichloroethane | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | 1,1-Dichloroethane | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | 1,1-Dichloroethene | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | 1,2-Dichloroethane | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | 1,2-Dichloropropane | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | 2-Hexanone | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Acetone | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Benzene | 8260 | | UJ | 1 |
| HP-CDL-01 | SAIC01 | PNCH | W | Bromodichloromethane | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Bromoform | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Bromomethane | 8260 | | UJ | 4,9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Carbon Disulfide | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Carbon Tetrachloride | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Chlorobenzene | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Chloroethane | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Chloroform | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Chloromethane | 8260 | | J | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | cis-1,2-Dichloroethene | 8260 | | J | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | cis-1,3-Dichloropropene | 8260 | | UJ | 4,9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Dibromochloromethane | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Ethylbenzene | 8260 | | J | 1 |
| HP-CDL-01 | SAIC01 | PNCH | W | m-and/or p-Xylene | 8260 | | J | 1 |
| HP-CDL-01 | SAIC01 | PNCH | W | Methyl Ethyl Ketone | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Methyl Isobutyl Ketone | 8260 | | UJ | 4,9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Methylene Chloride | 8260 | | UJ | 4,9 |
| HP-CDL-01 | SAIC01 | PNCH | W | o-xylene | 8260 | | J | 1 |
| HP-CDL-01 | SAIC01 | PNCH | W | Styrene | 8260 | | J | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Tetrachloroethene | 8260 | | J | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Toluene | 8260 | | J | 1 |
| HP-CDL-01 | SAIC01 | PNCH | W | trans-1,2-Dichloroethene | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | trans-1,3-Dichloropropene | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Trichloroethene | 8260 | | J | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Vinyl Chloride | 8260 | | UJ | 9 |
| HP-CDL-01 | SAIC01 | PNCH | W | Pyrene | 8270 | | UJ | 4 |
| HP-CDL-02 | SAIC01 | PNCH | W | Aluminum | 6010 | | UJ | 17A |
| HP-CDL-02 | SAIC01 | PNCH | W | Antimony | 6010 | | UJ | 17A |
| HP-CDL-02 | SAIC01 | PNCH | W | Cobalt | 6010 | | UJ | 6A |
| HP-CDL-02 | SAIC01 | PNCH | W | Copper | 6010 | | U | 8 |
| HP-CDL-02 | SAIC01 | PNCH | W | Zinc | 6010 | | U | 6 |
| HP-CDL-02 | SAIC01 | PNCH | W | Bromomethane | 8260 | | UJ | 4 |
| HP-CDL-02 | SAIC01 | PNCH | W | cis-1,3-Dichloropropene | 8260 | | UJ | 4 |
| HP-CDL-02 | SAIC01 | PNCH | W | Methyl Isobutyl Ketone | 8260 | | UJ | 4 |

**Table D-2. Reasons for Data Qualification**
**Limited Site Investigation**
**Wallops Flight Facility, Wallops Island, Virginia (Continued)**

