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ANNUAL GROUNDWATER REPORT – OCTOBER 2002

OPERABLE UNIT 7
FIRE TRAINING AREA GROUNDWATER



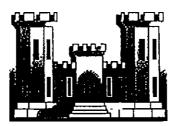
DEFENSE SUPPLY CENTER RICHMOND RICHMOND, VIRGINIA



DEFENSE LOGISTICS AGENCY

PREPARED FOR

U.S. ARMY ENGINEERING AND SUPPORT CENTER HUNTSVILLE



PREPARED BY



MACTEC ENGINEERING AND CONSULTING, INC.

CONTRACT No DACA87-02-D-0007, T.O. 0001 PROJECT No 12001-2-0701

AUGUST 2003

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Program Principal



August 6, 2003

Ms. Edna Sheridan
Contracting Officer
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Huntsville, AL 35816-1822

Subject: Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Center Richmond Contract No. DACA87-02-D-0007

Task Order 0001

Dear Ms Sheridan

MACTEC Engineering and Consulting, Inc. (f/k/a Law Engineering and Environmental Services, Inc.) is pleased to submit the Annual Groundwater Report for Operable Unit 7 (Fire Training Area Groundwater) of the Defense Supply Center Richmond (DSCR) in Chesterfield County, Virginia. The report includes data for groundwater sampling activities conducted during October 2002. Please note that 2002 funding issues delayed production of this document

The purpose of this report is to document the groundwater sampling activities conducted at the DSCR during October 2002. In addition, the Annual Report summarizes October 2001, March/April 2002, July 2002, and October 2002 sample results to evaluate trends and to assess the current nature and extent of contamination. This document includes isoconcentration plume maps for the primary contaminants for the upper and lower WBUs and time-series graphs for comparison to historical data.

Additional copies of this document were issued as noted on the attached distribution list. Please note that this document is intended as a data summary; therefore, no review comments are expected.

MACTEC appreciates the opportunity to assist you on this important project. If you have any questions regarding this submittal, please do not hesitate to call us at 770-421-3400.

Sincerely,

MACTEC ENGINEERING AND CONSULTING, INC.

Robin S Futch, P.G

Project Manager

Angela L McMath, R H S P

Dis Futol

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PREFACE

MACTEC Engineering and Consulting, Inc. (f/k/a Law Engineering and Environmental Services, Inc.) has prepared this Annual Groundwater