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| HP-CDL-02 | SAIC01 | PNCH | W | Methylene Chloride | 8260 | | UJ | 4,6 |
| HP-CDL-02 | SAIC01 | PNCH | W | Pyrene | 8270 | | UJ | 4 |
| HP-CDL-03 | SAIC01 | PNCH | W | Aluminum | 6010 | | UJ | 17A |
| HP-CDL-03 | SAIC01 | PNCH | W | Antimony | 6010 | | UJ | 17A |
| HP-CDL-03 | SAIC01 | PNCH | W | Cobalt | 6010 | | UJ | 6A |
| HP-CDL-03 | SAIC01 | PNCH | W | Copper | 6010 | | U | 8 |
| HP-CDL-03 | SAIC01 | PNCH | W | 1,1,1-Trichloroethane | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | 1,1,2-Trichloroethane | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | 1,1-Dichloroethane | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | 1,1-Dichloroethene | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | 1,2-Dichloroethane | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | 1,2-Dichloropropane | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | 2-Hexanone | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Acetone | 8260 | | UJ | 1,3 |
| HP-CDL-03 | SAIC01 | PNCH | W | Benzene | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Bromodichloromethane | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Bromoform | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Bromomethane | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Carbon Disulfide | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Carbon Tetrachloride | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Chlorobenzene | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Chloroethane | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Chloroform | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Chloromethane | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | cis-1,2-Dichloroethene | 8260 | | J | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | cis-1,3-Dichloropropene | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Dibromochloromethane | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Ethylbenzene | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | m-and/or p-Xylene | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Methyl Ethyl Ketone | 8260 | | UJ | 1,4 |
| HP-CDL-03 | SAIC01 | PNCH | W | Methyl Isobutyl Ketone | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Methylene Chloride | 8260 | | UJ | 1,6 |
| HP-CDL-03 | SAIC01 | PNCH | W | o-xylene | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Styrene | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Tetrachloroethene | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Toluene | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | trans-1,2-Dichloroethene | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | trans-1,3-Dichloropropene | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Trichloroethene | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Vinyl Chloride | 8260 | | UJ | 1 |
| HP-CDL-03 | SAIC01 | PNCH | W | Pyrene | 8270 | | UJ | 4 |
| HP-IWL-01 | SAIC01 | PNCH | W | Copper | 6010 | | U | 8 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| HP-IWL-01 | SAIC01 | PNCH | W | *Sodium* | 6010 | | J | 17A |
| HP-IWL-01 | SAIC01 | PNCH | W | Vanadium | 6010 | | UJ | 6A |
| HP-IWL-01 | SAIC01 | PNCH | W | Zinc | 6010 | | U | 6 |
| HP-IWL-01 | SAIC01 | PNCH | W | 1,1,1-Trichloroethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | 1,1,2-Trichloroethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | 1,1-Dichloroethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | 1,1-Dichloroethene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | 1,2-Dichloroethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | 1,2-Dichloropropane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | 2-Hexanone | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Acetone | 8260 | | UJ | 7,4 |
| HP-IWL-01 | SAIC01 | PNCH | W | Benzene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Bromodichloromethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Bromoform | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Bromomethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Carbon Disulfide | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Carbon Tetrachloride | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Chlorobenzene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Chloroethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Chloroform | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Chloromethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | *cis-1,2-Dichloroethene* | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | cis-1,3-Dichloropropene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Dibromochloromethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Ethylbenzene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | m-and/or p-Xylene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Methyl Ethyl Ketone | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Methyl Isobutyl Ketone | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Methylene Chloride | 8260 | 1 | UJ | 6,9 |
| HP-IWL-01 | SAIC01 | PNCH | W | o-xylene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Styrene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Tetrachloroethene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Toluene | 8260 | | J | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | trans-1,2-Dichloroethene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | trans-1,3-Dichloropropene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Trichloroethene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Vinyl Chloride | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01 | PNCH | W | Pyrene | 8270 | | UJ | 4 |
| HP-IWL-01 | SAIC01D | PNCH | W | Calcium | 6010 | | J | 20 |
| HP-IWL-01 | SAIC01D | PNCH | W | Cobalt | 6010 | | U | 8 |
| HP-IWL-01 | SAIC01D | PNCH | W | Copper | 6010 | | U | 6 |
| HP-IWL-01 | SAIC01D | PNCH | W | Sodium | 6010 | | UJ | 17A |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| HP-IWL-01 | SAIC01D | PNCH | W | Vanadium | 6010 | | UJ | 6A |
| HP-IWL-01 | SAIC01D | PNCH | W | 1,1,1-Trichloroethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | 1,1,2-Trichloroethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | 1,1-Dichloroethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | 1,1-Dichloroethene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | 1,2-Dichloroethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | 1,2-Dichloropropane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | 2-Hexanone | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Acetone | 8260 | | UJ | 4,9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Benzene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Bromodichloromethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Bromoform | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Bromomethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Carbon Disulfide | 8260 | | UJ | 7,9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Carbon Tetrachloride | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Chlorobenzene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Chloroethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Chloroform | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Chloromethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | cis-1,2-Dichloroethene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | cis-1,3-Dichloropropene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Dibromochloromethane | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Ethylbenzene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | m-and/or p-Xylene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Methyl Ethyl Ketone | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Methyl Isobutyl Ketone | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Methylene Chloride | 8260 | 1 | UJ | 6,9 |
| HP-IWL-01 | SAIC01D | PNCH | W | o-xylene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Styrene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Tetrachloroethene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Toluene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | trans-1,2-Dichloroethene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | trans-1,3-Dichloropropene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Trichloroethene | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Vinyl Chloride | 8260 | | UJ | 9 |
| HP-IWL-01 | SAIC01D | PNCH | W | Pyrene | 8270 | | UJ | 4 |
| HP-IWL-02 | SAIC01 | PNCH | W | Calcium | 6010 | | J | 20 |
| HP-IWL-02 | SAIC01 | PNCH | W | Sodium | 6010 | | J | 17A |
| HP-IWL-02 | SAIC01 | PNCH | W | Vanadium | 6010 | | UJ | 6A |
| HP-IWL-02 | SAIC01 | PNCH | W | Zinc | 6010 | | U | 6 |
| HP-IWL-02 | SAIC01 | PNCH | W | 1,1,1-Trichloroethane | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 9 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| HP-IWL-02 | SAIC01 | PNCH | W | 1,1,2-Trichloroethane | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | 1,1-Dichloroethane | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | 1,1-Dichloroethene | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | 1,2-Dichloroethane | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | 1,2-Dichloropropane | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | 2-Hexanone | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Acetone | 8260 | | UJ | 4,9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Benzene | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Bromodichloromethane | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Bromoform | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Bromomethane | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Carbon Disulfide | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Carbon Tetrachloride | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Chlorobenzene | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Chloroethane | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Chloroform | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Chloromethane | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | cis-1,2-Dichloroethene | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | cis-1,3-Dichloropropene | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Dibromochloromethane | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Ethylbenzene | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | m-and/or p-Xylene | 8260 | | J | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Methyl Ethyl Ketone | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Methyl Isobutyl Ketone | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Methylene Chloride | 8260 | 1 | UJ | 6,9 |
| HP-IWL-02 | SAIC01 | PNCH | W | o-xylene | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Styrene | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Tetrachloroethene | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Toluene | 8260 | | J | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | trans-1,2-Dichloroethene | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | trans-1,3-Dichloropropene | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Trichloroethene | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Vinyl Chloride | 8260 | | UJ | 9 |
| HP-IWL-02 | SAIC01 | PNCH | W | Pyrene | 8270 | | UJ | 4 |
| HP-IWL-03 | SAIC01 | PNCH | W | Calcium | 6010 | | J | 20 |
| HP-IWL-03 | SAIC01 | PNCH | W | Copper | 6010 | | U | 8 |
| HP-IWL-03 | SAIC01 | PNCH | W | Sodium | 6010 | | J | 17A |
| HP-IWL-03 | SAIC01 | PNCH | W | Vanadium | 6010 | | UJ | 6A |
| HP-IWL-03 | SAIC01 | PNCH | W | Zinc | 6010 | | U | 6 |
| HP-IWL-03 | SAIC01 | PNCH | W | 1,1,1-Trichloroethane | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | 1,1,2-Trichloroethane | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | 1,1-Dichloroethane | 8260 | | UJ | 9 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| HP-IWL-03 | SAIC01 | PNCH | W | 1,1-Dichloroethene | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | 1,2-Dichloroethane | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | 1,2-Dichloropropane | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | 2-Hexanone | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Acetone | 8260 | | UJ | 4,9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Benzene | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Bromodichloromethane | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Bromoform | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Bromomethane | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Carbon Disulfide | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Carbon Tetrachloride | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Chlorobenzene | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Chloroethane | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Chloroform | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Chloromethane | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | cis-1,2-Dichloroethene | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | cis-1,3-Dichloropropene | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Dibromochloromethane | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Ethylbenzene | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | m-and/or p-Xylene | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Methyl Ethyl Ketone | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Methyl Isobutyl Ketone | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Methylene Chloride | 8260 | 1 | UJ | 6,9 |
| HP-IWL-03 | SAIC01 | PNCH | W | o-xylene | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Styrene | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Tetrachloroethene | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Toluene | 8260 | | J | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | trans-1,2-Dichloroethene | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | trans-1,3-Dichloropropene | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Trichloroethene | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Vinyl Chloride | 8260 | | UJ | 9 |
| HP-IWL-03 | SAIC01 | PNCH | W | Pyrene | 8270 | | UJ | 4 |
| HP-IWL-04 | SAIC01 | PNCH | W | Aluminum | 6010 | | UJ | 17A |
| HP-IWL-04 | SAIC01 | PNCH | W | Antimony | 6010 | | UJ | 17A |
| HP-IWL-04 | SAIC01 | PNCH | W | Cobalt | 6010 | | UJ | 6A |
| HP-IWL-04 | SAIC01 | PNCH | W | Copper | 6010 | | U | 8 |
| HP-IWL-04 | SAIC01 | PNCH | W | Zinc | 6010 | | U | 6 |
| HP-IWL-04 | SAIC01 | PNCH | W | 1,1,1-Trichloroethane | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | 1,1,2-Trichloroethane | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | 1,1-Dichloroethane | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | 1,1-Dichloroethene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | 1,2-Dichloroethane | 8260 | | UJ | 1 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| HP-IWL-04 | SAIC01 | PNCH | W | 1,2-Dichloropropane | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | 2-Hexanone | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Acetone | 8260 | | UJ | 1,3 |
| HP-IWL-04 | SAIC01 | PNCH | W | Benzene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Bromodichloromethane | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Bromoform | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Bromomethane | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Carbon Disulfide | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Carbon Tetrachloride | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Chlorobenzene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Chloroethane | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Chloroform | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Chloromethane | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | cis-1,2-Dichloroethene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | cis-1,3-Dichloropropene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Dibromochloromethane | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Ethylbenzene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | m-and/or p-Xylene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Methyl Ethyl Ketone | 8260 | | UJ | 1,4 |
| HP-IWL-04 | SAIC01 | PNCH | W | Methyl Isobutyl Ketone | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Methylene Chloride | 8260 | | UJ | 1,6 |
| HP-IWL-04 | SAIC01 | PNCH | W | o-xylene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Styrene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Tetrachloroethene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Toluene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | trans-1,2-Dichloroethene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | trans-1,3-Dichloropropene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Trichloroethene | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Vinyl Chloride | 8260 | | UJ | 1 |
| HP-IWL-04 | SAIC01 | PNCH | W | Pyrene | 8270 | | UJ | 4 |
| SB-CDL-01 | SAIC01 | BORE | S | Antimony | 6010 | | UJ | 20 |
| SB-CDL-01 | SAIC01 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-CDL-01 | SAIC01 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-CDL-01 | SAIC01 | BORE | S | Acetone | 8260 | | U | 6 |
| SB-CDL-01 | SAIC01 | BORE | S | Methyl Ethyl Ketone | 8260 | | UJ | 3 |
| SB-CDL-01 | SAIC01 | BORE | S | Methylene Chloride | 8260 | 5.6 | U | 6 |
| SB-CDL-01 | SAIC01 | BORE | S | Trichloroethene | 8260 | 5.5 | U | 6 |
| SB-CDL-01 | SAIC02 | BORE | S | Antimony | 6010 | | UJ | 20 |
| SB-CDL-01 | SAIC02 | BORE | S | Copper | 6010 | | U | 6 |
| SB-CDL-01 | SAIC02 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-CDL-01 | SAIC02 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-CDL-01 | SAIC02 | BORE | S | 1,2-Dichloropropane | 8260 | | J | 9 |
| SB-CDL-01 | SAIC02 | BORE | S | Acetone | 8260 | | UJ | 4 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| SB-CDL-01 | SAIC02 | BORE | S | Ethylbenzene | 8260 | | J | 9 |
| SB-CDL-01 | SAIC02 | BORE | S | m-and/or p-Xylene | 8260 | | J | 9 |
| SB-CDL-01 | SAIC02 | BORE | S | Methylene Chloride | 8260 | 2200 | U | 6 |
| SB-CDL-01 | SAIC02 | BORE | S | Tetrachloroethene | 8260 | | J | 9 |
| SB-CDL-01 | SAIC02 | BORE | S | Trichloroethene | 8260 | 2100 | U | 6 |
| SB-CDL-02 | SAIC01 | BORE | S | Antimony | 6010 | | UJ | 20 |
| SB-CDL-02 | SAIC01 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-CDL-02 | SAIC01 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-CDL-02 | SAIC01 | BORE | S | Acetone | 8260 | | U | 6 |
| SB-CDL-02 | SAIC01 | BORE | S | Methyl Ethyl Ketone | 8260 | | UJ | 3 |
| SB-CDL-02 | SAIC01 | BORE | S | Methylene Chloride | 8260 | 6 | U | 6 |
| SB-CDL-02 | SAIC01 | BORE | S | Trichloroethene | 8260 | 6 | U | 6 |
| SB-CDL-02 | SAIC01D | BORE | S | Antimony | 6010 | | UJ | 8,20 |
| SB-CDL-02 | SAIC01D | BORE | S | Nickel | 6010 | | J | 6A |
| SB-CDL-02 | SAIC01D | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-CDL-02 | SAIC01D | BORE | S | Acetone | 8260 | | U | 6 |
| SB-CDL-02 | SAIC01D | BORE | S | Methyl Ethyl Ketone | 8260 | | UJ | 3 |
| SB-CDL-02 | SAIC01D | BORE | S | Methylene Chloride | 8260 | 6.4 | U | 6 |
| SB-CDL-02 | SAIC01D | BORE | S | Trichloroethene | 8260 | 6.4 | U | 6 |
| SB-CDL-02 | SAIC02 | BORE | S | Antimony | 6010 | | UJ | 20 |
| SB-CDL-02 | SAIC02 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-CDL-02 | SAIC02 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-CDL-02 | SAIC02 | BORE | S | Acetone | 8260 | 9.5 | U | 6 |
| SB-CDL-02 | SAIC02 | BORE | S | Methyl Ethyl Ketone | 8260 | | UJ | 3 |
| SB-CDL-02 | SAIC02 | BORE | S | Methylene Chloride | 8260 | 4.8 | U | 6 |
| SB-CDL-02 | SAIC02 | BORE | S | Trichloroethene | 8260 | 4.8 | U | 6 |
| SB-CDL-03 | SAIC01 | BORE | S | Antimony | 6010 | | J | 20 |
| SB-CDL-03 | SAIC01 | BORE | S | Nickel | 6010 | | U | 6A |
| SB-CDL-03 | SAIC01 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-CDL-03 | SAIC01 | BORE | S | Acetone | 8260 | | U | 6 |
| SB-CDL-03 | SAIC01 | BORE | S | Methyl Ethyl Ketone | 8260 | | UJ | 3 |
| SB-CDL-03 | SAIC01 | BORE | S | Methylene Chloride | 8260 | 9.7 | UJ | 6 |
| SB-CDL-03 | SAIC01 | BORE | S | Trichloroethene | 8260 | 9.5 | U | 6 |
| SB-CDL-03 | SAIC02 | BORE | S | Antimony | 6010 | | UJ | 8,20 |
| SB-CDL-03 | SAIC02 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-CDL-03 | SAIC02 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-CDL-03 | SAIC02 | BORE | S | Acetone | 8260 | | U | 6 |
| SB-CDL-03 | SAIC02 | BORE | S | Carbon Disulfide | 8260 | 5.7 | U | 7 |
| SB-CDL-03 | SAIC02 | BORE | S | Methyl Ethyl Ketone | 8260 | | UJ | 3 |
| SB-CDL-03 | SAIC02 | BORE | S | Methylene Chloride | 8260 | 5.7 | U | 6 |
| SB-CDL-03 | SAIC02 | BORE | S | Trichloroethene | 8260 | 5.7 | U | 6 |
| SB-CDL-03 | SAIC02 | BORE | S | Di-n-butyl Phthalate | 8270 | 410 | U | 8 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Aluminum | 6010 | | UJ | 17A |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| SB-CDL-03 | SAICRB02 | RNSW | W | Antimony | 6010 | | UJ | 17A |
| SB-CDL-03 | SAICRB02 | RNSW | W | Calcium | 6010 | | U | 6 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Cobalt | 6010 | | U | 6A |
| SB-CDL-03 | SAICRB02 | RNSW | W | Magnesium | 6010 | | U | 6 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Sodium | 6010 | | U | 6 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Bromomethane | 8260 | | UJ | 4 |
| SB-CDL-03 | SAICRB02 | RNSW | W | cis-1,3-Dichloropropene | 8260 | | UJ | 4 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Methylene Chloride | 8260 | | UJ | 4,6 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 1,2,4-Trichlorobenzene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 1,2-Dichlorobenzene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 1,3-Dichlorobenzene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 1,4-Dichlorobenzene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 2,4,5-Trichlorophenol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 2,4,6-Trichlorophenol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 2,4-Dichlorophenol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 2,4-Dimethylphenol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 2,4-Dinitrophenol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 2,4-Dinitrotoluene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 2,6-Dinitrotoluene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 2-Chloronaphthalene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 2-Chlorophenol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 2-Methylnaphthalene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 2-Methylphenol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 2-Nitroaniline | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 2-Nitrophenol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 3,3'-Dichloroobenzidine | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 3-Nitroaniline | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 4,6-Dinitro-2-Cresol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 4-Bromophenyl Phenyl Ether | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 4-Chloro-3-methylphenol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 4-Chloroaniline | 8270 | | UJ | 1,4 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 4-Chlorophenyl Phenyl Ether | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 4-Methylphenol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 4-Nitroaniline | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | 4-Nitrophenol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Acenaphthene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Acenaphthylene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Anthracene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Benzo(a)anthracene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Benzo(a)pyrene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Benzo(b)fluoranthene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Benzo(g,h,i)perylene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Benzo(k)fluoranthene | 8270 | | UJ | 1 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| SB-CDL-03 | SAICRB02 | RNSW | W | bis(2-Chloroethoxy)methane | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | bis(2-Chloroethyl)Ether | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | bis(2-Chloroisopropyl) ether | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | bis(2-Ethylhexyl)phthalate | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Butylbenzyl Phthalate | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Carbazole | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Chrysene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Di-n-butyl Phthalate | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Di-n-octyl Phthalate | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Dibenzo(a,h)anthracene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Dibenzofuran | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Diethyl Phthalate | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Dimethyl Phthalate | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Fluoranthene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Fluorene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Hexachlorobenzene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Hexachlorobutadiene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Hexachlorocyclopentadiene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Hexachloroethane | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Indeno(1,2,3-cd)pyrene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Isophorone | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | N-Nitrosodi-n-propylamine | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | N-Nitrosodiphenylamine | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Naphthalene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Nitrobenzene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Pentachlorophenol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Phenanthrene | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Phenol | 8270 | | UJ | 1 |
| SB-CDL-03 | SAICRB02 | RNSW | W | Pyrene | 8270 | | UJ | 1 |
| SB-IWL-01 | SAIC01 | BORE | S | Antimony | 6010 | | UJ | 8,20 |
| SB-IWL-01 | SAIC01 | BORE | S | Cobalt | 6010 | | J | 6A |
| SB-IWL-01 | SAIC01 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-IWL-01 | SAIC01 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-IWL-01 | SAIC01 | BORE | S | Vanadium | 6010 | | J | 17A |
| SB-IWL-01 | SAIC01 | BORE | S | Acetone | 8260 | 12 | U | 7 |
| SB-IWL-01 | SAIC01 | BORE | S | Methyl Ethyl Ketone | 8260 | | UJ | 3 |
| SB-IWL-01 | SAIC01 | BORE | S | Methylene Chloride | 8260 | 6.2 | U | 6 |
| SB-IWL-01 | SAIC01 | BORE | S | Trichloroethene | 8260 | 6.2 | U | 6 |
| SB-IWL-01 | SAIC02 | BORE | S | Antimony | 6010 | | UJ | 20,17A |
| SB-IWL-01 | SAIC02 | BORE | S | Cobalt | 6010 | | UJ | 8,6A |
| SB-IWL-01 | SAIC02 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-IWL-01 | SAIC02 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-IWL-01 | SAIC02 | BORE | S | Vanadium | 6010 | | J | 17A |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| SB-IWL-01 | SAIC02 | BORE | S | Acetone | 8260 | 12 | U | 7 |
| SB-IWL-01 | SAIC02 | BORE | S | Methyl Ethyl Ketone | 8260 | | UJ | 4 |
| SB-IWL-01 | SAIC02 | BORE | S | Methylene Chloride | 8260 | 5.8 | U | 6 |
| SB-IWL-01 | SAIC02 | BORE | S | Trichloroethene | 8260 | 5.8 | U | 6 |
| SB-IWL-01 | SAICTB01 | TRIP | W | 1,1,1-Trichloroethane | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | 1,1,2-Trichloroethane | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | 1,1-Dichloroethane | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | 1,1-Dichloroethene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | 1,2-Dichloroethane | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | 1,2-Dichloropropane | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | 2-Hexanone | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Acetone | 8260 | | J | 4,9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Benzene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Bromodichloromethane | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Bromoform | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Bromomethane | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Carbon Disulfide | 8260 | | J | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Carbon Tetrachloride | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Chlorobenzene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Chloroethane | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Chloroform | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Chloromethane | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | cis-1,2-Dichloroethene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | cis-1,3-Dichloropropene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Dibromochloromethane | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Ethylbenzene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | m-and/or p-Xylene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Methyl Ethyl Ketone | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Methyl Isobutyl Ketone | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Methylene Chloride | 8260 | | UJ | 6,9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | o-xylene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Styrene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Tetrachloroethene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Toluene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | trans-1,2-Dichloroethene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | trans-1,3-Dichloropropene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Trichloroethene | 8260 | | UJ | 9 |
| SB-IWL-01 | SAICTB01 | TRIP | W | Vinyl Chloride | 8260 | | UJ | 9 |
| SB-IWL-02 | SAIC01 | BORE | S | Antimony | 6010 | | UJ | 20,17A |
| SB-IWL-02 | SAIC01 | BORE | S | Cobalt | 6010 | | J | 6A |
| SB-IWL-02 | SAIC01 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-IWL-02 | SAIC01 | BORE | S | Sodium | 6010 | | UJ | 6,17A |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| SB-IWL-02 | SAIC01 | BORE | S | Vanadium | 6010 | | J | 17A |
| SB-IWL-02 | SAIC01 | BORE | S | Acetone | 8260 | | U | 7 |
| SB-IWL-02 | SAIC01 | BORE | S | Methyl Ethyl Ketone | 8260 | | UJ | 3 |
| SB-IWL-02 | SAIC01 | BORE | S | Methylene Chloride | 8260 | 6.4 | U | 6 |
| SB-IWL-02 | SAIC01 | BORE | S | Trichloroethene | 8260 | 6.4 | U | 6 |
| SB-IWL-02 | SAIC02 | BORE | S | Antimony | 6010 | | UJ | 20,17A |
| SB-IWL-02 | SAIC02 | BORE | S | Cobalt | 6010 | | J | 6A |
| SB-IWL-02 | SAIC02 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-IWL-02 | SAIC02 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-IWL-02 | SAIC02 | BORE | S | Vanadium | 6010 | | J | 17A |
| SB-IWL-02 | SAIC02 | BORE | S | Acetone | 8260 | 10 | U | 7 |
| SB-IWL-02 | SAIC02 | BORE | S | Methyl Ethyl Ketone | 8260 | | UJ | 3 |
| SB-IWL-02 | SAIC02 | BORE | S | Methylene Chloride | 8260 | 5.1 | U | 6 |
| SB-IWL-02 | SAIC02 | BORE | S | Trichloroethene | 8260 | 5.1 | U | 6 |
| SB-IWL-03 | SAIC01 | BORE | S | Antimony | 6010 | | UJ | 20,17A |
| SB-IWL-03 | SAIC01 | BORE | S | Cobalt | 6010 | | J | 6 |
| SB-IWL-03 | SAIC01 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-IWL-03 | SAIC01 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-IWL-03 | SAIC01 | BORE | S | Vanadium | 6010 | | J | 17A |
| SB-IWL-03 | SAIC01 | BORE | S | Acetone | 8260 | | U | 7 |
| SB-IWL-03 | SAIC01 | BORE | S | Methyl Ethyl Ketone | 8260 | | UJ | 3 |
| SB-IWL-03 | SAIC01 | BORE | S | Methylene Chloride | 8260 | 6.8 | U | 6 |
| SB-IWL-03 | SAIC01 | BORE | S | Trichloroethene | 8260 | 6.8 | U | 6 |
| SB-IWL-03 | SAIC02 | BORE | S | Antimony | 6010 | | UJ | 20,17A |
| SB-IWL-03 | SAIC02 | BORE | S | Chromium | 6010 | | U | 8 |
| SB-IWL-03 | SAIC02 | BORE | S | Cobalt | 6010 | | UJ | 8,6A |
| SB-IWL-03 | SAIC02 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-IWL-03 | SAIC02 | BORE | S | Potassium | 6010 | | U | 8 |
| SB-IWL-03 | SAIC02 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-IWL-03 | SAIC02 | BORE | S | Vanadium | 6010 | | J | 17A |
| SB-IWL-03 | SAIC02 | BORE | S | Acetone | 8260 | 12 | U | 7 |
| SB-IWL-03 | SAIC02 | BORE | S | Methyl Ethyl Ketone | 8260 | | UJ | 3 |
| SB-IWL-03 | SAIC02 | BORE | S | Methylene Chloride | 8260 | 6 | U | 6 |
| SB-IWL-03 | SAIC02 | BORE | S | Trichloroethene | 8260 | 6 | U | 6 |
| SB-IWL-04 | SAIC01 | BORE | S | Antimony | 6010 | | UJ | 20 |
| SB-IWL-04 | SAIC01 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-IWL-04 | SAIC01 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-IWL-04 | SAIC01 | BORE | S | Acetone | 8260 | | U | 6 |
| SB-IWL-04 | SAIC01 | BORE | S | Methyl Ethyl Ketone | 8260 | | J | 3 |
| SB-IWL-04 | SAIC01 | BORE | S | Methylene Chloride | 8260 | 5 | U | 6 |
| SB-IWL-04 | SAIC01 | BORE | S | Trichloroethene | 8260 | 5 | U | 6 |
| SB-IWL-04 | SAIC02 | BORE | S | Antimony | 6010 | | UJ | 20 |
| SB-IWL-04 | SAIC02 | BORE | S | Cobalt | 6010 | | U | 8 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| SB-IWL-04 | SAIC02 | BORE | S | Copper | 6010 | | U | 6 |
| SB-IWL-04 | SAIC02 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-IWL-04 | SAIC02 | BORE | S | Potassium | 6010 | | U | 8 |
| SB-IWL-04 | SAIC02 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-IWL-04 | SAIC02 | BORE | S | Acetone | 8260 | | U | 6 |
| SB-IWL-04 | SAIC02 | BORE | S | Methyl Ethyl Ketone | 8260 | | UJ | 3 |
| SB-IWL-04 | SAIC02 | BORE | S | Methylene Chloride | 8260 | 5.2 | U | 6 |
| SB-IWL-04 | SAIC02 | BORE | S | Trichloroethene | 8260 | 5.2 | U | 6 |
| SB-IWL-04 | SAICTB02 | TRIP | W | 1,1,1-Trichloroethane | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | 1,1,2-Trichloroethane | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | 1,1-Dichloroethane | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | 1,1-Dichloroethene | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | 1,2-Dichloroethane | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | 1,2-Dichloropropane | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | 2-Hexanone | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Acetone | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Benzene | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Bromodichloromethane | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Bromoform | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Bromomethane | 8260 | | UJ | 4,9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Carbon Disulfide | 8260 | | J | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Carbon Tetrachloride | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Chlorobenzene | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Chloroethane | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Chloroform | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Chloromethane | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | cis-1,2-Dichloroethene | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | cis-1,3-Dichloropropene | 8260 | | UJ | 4,9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Dibromochloromethane | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Ethylbenzene | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | m-and/or p-Xylene | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Methyl Ethyl Ketone | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Methyl Isobutyl Ketone | 8260 | | UJ | 4,9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Methylene Chloride | 8260 | | UJ | 4,6 |
| SB-IWL-04 | SAICTB02 | TRIP | W | o-xylene | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Styrene | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Tetrachloroethene | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Toluene | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | trans-1,2-Dichloroethene | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | trans-1,3-Dichloropropene | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Trichloroethene | 8260 | | UJ | 9 |
| SB-IWL-04 | SAICTB02 | TRIP | W | Vinyl Chloride | 8260 | | UJ | 9 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| SB-WWP-01 | SAIC01 | BORE | S | Antimony | 6010 | | UJ | 20 |
| SB-WWP-01 | SAIC01 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-WWP-01 | SAIC01 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-WWP-01 | SAIC01 | BORE | S | 4-Chloroaniline | 8270 | | UJ | 4 |
| SB-WWP-01 | SAIC01R | BORE | S | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 4 |
| SB-WWP-01 | SAIC01R | BORE | S | Acetone | 8260 | | UJ | 3,6 |
| SB-WWP-01 | SAIC01R | BORE | S | Bromomethane | 8260 | | UJ | 4 |
| SB-WWP-01 | SAIC01R | BORE | S | Methylene Chloride | 8260 | 5.3 | U | 6 |
| SB-WWP-01 | SAIC02 | BORE | S | Antimony | 6010 | | UJ | 20 |
| SB-WWP-01 | SAIC02 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-WWP-01 | SAIC02 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-WWP-01 | SAIC02 | BORE | S | 4-Chloroaniline | 8270 | | UJ | 4 |
| SB-WWP-01 | SAIC02 | BORE | S | 4-Nitrophenol | 8270 | | UJ | 4 |
| SB-WWP-01 | SAIC02R | BORE | S | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 4 |
| SB-WWP-01 | SAIC02R | BORE | S | Acetone | 8260 | | UJ | 3,6 |
| SB-WWP-01 | SAIC02R | BORE | S | Bromomethane | 8260 | | UJ | 4 |
| SB-WWP-01 | SAIC02R | BORE | S | Methylene Chloride | 8260 | 5.2 | U | 6 |
| SB-WWP-01 | SAIC02R | BORE | S | Toluene | 8260 | 5.2 | U | 8 |
| SB-WWP-01 | SAICTB03 | TRIP | W | 1,1,1-Trichloroethane | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | 1,1,2-Trichloroethane | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | 1,1-Dichloroethane | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | 1,1-Dichloroethene | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | 1,2-Dichloroethane | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | 1,2-Dichloropropane | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | 2-Hexanone | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Acetone | 8260 | | J | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Benzene | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Bromodichloromethane | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Bromoform | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Bromomethane | 8260 | | UJ | 4,9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Carbon Disulfide | 8260 | | J | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Carbon Tetrachloride | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Chlorobenzene | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Chloroethane | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Chloroform | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Chloromethane | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | cis-1,2-Dichloroethene | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | cis-1,3-Dichloropropene | 8260 | | UJ | 4,9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Dibromochloromethane | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Ethylbenzene | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | m-and/or p-Xylene | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Methyl Ethyl Ketone | 8260 | | UJ | 9 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| SB-WWP-01 | SAICTB03 | TRIP | W | Methyl Isobutyl Ketone | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Methylene Chloride | 8260 | | UJ | 4,6 |
| SB-WWP-01 | SAICTB03 | TRIP | W | o-xylene | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Styrene | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Tetrachloroethene | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Toluene | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | trans-1,2-Dichloroethene | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | trans-1,3-Dichloropropene | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Trichloroethene | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB03 | TRIP | W | Vinyl Chloride | 8260 | | UJ | 9 |
| SB-WWP-01 | SAICTB04 | TRIP | W | Acetone | 8260 | | J | 2 |
| SB-WWP-01 | SAICTB04 | TRIP | W | Methyl Ethyl Ketone | 8260 | | UJ | 4 |
| SB-WWP-01 | SAICTB04 | TRIP | W | Methylene Chloride | 8260 | | U | 6 |
| SB-WWP-02 | SAIC01 | BORE | S | Antimony | 6010 | | UJ | 20 |
| SB-WWP-02 | SAIC01 | BORE | S | Cobalt | 6010 | | U | 8 |
| SB-WWP-02 | SAIC01 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-WWP-02 | SAIC01 | BORE | S | Potassium | 6010 | | U | 8 |
| SB-WWP-02 | SAIC01 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-WWP-02 | SAIC01 | BORE | S | 4-Chloroaniline | 8270 | | UJ | 4 |
| SB-WWP-02 | SAIC01 | BORE | S | 4-Nitrophenol | 8270 | | UJ | 4 |
| SB-WWP-02 | SAIC01 | BORE | S | Di-n-butyl Phthalate | 8270 | 350 | U | 8 |
| SB-WWP-02 | SAIC01D | BORE | S | Antimony | 6010 | | UJ | 20 |
| SB-WWP-02 | SAIC01D | BORE | S | Cobalt | 6010 | | U | 8 |
| SB-WWP-02 | SAIC01D | BORE | S | Nickel | 6010 | | J | 6A |
| SB-WWP-02 | SAIC01D | BORE | S | Potassium | 6010 | | U | 8 |
| SB-WWP-02 | SAIC01D | BORE | S | Sodium | 6010 | | UJ | 6A,17A |
| SB-WWP-02 | SAIC01D | BORE | S | 4-Chloroaniline | 8270 | | UJ | 4 |
| SB-WWP-02 | SAIC01D | BORE | S | 4-Nitrophenol | 8270 | | UJ | 4 |
| SB-WWP-02 | SAIC01DR | BORE | S | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 4 |
| SB-WWP-02 | SAIC01DR | BORE | S | Acetone | 8260 | | UJ | 3,6 |
| SB-WWP-02 | SAIC01DR | BORE | S | Bromomethane | 8260 | | UJ | 4 |
| SB-WWP-02 | SAIC01DR | BORE | S | Methylene Chloride | 8260 | 7.4 | U | 6 |
| SB-WWP-02 | SAIC01DR | BORE | S | Toluene | 8260 | 7.4 | U | 8 |
| SB-WWP-02 | SAIC01R | BORE | S | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 4 |
| SB-WWP-02 | SAIC01R | BORE | S | Acetone | 8260 | | UJ | 3,6 |
| SB-WWP-02 | SAIC01R | BORE | S | Bromomethane | 8260 | | UJ | 4 |
| SB-WWP-02 | SAIC01R | BORE | S | Methylene Chloride | 8260 | 5.9 | U | 6 |
| SB-WWP-02 | SAIC02 | BORE | S | Antimony | 6010 | | UJ | 20 |
| SB-WWP-02 | SAIC02 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-WWP-02 | SAIC02 | BORE | S | Sodium | 6010 | | UJ | 6A,17A |
| SB-WWP-02 | SAIC02 | BORE | S | 4-Chloroaniline | 8270 | | UJ | 4 |
| SB-WWP-02 | SAIC02 | BORE | S | 4-Nitrophenol | 8270 | | UJ | 4 |
| SB-WWP-02 | SAIC02R | BORE | S | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 4 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| SB-WWP-02 | SAIC02R | BORE | S | Acetone | 8260 | | UJ | 3,6 |
| SB-WWP-02 | SAIC02R | BORE | S | Bromomethane | 8260 | | UJ | 4 |
| SB-WWP-02 | SAIC02R | BORE | S | Methylene Chloride | 8260 | 6.1 | U | 6 |
| SB-WWP-03 | SAIC01 | BORE | S | Antimony | 6010 | | UJ | 8,20 |
| SB-WWP-03 | SAIC01 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-WWP-03 | SAIC01 | BORE | S | Sodium | 6010 | | UJ | 17A |
| SB-WWP-03 | SAIC01 | BORE | S | 4-Chloroaniline | 8270 | | UJ | 4 |
| SB-WWP-03 | SAIC01 | BORE | S | 4-Nitrophenol | 8270 | | UJ | 4 |
| SB-WWP-03 | SAIC01 | BORE | S | Di-n-butyl Phthalate | 8270 | 430 | U | 8 |
| SB-WWP-03 | SAIC01R | BORE | S | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 4 |
| SB-WWP-03 | SAIC01R | BORE | S | Acetone | 8260 | | UJ | 3,6 |
| SB-WWP-03 | SAIC01R | BORE | S | Bromomethane | 8260 | | UJ | 4 |
| SB-WWP-03 | SAIC01R | BORE | S | Methylene Chloride | 8260 | 6.6 | U | 6 |
| SB-WWP-03 | SAIC02 | BORE | S | Antimony | 6010 | | J | 20 |
| SB-WWP-03 | SAIC02 | BORE | S | Nickel | 6010 | | J | 6A |
| SB-WWP-03 | SAIC02 | BORE | S | Sodium | 6010 | | UJ | 6,17A |
| SB-WWP-03 | SAIC02 | BORE | S | 4-Chloroaniline | 8270 | | UJ | 4 |
| SB-WWP-03 | SAIC02 | BORE | S | 4-Nitrophenol | 8270 | | UJ | 4 |
| SB-WWP-03 | SAIC02 | BORE | S | Di-n-butyl Phthalate | 8270 | 400 | U | 8 |
| SB-WWP-03 | SAIC02R | BORE | S | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 4 |
| SB-WWP-03 | SAIC02R | BORE | S | Acetone | 8260 | | UJ | 3,7 |
| SB-WWP-03 | SAIC02R | BORE | S | Bromomethane | 8260 | | UJ | 4 |
| SB-WWP-03 | SAIC02R | BORE | S | Methylene Chloride | 8260 | 6.1 | U | 6 |
| SB-WWP-03 | SAIC02R | BORE | S | Toluene | 8260 | 6.1 | U | 8 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Aluminum | 6010 | | UJ | 17A |
| SB-WWP-03 | SAICRB01 | RNSW | W | Antimony | 6010 | | J | 17A |
| SB-WWP-03 | SAICRB01 | RNSW | W | Arsenic | 6010 | | U | 17 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Calcium | 6010 | | U | 6 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Cobalt | 6010 | | J | 6A |
| SB-WWP-03 | SAICRB01 | RNSW | W | Copper | 6010 | | U | 6 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Magnesium | 6010 | | U | 6 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Sodium | 6010 | | U | 6 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Vanadium | 6010 | | U | 17 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Zinc | 6010 | | U | 6 |
| SB-WWP-03 | SAICRB01 | RNSW | W | 1,1,1-Trichloroethane | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | 1,1,2-Trichloroethane | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | 1,1-Dichloroethane | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | 1,1-Dichloroethene | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | 1,2-Dichloroethane | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | 1,2-Dichloropropane | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | 2-Hexanone | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Acetone | 8260 | | J | 9 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| SB-WWP-03 | SAICRB01 | RNSW | W | Benzene | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Bromodichloromethane | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Bromoform | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Bromomethane | 8260 | | UJ | 4,9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Carbon Disulfide | 8260 | | J | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Carbon Tetrachloride | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Chlorobenzene | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Chloroethane | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Chloroform | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Chloromethane | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | cis-1,2-Dichloroethene | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | cis-1,3-Dichloropropene | 8260 | | UJ | 4,9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Dibromochloromethane | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Ethylbenzene | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | m-and/or p-Xylene | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Methyl Ethyl Ketone | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Methyl Isobutyl Ketone | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Methylene Chloride | 8260 | | UJ | 4,6 |
| SB-WWP-03 | SAICRB01 | RNSW | W | o-xylene | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Styrene | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Tetrachloroethene | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Toluene | 8260 | | J | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | trans-1,2-Dichloroethene | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | trans-1,3-Dichloropropene | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Trichloroethene | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | Vinyl Chloride | 8260 | | UJ | 9 |
| SB-WWP-03 | SAICRB01 | RNSW | W | 4-Chloroaniline | 8270 | | UJ | 4 |
| WA-UST-01 | SAIC01 | SWTR | W | Aluminum | 6010 | | UJ | 17A |
| WA-UST-01 | SAIC01 | SWTR | W | Antimony | 6010 | | UJ | 17A |
| WA-UST-01 | SAIC01 | SWTR | W | Arsenic | 6010 | | U | 17 |
| WA-UST-01 | SAIC01 | SWTR | W | Cobalt | 6010 | | UJ | 6A |
| WA-UST-01 | SAIC01 | SWTR | W | Copper | 6010 | | U | 6 |
| WA-UST-01 | SAIC01 | SWTR | W | Zinc | 6010 | | U | 6 |
| WA-UST-01 | SAIC01 | SWTR | W | Methyl Ethyl Ketone | 8260 | | UJ | 4 |
| WA-UST-01 | SAIC01 | SWTR | W | Methylene Chloride | 8260 | | U | 6 |
| WA-UST-01 | SAIC01 | SWTR | W | 4-Chloroaniline | 8270 | | UJ | 4 |
| WA-UST-01 | SAIC01 | SWTR | W | 4-Nitrophenol | 8270 | | UJ | 4 |
| WA-UST-02 | SAIC01 | SWTR | W | Aluminum | 6010 | | UJ | 17A |
| WA-UST-02 | SAIC01 | SWTR | W | Antimony | 6010 | | UJ | 17A |
| WA-UST-02 | SAIC01 | SWTR | W | Cobalt | 6010 | | UJ | 6A |
| WA-UST-02 | SAIC01 | SWTR | W | Copper | 6010 | | U | 8 |
| WA-UST-02 | SAIC01 | SWTR | W | Thallium | 6010 | | U | 17 |
| WA-UST-02 | SAIC01 | SWTR | W | Zinc | 6010 | | U | 6 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| WA-UST-02 | SAIC01 | SWTR | W | Methyl Ethyl Ketone | 8260 | | UJ | 4 |
| WA-UST-02 | SAIC01 | SWTR | W | Methylene Chloride | 8260 | | U | 6 |
| WA-UST-02 | SAIC01 | SWTR | W | 4-Chloroaniline | 8270 | | UJ | 4 |
| WA-UST-02 | SAIC01 | SWTR | W | 4-Nitrophenol | 8270 | | UJ | 4 |
| WA-UST-03 | SAIC01 | SWTR | W | Aluminum | 6010 | | UJ | 17A |
| WA-UST-03 | SAIC01 | SWTR | W | Antimony | 6010 | | UJ | 17A |
| WA-UST-03 | SAIC01 | SWTR | W | Cobalt | 6010 | | UJ | 6A |
| WA-UST-03 | SAIC01 | SWTR | W | Copper | 6010 | | U | 8 |
| WA-UST-03 | SAIC01 | SWTR | W | Vanadium | 6010 | | U | 17 |
| WA-UST-03 | SAIC01 | SWTR | W | Carbon Disulfide | 8260 | 1 | U | 7 |
| WA-UST-03 | SAIC01 | SWTR | W | Methyl Ethyl Ketone | 8260 | | UJ | 4 |
| WA-UST-03 | SAIC01 | SWTR | W | Methylene Chloride | 8260 | | U | 6 |
| WA-UST-03 | SAIC01 | SWTR | W | 4-Chloroaniline | 8270 | | UJ | 4 |
| WA-UST-03 | SAIC01 | SWTR | W | 4-Nitrophenol | 8270 | | U | 4 |
| WA-UST-04 | SAIC01 | SWTR | W | Aluminum | 6010 | | UJ | 17A |
| WA-UST-04 | SAIC01 | SWTR | W | Antimony | 6010 | | UJ | 17A |
| WA-UST-04 | SAIC01 | SWTR | W | Arsenic | 6010 | | U | 17 |
| WA-UST-04 | SAIC01 | SWTR | W | Cobalt | 6010 | | J | 6A |
| WA-UST-04 | SAIC01 | SWTR | W | Copper | 6010 | | U | 8 |
| WA-UST-04 | SAIC01 | SWTR | W | Thallium | 6010 | | U | 17 |
| WA-UST-04 | SAIC01 | SWTR | W | Zinc | 6010 | | U | 6 |
| WA-UST-04 | SAIC01 | SWTR | W | 1,1,1-Trichloroethane | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | 1,1,2,2-Tetrachloroethane | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | 1,1,2-Trichloroethane | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | 1,1-Dichloroethane | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | 1,1-Dichloroethene | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | 1,2-Dichloroethane | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | 1,2-Dichloropropane | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | 2-Hexanone | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Acetone | 8260 | | UJ | 7,9 |
| WA-UST-04 | SAIC01 | SWTR | W | Benzene | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Bromodichloromethane | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Bromoform | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Bromomethane | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Carbon Disulfide | 8260 | | UJ | 7,9 |
| WA-UST-04 | SAIC01 | SWTR | W | Carbon Tetrachloride | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Chlorobenzene | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Chloroethane | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Chloroform | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Chloromethane | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | cis-1,2-Dichloroethene | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | cis-1,3-Dichloropropene | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Dibromochloromethane | 8260 | | UJ | 9 |

## Table D-2. Reasons for Data Qualification
## Limited Site Investigation
## Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | Field Sample | Sample Type | Matrix | Test Name | Method | New Value | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| WA-UST-04 | SAIC01 | SWTR | W | Ethylbenzene | 8260 | | J | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | m-and/or p-Xylene | 8260 | | J | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Methyl Ethyl Ketone | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Methyl Isobutyl Ketone | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Methylene Chloride | 8260 | | UJ | 6,9 |
| WA-UST-04 | SAIC01 | SWTR | W | o-xylene | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Styrene | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Tetrachloroethene | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Toluene | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | trans-1,2-Dichloroethene | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | trans-1,3-Dichloropropene | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Trichloroethene | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | Vinyl Chloride | 8260 | | UJ | 9 |
| WA-UST-04 | SAIC01 | SWTR | W | 4-Chloroaniline | 8270 | | UJ | 4 |
| WA-UST-04 | SAIC01 | SWTR | W | 4-Nitrophenol | 8270 | | UJ | 4 |

**Table D-2. Reasons for Data Qualification**
**Limited Site Investigation**
**Wallops Flight Facility, Wallops Island, Virginia (Continued)**

| REASON CODE | DEFINITION |
|---|---|
| 1 | Holding times exceeded |
| 2 | Initial calibration percent relative standard deviation (% RSD) outside QC limits |
| 3 | Initial calibration RRF result outside QC limits |
| 3A | Compound/element exceeds the calibration range |
| 4 | Continuing calibration percent (%) difference outside QC limits |
| 5 | Continuing calibration RRF result outside QC limits |
| 6 | Laboratory method blank (reagent blank) contamination |
| 7 | Volatile trip blank contamination |
| 8 | Equipment rinsate blank contamination |
| 9 | Surrogate recovery results outside QC limits |
| 10 | Laboratory MS/MSD results outside QC limits |
| 11 | LCS results outside QC limits |
| 12 | Internal standards (ISs) outside QC limits |
| 13 | Tentatively identified compounds (TICs) (common laboratory contaminant or artifact not found in the associated method blank) |
| 14 | System performance |
| 15 | Greater than 25 percent difference for detected concentrations of single response pesticide between the two GC columns |
| 16 | Initial calibration verification (ICV) and/or continuing calibration verification (CCV) percent recovery outside QC limits |
| 17 | ICB and/or CCB contamination outside QC limits or negative ICB/CCB results greater than the instrument detection limit (IDL) |
| 18 | Ion chromatography plasma (ICP) interference check sample results outside QC limits |
| 19 | Laboratory duplicate RPD outside QC limits |
| 20 | Laboratory matrix spike results outside QC limits |
| 21 | Graphite furnace atomic adsorption (GFAA) duplicate injection outside QC limits |
| 22 | GFAA analytical spike recovery (post-digestion spike) outside QC limits |
| 23 | GFAA correlation coefficient outside QC limits |
| 24 | ICP serial dilution result outside QC limits |
| 25 | Incorrect IS was used for quantitation |
| 26 | Bromofluorobenzene (BFB) over 12-hour tune time |
| 27 | Field blank contamination |
| 28 | Performance evaluation mixture % difference |
| 29A | Does not meet the retention time (RT) identification criteria |
| 29B | The calibration standard responses do not support the reported detection limit |
| 30 | Common laboratory contaminant(target compound) not found in the associated method blank |
| 31 | The second-column confirmation was not performed |

**Table D-3. Volatile Organic Compound Analysis Initial Calibration QC Summary: Soil**
**Wallops Flight Facility, Wallops Island, Virginia**

| Outliers | Number of ICC Analysis | Max %RSD | %RSD Control Limit | Number %RSD Within Control Limits | Number %RSD Outside Control Limits | Outlier RRF Range | Min RRF Limit | Number RRF Within Control Limit | Number RRF Outside Control Limit* |
|---|---|---|---|---|---|---|---|---|---|
| MEK | 2 | No Outliers | 30 | 2 | 0 | 0.016-0.021 | 0.05 | 6 | 6 |
| Acetone | 2 | 33.9 | 30 | 1 | 1 | No Outliers | 0.05 | 12 | 0 |
| Methylene chloride | 2 | 31.6 | 30 | 1 | 1 | No Outliers | 0.05 | 12 | 0 |

ICC - Initial Calibration Curve
*6 RRF per initial calibration (1 per standard + average)

**Table D-4. Volatile Organic Compound Analysis Initial Calibration QC Summary: Water Wallops Flight Facility, Wallops Island, Virginia**

| Outliers | Number of ICC Analysis | Max %RSD | %RSD Control Limit | Number %RSD Within Control Limits | Number %RSD Outside Control Limits | Outlier RRF Range | Min RRF Limit | Number RRF Within Control Limit | Number RRF Outside Control Limit* |
|---|---|---|---|---|---|---|---|---|---|
| Acetone | 2 | 30.8 | 30 | 1 | 1 | 0.039-0.042 | 0.05 | 10 | 2 |
| Trans-1,3-dichloropropene | 2 | 38.4 | 30 | 1 | 1 | No Outliers | 0.05 | 12 | 0 |

ICC - Initial Calibration Curve
*6 RRF per initial calibration (1 per standard + average)

**Table D-5. Volatile Organic Compound Analysis Continuing Calibration QC Summary: Soil**
**Wallops Flight Facility, Wallops Island, Virginia**

| Outliers | Number CCC Analysis | Outlier %D Range | %D Control Limit | Number %D Within Control Limits | Number %D Outside Control Limits | Outlier RRF Range | Min RRF Limit | Number RRF Within Control Limit | Number RRF Outside Control Limit |
|---|---|---|---|---|---|---|---|---|---|
| Acetone | 4 | -29.7 | 25 | 3 | 1 | No Outliers | 0.05 | 4 | 0 |
| MEK | 4 | No Outliers | 25 | 4 | 0 | 0.014-0.016 | 0.05 | 2 | 2 |
| Bromomethane | 4 | 26.3 | 25 | 3 | 1 | No Outliers | 0.05 | 4 | 0 |
| 1,1,2,2-Tetrachloroethane | 4 | 27.4 | 25 | 3 | 1 | No Outliers | 0.05 | 4 | 0 |

CCC - Continuing Calibration Chec

**Table D-6. Volatile Organic Compound Analysis Continuing Calibration QC Summary: Water**
**Wallops Flight Facility, Wallops Island, Virginia**

| Outliers | Number CCC Analysis | Outlier %D Range | %D Control Limit | Number %D Within Control Limits | Number %D Outside Control Limits | Outlier RRF Range | Min RRF Limit | Number RRF Within Control Limit | Number RRF Outside Control Limit |
|---|---|---|---|---|---|---|---|---|---|
| Acetone | 5 | (-29.4)-(-35.8) | 25 | 2 | 3 | No Outliers | 0.05 | 5 | 0 |
| Cis-1,3-dichloropropene | 5 | -28 | 25 | 4 | 1 | No Outliers | 0.05 | 5 | 0 |
| MEK | 5 | (-30.1)-(-34.7) | 25 | 3 | 2 | No Outliers | 0.05 | 5 | 0 |
| Bromomethane | 5 | -25.8 | 25 | 4 | 1 | No Outliers | 0.05 | 5 | 0 |
| Methylene Chloride | 5 | -27.1 | 25 | 4 | 1 | No Outliers | 0.05 | 5 | 0 |
| MIBK | 5 | -27.3 | 25 | 4 | 1 | No Outliers | 0.05 | 5 | 0 |
| MNBK | 5 | -41.7 | 25 | 4 | 1 | No Outliers | 0.05 | 5 | 0 |
| Chloromethane | 5 | -27.5 | 25 | 4 | 1 | No Outliers | 0.05 | 5 | 0 |

CCC - Continuing Calibration Chec

**Table D-7. Semivolatile Organic Compound Analysis Initial and Continuing Calibration QC Summary: Water and Soil**
**Wallops Flight Facility, Wallops Island, Virginia**

| Outliers | Number of ICC Analysis | Max %RSD | %RSD Control Limit | Number Within Control Limits | Number Outside Control Limits | Number of CCC Analysis | %D Outlier Range | %D Limit | Number Within Control Limit | Number Outside Control Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| 4-Chloroaniline | 2 | No Outlier | 30 | 2 | 0 | 7 | 27.7-36.9 | ±25 | 5 | 2 |
| Pyrene | 2 | No Outlier | 30 | 2 | 0 | 7 | -25.8 | ±25 | 6 | 1 |
| 4-Nitrophenol | 2 | No Outlier | 30 | 2 | 0 | 7 | 32.6 | ±25 | 6 | 1 |
| Terphenyl-d14 (surrogate) | 2 | No Outlier | 30 | 2 | 0 | 7 | -30.6 | ±25 | 6 | 1 |
| Nitrobenzene-d5 (surrogate) | 2 | No Outlier | 30 | 2 | 0 | 7 | 30.2-31.3 | ±25 | 5 | 2 |

ICC - Initial Calibration Curve
CCC - Continuing Calibration Check

**Table D-8. Volatile Organic Compounds Analysis Blank Summary: Soil
Wallops Flight Facility, Wallops Island, Virginia**

| Lot | Blank ID | Contaminant | Concentration | Action Level | Number of Samples Qualified |
|---|---|---|---|---|---|
| 208040 | BLK56135 | Methylene Chloride | 14 | 140 | 6 |
| 208040 | BLK56135 | Trichloroethene | 1.5 | 7.5 | 6 |
| 208057 | BLK56331 | Methylene Chloride | 8.2 | 82 | 8 |
| 208057 | BLK56331 | Trichloroethene | 1.6 | 8 | 8 |
| 208057 | BLK56331 | Acetone | 5.2 | 52 | 8 |
| 208057 | BLK56332 | Methylene Chloride | 7 | 70 | 1 |
| 208057 | BLK56332 | Trichloroethene | 1.8 | 9 | 1 |
| 208126 | BLK56362 | Methylene Chloride | 4.2 | 42 | 7 |
| 208126 | BLK56362 | Acetone | 6.8 | 68 | 6 |

**Table D-9. Volatile Organic Compounds Analysis Blank Summary: Water**
**Wallops Flight Facility, Wallops Island, Virginia**

| Lot | Blank ID | Contaminant | Concentration | Action Level | Number of Samples Qualified |
|---|---|---|---|---|---|
| 208040 | BLK56346 | Methylene Chloride | 0.91 | 9.1 | 7 |
| 208040 | BLK56405 | Methylene Chloride | 1.2 | 12 | 7 |
| 208057 | BLK56349 | Methylene Chloride | 1 | 10 | 4 |
| 208057 | BLK56537 | Methylene Chloride | 2.1 | 21 | 4 |
| 208057 | BLK56346 | Methylene Chloride | 0.91 | 9.1 | 0 |
| 208082 | BLK56563 | Methylene Chloride | 1.7 | 17 | 7 |
| 208082 | BLK56349 | Methylene Chloride | 1 | 10 | 7 |
| 208126 | BLK56537 | Methylene Chloride | 2.1 | 21 | 1 |

## Table D-10. Metals Analysis Blank Summary: Soil Wallops Flight Facility, Wallops Island, Virginia

| Lot | Blank ID | Contaminant | Concentration | Action Level | Number of Samples Qualified |
|---|---|---|---|---|---|
| 208040 | BLK56111 | Sodium | 67.7 | 338.5 | 6 |
| 208082 | BLK56213 | Sodium | 77.1 | 385.5 | 6 |
| 208057 | BLK56213 | Copper | 0.27 | 1.35 | 2 |
| 208057 | BLK56213 | Zinc | 77.1 | 385.5 | 9 |

**Table D-11. Metals Analysis Blank Summary: Water**
**Wallops Flight Facility, Wallops Island, Virginia**

| Lot | Blank ID | Contaminant | Concentration | Action Level | Number of Samples Qualified |
|---|---|---|---|---|---|
| 208040 | BLK56389 | Copper | 1.3 | 6.5 | 2 |
| 208040 | BLK56389 | Iron | 28 | 140 | 1 |
| 208040 | BLK56389 | Manganese | 0.87 | 4.35 | 1 |
| 208040 | BLK56389 | Zinc | 7.4 | 37 | 4 |
| 208040 | CCB4 | Magnesium | 59.1 | 295.5 | 1 |
| 208082 | BLK56248 | Calcium | 298 | 1490 | 2 |
| 208082 | BLK56248 | Magnesium | 13.6 | 68 | 2 |
| 208082 | BLK56248 | Sodium | 701 | 3505 | 2 |
| 208082 | BLK56248 | Zinc | 6.5 | 32.5 | 4 |
| 208082 | CCB5 | Arsenic | 3.5 | 17.5 | 3 |
| 208082 | CCB3 | Thallium | 6 | 30 | 3 |
| 208082 | CCB3 | Vanadium | 0.8 | 4 | 1 |
| 208057 | BLK56248 | Zinc | 6.5 | 32.5 | 3 |
| 208057 | CCB5 | Arsenic | 3.5 | 17.5 | 1 |

Table D-12. Volatile Organic Compound Analysis Surrogate Recovery QC Summary: Soil
Wallops Flight Facility, Wallops Island, Virginia

| Surrogates | Total Number Analyses* | Percent Recovery Range | Control Limits | Number Within Control Limits | Number Outside Control Limits |
|---|---|---|---|---|---|
| Toluene-d8 | 34 | 85-105 | 84-138 | 33 | 1 |
| Bromofluorobenzene | 34 | 86-118 | 59-113 | 34 | 0 |
| 1,2-Dichloroethane-d4 | 34 | 84-127 | 70-121 | 33 | 1 |
| 1,2-Dichlorobenzene-d4 | 34 | 82-106 | 68-138 | 34 | 0 |

* Soil/Sediment Environmental Samples, MS/MSD Samples, and Method Blanks

Table D-13. Volatile Organic Compound Analysis Surrogate Recovery QC Summary: Water
Wallops Flight Facility, Wallops Island, Virginia

| Surrogate | Total Number Analyses* | Percent Recovery Range | Control Limits | Number Within Control Limits | Number Outside Control Limits |
|---|---|---|---|---|---|
| Toluene-d8 | 50 | 68-115 | 88-110 | 34 | 27 |
| Bromofluorobenzene | 50 | 81-109 | 86-115 | 45 | 5 |
| 1,2-Dichloroethane-d4 | 50 | 81-118 | 76-114 | 48 | 2 |
| 1,2-Dichlorobenzene-d4 | 50 | 76-103 | 76-134 | 50 | 0 |

* Water Environmental Samples, LCSs, Method Blanks, Field Blanks, Equipment Rinsate Blanks, and Trip Blanks

**Table D-14. Semivolatile Organic Compound Analysis Surrogate Recovery QC Summary: Soil
Wallops Flight Facility, Wallops Island, Virginia**

| Surrogates | Total Number Analyses* | Percent Recovery Range | Control Limits | Number Within Control Limits | Number Outside Control Limits |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | 30 | 58-100 | 23-120 | 30 | 0 |
| 2-Fluorobiphenyl | 30 | 54-103 | 30-115 | 30 | 0 |
| Terphenyl-d14 | 30 | 56-122 | 18-137 | 30 | 0 |
| Phenol-d5 | 30 | 54-89 | 24-113 | 30 | 0 |
| 2-Fluorophenol | 30 | 46-76 | 25-121 | 30 | 0 |
| 2,4,6-Tribromophenol | 30 | 55-115 | 19-122 | 30 | 0 |

* Soil/Sediment Environmental Samples, Method Blanks, and MS/MSD Samples

**Table D-15. Semivolatile Organic Compound Analysis Surrogate Recovery QC Summary: Water**
**Wallops Flight Facility, Wallops Island, Virginia**

| Surrogates | Total Number Analyses* | Percent Recovery Range | Control Limits | Number Within Control Limits | Number Outside Control Limits |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | 22 | 87-168 | 34-114 | 20 | 2 |
| 2-Fluorobiphenyl | 22 | 77-132 | 43-116 | 20 | 2 |
| Terphenyl-d14 | 22 | 82-165 | 33-141 | 21 | 1 |
| Phenol-d5 | 22 | 51-98 | 10-110 | 22 | 0 |
| 2-Fluorophenol | 22 | 19-85 | 21-110 | 21 | 1 |
| 2,4,6-Tribromophenol | 22 | 81-141 | 10-123 | 21 | 1 |

*Water Environmental Samples (including dilution), LCSs, Method Blanks, Field Blanks, and Equipment Rinsate Blanks

**Table D-16. Volatile Organic Compound LCS/LCSD QC Summary: Soil**
**Wallops Flight Facility, Wallops Island, Virginia**

| ACCURACY | | | | | | PRECISION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| MS/MSD Compounds | MS/MSD Calculated Recoveries | Percent Recovery Range | Percent Recovery Control Limits | Number Within Control Limits | Number Outside Control Limits | MS/MSD Calculated RPD | MAX RPD | RPD Limit | Number Within Control Limits | Number Outside Control Limits |
| 1,1-Dichloroethene | 6 | 72-107 | 59-172 | 6 | 0 | 3 | 12 | 22 | 3 | 0 |
| Trichloroethene | 6 | 85-107 | 62-137 | 6 | 0 | 3 | 14 | 24 | 3 | 0 |
| Benzene | 6 | 88-108 | 66-142 | 6 | 0 | 3 | 14 | 21 | 3 | 0 |
| Toluene | 6 | 94-102 | 59-139 | 6 | 0 | 3 | 15 | 21 | 3 | 0 |
| Chlorobenzene | 6 | 82-113 | 60-133 | 6 | 0 | 3 | 10 | 21 | 3 | 0 |

**Table D-17. Volatile Organic Compound MS/MSD QC Summary: Water**
**Wallops Flight Facility, Wallops Island, Virginia**

| | ACCURACY | | | | | PRECISION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| MS/MSD Compounds | MS/MSD Calculated Recoveries | Percent Recovery Range | Percent Recovery Control Limits | Number Within Control Limits | Number Outside Control Limits | MS/MSD Calculated RPD | MAX RPD | RPD Limit | Number Within Control Limits | Number Outside Control Limits |
| 1,1-Dichloroethene | 2 | 85-88 | 61-145 | 2 | 0 | 1 | 3 | 14 | 1 | 0 |
| Trichloroethene | 2 | 85-87 | 71-120 | 2 | 0 | 1 | 2 | 14 | 1 | 0 |
| Benzene | 2 | 85-86 | 76-127 | 2 | 0 | 1 | 1 | 11 | 1 | 0 |
| Toluene | 2 | 81-82 | 76-125 | 2 | 0 | 1 | 1 | 13 | 1 | 0 |
| Chlorobenzene | 2 | 100 | 75-130 | 2 | 0 | 1 | 0 | 13 | 1 | 0 |

**Table D-18. Semivolatile Organic Compound MS/MSD QC Summary: Soil**
**Wallops Flight Facility, Wallops Island, Virginia**

| | ACCURACY | | | | | PRECISION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| MS/MSD Compounds | MS/MSD Calculated Recoveries | Percent Recovery Range | Percent Recovery Control Limits | Number Within Control Limits | Number Outside Control Limits | MS/MSD Calculated RPD | Max RPD | RPD Limit | Number Within Control Limits | Number Outside Control Limits |
| Phenol | 4 | 57-94 | 26-90 | 2 | 2 | 2 | 10 | 35 | 2 | 0 |
| 2-Chlorophenol | 4 | 30-94 | 25-102 | 4 | 0 | 2 | 15 | 50 | 2 | 0 |
| n-Nitroso-di-n-propylamine | 4 | 69-89 | 41-126 | 4 | 0 | 2 | 3 | 38 | 2 | 0 |
| 4-Chloro-3-methylphenol | 4 | 80-91 | 26-103 | 4 | 0 | 2 | 5 | 33 | 2 | 0 |
| Acenaphthene | 4 | 69-109 | 31-137 | 4 | 0 | 2 | 0 | 19 | 2 | 0 |
| 4-Nitrophenol | 4 | 74-89 | 11-114 | 4 | 0 | 2 | 4 | 50 | 2 | 0 |
| 2,4-Dinitrotoluene | 4 | 77-129 | 28-89 | 2 | 2 | 2 | 2 | 47 | 2 | 0 |
| Pentachlorophenol | 4 | 66-114 | 17-109 | 2 | 2 | 2 | 3 | 47 | 2 | 0 |
| Pyrene | 4 | 89-109 | 35-142 | 4 | 0 | 2 | 3 | 36 | 2 | 0 |

| | ACCURACY | | | | | PRECISION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| MS Compounds | MS[a] Calculated Recoveries | Percent Recovery Range | Percent Recovery Control Limits | Number Within Control Limits | Number Outside Control Limits | RPD | Max RPD[b] | RPD Limit[c] | Number Within Control Limits | Number Outside Control Limits |
| ***ICP Metals*** | | | | | | | | | | |
| Aluminum | 2 | NC | 75-125 | 2 | 0 | 2 | 1.5 | 20 | 2 | 0 |
| Antimony | 2 | 45.7-72.4 | 75-125 | 0 | 2 | 2 | 200 | 20 | 2 | 0 |
| Arsenic | 2 | 96.4-99.1 | 75-125 | 2 | 0 | 2 | 8 | 20 | 2 | 0 |
| Barium | 2 | 103.7-111.6 | 75-125 | 2 | 0 | 2 | 4.9 | 20 | 2 | 0 |
| Beryllium | 2 | 97.9-99.4 | 75-125 | 2 | 0 | 2 | 3 | 20 | 2 | 0 |
| Cadmium | 2 | 97.2-97.9 | 75-125 | 2 | 0 | 2 | 13.2 | 20 | 2 | 0 |
| Calcium | 2 | 104.3 | 75-125 | 2 | 0 | 2 | 7.8 | 20 | 2 | 0 |
| Chromium | 2 | 103.3-104.9 | 75-125 | 2 | 0 | 2 | 1 | 20 | 2 | 0 |
| Cobalt | 2 | 96.7-97.7 | 75-125 | 2 | 0 | 2 | 6.3 | 20 | 2 | 0 |
| Copper | 2 | 100-102.1 | 75-125 | 2 | 0 | 2 | 0.7 | 20 | 2 | 0 |
| Iron | 2 | NC | 75-125 | 2 | 0 | 2 | 1.4 | 20 | 2 | 0 |
| Lead | 2 | 95.6-96 | 75-125 | 2 | 0 | 2 | 9 | 20 | 2 | 0 |
| Magnesium | 2 | 112.5 | 75-125 | 2 | 0 | 2 | 3.9 | 20 | 2 | 0 |
| Manganese | 2 | 97.5 | 75-125 | 2 | 0 | 2 | 3.6 | 20 | 2 | 0 |
| Nickel | 2 | 97.2-98.1 | 75-125 | 2 | 0 | 2 | 0.8 | 20 | 2 | 0 |
| Potassium | 2 | 122.4-124.3 | 75-125 | 2 | 0 | 2 | 2.1 | 20 | 2 | 0 |
| Selenium | 2 | 88.7-89.5 | 75-125 | 2 | 0 | 2 | | 20 | 2 | 0 |
| Silver | 2 | 97.3-99.4 | 75-125 | 2 | 0 | 2 | | 20 | 2 | 0 |
| Sodium | 2 | 97.4-103.6 | 75-125 | 2 | 0 | 2 | 15.2 | 20 | 2 | 0 |
| Thallium | 2 | 91.8-92.2 | 75-125 | 2 | 0 | 2 | | 20 | 2 | 0 |
| Vanadium | 2 | 108.9-112.6 | 75-125 | 2 | 0 | 2 | 1.8 | 20 | 2 | 0 |
| Zinc | 2 | 94.4-97.4 | 75-125 | 2 | 0 | 2 | 2.3 | 20 | 2 | 0 |
| ***AA Metals*** | | | | | | | | | | |
| Mercury | 2 | 96.3 | 75-125 | 2 | 0 | 2 | 4 | 20 | 2 | 0 |

**NC=Not Calculated**

[a] If the sample concentration exceeded the spike concentration by a factor of 4 or more, and the recovery was outside the limits, the results were not included in this summary.

[b] If the sample concentration is greater than 5X the CRDL, the control limit is 35 percent. However, if the sample concentration is less than 5X the CRDL, the control limit is 2X the CRDL.

[c] If either the sample or duplicate is a nondetect and the other is detected, the RPD is always calculated as 200. The data are only considered outside the limits if the difference between the nondetected result and the detected result is greater than 2X the CRDL.

**Table D-20. Metals MS/Duplicate QC Summary: Water**
**Wallops Flight Facility, Wallops Island, Virginia**

| | ACCURACY | | | | | PRECISION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| MS Compounds | MS[a] Calculated Recoveries | Percent Recovery Range | Percent Recovery Control Limits | Number Within Control Limits | Number Outside Control Limits | Calculated RPD | Max RPD[b] | RPD Limit[c] | Number Within Control Limits | Number Outside Control Limits |
| ***ICP Metals*** | | | | | | | | | | |
| Aluminum | 2 | 98.4-234.3[a] | 75-125 | 1 | 1 | 2 | 4.5 | 20 | 2 | 0 |
| Antimony | 2 | 93.2-94.5 | 75-125 | 2 | 0 | 2 | NC | 20 | 2 | 0 |
| Arsenic | 2 | 92.2-109.2 | 75-125 | 2 | 0 | 2 | NC | 20 | 2 | 0 |
| Barium | 2 | 91.6-99.4 | 75-125 | 2 | 0 | 2 | 7.2 | 20 | 2 | 0 |
| Beryllium | 2 | 91.3-101.7 | 75-125 | 2 | 0 | 2 | 9.1 | 20 | 2 | 0 |
| Cadmium | 2 | 93.6-101.3 | 75-125 | 2 | 0 | 2 | NC | 20 | 2 | 0 |
| Calcium | 2 | 140.9[a] | 75-125 | 1 | 1 | 2 | 7.2 | 20 | 2 | 0 |
| Chromium | 2 | 90.9-99.7 | 75-125 | 2 | 0 | 2 | 4 | 20 | 2 | 0 |
| Cobalt | 2 | 91.1-99.1 | 75-125 | 2 | 0 | 2 | 34 | 20 | 2 | 0 |
| Copper | 2 | 92.4-102.9 | 75-125 | 2 | 0 | 2 | 25.2 | 20 | 2 | 0 |
| Iron | 2 | 98-119.5 | 75-125 | 2 | 0 | 2 | 4.4 | 20 | 2 | 0 |
| Lead | 2 | 91.1-98.8 | 75-125 | 2 | 0 | 2 | 11.8 | 20 | 2 | 0 |
| Magnesium | 2 | 106.2 | 75-125 | 2 | 0 | 2 | 7.6 | 20 | 2 | 0 |
| Manganese | 2 | 95-103.6 | 75-125 | 2 | 0 | 2 | 7.6 | 20 | 2 | 0 |
| Nickel | 2 | 89.9-97.8 | 75-125 | 2 | 0 | 2 | 4.8 | 20 | 2 | 0 |
| Potassium | 2 | 102.2-103.8 | 75-125 | 2 | 0 | 2 | 4.5 | 20 | 2 | 0 |
| Selenium | 2 | 87.1-92.8 | 75-125 | 2 | 0 | 2 | NC | 20 | 2 | 0 |
| Silver | 2 | 98.7-102.9 | 75-125 | 2 | 0 | 2 | NC | 20 | 2 | 0 |
| Sodium | 2 | 104.3-112.5 | 75-125 | 2 | 0 | 2 | 10 | 20 | 2 | 0 |
| Thallium | 2 | 85.4-90.7 | 75-125 | 2 | 0 | 2 | 200 | 20 | 2 | 0 |
| Vanadium | 2 | 94.8-105 | 75-125 | 2 | 0 | 2 | 3.2 | 20 | 2 | 0 |
| Zinc | 2 | 90.7-97.5 | 75-125 | 2 | 0 | 2 | 0.9 | 20 | 2 | 0 |
| ***AA Metals*** | | | | | | | | | | |
| Mercury | 2 | 99.6-112 | 75-125 | 2 | 0 | 2 | NC | 20 | 2 | 0 |

**NC=Not Calculated**

[a] If the sample concentration exceeded the spike concentration by a factor of 4 or more, and the recovery was outside the limits, the results were not included in this summary.

[b] If the sample concentration is greater than 5X the CRDL, the control limit is 35 percent. However, if the sample concentration is less than 5X the CRDL, the control limit is 2X the CRDL.

[c] If either the sample or duplicate is a nondetect and the other is detected, the RPD is always calculated as 200. The data are only considered outside the limits if the difference between the nondetected result and the detected result is greater than 2X the CRDL.

**Table D-21. Volatile Organic Compound Analysis LCS QC Summary: Soil**
**Wallops Flight Facility, Wallops Island, Virginia**

| LCS Compounds | Total Number Analyses | Percent Recovery Range | Control Limits | Number Within Control Limits | Number Outside Control Limits |
|---|---|---|---|---|---|
| 1,1-Dichloroethene | 1 | 96 | 59-172 | 1 | 0 |
| Trichloroethene | 1 | 84 | 62-137 | 1 | 0 |
| Benzene | 1 | 94 | 66-142 | 1 | 0 |
| Toluene | 1 | 88 | 59-139 | 1 | 0 |
| Chlorobenzene | 1 | 96 | 60-133 | 1 | 0 |

## Table D-22. Volatile Organic Compound Analysis LCS QC Summary: Water
## Wallops Flight Facility, Wallops Island, Virginia

| LCS Compounds | Total Number Analyses | Percent Recovery Range | Control Limits | Number Within Control Limits | Number Outside Control Limits |
|---|---|---|---|---|---|
| 1,1-Dichloroethene | 5 | 93-100 | 61-145 | 5 | 0 |
| Trichloroethene | 5 | 88-110 | 71-120 | 5 | 0 |
| Benzene | 5 | 82-110 | 76-127 | 5 | 0 |
| Toluene | 5 | 85-110 | 76-125 | 5 | 0 |
| Chlorobenzene | 5 | 96-100 | 75-130 | 5 | 0 |

**Table D-23. Semivolatile Organic Compound Analysis LCS QC Summary: Soil**
**Wallops Flight Facility, Wallops Island, Virginia**

| LCS Compounds | Total Number Analyses | Percent Recovery Range | Control Limits | Number Within Control Limits | Number Outside Control Limits |
|---|---|---|---|---|---|
| Phenol | 2 | 88-100 | 26-90 | 1 | 1 |
| 2-Chlorophenol | 2 | 94-97 | 25-102 | 2 | 0 |
| n-Nitroso-di-n-propylamine | 2 | 91-106 | 41-126 | 2 | 0 |
| 4-Chloro-3-methylphenol | 2 | 88-103 | 26-103 | 2 | 0 |
| Acenaphthene | 2 | 91-106 | 31-137 | 2 | 0 |
| 4-Nitrophenol | 2 | 88-97 | 11-114 | 2 | 0 |
| 2,4-Dinitrotoluene | 2 | 97-124 | 28-89 | 0 | 2 |
| Pentachlorophenol | 2 | 94-103 | 17-115 | 2 | 0 |
| Pyrene | 2 | 97-118 | 35-142 | 2 | 0 |

**Table D-24. Semivolatile Organic Compound Analysis LCS QC Summary: Water Wallops Flight Facility, Wallops Island, Virginia**

| LCS Compounds | Total Number Analyses | Percent Recovery Range | Control Limits | Number Within Control Limits | Number Outside Control Limits |
|---|---|---|---|---|---|
| Phenol | 2 | 88-95 | 12-110 | 2 | 0 |
| 2-Chlorophenol | 2 | 81-100 | 27-133 | 2 | 0 |
| n-Nitroso-di-n-propylamine | 2 | 73-77 | 41-116 | 2 | 0 |
| 4-Chloro-3-methylphenol | 2 | 74-110 | 23-97 | 1 | 1 |
| Acenaphthene | 2 | 90-94 | 46-118 | 2 | 0 |
| 4-Nitrophenol | 2 | 72-96 | (10-80) | 1 | 1 |
| 2,4-Dinitrotoluene | 2 | 97-100 | 24-96 | 2 | 0 |
| Pentachlorophenol | 2 | 91-110 | 9-103 | 1 | 1 |
| Pyrene | 2 | 91-110 | 26-127 | 2 | 0 |

## Table D-25. Metals Analysis LCS QC Summary: Soil
## Wallops Flight Facility, Wallops Island, Virginia

| LCS Compounds | Total Number Analyses | Percent Recovery Range | Control Limits | Number Within Control Limits | Number Outside Control Limits |
|---|---|---|---|---|---|
| ***ICP Metals*** | | | | | |
| Aluminum | 2 | 94-100.2 | 80-120 | 2 | 0 |
| Antimony | 2 | 95.6-97.3 | 80-120 | 2 | 0 |
| Arsenic | 2 | 94.9-95.5 | 80-120 | 2 | 0 |
| Barium | 2 | 95-99 | 80-120 | 2 | 0 |
| Beryllium | 2 | 96.5-99.5 | 80-120 | 2 | 0 |
| Cadmium | 2 | 97.3-99.6 | 80-120 | 2 | 0 |
| Calcium | 2 | 98.6-102.3 | 80-120 | 2 | 0 |
| Chromium | 2 | 97.5-99.1 | 80-120 | 2 | 0 |
| Cobalt | 2 | 96.3-98.2 | 80-120 | 2 | 0 |
| Copper | 2 | 96-102.3 | 80-120 | 2 | 0 |
| Iron | 2 | 97.1-99.2 | 80-120 | 2 | 0 |
| Lead | 2 | 95.8-97.7 | 80-120 | 2 | 0 |
| Magnesium | 2 | 93.6-94 | 80-120 | 2 | 0 |
| Manganese | 2 | 97.8-100.9 | 80-120 | 2 | 0 |
| Nickel | 2 | 96.8-96.8 | 80-120 | 2 | 0 |
| Potassium | 2 | 93.3-93.9 | 80-120 | 2 | 0 |
| Selenium | 2 | 90-91.5 | 80-120 | 2 | 0 |
| Silver | 2 | 95.8-101.5 | 80-120 | 2 | 0 |
| Sodium | 2 | 101.6-104 | 80-120 | 2 | 0 |
| Thallium | 2 | 89.2-93.3 | 80-120 | 2 | 0 |
| Vanadium | 2 | 97.5103.1 | 80-120 | 2 | 0 |
| Zinc | 2 | 97.2-98.2 | 80-120 | 2 | 0 |
| ***AA Metals*** | | | | | |
| Mercury | 2 | 98.3 | 80-120 | 2 | 0 |

## Table D-26. Metals Analysis LCS QC Summary: Water
## Wallops Flight Facility, Wallops Island, Virginia

| LCS Compounds | Total Number Analyses | Percent Recovery Range | Control Limits | Number Within Control Limits | Number Outside Control Limits |
|---|---|---|---|---|---|
| ***ICP Metals*** | | | | | |
| Aluminum | 2 | 95.4-102.6 | 80-120 | 2 | 0 |
| Antimony | 2 | 82.8-92.2 | 80-120 | 2 | 0 |
| Arsenic | 2 | 95.5-99.3 | 80-120 | 2 | 0 |
| Barium | 2 | 88.9-96.3 | 80-120 | 2 | 0 |
| Beryllium | 2 | 88.8-99.1 | 80-120 | 2 | 0 |
| Cadmium | 2 | 91.9-101.4 | 80-120 | 2 | 0 |
| Calcium | 2 | 100.2-109.9 | 80-120 | 2 | 0 |
| Chromium | 2 | 89.1-98.5 | 80-120 | 2 | 0 |
| Cobalt | 2 | 89.2-98.1 | 80-120 | 2 | 0 |
| Copper | 2 | 90.9-101.8 | 80-120 | 2 | 0 |
| Iron | 2 | 92.6-100.5 | 80-120 | 2 | 0 |
| Lead | 2 | 89.9-98.7 | 80-120 | 2 | 0 |
| Magnesium | 2 | 89.3-99.2 | 80-120 | 2 | 0 |
| Manganese | 2 | 90.6-99.7 | 80-120 | 2 | 0 |
| Nickel | 2 | 88.3-95.3 | 80-120 | 2 | 0 |
| Potassium | 2 | 101.5-103.7 | 80-120 | 2 | 0 |
| Selenium | 2 | 88.5-92.1 | 80-120 | 2 | 0 |
| Silver | 2 | 94.1-101.5 | 80-120 | 2 | 0 |
| Sodium | 2 | 98.7-115.7 | 80-120 | 2 | 0 |
| Thallium | 2 | 87.7-107.3 | 80-120 | 2 | 0 |
| Vanadium | 2 | 92.3-102.6 | 80-120 | 2 | 0 |
| Zinc | 2 | 89.6-98.2 | 80-120 | 2 | 0 |
| ***AA Metals*** | | | | | |
| Mercury | 2 | 97.3-104 | 80-120 | 2 | 0 |

**Table D-27. Trip Blank Results – Data Summary Tables**
**Wallops Flight Facility, Wallops Island, Virginia**

| Site ID | | | SB-IWL-01 | | SB-IWL-04 | | SB-WWP-01 | | SB-WWP-01 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAICTB01 | | SAICTB02 | | SAICTB03 | | SAICTB04 | |
| Site Type | | | TRIP | | TRIP | | TRIP | | TRIP | |
| Collection Date | | | 08/06/02 | | 08/08/02 | | 08/08/02 | | 08/16/02 | |
| Depth (ft) | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | |
| Acetone | ug/L | 5 | 3.9 | J | 5 | UJ | 13 | J | 8.7 | J |
| Carbon Disulfide | ug/L | 1 | 0.8 | J | 4.7 | J | 0.74 | J | 1 | U |
| Methylene Chloride | ug/L | 1 | 1.4 | UJ | 5 | UJ | 5.3 | UJ | 2.9 | U |

# Table D-28. Equipment Rinsate Blank Results - Data Summary Tables
## Wallops Flight Facility, Wallops Island, Virginia

| Site ID | | | SB-CDL-03 | | SB-WWP-03 | |
|---|---|---|---|---|---|---|
| Field Sample Number | | | SAICRB02 | | SAICRB01 | |
| Site Type | | | RNSW | | RNSW | |
| Collection Date | | | 08/08/02 | | 08/08/02 | |
| Depth (ft) | | | 0.00 | | 0.00 | |
| ***METALS(6010)*** | | | | | | |
| Parameter | Units | RL | | | | |
| Antimony | ug/L | 6 | 2.5 | UJ | 6 | J |
| Arsenic | ug/L | 10 | 3.4 | U | 4.6 | U |
| Calcium | ug/L | 1000 | 280 | U | 272 | U |
| Chromium | ug/L | 10 | 1.3 | U | 2.1 | B |
| Cobalt | ug/L | 50 | 0.6 | U | 0.93 | J |
| Copper | ug/L | 10 | 2.7 | B | 2.5 | U |
| Magnesium | ug/L | 1000 | 57.3 | U | 43.1 | U |
| Manganese | ug/L | 15 | 0.7 | U | 0.88 | B |
| Potassium | ug/L | 1000 | 25.7 | B | 99.3 | B |
| Silver | ug/L | 10 | 0.6 | U | 2.5 | B |
| Sodium | ug/L | 1000 | 857 | U | 1350 | U |
| Vanadium | ug/L | 50 | 0.7 | U | 2.4 | U |
| Zinc | ug/L | 20 | 4 | U | 7.6 | U |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | |
| Parameter | Units | RL | | | | |
| Di-n-Butyl Phthalate | ug/L | 10 | 12 | UJ | 2 | J |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | |
| Parameter | Units | RL | | | | |
| Acetone | ug/L | 5 | 5 | U | 3.3 | J |
| Carbon Disulfide | ug/L | 1 | 1.3 | | 1.2 | J |
| Methylene Chloride | ug/L | 1 | 7.1 | UJ | 6 | UJ |
| Toluene | ug/L | 1 | 1 | U | 0.52 | J |

## Table D-29. Field Blank Results - Data Summary Tables
## Wallops Flight Facility, Wallops Island, Virginia

| Site ID | | | DIWATER | | GEOWATER | |
|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01 | |
| Site Type | | | FBLK | | FBLK | |
| Collection Date | | | 08/06/02 | | 08/06/02 | |
| Depth (ft) | | | 0.00 | | 0.00 | |
| ***METALS(6010)*** | | | | | | |
| Parameter | Units | RL | | | | |
| Barium | ug/L | 200 | 0.5 | U | 24.2 | |
| Calcium | ug/L | 1000 | 164 | U | 27500 | J |
| Copper | ug/L | 10 | 1.4 | U | 39.3 | |
| Magnesium | ug/L | 1000 | 17.1 | U | 9400 | |
| Manganese | ug/L | 15 | 0.7 | U | 1.5 | U |
| Potassium | ug/L | 1000 | 34.3 | B | 1950 | |
| Sodium | ug/L | 1000 | 514 | J | 16400 | J |
| Zinc | ug/L | 20 | 7.6 | U | 170 | |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | |
| Parameter | Units | RL | | | | |
| Bromodichloromethane | ug/L | 1 | 1 | UJ | 2 | J |
| Chloroform | ug/L | 1 | 1 | UJ | 5.2 | J |
| Dibromochloromethane | ug/L | 1 | 1 | UJ | 0.6 | J |
| Methylene Chloride | ug/L | 1 | 1 | UJ | 1 | UJ |

# Field QC Blank Results Footnotes
# Wallops Flight Facility, Wallops Island, Virginia

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit, but greater than or equal to the instrument detection limit.
B – Organics: Analyte was found in the associated method blank. Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore, this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25 percent difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. For SW846 methods, the samples are reported down to the method detection limit (MDL). For metals, the samples are reported down to the instrument detection limit (IDL).
MDL – Method Detection Limit.

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# APPENDIX E

# SOURCE WATER LABORATORY RESULTS

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# Table E-1. Field Blank Results - Data Presentation Tables
# Wallops Flight Facility, Wallops Island, Virginia

| Site ID | | | DIWATER | | GEOWATER | |
|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01 | |
| Site Type | | | FBLK | | FBLK | |
| Collection Date | | | 08/06/02 | | 08/06/02 | |
| Depth (ft) | | | 0.00 | | 0.00 | |

***METALS(6010)***

| Parameter | Units | RL | | | | |
|---|---|---|---|---|---|---|
| Aluminum | ug/L | 200 | 30.9 | U | 30.9 | U |
| Antimony | ug/L | 6 | 2.5 | U | 2.5 | U |
| Arsenic | ug/L | 10 | 3.4 | U | 3.4 | U |
| Barium | ug/L | 200 | 0.5 | U | **24.2** | |
| Beryllium | ug/L | 5 | 0.1 | U | 0.1 | U |
| Cadmium | ug/L | 5 | 0.3 | U | 0.3 | U |
| Calcium | ug/L | 1000 | 164 | U | **27500** | J |
| Chromium | ug/L | 10 | 1.3 | U | 1.3 | U |
| Cobalt | ug/L | 50 | 0.6 | U | 0.6 | U |
| Copper | ug/L | 10 | 1.4 | U | **39.3** | |
| Iron | ug/L | 100 | 24.3 | U | 24.3 | U |
| Lead | ug/L | 3 | 1.6 | U | 1.6 | U |
| Magnesium | ug/L | 1000 | 17.1 | U | **9400** | |
| Manganese | ug/L | 15 | 0.7 | U | 1.5 | U |
| Nickel | ug/L | 10 | 1.1 | U | 1.1 | U |
| Potassium | ug/L | 1000 | **34.3** | B | **1950** | |
| Selenium | ug/L | 5 | 3.5 | U | 3.5 | U |
| Silver | ug/L | 10 | 0.6 | U | 0.6 | U |
| Sodium | ug/L | 1000 | **514** | J | **16400** | J |
| Thallium | ug/L | 10 | 2.7 | U | 2.7 | U |
| Vanadium | ug/L | 50 | 0.7 | UJ | 0.7 | UJ |
| Zinc | ug/L | 20 | 7.6 | U | **170** | |

***METALS(7470)***

| Parameter | Units | RL | | | | |
|---|---|---|---|---|---|---|
| Mercury | ug/L | 0.2 | 0.1 | U | 0.1 | U |

***VOLATILE ORGANIC COMPOUNDS(8260)***

| Parameter | Units | RL | | | | |
|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | ug/L | 1 | 1 | UJ | 1 | UJ |
| 1,1,2,2-Tetrachloroethane | ug/L | 1 | 1 | UJ | 1 | UJ |
| 1,1,2-Trichloroethane | ug/L | 1 | 1 | UJ | 1 | UJ |
| 1,1-Dichloroethane | ug/L | 1 | 1 | UJ | 1 | UJ |
| 1,1-Dichloroethene | ug/L | 1 | 1 | UJ | 1 | UJ |
| 1,2-Dichloroethane | ug/L | 1 | 1 | UJ | 1 | UJ |
| 1,2-Dichloropropane | ug/L | 1 | 1 | UJ | 1 | UJ |
| 2-Hexanone | ug/L | 5 | 5 | UJ | 5 | UJ |
| Acetone | ug/L | 5 | 5 | UJ | 5 | UJ |
| Benzene | ug/L | 1 | 1 | UJ | 1 | UJ |
| Bromodichloromethane | ug/L | 1 | 1 | UJ | **2** | J |
| Bromoform | ug/L | 1 | 1 | UJ | 1 | UJ |
| Bromomethane | ug/L | 1 | 1 | UJ | 1 | UJ |
| Carbon disulfide | ug/L | 1 | 1 | UJ | 1 | UJ |
| Carbon Tetrachloride | ug/L | 1 | 1 | UJ | 1 | UJ |
| Chlorobenzene | ug/L | 1 | 1 | UJ | 1 | UJ |
| Chloroethane | ug/L | 1 | 1 | UJ | 1 | UJ |
| Chloroform | ug/L | 1 | 1 | UJ | **5.2** | J |
| Chloromethane | ug/L | 1 | 1 | UJ | 1 | UJ |
| cis-1,2-Dichloroethene | ug/L | 1 | 1 | UJ | 1 | UJ |
| cis-1,3-Dichloropropene | ug/L | 1 | 1 | UJ | 1 | UJ |
| Dibromochloromethane | ug/L | 1 | 1 | UJ | **0.6** | J |
| Ethylbenzene | ug/L | 1 | 1 | UJ | 1 | UJ |
| *m-and/or p-Xylene* | ug/L | 1 | 1 | UJ | 1 | UJ |
| Methyl ethyl ketone | ug/L | 5 | 5 | UJ | 5 | UJ |
| Methyl isobutyl ketone | ug/L | 5 | 5 | UJ | 5 | UJ |
| Methylene Chloride | ug/L | 1 | 1 | UJ | 1 | UJ |
| o-xylene | ug/L | 1 | 1 | UJ | 1 | UJ |
| Styrene | ug/L | 1 | 1 | UJ | 1 | UJ |
| Tetrachloroethene | ug/L | 1 | 1 | UJ | 1 | UJ |
| Toluene | ug/L | 1 | 1 | UJ | 1 | UJ |
| trans-1,2-Dichloroethene | ug/L | 1 | 1 | UJ | 1 | UJ |
| trans-1,3-Dichloropropene | ug/L | 1 | 1 | UJ | 1 | UJ |
| Trichloroethene | ug/L | 1 | 1 | UJ | 1 | UJ |
| Vinyl Chloride | ug/L | 1 | 1 | UJ | 1 | UJ |

## Table E-1. Field Blank Results - Data Presentation Tables Wallops Flight Facility, Wallops Island, Virginia (Continued)

| Site ID | | | DIWATER | | GEOWATER | |
|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01 | |
| Site Type | | | FBLK | | FBLK | |
| Collection Date | | | 08/06/02 | | 08/06/02 | |
| Depth (ft) | | | 0.00 | | 0.00 | |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | |
| Parameter | Units | RL | | | | |
| 1,2,4-Trichlorobenzene | ug/L | 10 | 12 | U | 11 | U |
| 1,2-Dichlorobenzene | ug/L | 10 | 12 | U | 11 | U |
| 1,3-Dichlorobenzene | ug/L | 10 | 12 | U | 11 | U |
| 1,4-Dichlorobenzene | ug/L | 10 | 12 | U | 11 | U |
| 2,4,5-Trichlorophenol | ug/L | 20 | 12 | U | 11 | U |
| 2,4,6-Trichlorophenol | ug/L | 10 | 12 | U | 11 | U |
| 2,4-Dichlorophenol | ug/L | 10 | 12 | U | 11 | U |
| 2,4-Dimethylphenol | ug/L | 10 | 12 | U | 11 | U |
| 2,4-Dinitrophenol | ug/L | 20 | 24 | U | 22 | U |
| 2,4-Dinitrotoluene | ug/L | 10 | 12 | U | 11 | U |
| 2,6-Dinitrotoluene | ug/L | 10 | 12 | U | 11 | U |
| 2-Chloronaphthalene | ug/L | 10 | 12 | U | 11 | U |
| 2-Chlorophenol | ug/L | 10 | 12 | U | 11 | U |
| 2-Methylnaphthalene | ug/L | 10 | 12 | U | 11 | U |
| 2-Methylphenol | ug/L | 10 | 12 | U | 11 | U |
| 2-Nitroaniline | ug/L | 10 | 12 | U | 11 | U |
| 2-Nitrophenol | ug/L | 10 | 12 | U | 11 | U |
| 3,3'-Dichlorobenzidine | ug/L | 20 | 24 | U | 22 | U |
| 3-Nitroaniline | ug/L | 10 | 12 | U | 11 | U |
| 4,6-Dinitro-2-cresol | ug/L | 20 | 24 | U | 22 | U |
| 4-Bromophenyl phenyl ether | ug/L | 10 | 12 | U | 11 | U |
| 4-Chloro-3-methylphenol | ug/L | 10 | 12 | U | 11 | U |
| 4-Chloroaniline | ug/L | 10 | 12 | U | 11 | U |
| 4-Chlorophenyl phenyl ether | ug/L | 10 | 12 | U | 11 | U |
| 4-Methylphenol | ug/L | 10 | 12 | U | 11 | U |
| 4-Nitroaniline | ug/L | 10 | 12 | U | 11 | U |
| 4-Nitrophenol | ug/L | 20 | 24 | U | 22 | U |
| Acenaphthene | ug/L | 10 | 12 | U | 11 | U |
| Acenaphthylene | ug/L | 10 | 12 | U | 11 | U |
| Anthracene | ug/L | 10 | 12 | U | 11 | U |
| Benzo(a)anthracene | ug/L | 10 | 12 | U | 11 | U |
| Benzo(a)pyrene | ug/L | 10 | 12 | U | 11 | U |
| Benzo(b)fluoranthene | ug/L | 10 | 12 | U | 11 | U |
| Benzo(g,h,i)perylene | ug/L | 10 | 12 | U | 11 | U |
| Benzo(k)fluoranthene | ug/L | 10 | 12 | U | 11 | U |
| bis(2-chloroethoxy) methane | ug/L | 10 | 12 | U | 11 | U |
| bis(2-Chloroethyl) Ether | ug/L | 10 | 12 | U | 11 | U |
| bis(2-chloroisopropyl) ether | ug/L | 10 | 12 | U | 11 | U |
| bis(2-Ethylhexyl)phthalate | ug/L | 10 | 12 | U | 11 | U |
| Butylbenzyl phthalate | ug/L | 10 | 12 | U | 11 | U |
| Carbazole | ug/L | 10 | 12 | U | 11 | U |
| Chrysene | ug/L | 10 | 12 | U | 11 | U |
| Dibenzo(a,h)anthracene | ug/L | 10 | 12 | U | 11 | U |
| Dibenzofuran | ug/L | 10 | 12 | U | 11 | U |
| Diethyl phthalate | ug/L | 10 | 12 | U | 11 | U |
| Dimethyl phthalate | ug/L | 10 | 12 | U | 11 | U |
| Di-n-butyl phthalate | ug/L | 10 | 12 | U | 11 | U |
| Di-n-octyl phthalate | ug/L | 10 | 12 | U | 11 | U |
| Fluoranthene | ug/L | 10 | 12 | U | 11 | U |
| Fluorene | ug/L | 10 | 12 | U | 11 | U |
| Hexachlorobenzene | ug/L | 10 | 12 | U | 11 | U |
| Hexachlorobutadiene | ug/L | 10 | 12 | U | 11 | U |
| Hexachlorocyclopentadiene | ug/L | 10 | 12 | U | 11 | U |
| Hexachloroethane | ug/L | 10 | 12 | U | 11 | U |
| Indeno(1,2,3-cd)pyrene | ug/L | 10 | 12 | U | 11 | U |
| Isophorone | ug/L | 10 | 12 | U | 11 | U |
| Naphthalene | ug/L | 10 | 12 | U | 11 | U |
| Nitrobenzene | ug/L | 10 | 12 | U | 11 | U |
| N-Nitrosodi-n-propylamine | ug/L | 10 | 12 | U | 11 | U |
| N-Nitrosodiphenylamine | ug/L | 10 | 12 | U | 11 | U |
| Pentachlorophenol | ug/L | 20 | 24 | U | 22 | U |
| Phenanthrene | ug/L | 10 | 12 | U | 11 | U |
| Phenol | ug/L | 10 | 12 | U | 11 | U |
| Pyrene | ug/L | 10 | 12 | UJ | 11 | U |

**Table E-1. Field Blank Results - Data Presentation Tables**
**Wallops Flight Facility, Wallops Island, Virginia (Continued)**

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit but greater than or equal to the instrument detection limit.
B – Organics: Analyte was found in the associated method blank. Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25% difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. For SW846 methods, the samples are reported down to the method detection limits (MDL). For metals, the samples are reported down to the instrument detection limit (IDL).
MDL – Method Detection Limit.
SAICXXR – An SAIC field sample number followed by an "R" designates a recollected sample.

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# APPENDIX F

# SURVEY DATA

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## SURVEY DATA

| Site ID | Site | Northing | Easting |
|---|---|---|---|
| SB-WWP-002 | WWP | 4199762.648 | 4199762.648 |
| SB-WWP-001 | WWP | 4199756.826 | 4199756.826 |
| SB-IWL-004 | WIL | 4197007.559 | 4197007.559 |
| SB-IWL-003 | WIL | 4196945.469 | 4196945.469 |
| SB-IWL-002 | WIL | 4196882.308 | 4196882.308 |
| SB-IWL-001 | WIL | 4196922.988 | 4196922.988 |
| SB-CDL-003 | CDL | 4199912.031 | 4199912.031 |
| SB-CDL-002 | CDL | 4199953.418 | 4199953.418 |
| SB-CDL-001 | CDL | 4199990.101 | 4199990.101 |
| SB-WWP-003 | WWP | 4199734.084 | 4199734.084 |
| SW-UST-001 | UST | 4199918.834 | 4199918.834 |
| SW-UST-002 | UST | 4199918.834 | 4199918.834 |
| SW-UST-003 | UST | 4199921.480 | 4199921.480 |
| SW-UST-004 | UST | 4199921.216 | 4199921.216 |

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# APPENDIX G

# ANALYTICAL DATA PRESENTATION TABLES

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# Table G-1. Data Presentation: Soil Boring Results, Site 1 - Old Wastewater Treatment Plant
## Wallops Flight Facility, Accomack County, Virginia

| Site ID | | | SB-WWP-01 | SB-WWP-01 | SB-WWP-01 | SB-WWP-01 | SB-WWP-02 | SB-WWP-02 | SB-WWP-02 |
|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | SAIC01R | SAIC02 | SAIC02R | SAIC01 | SAIC01D | SAIC01DR |
| Site Type | | | BORE | BORE | BORE | BORE | BORE | BORE | BORE |
| Collection Date | | | 08/08/02 | 08/16/02 | 08/08/02 | 08/16/02 | 08/08/02 | 08/08/02 | 08/16/02 |
| Depth (ft) | | | 0.00 | 0.00 | 0.50 | 0.50 | 0.00 | 0.00 | 0.00 |
| ***METALS(6010)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Aluminum | MG/KG | 20 | 5110 | N/A | 5630 | N/A | 4770 | 4520 | N/A |
| Antimony | MG/KG | 0.6 | 0.25 UJ | N/A | 0.23 UJ | N/A | 1.2 UJ | 1.1 UJ | N/A |
| Arsenic | MG/KG | 1 | 2.2 | N/A | 2.4 | N/A | 2.3 B | 2.3 B | N/A |
| Barium | MG/KG | 20 | 24.1 | N/A | 19.1 | N/A | 37.7 | 36.8 | N/A |
| Beryllium | MG/KG | 0.5 | 0.2 | N/A | 0.18 | N/A | 0.18 B | 0.18 B | N/A |
| Cadmium | MG/KG | 0.5 | 0.09 B | N/A | 0.02 U | N/A | 4 | 4 | N/A |
| Calcium | MG/KG | 100 | 541 | N/A | 224 | N/A | 6240 | 9750 | N/A |
| Chromium | MG/KG | 1 | 5.3 | N/A | 5 | N/A | 8.1 | 7.7 | N/A |
| Cobalt | MG/KG | 5 | 1.2 | N/A | 1 | N/A | 1.4 U | 1.2 U | N/A |
| Copper | MG/KG | 1 | 2.6 | N/A | 1.7 | N/A | 14.9 | 14.5 | N/A |
| Iron | MG/KG | 10 | 3850 | N/A | 3300 | N/A | 3870 | 3750 | N/A |
| Lead | MG/KG | 0.3 | 8.2 | N/A | 2.7 | N/A | 36.2 | 35.3 | N/A |
| Magnesium | MG/KG | 100 | 450 | N/A | 300 | N/A | 564 | 558 | N/A |
| Manganese | MG/KG | 1.5 | 113 | N/A | 53.6 | N/A | 73.5 | 73.5 | N/A |
| Nickel | MG/KG | 1 | 2.7 J | N/A | 2 J | N/A | 4.6 J | 4.2 J | N/A |
| Potassium | MG/KG | 100 | 281 | N/A | 203 | N/A | 231 U | 219 U | N/A |
| Selenium | MG/KG | 0.5 | 0.25 U | N/A | 0.23 U | N/A | 1.2 U | 1.1 U | N/A |
| Silver | MG/KG | 1 | 0.06 U | N/A | 0.05 U | N/A | 2 | 2.1 | N/A |
| Sodium | MG/KG | 100 | 67.9 UJ | N/A | 64.2 UJ | N/A | 95.1 UJ | 110 UJ | N/A |
| Thallium | MG/KG | 1 | 0.55 U | N/A | 0.5 U | N/A | 2.6 U | 2.5 U | N/A |
| Vanadium | MG/KG | 5 | 10.9 | N/A | 7.2 | N/A | 8.6 | 8.2 | N/A |
| Zinc | MG/KG | 2 | 16.1 | N/A | 5.8 | N/A | 775 | 762 | N/A |
| ***METALS(7471)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Mercury | MG/KG | 0.1 | 0.2 | N/A | 0.04 | N/A | 2.3 | 2.8 | N/A |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 1,2-Dichlorobenzene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 1,3-Dichlorobenzene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 1,4-Dichlorobenzene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 32 J | N/A |
| 2,4,5-Trichlorophenol | ug/kg | 660 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 2,4,6-Trichlorophenol | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 2,4-Dichlorophenol | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 2,4-Dimethylphenol | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 2,4-Dinitrophenol | ug/kg | 660 | 690 U | N/A | 710 U | N/A | 690 U | 700 U | N/A |
| 2,4-Dinitrotoluene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 2,6-Dinitrotoluene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 2-Chloronaphthalene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 2-Chlorophenol | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 2-Methylnaphthalene | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 2-Methylphenol | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 2-Nitroaniline | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |
| 2-Nitrophenol | ug/kg | 330 | 350 U | N/A | 350 U | N/A | 350 U | 350 U | N/A |

Created on 11/7/2002

## Table G-1. Data Presentation: Soil Boring Results, Site 1 - Old Wastewater Treatment Plant
## Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | SB-WWP-01 | | SB-WWP-01 | SB-WWP-01 | | SB-WWP-01 | SB-WWP-02 | | SB-WWP-02 | | SB-WWP-02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01R | SAIC02 | | SAIC02R | SAIC01 | | SAIC01D | | SAIC01DR |
| Site Type | | | BORE | | BORE | BORE | | BORE | BORE | | BORE | | BORE |
| Collection Date | | | 08/08/02 | | 08/16/02 | 08/08/02 | | 08/16/02 | 08/08/02 | | 08/08/02 | | 08/16/02 |
| Depth (ft) | | | 0.00 | | 0.00 | 0.50 | | 0.50 | 0.00 | | 0.00 | | 0.00 |
| 3,3'-Dichlorobenzidine | ug/kg | 660 | 690 | U | N/A | 710 | U | N/A | 690 | U | 700 | U | N/A |
| 3-Nitroaniline | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| 4,6-Dinitro-2-cresol | ug/kg | 660 | 690 | U | N/A | 710 | U | N/A | 690 | U | 700 | U | N/A |
| 4-Bromophenyl phenyl ether | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| 4-Chloro-3-methylphenol | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| 4-Chloroaniline | ug/kg | 330 | 350 | UJ | N/A | 350 | UJ | N/A | 350 | UJ | 350 | UJ | N/A |
| 4-Chlorophenyl phenyl ether | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| 4-Methylphenol | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| 4-Nitroaniline | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| 4-Nitrophenol | ug/kg | 660 | 690 | U | N/A | 710 | UJ | N/A | 690 | UJ | 700 | UJ | N/A |
| Acenaphthene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Acenaphthylene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Anthracene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Benzo(a)anthracene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Benzo(a)pyrene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 34 | J | 350 | U | N/A |
| Benzo(b)fluoranthene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Benzo(g,h,i)perylene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Benzo(k)fluoranthene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| bis(2-chloroethoxy) methane | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| bis(2-Chloroethyl) Ether | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| bis(2-chloroisopropyl) ether | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| bis(2-Ethylhexyl)phthalate | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Butylbenzyl phthalate | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Carbazole | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Chrysene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 56 | J | 86 | J | N/A |
| Dibenzo(a,h)anthracene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Dibenzofuran | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Diethyl phthalate | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Dimethyl phthalate | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Di-n-butyl phthalate | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Di-n-octyl phthalate | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Fluoranthene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Fluorene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Hexachlorobenzene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Hexachlorobutadiene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Hexachlorocyclopentadiene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Hexachloroethane | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Indeno(1,2,3-cd)pyrene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Isophorone | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Naphthalene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Nitrobenzene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| N-Nitrosodi-n-propylamine | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| N-Nitrosodiphenylamine | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Pentachlorophenol | ug/kg | 660 | 690 | U | N/A | 710 | U | N/A | 690 | U | 700 | U | N/A |
| Phenanthrene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Phenol | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |
| Pyrene | ug/kg | 330 | 350 | U | N/A | 350 | U | N/A | 350 | U | 350 | U | N/A |

Created on 11/7/2002

# Table G-1. Data Presentation: Soil Boring Results, Site 1 - Old Wastewater Treatment Plant
## Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | SB-WWP-01 | | SB-WWP-01 | | SB-WWP-01 | | SB-WWP-01 | | SB-WWP-02 | | SB-WWP-02 | | SB-WWP-02 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01R | | SAIC02 | | SAIC02R | | SAIC01 | | SAIC01D | | SAIC01DR | |
| Site Type | | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | |
| Collection Date | | | 08/08/02 | | 08/16/02 | | 08/08/02 | | 08/16/02 | | 08/08/02 | | 08/08/02 | | 08/16/02 | |
| Depth (ft) | | | 0.00 | | 0.00 | | 0.50 | | 0.50 | | 0.00 | | 0.00 | | 0.00 | |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| 1,1,2,2-Tetrachloroethane | ug/kg | 5 | N/A | | 5.3 | UJ | N/A | | 5.2 | UJ | N/A | | N/A | | 7.4 | UJ |
| 1,1,2-Trichloroethane | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| 1,1-Dichloroethane | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| 1,1-Dichloroethene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| 1,2-Dichloroethane | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| 1,2-Dichloropropane | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| 2-Hexanone | ug/kg | 10 | N/A | | 11 | U | N/A | | 10 | U | N/A | | N/A | | 15 | U |
| Acetone | ug/kg | 10 | N/A | | 37 | UJ | N/A | | 61 | UJ | N/A | | N/A | | 68 | UJ |
| Benzene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Bromodichloromethane | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Bromoform | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Bromomethane | ug/kg | 5 | N/A | | 5.3 | UJ | N/A | | 5.2 | UJ | N/A | | N/A | | 7.4 | UJ |
| Carbon disulfide | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Carbon Tetrachloride | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Chlorobenzene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Chloroethane | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Chloroform | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Chloromethane | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| cis-1,2-Dichloroethene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| cis-1,3-Dichloropropene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Dibromochloromethane | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Ethylbenzene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| m-and/or p-Xylene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Methyl ethyl ketone | ug/kg | 10 | N/A | | 10 | J | N/A | | 6.6 | J | N/A | | N/A | | 15 | U |
| Methyl isobutyl ketone | ug/kg | 10 | N/A | | 11 | U | N/A | | 10 | U | N/A | | N/A | | 15 | U |
| Methylene Chloride | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| o-xylene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Styrene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Tetrachloroethene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Toluene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| trans-1,2-Dichloroethene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| trans-1,3-Dichloropropene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Trichloroethene | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |
| Vinyl Chloride | ug/kg | 5 | N/A | | 5.3 | U | N/A | | 5.2 | U | N/A | | N/A | | 7.4 | U |

Created on 11/7/2002

## Table G-1. Data Presentation: Soil Boring Results, Site 1 - Old Wastewater Treatment Plant
## Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | SB-WWP-02 | SB-WWP-02 | SB-WWP-02 | SB-WWP-03 | SB-WWP-03 | SB-WWP-03 | SB-WWP-03 |
|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01R | SAIC02 | SAIC02R | SAIC01 | SAIC01R | SAIC02 | SAIC02R |
| Site Type | | | BORE | BORE | BORE | BORE | BORE | BORE | BORE |
| Collection Date | | | 08/16/02 | 08/08/02 | 08/16/02 | 08/08/02 | 08/16/02 | 08/08/02 | 08/16/02 |
| Depth (ft) | | | 0.00 | 3.50 | 3.50 | 0.00 | 0.00 | 0.50 | 0.50 |
| ***METALS(6010)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Aluminum | MG/KG | 20 | N/A | 14300 | N/A | 6700 | N/A | 6220 | N/A |
| Antimony | MG/KG | 0.6 | N/A | 0.26 UJ | N/A | 10.8 UJ | N/A | 7.2 J | N/A |
| Arsenic | MG/KG | 1 | N/A | 11.9 | N/A | 7.7 B | N/A | 3.4 | N/A |
| Barium | MG/KG | 20 | N/A | 81.8 | N/A | 453 | N/A | 285 | N/A |
| Beryllium | MG/KG | 0.5 | N/A | 0.68 | N/A | 0.49 B | N/A | 0.37 | N/A |
| Cadmium | MG/KG | 0.5 | N/A | 0.17 B | N/A | 6.4 | N/A | 5.1 | N/A |
| Calcium | MG/KG | 100 | N/A | 1110 | N/A | 8460 | N/A | 4090 | N/A |
| Chromium | MG/KG | 1 | N/A | 13.8 | N/A | 61.3 | N/A | 38.2 | N/A |
| Cobalt | MG/KG | 5 | N/A | 4.1 | N/A | 4.9 | N/A | 2.7 | N/A |
| Copper | MG/KG | 1 | N/A | 6.9 | N/A | 221 | N/A | 146 | N/A |
| Iron | MG/KG | 10 | N/A | 9920 | N/A | 53200 | N/A | 18800 | N/A |
| Lead | MG/KG | 0.3 | N/A | 14.3 | N/A | 883 | N/A | 586 | N/A |
| Magnesium | MG/KG | 100 | N/A | 1330 | N/A | 1450 | N/A | 1080 | N/A |
| Manganese | MG/KG | 1.5 | N/A | 115 | N/A | 632 | N/A | 237 | N/A |
| Nickel | MG/KG | 1 | N/A | 7.9 J | N/A | 16.8 J | N/A | 10.9 J | N/A |
| Potassium | MG/KG | 100 | N/A | 485 | N/A | 486 | N/A | 308 | N/A |
| Selenium | MG/KG | 0.5 | N/A | 0.26 U | N/A | 2.5 B | N/A | 1.1 B | N/A |
| Silver | MG/KG | 1 | N/A | 0.06 U | N/A | 144 | N/A | 103 | N/A |
| Sodium | MG/KG | 100 | N/A | 126 UJ | N/A | 118 UJ | N/A | 82.8 UJ | N/A |
| Thallium | MG/KG | 1 | N/A | 0.58 U | N/A | 3.3 U | N/A | 1.2 U | N/A |
| Vanadium | MG/KG | 5 | N/A | 20.9 | N/A | 23.4 | N/A | 11.6 | N/A |
| Zinc | MG/KG | 2 | N/A | 58.2 | N/A | 1180 | N/A | 746 | N/A |
| ***METALS(7471)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| Mercury | MG/KG | 0.1 | N/A | 0.21 | N/A | 32.2 | N/A | 24.3 | N/A |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |
| 1,2-Dichlorobenzene | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |
| 1,3-Dichlorobenzene | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |
| 1,4-Dichlorobenzene | ug/kg | 330 | N/A | 370 U | N/A | 240 J | N/A | 480 | N/A |
| 2,4,5-Trichlorophenol | ug/kg | 660 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |
| 2,4,6-Trichlorophenol | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |
| 2,4-Dichlorophenol | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |
| 2,4-Dimethylphenol | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |
| 2,4-Dinitrophenol | ug/kg | 660 | N/A | 750 U | N/A | 860 U | N/A | 800 U | N/A |
| 2,4-Dinitrotoluene | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 82 J | N/A |
| 2,6-Dinitrotoluene | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |
| 2-Chloronaphthalene | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |
| 2-Chlorophenol | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |
| 2-Methylnaphthalene | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 61 J | N/A |
| 2-Methylphenol | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |
| 2-Nitroaniline | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |
| 2-Nitrophenol | ug/kg | 330 | N/A | 370 U | N/A | 430 U | N/A | 400 U | N/A |

Created on 11/7/2002

# Table G-1. Data Presentation: Soil Boring Results, Site 1 - Old Wastewater Treatment Plant Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | SB-WWP-02 | SB-WWP-02 | | SB-WWP-02 | SB-WWP-03 | | SB-WWP-03 | SB-WWP-03 | | SB-WWP-03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01R | SAIC02 | | SAIC02R | SAIC01 | | SAIC01R | SAIC02 | | SAIC02R |
| Site Type | | | BORE | BORE | | BORE | BORE | | BORE | BORE | | BORE |
| Collection Date | | | 08/16/02 | 08/08/02 | | 08/16/02 | 08/08/02 | | 08/16/02 | 08/08/02 | | 08/16/02 |
| Depth (ft) | | | 0.00 | 3.50 | | 3.50 | 0.00 | | 0.00 | 0.50 | | 0.50 |
| 3,3'-Dichlorobenzidine | ug/kg | 660 | N/A | 750 | U | N/A | 860 | U | N/A | 800 | U | N/A |
| 3-Nitroaniline | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| 4,6-Dinitro-2-cresol | ug/kg | 660 | N/A | 750 | U | N/A | 860 | U | N/A | 800 | U | N/A |
| 4-Bromophenyl phenyl ether | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| 4-Chloro-3-methylphenol | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| 4-Chloroaniline | ug/kg | 330 | N/A | 370 | UJ | N/A | 430 | UJ | N/A | 400 | UJ | N/A |
| 4-Chlorophenyl phenyl ether | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| 4-Methylphenol | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| 4-Nitroaniline | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| 4-Nitrophenol | ug/kg | 660 | N/A | 750 | UJ | N/A | 860 | UJ | N/A | 800 | UJ | N/A |
| Acenaphthene | ug/kg | 330 | N/A | 370 | U | N/A | 89 | J | N/A | 400 | U | N/A |
| Acenaphthylene | ug/kg | 330 | N/A | 370 | U | N/A | 160 | J | N/A | 400 | U | N/A |
| Anthracene | ug/kg | 330 | N/A | 370 | U | N/A | 610 | | N/A | 420 | | N/A |
| Benzo(a)anthracene | ug/kg | 330 | N/A | 370 | U | N/A | 3200 | | N/A | 1700 | | N/A |
| Benzo(a)pyrene | ug/kg | 330 | N/A | 370 | U | N/A | 3100 | | N/A | 1500 | | N/A |
| Benzo(b)fluoranthene | ug/kg | 330 | N/A | 370 | U | N/A | 4300 | | N/A | 2300 | | N/A |
| Benzo(g,h,i)perylene | ug/kg | 330 | N/A | 370 | U | N/A | 2000 | | N/A | 1100 | | N/A |
| Benzo(k)fluoranthene | ug/kg | 330 | N/A | 370 | U | N/A | 1300 | | N/A | 600 | | N/A |
| bis(2-chloroethoxy) methane | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| bis(2-Chloroethyl) Ether | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| bis(2-chloroisopropyl) ether | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| bis(2-Ethylhexyl)phthalate | ug/kg | 330 | N/A | 370 | U | N/A | 67 | J | N/A | 400 | U | N/A |
| Butylbenzyl phthalate | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| Carbazole | ug/kg | 330 | N/A | 370 | U | N/A | 420 | J | N/A | 300 | J | N/A |
| Chrysene | ug/kg | 330 | N/A | 370 | U | N/A | 3100 | | N/A | 1500 | | N/A |
| Dibenzo(a,h)anthracene | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| Dibenzofuran | ug/kg | 330 | N/A | 370 | U | N/A | 76 | J | N/A | 61 | J | N/A |
| Diethyl phthalate | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| Dimethyl phthalate | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| Di-n-butyl phthalate | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| Di-n-octyl phthalate | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| Fluoranthene | ug/kg | 330 | N/A | 370 | U | N/A | 4700 | | N/A | 2700 | | N/A |
| Fluorene | ug/kg | 330 | N/A | 370 | U | N/A | 160 | J | N/A | 96 | J | N/A |
| Hexachlorobenzene | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| Hexachlorobutadiene | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| Hexachlorocyclopentadiene | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| Hexachloroethane | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| Indeno(1,2,3-cd)pyrene | ug/kg | 330 | N/A | 370 | U | N/A | 1800 | | N/A | 1000 | | N/A |
| Isophorone | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| Naphthalene | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| Nitrobenzene | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| N-Nitrosodi-n-propylamine | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| N-Nitrosodiphenylamine | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 30 | J | N/A |
| Pentachlorophenol | ug/kg | 660 | N/A | 750 | U | N/A | 860 | U | N/A | 800 | U | N/A |
| Phenanthrene | ug/kg | 330 | N/A | 370 | U | N/A | 2500 | | N/A | 1300 | | N/A |
| Phenol | ug/kg | 330 | N/A | 370 | U | N/A | 430 | U | N/A | 400 | U | N/A |
| Pyrene | ug/kg | 330 | N/A | 370 | U | N/A | 4200 | | N/A | 2000 | | N/A |

## Table G-1. Data Presentation: Soil Boring Results, Site 1 - Old Wastewater Treatment Plant
## Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | SB-WWP-02 | SB-WWP-02 | SB-WWP-02 | SB-WWP-03 | SB-WWP-03 | SB-WWP-03 | SB-WWP-03 |
|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01R | SAIC02 | SAIC02R | SAIC01 | SAIC01R | SAIC02 | SAIC02R |
| Site Type | | | BORE | BORE | BORE | BORE | BORE | BORE | BORE |
| Collection Date | | | 08/16/02 | 08/08/02 | 08/16/02 | 08/08/02 | 08/16/02 | 08/08/02 | 08/16/02 |
| Depth (ft) | | | 0.00 | 3.50 | 3.50 | 0.00 | 0.00 | 0.50 | 0.50 |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | | |
| Parameter | Units | RL | | | | | | | |
| 1,1,1-Trichloroethane | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| 1,1,2,2-Tetrachloroethane | ug/kg | 5 | 5.9 UJ | N/A | 6.1 UJ | N/A | 6.6 UJ | N/A | 6.1 UJ |
| 1,1,2-Trichloroethane | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| 1,1-Dichloroethane | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| 1,1-Dichloroethene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| 1,2-Dichloroethane | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| 1,2-Dichloropropane | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| 2-Hexanone | ug/kg | 10 | 12 U | N/A | 12 U | N/A | 13 U | N/A | 12 U |
| Acetone | ug/kg | 10 | 45 UJ | N/A | 25 UJ | N/A | 65 UJ | N/A | 84 UJ |
| Benzene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Bromodichloromethane | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Bromoform | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Bromomethane | ug/kg | 5 | 5.9 UJ | N/A | 6.1 UJ | N/A | 6.6 UJ | N/A | 6.1 UJ |
| Carbon disulfide | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Carbon Tetrachloride | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Chlorobenzene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Chloroethane | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Chloroform | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Chloromethane | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| cis-1,2-Dichloroethene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| cis-1,3-Dichloropropene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Dibromochloromethane | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Ethylbenzene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| m-and/or p-Xylene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Methyl ethyl ketone | ug/kg | 10 | 8.9 J | N/A | 4.8 J | N/A | 14 | N/A | 17 |
| Methyl isobutyl ketone | ug/kg | 10 | 12 U | N/A | 12 U | N/A | 13 U | N/A | 12 U |
| Methylene Chloride | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| o-xylene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Styrene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Tetrachloroethene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Toluene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| trans-1,2-Dichloroethene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| trans-1,3-Dichloropropene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Trichloroethene | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |
| Vinyl Chloride | ug/kg | 5 | 5.9 U | N/A | 6.1 U | N/A | 6.6 U | N/A | 6.1 U |

## Table G-1. Data Presentation: Soil Boring Results, Site 1 - Old Wastewater Treatment Plant Wallops Flight Facility, Accomack County, Virginia (continued)

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit but greater than or equal to the instrument detection limit.
B – *Organics: Analyte was found in the associated method blank.* Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25% difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. *For SW846 methods, the samples are reported down to the method detection limits (MDL). For metals, the samples are reported down to* the instrument detection limit (IDL).
MDL – Method Detection Limit.
SAICXXR – *An SAIC field sample number followed by an "R" designates a recollected sample.*

## Table G-2. Data Presentation: UST Liquids Results, Site 3 - Two 600,000-Gallon Fuel Tanks
## Wallops Flight Facility, Accomack County, Virginia

| Site ID | | | WA-UST-01 | | WA-UST-02 | | WA-UST-03 | | WA-UST-04 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01 | | SAIC01 | | SAIC01 | |
| Site Type | | | SWTR | | SWTR | | SWTR | | SWTR | |
| Collection Date | | | 08/08/02 | | 08/08/02 | | 08/08/02 | | 08/08/02 | |
| Depth (ft) | | | 0.00 | | 13.00 | | 0.00 | | 11.00 | |

***METALS(6010)***

| Parameter | Units | RL | WA-UST-01 | | WA-UST-02 | | WA-UST-03 | | WA-UST-04 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ug/L | 200 | 30.9 | UJ | 30.9 | UJ | 30.9 | UJ | 30.9 | UJ |
| Antimony | ug/L | 6 | 2.5 | UJ | 2.5 | UJ | 2.5 | UJ | 2.5 | UJ |
| Arsenic | ug/L | 10 | 3.6 | U | 3.4 | U | 3.4 | U | 4.1 | U |
| Barium | ug/L | 200 | 3.3 | B | 2.9 | B | 16.1 | | 13.6 | |
| Beryllium | ug/L | 5 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Cadmium | ug/L | 5 | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U |
| Calcium | ug/L | 1000 | 8160 | | 7640 | | 8490 | | 8230 | |
| Chromium | ug/L | 10 | 1.3 | U | 1.3 | U | 1.3 | U | 1.3 | U |
| Cobalt | ug/L | 50 | 0.6 | UJ | 0.6 | UJ | 0.6 | UJ | 0.83 | J |
| Copper | ug/L | 10 | 2.5 | U | 2.9 | U | 2 | U | 3.2 | U |
| Iron | ug/L | 100 | 40.1 | B | 817 | | 2110 | | 5070 | |
| Lead | ug/L | 3 | 1.6 | U | 1.6 | U | 1.6 | U | 1.6 | U |
| Magnesium | ug/L | 1000 | 6400 | | 5180 | | 5930 | | 5760 | |
| Manganese | ug/L | 15 | 72.8 | | 123 | | 336 | | 367 | |
| Nickel | ug/L | 10 | 1.1 | U | 2 | B | 1.1 | U | 1.5 | B |
| Potassium | ug/L | 1000 | 3740 | | 3910 | | 3920 | | 3910 | |
| Selenium | ug/L | 5 | 3.5 | U | 3.5 | U | 3.5 | U | 3.5 | U |
| Silver | ug/L | 10 | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U |
| Sodium | ug/L | 1000 | 12300 | | 12300 | | 14100 | | 13900 | |
| Thallium | ug/L | 10 | 2.7 | U | 3.6 | U | 2.8 | B | 2.8 | U |
| Vanadium | ug/L | 50 | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U |
| Zinc | ug/L | 20 | 5.2 | U | 5 | U | 4 | U | 4 | U |

***METALS(7470)***

| Parameter | Units | RL | WA-UST-01 | | WA-UST-02 | | WA-UST-03 | | WA-UST-04 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | ug/L | 0.2 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |

***SEMIVOLATILE ORGANIC COMPOUNDS(8270)***

| Parameter | Units | RL | WA-UST-01 | | WA-UST-02 | | WA-UST-03 | | WA-UST-04 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 1,2-Dichlorobenzene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 1,3-Dichlorobenzene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 1,4-Dichlorobenzene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 2,4,5-Trichlorophenol | ug/L | 20 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 2,4,6-Trichlorophenol | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 2,4-Dichlorophenol | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 2,4-Dimethylphenol | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 2,4-Dinitrophenol | ug/L | 20 | 500 | U | 250 | U | 25 | U | 5700 | U |
| 2,4-Dinitrotoluene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 2,6-Dinitrotoluene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 2-Chloronaphthalene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 2-Chlorophenol | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 2-Methylnaphthalene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 1000 | J |
| 2-Methylphenol | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 2-Nitroaniline | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 2-Nitrophenol | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |

Created on 11/7/2002

## Table G-2. Data Presentation: UST Liquids Results, Site 3 - Two 600,000-Gallon Fuel Tanks Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | WA-UST-01 | | WA-UST-02 | | WA-UST-03 | | WA-UST-04 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01 | | SAIC01 | | SAIC01 | |
| Site Type | | | SWTR | | SWTR | | SWTR | | SWTR | |
| Collection Date | | | 08/08/02 | | 08/08/02 | | 08/08/02 | | 08/08/02 | |
| Depth (ft) | | | 0.00 | | 13.00 | | 0.00 | | 11.00 | |
| 3,3'-Dichlorobenzidine | ug/L | 20 | 500 | U | 250 | U | 25 | U | 5700 | U |
| 3-Nitroaniline | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 4,6-Dinitro-2-cresol | ug/L | 20 | 500 | U | 250 | U | 25 | U | 5700 | U |
| 4-Bromophenyl phenyl ether | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 4-Chloro-3-methylphenol | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 4-Chloroaniline | ug/L | 10 | 250 | UJ | 130 | UJ | 13 | UJ | 2900 | UJ |
| 4-Chlorophenyl phenyl ether | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 4-Methylphenol | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 4-Nitroaniline | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| 4-Nitrophenol | ug/L | 20 | 500 | UJ | 250 | UJ | 25 | U | 5700 | UJ |
| Acenaphthene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Acenaphthylene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Anthracene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Benzo(a)anthracene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Benzo(a)pyrene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Benzo(b)fluoranthene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Benzo(g,h,i)perylene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Benzo(k)fluoranthene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| bis(2-chloroethoxy) methane | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| bis(2-Chloroethyl) Ether | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| bis(2-chloroisopropyl) ether | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| bis(2-Ethylhexyl)phthalate | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Butylbenzyl phthalate | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Carbazole | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Chrysene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Dibenzo(a,h)anthracene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Dibenzofuran | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Diethyl phthalate | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Dimethyl phthalate | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Di-n-butyl phthalate | ug/L | 10 | 250 | U | 130 | U | 1.7 | J | 2900 | U |
| Di-n-octyl phthalate | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Fluoranthene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Fluorene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Hexachlorobenzene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Hexachlorobutadiene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Hexachlorocyclopentadiene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Hexachloroethane | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Indeno(1,2,3-cd)pyrene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Isophorone | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Naphthalene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Nitrobenzene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| N-Nitrosodi-n-propylamine | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| N-Nitrosodiphenylamine | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Pentachlorophenol | ug/L | 20 | 500 | U | 250 | U | 25 | U | 5700 | U |
| Phenanthrene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Phenol | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |
| Pyrene | ug/L | 10 | 250 | U | 130 | U | 13 | U | 2900 | U |

# Table G-2. Data Presentation: UST Liquids Results, Site 3 - Two 600,000-Gallon Fuel Tanks Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | WA-UST-01 | | WA-UST-02 | | WA-UST-03 | | WA-UST-04 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01 | | SAIC01 | | SAIC01 | |
| Site Type | | | SWTR | | SWTR | | SWTR | | SWTR | |
| Collection Date | | | 08/08/02 | | 08/08/02 | | 08/08/02 | | 08/08/02 | |
| Depth (ft) | | | 0.00 | | 13.00 | | 0.00 | | 11.00 | |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | | | |
| **Parameter** | **Units** | **RL** | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| 1,1,2,2-Tetrachloroethane | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| 1,1,2-Trichloroethane | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| 1,1-Dichloroethane | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| 1,1-Dichloroethene | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| 1,2-Dichloroethane | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| 1,2-Dichloropropane | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| 2-Hexanone | ug/L | 5 | 25 | U | 25 | U | 5 | U | 130 | UJ |
| Acetone | ug/L | 5 | 25 | U | 25 | U | 5 | U | 140 | UJ |
| Benzene | ug/L | 1 | 5 | U | 5 | U | 8.7 | | 25 | UJ |
| Bromodichloromethane | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| Bromoform | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| Bromomethane | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| Carbon disulfide | ug/L | 1 | 5 | U | 5 | U | 1 | U | 42 | UJ |
| Carbon Tetrachloride | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| Chlorobenzene | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| Chloroethane | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| Chloroform | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| Chloromethane | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| cis-1,2-Dichloroethene | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| cis-1,3-Dichloropropene | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| Dibromochloromethane | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| Ethylbenzene | ug/L | 1 | 5 | U | 5 | U | 1 | U | 28 | J |
| m-and/or p-Xylene | ug/L | 1 | 5 | U | 5 | U | 4.1 | | 33 | J |
| Methyl ethyl ketone | ug/L | 5 | 25 | UJ | 25 | UJ | 5 | UJ | 130 | UJ |
| Methyl isobutyl ketone | ug/L | 5 | 25 | U | 25 | U | 5 | U | 130 | UJ |
| Methylene Chloride | ug/L | 1 | 7.4 | U | 6.4 | U | 1.1 | U | 31 | UJ |
| o-xylene | ug/L | 1 | 5 | U | 5 | U | 1.5 | | 25 | UJ |
| Styrene | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| Tetrachloroethene | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| Toluene | ug/L | 1 | 5 | U | 5 | U | 5.1 | | 25 | UJ |
| trans-1,2-Dichloroethene | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| trans-1,3-Dichloropropene | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| Trichloroethene | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |
| Vinyl Chloride | ug/L | 1 | 5 | U | 5 | U | 1 | U | 25 | UJ |

Created on 11/7/2002

## Table G-2. Data Presentation: UST Liquids Results, Site 3 - Two 600,000-Gallon Fuel Tanks Wallops Flight Facility, Accomack County, Virginia (continued)

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit but greater than or equal to the instrument detection limit.
B – Organics: Analyte was found in the associated method blank. Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25% difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. For SW846 methods, the samples are reported down to the method detection limits (MDL). For metals, the samples are reported down to the instrument detection limit (IDL).
MDL – Method Detection Limit.
SAICXXR – An SAIC field sample number followed by an "R" designates a recollected sample.

# Table G-3. Data Presentation: Soil Boring Results, Industrial Waste/Sanitary Landfill
## Wallops Flight Facility, Accomack County, Virginia

| Site ID | | | SB-IWL-01 | | SB-IWL-01 | | SB-IWL-02 | | SB-IWL-02 | | SB-IWL-03 | | SB-IWL-03 | | SB-IWL-04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC02 | | SAIC01 | | SAIC02 | | SAIC01 | | SAIC02 | | SAIC01 | |
| Site Type | | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | |
| Collection Date | | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/07/02 | |
| Depth (ft) | | | 0.00 | | 16.50 | | 0.00 | | 16.00 | | 0.00 | | 19.00 | | 13.00 | |
| ***METALS(6010)*** | | | | | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | | | | | |
| Aluminum | MG/KG | 20 | 4450 | | 2440 | | 3980 | | 6590 | | 3350 | | 508 | | 2610 | |
| Antimony | MG/KG | 0.6 | 0.25 | UJ | 0.22 | UJ | 0.2 | UJ | 0.2 | UJ | 0.2 | UJ | 0.2 | UJ | 0.23 | UJ |
| Arsenic | MG/KG | 1 | 1.8 | | 2 | | 1.6 | | 2 | | 1.1 | B | 0.7 | B | 1.2 | B |
| Barium | MG/KG | 20 | 10.6 | | 3.3 | | 9.5 | | 18.3 | | 4.3 | | 1.1 | | 4.4 | |
| Beryllium | MG/KG | 0.5 | 0.11 | B | 0.06 | B | 0.09 | B | 0.12 | B | 0.08 | B | 0.02 | B | 0.07 | B |
| Cadmium | MG/KG | 0.5 | 0.02 | B | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U |
| Calcium | MG/KG | 100 | 97.8 | | 101 | | 48.1 | B | 144 | | 59.2 | B | 23.3 | B | 108 | |
| Chromium | MG/KG | 1 | 4.2 | | 2.1 | | 3.3 | | 4.2 | | 3.5 | | 0.8 | U | 11.2 | |
| Cobalt | MG/KG | 5 | 1 | J | 0.19 | UJ | 0.6 | J | 0.9 | J | 0.7 | J | 0.08 | UJ | 0.62 | |
| Copper | MG/KG | 1 | 3.1 | | 0.5 | B | 3.2 | | 1 | | 2.7 | | 0.38 | B | 2 | |
| Iron | MG/KG | 10 | 2900 | | 1110 | | 1900 | | 1710 | | 2010 | | 683 | | 2020 | |
| Lead | MG/KG | 0.3 | 3.6 | | 0.7 | | 2.8 | | 2.1 | | 4.6 | | 0.6 | B | 1.4 | |
| Magnesium | MG/KG | 100 | 263 | | 145 | | 146 | | 205 | | 180 | | 30.8 | | 143 | |
| Manganese | MG/KG | 1.5 | 34.4 | | 5.8 | | 21.9 | | 28 | | 18.7 | | 4 | | 38.3 | |
| Nickel | MG/KG | 1 | 2.3 | J | 0.62 | J | 1.3 | J | 1 | J | 2.1 | J | 0.2 | J | 1.7 | J |
| Potassium | MG/KG | 100 | 162 | | 146 | | 114 | | 204 | | 118 | | 29 | U | 131 | |
| Selenium | MG/KG | 0.5 | 0.2 | U | 0.22 | U | 0.2 | U | 0.2 | U | 0.2 | U | 0.2 | U | 0.23 | U |
| Silver | MG/KG | 1 | 0.1 | B | 0.06 | U | 0.06 | B | 0.06 | U | 0.06 | U | 0.06 | U | 0.05 | U |
| Sodium | MG/KG | 100 | 51.3 | UJ | 55 | UJ | 46.3 | UJ | 57.4 | UJ | 45.9 | UJ | 42.6 | UJ | 75.3 | UJ |
| Thallium | MG/KG | 1 | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.51 | U |
| Vanadium | MG/KG | 5 | 6.7 | J | 2.6 | J | 4.6 | J | 4.9 | J | 4.7 | J | 0.8 | J | 3.2 | |
| Zinc | MG/KG | 2 | 7.1 | | 3.8 | | 4.9 | | 3.9 | | 6.7 | | 1.7 | | 3.3 | |
| ***METALS(7471)*** | | | | | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | | | | | |
| Mercury | MG/KG | 0.1 | 0.02 | B | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 1,2-Dichlorobenzene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 1,3-Dichlorobenzene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 1,4-Dichlorobenzene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 2,4,5-Trichlorophenol | ug/kg | 660 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 2,4,6-Trichlorophenol | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 2,4-Dichlorophenol | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 2,4-Dimethylphenol | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 2,4-Dinitrophenol | ug/kg | 660 | 680 | U | 870 | U | 720 | U | 800 | U | 680 | U | 770 | U | 690 | U |
| 2,4-Dinitrotoluene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 2,6-Dinitrotoluene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 2-Chloronaphthalene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 2-Chlorophenol | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 2-Methylnaphthalene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 2-Methylphenol | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 2-Nitroaniline | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 2-Nitrophenol | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |

Created on 11/7/2002

## Table G-3. Data Presentation: Soil Boring Results, Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | SB-IWL-01 | | SB-IWL-01 | | SB-IWL-02 | | SB-IWL-02 | | SB-IWL-03 | | SB-IWL-03 | | SB-IWL-04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC02 | | SAIC01 | | SAIC02 | | SAIC01 | | SAIC02 | | SAIC01 | |
| Site Type | | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | |
| Collection Date | | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/07/02 | |
| Depth (ft) | | | 0.00 | | 16.50 | | 0.00 | | 16.00 | | 0.00 | | 19.00 | | 13.00 | |
| 3,3'-Dichlorobenzidine | ug/kg | 660 | 680 | U | 870 | U | 720 | U | 800 | U | 680 | U | 770 | U | 690 | U |
| 3-Nitroaniline | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 4,6-Dinitro-2-cresol | ug/kg | 660 | 680 | U | 870 | U | 720 | U | 800 | U | 680 | U | 770 | U | 690 | U |
| 4-Bromophenyl phenyl ether | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 4-Chloro-3-methylphenol | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 4-Chloroaniline | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 4-Chlorophenyl phenyl ether | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 4-Methylphenol | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 4-Nitroaniline | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| 4-Nitrophenol | ug/kg | 660 | 680 | U | 870 | U | 720 | U | 800 | U | 680 | U | 770 | U | 690 | U |
| Acenaphthene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Acenaphthylene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Anthracene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Benzo(a)anthracene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Benzo(a)pyrene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Benzo(b)fluoranthene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Benzo(g,h,i)perylene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Benzo(k)fluoranthene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| bis(2-chloroethoxy) methane | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| bis(2-Chloroethyl) Ether | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| bis(2-chloroisopropyl) ether | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| bis(2-Ethylhexyl)phthalate | ug/kg | 330 | 340 | U | 33 | J | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Butylbenzyl phthalate | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Carbazole | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Chrysene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Dibenzo(a,h)anthracene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Dibenzofuran | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Diethyl phthalate | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Dimethyl phthalate | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Di-n-butyl phthalate | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Di-n-octyl phthalate | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Fluoranthene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Fluorene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Hexachlorobenzene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Hexachlorobutadiene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Hexachlorocyclopentadiene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Hexachloroethane | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Indeno(1,2,3-cd)pyrene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Isophorone | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Naphthalene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Nitrobenzene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| N-Nitrosodi-n-propylamine | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| N-Nitrosodiphenylamine | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Pentachlorophenol | ug/kg | 660 | 680 | U | 870 | U | 720 | U | 800 | U | 680 | U | 770 | U | 690 | U |
| Phenanthrene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Phenol | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |
| Pyrene | ug/kg | 330 | 340 | U | 430 | U | 360 | U | 400 | U | 340 | U | 390 | U | 350 | U |

## Table G-3. Data Presentation: Soil Boring Results, Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | SB-IWL-01 | | SB-IWL-01 | | SB-IWL-02 | | SB-IWL-02 | | SB-IWL-03 | | SB-IWL-03 | | SB-IWL-04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC02 | | SAIC01 | | SAIC02 | | SAIC01 | | SAIC02 | | SAIC01 | |
| Site Type | | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | |
| Collection Date | | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/07/02 | |
| Depth (ft) | | | 0.00 | | 16.50 | | 0.00 | | 16.00 | | 0.00 | | 19.00 | | 13.00 | |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| 1,1,2,2-Tetrachloroethane | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| 1,1,2-Trichloroethane | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| 1,1-Dichloroethane | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| 1,1-Dichloroethene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| 1,2-Dichloroethane | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| 1,2-Dichloropropane | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| 2-Hexanone | ug/kg | 10 | 12 | U | 12 | U | 13 | U | 10 | U | 20 | | 12 | U | 10 | U |
| Acetone | ug/kg | 10 | 12 | U | 12 | U | 14 | U | 10 | U | 32 | U | 12 | U | 41 | U |
| Benzene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Bromodichloromethane | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Bromoform | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Bromomethane | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Carbon disulfide | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Carbon Tetrachloride | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Chlorobenzene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Chloroethane | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Chloroform | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Chloromethane | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| cis-1,2-Dichloroethene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| cis-1,3-Dichloropropene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Dibromochloromethane | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Ethylbenzene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| m-and/or p-Xylene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Methyl ethyl ketone | ug/kg | 10 | 12 | UJ | 12 | UJ | 13 | UJ | 10 | UJ | 14 | UJ | 12 | UJ | 5.7 | J |
| Methyl isobutyl ketone | ug/kg | 10 | 12 | U | 12 | U | 13 | U | 10 | U | 14 | U | 12 | U | 10 | U |
| Methylene Chloride | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| o-xylene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Styrene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Tetrachloroethene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Toluene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| trans-1,2-Dichloroethene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| trans-1,3-Dichloropropene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Trichloroethene | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |
| Vinyl Chloride | ug/kg | 5 | 6.2 | U | 5.8 | U | 6.4 | U | 5.1 | U | 6.8 | U | 6 | U | 5 | U |

Created on 11/7/2002

## Table G-3. Data Presentation: Soil Boring Results, Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

| | | | | |
|---|---|---|---|---|
| Site ID | | | SB-IWL-04 | |
| Field Sample Number | | | SAIC02 | |
| Site Type | | | BORE | |
| Collection Date | | | 08/07/02 | |
| Depth (ft) | | | 19.00 | |

***METALS(6010)***

| Parameter | Units | RL | | |
|---|---|---|---|---|
| Aluminum | MG/KG | 20 | 1080 | |
| Antimony | MG/KG | 0.6 | 0.2 | UJ |
| Arsenic | MG/KG | 1 | 1.3 | |
| Barium | MG/KG | 20 | 1.2 | |
| Beryllium | MG/KG | 0.5 | 0.03 | B |
| Cadmium | MG/KG | 0.5 | 0.02 | U |
| Calcium | MG/KG | 100 | 33 | B |
| Chromium | MG/KG | 1 | 1.3 | |
| Cobalt | MG/KG | 5 | 0.24 | U |
| Copper | MG/KG | 1 | 0.42 | U |
| Iron | MG/KG | 10 | 641 | |
| Lead | MG/KG | 0.3 | 0.41 | B |
| Magnesium | MG/KG | 100 | 68.6 | |
| Manganese | MG/KG | 1.5 | 13.4 | |
| Nickel | MG/KG | 1 | 0.49 | J |
| Potassium | MG/KG | 100 | 34.4 | U |
| Selenium | MG/KG | 0.5 | 0.2 | U |
| Silver | MG/KG | 1 | 0.05 | U |
| Sodium | MG/KG | 100 | 51 | UJ |
| Thallium | MG/KG | 1 | 0.44 | U |
| Vanadium | MG/KG | 5 | 1.6 | |
| Zinc | MG/KG | 2 | 1.6 | |

***METALS(7471)***

| Parameter | Units | RL | | |
|---|---|---|---|---|
| Mercury | MG/KG | 0.1 | 0.01 | U |

***SEMIVOLATILE ORGANIC COMPOUNDS(8270)***

| Parameter | Units | RL | | |
|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | ug/kg | 330 | 380 | U |
| 1,2-Dichlorobenzene | ug/kg | 330 | 380 | U |
| 1,3-Dichlorobenzene | ug/kg | 330 | 380 | U |
| 1,4-Dichlorobenzene | ug/kg | 330 | 380 | U |
| 2,4,5-Trichlorophenol | ug/kg | 660 | 380 | U |
| 2,4,6-Trichlorophenol | ug/kg | 330 | 380 | U |
| 2,4-Dichlorophenol | ug/kg | 330 | 380 | U |
| 2,4-Dimethylphenol | ug/kg | 330 | 380 | U |
| 2,4-Dinitrophenol | ug/kg | 660 | 760 | U |
| 2,4-Dinitrotoluene | ug/kg | 330 | 380 | U |
| 2,6-Dinitrotoluene | ug/kg | 330 | 380 | U |
| 2-Chloronaphthalene | ug/kg | 330 | 380 | U |
| 2-Chlorophenol | ug/kg | 330 | 380 | U |
| 2-Methylnaphthalene | ug/kg | 330 | 380 | U |
| 2-Methylphenol | ug/kg | 330 | 380 | U |
| 2-Nitroaniline | ug/kg | 330 | 380 | U |
| 2-Nitrophenol | ug/kg | 330 | 380 | U |

## Table G-3. Data Presentation: Soil Boring Results, Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | SB-IWL-04 | |
|---|---|---|---|---|
| Field Sample Number | | | SAIC02 | |
| Site Type | | | BORE | |
| Collection Date | | | 08/07/02 | |
| Depth (ft) | | | 19.00 | |
| 3,3'-Dichlorobenzidine | ug/kg | 660 | 760 | U |
| 3-Nitroaniline | ug/kg | 330 | 380 | U |
| 4,6-Dinitro-2-cresol | ug/kg | 660 | 760 | U |
| 4-Bromophenyl phenyl ether | ug/kg | 330 | 380 | U |
| 4-Chloro-3-methylphenol | ug/kg | 330 | 380 | U |
| 4-Chloroaniline | ug/kg | 330 | 380 | U |
| 4-Chlorophenyl phenyl ether | ug/kg | 330 | 380 | U |
| 4-Methylphenol | ug/kg | 330 | 380 | U |
| 4-Nitroaniline | ug/kg | 330 | 380 | U |
| 4-Nitrophenol | ug/kg | 660 | 760 | U |
| Acenaphthene | ug/kg | 330 | 380 | U |
| Acenaphthylene | ug/kg | 330 | 380 | U |
| Anthracene | ug/kg | 330 | 380 | U |
| Benzo(a)anthracene | ug/kg | 330 | 380 | U |
| Benzo(a)pyrene | ug/kg | 330 | 380 | U |
| Benzo(b)fluoranthene | ug/kg | 330 | 380 | U |
| Benzo(g,h,i)perylene | ug/kg | 330 | 380 | U |
| Benzo(k)fluoranthene | ug/kg | 330 | 380 | U |
| bis(2-chloroethoxy) methane | ug/kg | 330 | 380 | U |
| bis(2-Chloroethyl) Ether | ug/kg | 330 | 380 | U |
| bis(2-chloroisopropyl) ether | ug/kg | 330 | 380 | U |
| bis(2-Ethylhexyl)phthalate | ug/kg | 330 | 380 | U |
| Butylbenzyl phthalate | ug/kg | 330 | 380 | U |
| Carbazole | ug/kg | 330 | 380 | U |
| Chrysene | ug/kg | 330 | 380 | U |
| Dibenzo(a,h)anthracene | ug/kg | 330 | 380 | U |
| Dibenzofuran | ug/kg | 330 | 380 | U |
| Diethyl phthalate | ug/kg | 330 | 380 | U |
| Dimethyl phthalate | ug/kg | 330 | 380 | U |
| Di-n-butyl phthalate | ug/kg | 330 | 380 | U |
| Di-n-octyl phthalate | ug/kg | 330 | 380 | U |
| Fluoranthene | ug/kg | 330 | 380 | U |
| Fluorene | ug/kg | 330 | 380 | U |
| Hexachlorobenzene | ug/kg | 330 | 380 | U |
| Hexachlorobutadiene | ug/kg | 330 | 380 | U |
| Hexachlorocyclopentadiene | ug/kg | 330 | 380 | U |
| Hexachloroethane | ug/kg | 330 | 380 | U |
| Indeno(1,2,3-cd)pyrene | ug/kg | 330 | 380 | U |
| Isophorone | ug/kg | 330 | 380 | U |
| Naphthalene | ug/kg | 330 | 380 | U |
| Nitrobenzene | ug/kg | 330 | 380 | U |
| N-Nitrosodi-n-propylamine | ug/kg | 330 | 380 | U |
| N-Nitrosodiphenylamine | ug/kg | 330 | 380 | U |
| Pentachlorophenol | ug/kg | 660 | 760 | U |
| Phenanthrene | ug/kg | 330 | 380 | U |
| Phenol | ug/kg | 330 | 380 | U |
| Pyrene | ug/kg | 330 | 380 | U |

Created on 11/7/2002

**Table G-3. Data Presentation: Soil Boring Results, Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia (continued)**

| Site ID | | | SB-IWL-04 | |
|---|---|---|---|---|
| Field Sample Number | | | SAIC02 | |
| Site Type | | | BORE | |
| Collection Date | | | 08/07/02 | |
| Depth (ft) | | | 19.00 | |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | |
| Parameter | Units | RL | | |
| 1,1,1-Trichloroethane | ug/kg | 5 | 5.2 | U |
| 1,1,2,2-Tetrachloroethane | ug/kg | 5 | 5.2 | U |
| 1,1,2-Trichloroethane | ug/kg | 5 | 5.2 | U |
| 1,1-Dichloroethane | ug/kg | 5 | 5.2 | U |
| 1,1-Dichloroethene | ug/kg | 5 | 5.2 | U |
| 1,2-Dichloroethane | ug/kg | 5 | 5.2 | U |
| 1,2-Dichloropropane | ug/kg | 5 | 5.2 | U |
| 2-Hexanone | ug/kg | 10 | 10 | U |
| Acetone | ug/kg | 10 | 10 | U |
| Benzene | ug/kg | 5 | 5.2 | U |
| Bromodichloromethane | ug/kg | 5 | 5.2 | U |
| Bromoform | ug/kg | 5 | 5.2 | U |
| Bromomethane | ug/kg | 5 | 5.2 | U |
| Carbon disulfide | ug/kg | 5 | 5.2 | U |
| Carbon Tetrachloride | ug/kg | 5 | 5.2 | U |
| Chlorobenzene | ug/kg | 5 | 5.2 | U |
| Chloroethane | ug/kg | 5 | 5.2 | U |
| Chloroform | ug/kg | 5 | 5.2 | U |
| Chloromethane | ug/kg | 5 | 5.2 | U |
| cis-1,2-Dichloroethene | ug/kg | 5 | 5.2 | U |
| cis-1,3-Dichloropropene | ug/kg | 5 | 5.2 | U |
| Dibromochloromethane | ug/kg | 5 | 5.2 | U |
| Ethylbenzene | ug/kg | 5 | 5.2 | U |
| m-and/or p-Xylene | ug/kg | 5 | 5.2 | U |
| Methyl ethyl ketone | ug/kg | 10 | 10 | UJ |
| Methyl isobutyl ketone | ug/kg | 10 | 10 | U |
| Methylene Chloride | ug/kg | 5 | 5.2 | U |
| o-xylene | ug/kg | 5 | 10 | U |
| Styrene | ug/kg | 5 | 5.2 | U |
| Tetrachloroethene | ug/kg | 5 | 5.2 | U |
| Toluene | ug/kg | 5 | 5.2 | U |
| trans-1,2-Dichloroethene | ug/kg | 5 | 5.2 | U |
| trans-1,3-Dichloropropene | ug/kg | 5 | 5.2 | U |
| Trichloroethene | ug/kg | 5 | 5.2 | U |
| Vinyl Chloride | ug/kg | 5 | 5.2 | U |



Created on 11/7/2002

## Table G-3. Data Presentation: Soil Boring Results, Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit but greater than or equal to the instrument detection limit.
B – Organics: Analyte was found in the associated method blank. Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25% difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. For SW846 methods, the samples are reported down to the method detection limits (MDL). For metals, the samples are reported down to the instrument detection limit (IDL).
MDL – Method Detection Limit.
SAICXXR – An SAIC field sample number followed by an "R" designates a recollected sample.

Created on 11/7/2002

# Table G-4. Data Presentation: Groundwater Results, Industrial Waste/Sanitary Landfill
## Wallops Flight Facility, Accomack County, Virginia

| Site ID | | | HP-IWL-01 | | HP-IWL-01 | | HP-IWL-02 | | HP-IWL-03 | | HP-IWL-04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01D | | SAIC01 | | SAIC01 | | SAIC01 | |
| Site Type | | | PNCH | | PNCH | | PNCH | | PNCH | | PNCH | |
| Collection Date | | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/07/02 | |
| Depth (ft) | | | 16.50 | | 16.50 | | 16.00 | | 19.00 | | 19.00 | |
| ***METALS(6010)*** | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | |
| Aluminum | ug/L | 200 | 30.9 | U | 30.9 | U | 30.9 | U | 30.9 | U | 30.9 | UJ |
| Antimony | ug/L | 6 | 2.5 | U | 2.5 | U | 2.5 | U | 2.5 | U | 2.5 | UJ |
| Arsenic | ug/L | 10 | 3.4 | U | 3.4 | U | 3.4 | U | 3.4 | U | 3.4 | U |
| Barium | ug/L | 200 | 14.5 | | 14.1 | | 8.6 | | 12.6 | | 19.3 | |
| Beryllium | ug/L | 5 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Cadmium | ug/L | 5 | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U |
| Calcium | ug/L | 1000 | 26600 | N | 26800 | J | 11500 | J | 15000 | J | 29300 | |
| Chromium | ug/L | 10 | 1.3 | U | 1.3 | U | 1.3 | U | 1.3 | U | 1.3 | U |
| Cobalt | ug/L | 50 | 1 | B | 0.8 | U | 1.8 | B | 0.8 | B | 0.6 | UJ |
| Copper | ug/L | 10 | 1.5 | U | 1.4 | U | 1 | U | 1.7 | U | 2.8 | U |
| Iron | ug/L | 100 | 187 | | 116 | B | 660 | | 952 | | 568 | |
| Lead | ug/L | 3 | 1.6 | U | 1.6 | U | 1.6 | U | 1.6 | U | 1.6 | U |
| Magnesium | ug/L | 1000 | 5210 | | 5250 | | 3460 | | 5160 | | 7820 | |
| Manganese | ug/L | 15 | 128 | | 80.8 | | 91.7 | | 35.8 | | 52.3 | |
| Nickel | ug/L | 10 | 1.1 | U | 1.1 | U | 2.8 | B | 3.9 | B | 1.5 | B |
| Potassium | ug/L | 1000 | 4360 | | 4240 | | 1560 | | 1730 | | 2190 | |
| Selenium | ug/L | 5 | 3.5 | U | 3.5 | U | 3.5 | U | 3.5 | U | 3.5 | U |
| Silver | ug/L | 10 | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U |
| Sodium | ug/L | 1000 | 12900 | J | 12800 | UJ | 7420 | J | 6290 | J | 7300 | |
| Thallium | ug/L | 10 | 2.7 | U | 2.7 | U | 2.7 | U | 2.7 | U | 2.7 | U |
| Vanadium | ug/L | 50 | 0.7 | UJ | 0.7 | UJ | 0.7 | UJ | 0.7 | UJ | 0.7 | U |
| Zinc | ug/L | 20 | 4.2 | U | 4 | U | 7.2 | U | 26.6 | U | 8.6 | U |
| ***METALS(7470)*** | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | |
| Mercury | ug/L | 0.2 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 1,2-Dichlorobenzene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 1,3-Dichlorobenzene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 1,4-Dichlorobenzene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 2,4,5-Trichlorophenol | ug/L | 20 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 2,4,6-Trichlorophenol | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 2,4-Dichlorophenol | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 2,4-Dimethylphenol | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 2,4-Dinitrophenol | ug/L | 20 | 25 | U | 27 | U | 25 | U | 24 | U | 24 | U |
| 2,4-Dinitrotoluene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 2,6-Dinitrotoluene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 2-Chloronaphthalene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 2-Chlorophenol | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 2-Methylnaphthalene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 2-Methylphenol | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 2-Nitroaniline | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 2-Nitrophenol | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |

Created on 11/7/2002

# Table G-4. Data Presentation: Groundwater Results, Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | HP-IWL-01 | | HP-IWL-01 | | HP-IWL-02 | | HP-IWL-03 | | HP-IWL-04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01D | | SAIC01 | | SAIC01 | | SAIC01 | |
| Site Type | | | PNCH | | PNCH | | PNCH | | PNCH | | PNCH | |
| Collection Date | | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/07/02 | |
| Depth (ft) | | | 16.50 | | 16.50 | | 16.00 | | 19.00 | | 19.00 | |
| 3,3'-Dichlorobenzidine | ug/L | 20 | 25 | U | 27 | U | 25 | U | 24 | U | 24 | U |
| 3-Nitroaniline | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 4,6-Dinitro-2-cresol | ug/L | 20 | 25 | U | 27 | U | 25 | U | 24 | U | 24 | U |
| 4-Bromophenyl phenyl ether | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 4-Chloro-3-methylphenol | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 4-Chloroaniline | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 4-Chlorophenyl phenyl ether | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 4-Methylphenol | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 4-Nitroaniline | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| 4-Nitrophenol | ug/L | 20 | 25 | U | 27 | U | 25 | U | 24 | U | 24 | U |
| Acenaphthene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Acenaphthylene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Anthracene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Benzo(a)anthracene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Benzo(a)pyrene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Benzo(b)fluoranthene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Benzo(g,h,i)perylene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Benzo(k)fluoranthene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| bis(2-chloroethoxy) methane | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| bis(2-Chloroethyl) Ether | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| bis(2-chloroisopropyl) ether | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| bis(2-Ethylhexyl)phthalate | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Butylbenzyl phthalate | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Carbazole | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Chrysene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Dibenzo(a,h)anthracene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Dibenzofuran | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Diethyl phthalate | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Dimethyl phthalate | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Di-n-butyl phthalate | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Di-n-octyl phthalate | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Fluoranthene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Fluorene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Hexachlorobenzene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Hexachlorobutadiene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Hexachlorocyclopentadiene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Hexachloroethane | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Indeno(1,2,3-cd)pyrene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Isophorone | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Naphthalene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Nitrobenzene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| N-Nitrosodi-n-propylamine | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| N-Nitrosodiphenylamine | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Pentachlorophenol | ug/L | 20 | 25 | U | 27 | U | 25 | U | 24 | U | 24 | U |
| Phenanthrene | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Phenol | ug/L | 10 | 13 | U | 13 | U | 13 | U | 12 | U | 12 | U |
| Pyrene | ug/L | 10 | 13 | UJ | 13 | UJ | 13 | UJ | 12 | UJ | 12 | UJ |

Created on 11/7/2002

## Table G-4. Data Presentation: Groundwater Results, Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | HP-IWL-01 | | HP-IWL-01 | | HP-IWL-02 | | HP-IWL-03 | | HP-IWL-04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01D | | SAIC01 | | SAIC01 | | SAIC01 | |
| Site Type | | | PNCH | | PNCH | | PNCH | | PNCH | | PNCH | |
| Collection Date | | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/06/02 | | 08/07/02 | |
| Depth (ft) | | | 16.50 | | 16.50 | | 16.00 | | 19.00 | | 19.00 | |
| *VOLATILE ORGANIC COMPOUNDS(8260)* | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| 1,1,2,2-Tetrachloroethane | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| 1,1,2-Trichloroethane | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| 1,1-Dichloroethane | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| 1,1-Dichloroethene | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| 1,2-Dichloroethane | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| 1,2-Dichloropropane | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| 2-Hexanone | ug/L | 5 | 5 | UJ | 5 | UJ | 5 | UJ | 5 | UJ | 5 | UJ |
| Acetone | ug/L | 5 | 7.1 | UJ | 5 | UJ | 5 | UJ | 5 | UJ | 5 | UJ |
| Benzene | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Bromodichloromethane | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Bromoform | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Bromomethane | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Carbon disulfide | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Carbon Tetrachloride | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Chlorobenzene | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Chloroethane | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Chloroform | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Chloromethane | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| cis-1,2-Dichloroethene | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| cis-1,3-Dichloropropene | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Dibromochloromethane | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Ethylbenzene | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| m-and/or p-Xylene | ug/L | 1 | 1 | UJ | 1 | UJ | 0.7 | J | 1 | UJ | 1 | UJ |
| Methyl ethyl ketone | ug/L | 5 | 5 | UJ | 5 | UJ | 5 | UJ | 5 | UJ | 5 | UJ |
| Methyl isobutyl ketone | ug/L | 5 | 5 | UJ | 5 | UJ | 5 | UJ | 5 | UJ | 5 | UJ |
| Methylene Chloride | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 2.3 | UJ |
| o-xylene | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Styrene | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Tetrachloroethene | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Toluene | ug/L | 1 | 0.6 | J | 1 | UJ | 1.7 | J | 1.2 | J | 1 | UJ |
| trans-1,2-Dichloroethene | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| trans-1,3-Dichloropropene | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Trichloroethene | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |
| Vinyl Chloride | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ | 1 | UJ |



Created on 11/7/2002

## Table G-4. Data Presentation: Groundwater Results, Industrial Waste/Sanitary Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit but greater than or equal to the instrument detection limit.
B – Organics: Analyte was found in the associated method blank. Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25% difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. For SW846 methods, the samples are reported down to the method detection limits (MDL). For metals, the samples are reported down to the instrument detection limit (IDL).
MDL – Method Detection Limit.
SAICXXR – An SAIC field sample number followed by an "R" designates a recollected sample.

Created on 11/7/2002

# Table G-5. Data Presentation: Soil Boring Results, Construction Debris Landfill
## Wallops Flight Facility, Accomack County, Virginia

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site ID | | | SB-CDL-01 | | SB-CDL-01 | | SB-CDL-02 | | SB-CDL-02 | | SB-CDL-02 | | SB-CDL-03 | | SB-CDL-03 | |
| Field Sample Number | | | SAIC01 | | SAIC02 | | SAIC01 | | SAIC01D | | SAIC02 | | SAIC01 | | SAIC02 | |
| Site Type | | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | |
| Collection Date | | | 08/07/02 | | 08/07/02 | | 08/07/02 | | 08/07/02 | | 08/07/02 | | 08/07/02 | | 08/07/02 | |
| Depth (ft) | | | 6.50 | | 9.00 | | 0.00 | | 0.00 | | 7.00 | | 0.00 | | 4.00 | |

***METALS(6010)***

| Parameter | Units | RL | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | MG/KG | 20 | 7170 | | 4140 | | 29100 | | 31200 | | 6770 | | 44400 | | 11000 | |
| Antimony | MG/KG | 0.6 | 0.21 | UJ | 0.22 | UJ | 1.2 | UJ | 1.7 | UJ | 0.24 | UJ | 23.5 | J | 3.4 | UJ |
| Arsenic | MG/KG | 1 | 1.6 | | 0.64 | B | 5 | B | 6.9 | B | 1.9 | | 5.3 | B | 6.9 | |
| Barium | MG/KG | 20 | 15.9 | | 5.2 | | 371 | | 325 | | 30.6 | | 240 | | 55.3 | |
| Beryllium | MG/KG | 0.5 | 0.17 | | 0.15 | | 0.41 | B | 0.4 | B | 0.34 | | 0.4 | B | 0.28 | |
| Cadmium | MG/KG | 0.5 | 0.03 | B | 0.02 | U | 25.9 | | 29.7 | | 0.04 | B | 23.9 | | 4.9 | |
| Calcium | MG/KG | 100 | 3480 | | 546 | | 2940 | | 2710 | | 626 | | 1750 | | 871 | |
| Chromium | MG/KG | 1 | 7.6 | | 3.7 | | 26.8 | | 29.7 | | 6.7 | | 53 | | 19.7 | |
| Cobalt | MG/KG | 5 | 1.3 | | 1.2 | | 3 | | 3.8 | | 1.6 | | 3.6 | | 4.3 | |
| Copper | MG/KG | 1 | 3.5 | | 1.5 | U | 1110 | | 1240 | | 2.5 | | 2660 | | 155 | |
| Iron | MG/KG | 10 | 3740 | | 2100 | | 7740 | | 34300 | | 4420 | | 10700 | | 39200 | |
| Lead | MG/KG | 0.3 | 9.8 | | 12.4 | | 266 | | 253 | | 4 | | 947 | | 141 | |
| Magnesium | MG/KG | 100 | 288 | | 134 | | 1450 | | 1390 | | 660 | | 1950 | | 843 | |
| Manganese | MG/KG | 1.5 | 30.8 | | 6.7 | | 407 | | 642 | | 45.3 | | 387 | | 185 | |
| Nickel | MG/KG | 1 | 4.2 | J | 2.2 | J | 10.8 | J | 12.7 | J | 3.9 | J | 110 | U | 15.4 | J |
| Potassium | MG/KG | 100 | 179 | | 99 | | 565 | | 518 | | 255 | | 389 | | 387 | |
| Selenium | MG/KG | 0.5 | 0.23 | B | 0.22 | U | 1.2 | U | 1.3 | B | 0.37 | B | 2 | B | 1 | B |
| Silver | MG/KG | 1 | 0.05 | U | 0.05 | U | 0.29 | U | 0.33 | B | 0.06 | U | 16.8 | | 1.6 | |
| Sodium | MG/KG | 100 | 73.5 | UJ | 62.4 | UJ | 163 | UJ | 113 | UJ | 76.4 | UJ | 150 | UJ | 39.6 | UJ |
| Thallium | MG/KG | 1 | 0.47 | U | 0.49 | U | 2.8 | U | 2.8 | U | 0.53 | U | 2.7 | U | 1.4 | B |
| Vanadium | MG/KG | 5 | 7.5 | | 3.9 | | 14.1 | | 14.7 | | 9.7 | | 13.2 | | 15.6 | |
| Zinc | MG/KG | 2 | 14.6 | | 3.2 | | 1400 | | 1420 | | 15.9 | | 1030 | | 258 | |

***METALS(7471)***

| Parameter | Units | RL | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | MG/KG | 0.1 | 0.04 | | 0.02 | U | 0.33 | | 0.08 | | 0.02 | B | 0.32 | | 0.04 | |

***SEMIVOLATILE ORGANIC COMPOUNDS(8270)***

| Parameter | Units | RL | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 1,2-Dichlorobenzene | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 1,3-Dichlorobenzene | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 1,4-Dichlorobenzene | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 2,4,5-Trichlorophenol | ug/kg | 660 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 2,4,6-Trichlorophenol | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 2,4-Dichlorophenol | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 2,4-Dimethylphenol | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 2,4-Dinitrophenol | ug/kg | 660 | 740 | U | 810 | U | 720 | U | 710 | U | 800 | U | 760 | U | 820 | U |
| 2,4-Dinitrotoluene | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 2,6-Dinitrotoluene | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 2-Chloronaphthalene | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 2-Chlorophenol | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 2-Methylnaphthalene | ug/kg | 330 | 370 | U | 2500 | | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 2-Methylphenol | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 2-Nitroaniline | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 2-Nitrophenol | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |

Created on 11/7/2002

## Table G-5. Data Presentation: Soil Boring Results, Construction Debris Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | SB-CDL-01 | | SB-CDL-01 | | SB-CDL-02 | | SB-CDL-02 | | SB-CDL-02 | | SB-CDL-03 | | SB-CDL-03 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC02 | | SAIC01 | | SAIC01D | | SAIC02 | | SAIC01 | | SAIC02 | |
| Site Type | | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | |
| Collection Date | | | 08/07/02 | | 08/07/02 | | 08/07/02 | | 08/07/02 | | 08/07/02 | | 08/07/02 | | 08/07/02 | |
| Depth (ft) | | | 6.50 | | 9.00 | | 0.00 | | 0.00 | | 7.00 | | 0.00 | | 4.00 | |
| 3,3'-Dichlorobenzidine | ug/kg | 660 | 740 | U | 810 | U | 720 | U | 710 | U | 800 | U | 760 | U | 820 | U |
| 3-Nitroaniline | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 4,6-Dinitro-2-cresol | ug/kg | 660 | 740 | U | 810 | U | 720 | U | 710 | U | 800 | U | 760 | U | 820 | U |
| 4-Bromophenyl phenyl ether | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 4-Chloro-3-methylphenol | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 4-Chloroaniline | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 4-Chlorophenyl phenyl ether | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 4-Methylphenol | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 4-Nitroaniline | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| 4-Nitrophenol | ug/kg | 660 | 740 | U | 810 | U | 720 | U | 710 | U | 800 | U | 760 | U | 820 | U |
| Acenaphthene | ug/kg | 330 | 72 | J | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Acenaphthylene | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Anthracene | ug/kg | 330 | 150 | J | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Benzo(a)anthracene | ug/kg | 330 | 270 | J | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Benzo(a)pyrene | ug/kg | 330 | 220 | J | 400 | U | 360 | U | 360 | U | 400 | U | 37 | J | 410 | U |
| Benzo(b)fluoranthene | ug/kg | 330 | 260 | J | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Benzo(g,h,i)perylene | ug/kg | 330 | 150 | J | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Benzo(k)fluoranthene | ug/kg | 330 | 94 | J | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| bis(2-chloroethoxy) methane | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| bis(2-Chloroethyl) Ether | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| bis(2-chloroisopropyl) ether | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| bis(2-Ethylhexyl)phthalate | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 25 | J | 400 | U | 65 | J | 410 | U |
| Butylbenzyl phthalate | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Carbazole | ug/kg | 330 | 79 | J | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Chrysene | ug/kg | 330 | 210 | J | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Dibenzo(a,h)anthracene | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Dibenzofuran | ug/kg | 330 | 44 | J | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Diethyl phthalate | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Dimethyl phthalate | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Di-n-butyl phthalate | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Di-n-octyl phthalate | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Fluoranthene | ug/kg | 330 | 430 | | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Fluorene | ug/kg | 330 | 78 | J | 95 | J | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Hexachlorobenzene | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Hexachlorobutadiene | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Hexachlorocyclopentadiene | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Hexachloroethane | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Indeno(1,2,3-cd)pyrene | ug/kg | 330 | 110 | J | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Isophorone | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Naphthalene | ug/kg | 330 | 55 | J | 830 | | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Nitrobenzene | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| N-Nitrosodi-n-propylamine | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| N-Nitrosodiphenylamine | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Pentachlorophenol | ug/kg | 660 | 740 | U | 810 | U | 720 | U | 710 | U | 800 | U | 760 | U | 820 | U |
| Phenanthrene | ug/kg | 330 | 530 | | 63 | J | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Phenol | ug/kg | 330 | 370 | U | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |
| Pyrene | ug/kg | 330 | 510 | | 400 | U | 360 | U | 360 | U | 400 | U | 380 | U | 410 | U |



Created on 11/7/2002

## Table G-5. Data Presentation: Soil Boring Results, Construction Debris Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | SB-CDL-01 | | SB-CDL-01 | | SB-CDL-02 | | SB-CDL-02 | | SB-CDL-02 | | SB-CDL-03 | | SB-CDL-03 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC02 | | SAIC01 | | SAIC01D | | SAIC02 | | SAIC01 | | SAIC02 | |
| Site Type | | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | | BORE | |
| Collection Date | | | 08/07/02 | | 08/07/02 | | 08/07/02 | | 08/07/02 | | 08/07/02 | | 08/07/02 | | 08/07/02 | |
| Depth (ft) | | | 6.50 | | 9.00 | | 0.00 | | 0.00 | | 7.00 | | 0.00 | | 4.00 | |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | | | | | | | | | |
| Parameter | Units | RL | | | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| 1,1,2,2-Tetrachloroethane | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| 1,1,2-Trichloroethane | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| 1,1-Dichloroethane | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| 1,1-Dichloroethene | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| 1,2-Dichloroethane | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| 1,2-Dichloropropane | ug/kg | 5 | 5.5 | U | 2000 | J | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| 2-Hexanone | ug/kg | 10 | 11 | U | 4100 | U | 12 | U | 13 | U | 9.5 | U | 19 | U | 11 | U |
| *Acetone* | *ug/kg* | *10* | 12 | U | *4100* | *UJ* | 36 | U | *55* | U | 9.5 | U | *55* | U | 15 | U |
| Benzene | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Bromodichloromethane | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Bromoform | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Bromomethane | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Carbon disulfide | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Carbon Tetrachloride | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Chlorobenzene | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Chloroethane | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Chloroform | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Chloromethane | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 87 | | 5.7 | U |
| cis-1,2-Dichloroethene | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| cis-1,3-Dichloropropene | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Dibromochloromethane | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Ethylbenzene | ug/kg | 5 | 5.5 | U | 12000 | J | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| m-and/or p-Xylene | ug/kg | 5 | 5.5 | U | 9600 | J | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Methyl ethyl ketone | ug/kg | 10 | 11 | UJ | 4100 | U | 12 | UJ | 13 | UJ | 9.5 | UJ | 19 | UJ | 11 | UJ |
| Methyl isobutyl ketone | ug/kg | 10 | 11 | U | 4100 | U | 12 | U | 13 | U | 9.5 | U | 19 | U | 11 | U |
| Methylene Chloride | ug/kg | 5 | 5.6 | U | 2200 | U | 6 | U | 6.4 | U | 4.8 | U | 9.7 | UJ | 5.7 | U |
| o-xylene | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Styrene | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Tetrachloroethene | ug/kg | 5 | 5.5 | U | 1100 | J | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Toluene | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| trans-1,2-Dichloroethene | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| trans-1,3-Dichloropropene | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Trichloroethene | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |
| Vinyl Chloride | ug/kg | 5 | 5.5 | U | 2100 | U | 6 | U | 6.4 | U | 4.8 | U | 9.5 | U | 5.7 | U |

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## Table G-5. Data Presentation: Soil Boring Results, Construction Debris Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit but greater than or equal to the instrument detection limit.
B – Organics: Analyte was found in the associated method blank. Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25% difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. For SW846 methods, the samples are reported down to the method detection limits (MDL). For metals, the samples are reported down to the instrument detection limit (IDL).
MDL – Method Detection Limit.
SAICXXR – An SAIC field sample number followed by an "R" designates a recollected sample.

Created on 11/7/2002

# Table G-6. Data Presentation: Groundwater Results, Construction Debris Landfill
## Wallops Flight Facility, Accomack County, Virginia

| Site ID | | | HP-CDL-01 | | HP-CDL-02 | | HP-CDL-03 | |
|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01 | | SAIC01 | |
| Site Type | | | PNCH | | PNCH | | PNCH | |
| Collection Date | | | 08/07/02 | | 08/07/02 | | 08/07/02 | |
| Depth (ft) | | | 10.00 | | 8.00 | | 4.00 | |
| ***METALS(6010)*** | | | | | | | | |
| Parameter | Units | RL | | | | | | |
| Aluminum | ug/L | 200 | 30.9 | UJ | 30.9 | UJ | 30.9 | UJ |
| Antimony | ug/L | 6 | 2.5 | UJ | 2.5 | UJ | 2.5 | UJ |
| Arsenic | ug/L | 10 | 12.7 | U | 3.4 | U | 3.4 | U |
| Barium | ug/L | 200 | **28** | | **18.7** | | **315** | |
| Beryllium | ug/L | 5 | 0.1 | U | 0.1 | U | 0.1 | U |
| Cadmium | ug/L | 5 | **0.35** | B | 0.3 | U | 0.3 | U |
| Calcium | ug/L | 1000 | **17000** | | **33600** | | **54000** | |
| Chromium | ug/L | 10 | 1.3 | U | 1.3 | U | **3.4** | B |
| Cobalt | ug/L | 50 | 0.6 | UJ | 0.6 | UJ | 0.6 | UJ |
| Copper | ug/L | 10 | 2.2 | U | 5.6 | U | 3 | U |
| Iron | ug/L | 100 | **28600** | | 24.3 | U | **359** | |
| Lead | ug/L | 3 | **13.6** | | 1.6 | U | 1.6 | U |
| Magnesium | ug/L | 1000 | **1110** | | **8500** | | **6210** | |
| Manganese | ug/L | 15 | **791** | | **105** | | **451** | |
| Nickel | ug/L | 10 | 1.1 | U | 1.1 | U | **14.3** | |
| Potassium | ug/L | 1000 | **2220** | | **2360** | | **4300** | |
| Selenium | ug/L | 5 | 3.5 | U | 3.5 | U | 3.5 | U |
| Silver | ug/L | 10 | 0.6 | U | 0.6 | U | 0.6 | U |
| Sodium | ug/L | 1000 | **9040** | | **9670** | | **9530** | |
| Thallium | ug/L | 10 | 2.7 | U | 2.7 | U | 2.7 | U |
| Vanadium | ug/L | 50 | **3.1** | B | **0.79** | B | 0.7 | U |
| Zinc | ug/L | 20 | 9.3 | U | 4.5 | U | **87.4** | |
| ***METALS(7470)*** | | | | | | | | |
| Parameter | Units | RL | | | | | | |
| Mercury | ug/L | 0.2 | 0.1 | U | 0.1 | U | 0.1 | U |
| ***SEMIVOLATILE ORGANIC COMPOUNDS(8270)*** | | | | | | | | |
| Parameter | Units | RL | | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 1,2-Dichlorobenzene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 1,3-Dichlorobenzene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 1,4-Dichlorobenzene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 2,4,5-Trichlorophenol | ug/L | 20 | 14 | U | 14 | U | 13 | U |
| 2,4,6-Trichlorophenol | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 2,4-Dichlorophenol | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 2,4-Dimethylphenol | ug/L | 10 | **10.4** | J | 14 | U | 13 | U |
| 2,4-Dinitrophenol | ug/L | 20 | 29 | U | 29 | U | 25 | U |
| 2,4-Dinitrotoluene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 2,6-Dinitrotoluene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 2-Chloronaphthalene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 2-Chlorophenol | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 2-Methylnaphthalene | ug/L | 10 | **49** | | 14 | U | 13 | U |
| 2-Methylphenol | ug/L | 10 | **27** | | 14 | U | 13 | U |
| 2-Nitroaniline | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 2-Nitrophenol | ug/L | 10 | 14 | U | 14 | U | 13 | U |

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## Table G-6. Data Presentation: Groundwater Results, Construction Debris Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | HP-CDL-01 | | HP-CDL-02 | | HP-CDL-03 | |
|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01 | | SAIC01 | |
| Site Type | | | PNCH | | PNCH | | PNCH | |
| Collection Date | | | 08/07/02 | | 08/07/02 | | 08/07/02 | |
| Depth (ft) | | | 10.00 | | 8.00 | | 4.00 | |
| 3,3'-Dichlorobenzidine | ug/L | 20 | 29 | U | 29 | U | 25 | U |
| 3-Nitroaniline | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 4,6-Dinitro-2-cresol | ug/L | 20 | 29 | U | 29 | U | 25 | U |
| 4-Bromophenyl phenyl ether | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 4-Chloro-3-methylphenol | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 4-Chloroaniline | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 4-Chlorophenyl phenyl ether | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 4-Methylphenol | ug/L | 10 | 46 | | 14 | U | 13 | U |
| 4-Nitroaniline | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| 4-Nitrophenol | ug/L | 20 | 29 | U | 29 | U | 25 | U |
| Acenaphthene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Acenaphthylene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Anthracene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Benzo(a)anthracene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Benzo(a)pyrene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Benzo(b)fluoranthene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Benzo(g,h,i)perylene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Benzo(k)fluoranthene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| bis(2-chloroethoxy) methane | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| bis(2-Chloroethyl) Ether | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| bis(2-chloroisopropyl) ether | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| bis(2-Ethylhexyl)phthalate | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Butylbenzyl phthalate | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Carbazole | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Chrysene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Dibenzo(a,h)anthracene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Dibenzofuran | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Diethyl phthalate | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Dimethyl phthalate | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Di-n-butyl phthalate | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Di-n-octyl phthalate | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Fluoranthene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Fluorene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Hexachlorobenzene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Hexachlorobutadiene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Hexachlorocyclopentadiene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Hexachloroethane | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Indeno(1,2,3-cd)pyrene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Isophorone | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Naphthalene | ug/L | 10 | 120 | | 14 | U | 13 | U |
| Nitrobenzene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| N-Nitrosodi-n-propylamine | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| N-Nitrosodiphenylamine | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Pentachlorophenol | ug/L | 20 | 29 | U | 29 | U | 25 | U |
| Phenanthrene | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Phenol | ug/L | 10 | 14 | U | 14 | U | 13 | U |
| Pyrene | ug/L | 10 | 14 | UJ | 14 | UJ | 13 | UJ |

Created on 11/7/2002

## Table G-6. Data Presentation: Groundwater Results, Construction Debris Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

| Site ID | | | HP-CDL-01 | | HP-CDL-02 | | HP-CDL-03 | |
|---|---|---|---|---|---|---|---|---|
| Field Sample Number | | | SAIC01 | | SAIC01 | | SAIC01 | |
| Site Type | | | PNCH | | PNCH | | PNCH | |
| Collection Date | | | 08/07/02 | | 08/07/02 | | 08/07/02 | |
| Depth (ft) | | | 10.00 | | 8.00 | | 4.00 | |
| ***VOLATILE ORGANIC COMPOUNDS(8260)*** | | | | | | | | |
| Parameter | Units | RL | | | | | | |
| 1,1,1-Trichloroethane | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| 1,1,2,2-Tetrachloroethane | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| 1,1,2-Trichloroethane | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| 1,1-Dichloroethane | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| 1,1-Dichloroethene | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| 1,2-Dichloroethane | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| 1,2-Dichloropropane | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| 2-Hexanone | ug/L | 5 | 5 | UJ | 5 | U | 5 | UJ |
| Acetone | ug/L | 5 | 5 | UJ | 6.2 | | 5 | UJ |
| Benzene | ug/L | 1 | 500 | UJ | 0.64 | J | 1 | UJ |
| Bromodichloromethane | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| Bromoform | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| Bromomethane | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ |
| Carbon disulfide | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| Carbon Tetrachloride | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| Chlorobenzene | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| Chloroethane | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| Chloroform | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| Chloromethane | ug/L | 1 | 0.7 | J | 1 | U | 1 | UJ |
| cis-1,2-Dichloroethene | ug/L | 1 | 12 | J | 1 | U | 2.3 | J |
| cis-1,3-Dichloropropene | ug/L | 1 | 1 | UJ | 1 | UJ | 1 | UJ |
| Dibromochloromethane | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| Ethylbenzene | ug/L | 1 | 920 | J | 1 | U | 1 | UJ |
| m-and/or p-Xylene | ug/L | 1 | 3700 | J | 1 | U | 1 | UJ |
| Methyl ethyl ketone | ug/L | 5 | 5 | UJ | 5 | U | 5 | UJ |
| Methyl isobutyl ketone | ug/L | 5 | 5 | UJ | 5 | UJ | 5 | UJ |
| Methylene Chloride | ug/L | 1 | 1 | UJ | 2.2 | UJ | 2 | UJ |
| o-xylene | ug/L | 1 | 1700 | J | 1 | U | 1 | UJ |
| Styrene | ug/L | 1 | 22 | J | 1 | U | 1 | UJ |
| Tetrachloroethene | ug/L | 1 | 12 | J | 1 | U | 1 | UJ |
| Toluene | ug/L | 1 | 12000 | J | 1.1 | | 1 | UJ |
| trans-1,2-Dichloroethene | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| trans-1,3-Dichloropropene | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |
| Trichloroethene | ug/L | 1 | 1.1 | J | 1 | U | 1 | UJ |
| Vinyl Chloride | ug/L | 1 | 1 | UJ | 1 | U | 1 | UJ |

Created on 11/7/2002

## Table G-6. Data Presentation: Groundwater Results, Construction Debris Landfill Wallops Flight Facility, Accomack County, Virginia (continued)

***Footnotes:***

B – Metals: Reported value was less than the contract required detection limit but greater than or equal to the instrument detection limit.
B – Organics: Analyte was found in the associated method blank. Validation of the data did not result in this compound being qualified as nondetect due to blank contamination. Therefore this result is considered to be site related.
D - The value for the target analyte was calculated from a dilution.
E - Metals: The reported value is estimated because of the presence of interferents.
E - Organics: Concentration range exceeded for this analyte.
J – Value is estimated.
N - Metals: Spiked sample recovery not within control limits.
N - Organics: Tentatively identified compound based on mass spectral library search.
P - There is greater than 25% difference for detected concentrations between the two GC columns for the associated pesticide/PCB target analyte.
R – Value is rejected.
U – Compound was analyzed for but not detected.
UJ - Compound was analyzed for but not detected and is considered an estimate.
X - The mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.
* - Duplicate analysis not within control limits.
N/A – Compound not analyzed for.
NF – Data not found.
RL – Reporting Limit for each method. For SW846 methods, the samples are reported down to the method detection limits (MDL). For metals, the samples are reported down to the instrument detection limit (IDL).
MDL – Method Detection Limit.
SAICXXR – An SAIC field sample number followed by an "R" designates a recollected sample.



Created on 11/7/2002

# APPENDIX H

# PHOTOGRAPHS

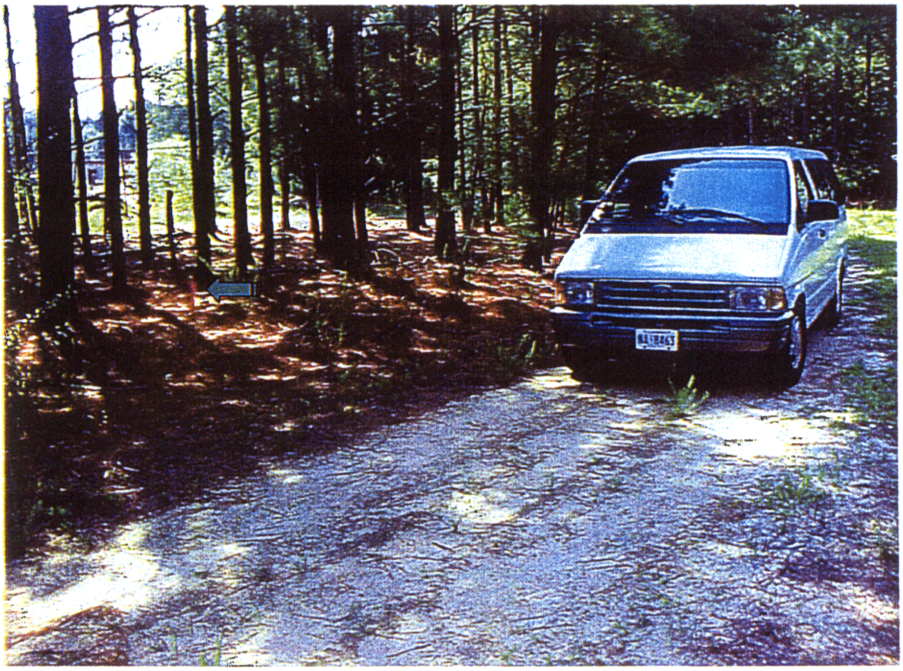
**ENTRANCE TO SB-CDL-01**
**(CDL Site Conditions)**

**SB-CDL-02 SAMPLING LOCATION**
**(Adjacent to Northern Man-made Channel)**

**SB-CDL-02 SAMPLING LOCATION**

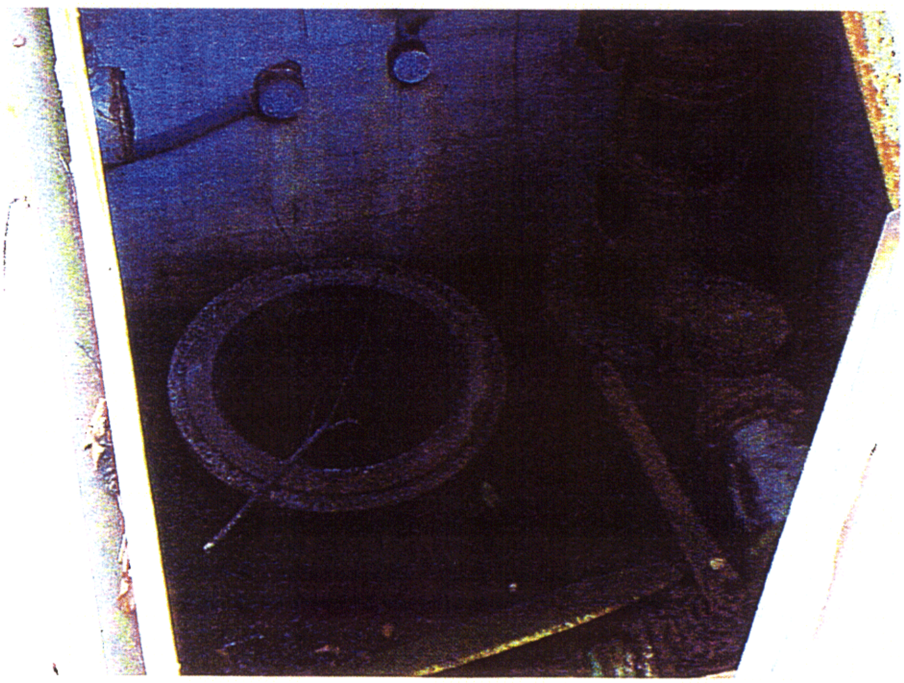
**ENTRANCE TO SB-CDL-03 SAMPLING LOCATION**

**SB-IWL-02 SAMPLING LOCATION**

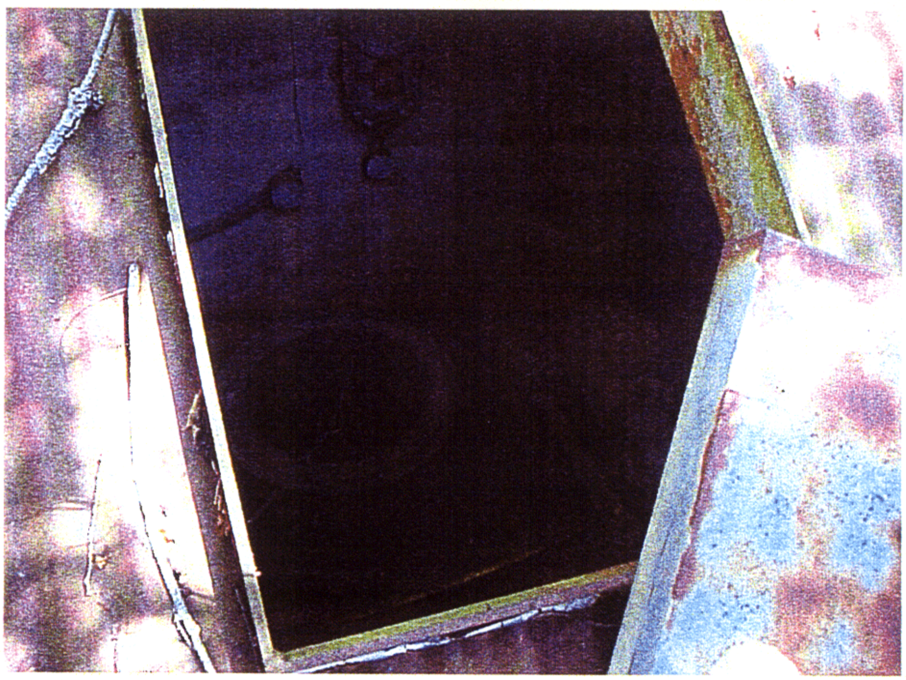


**SB-IWL-03 SAMPLING LOCATION**

OLD WWTP ACCESS ROAD



UST FILL PORT (SAMPLING ACCESS)



**VIEW FROM DOGHOUSE OPENING**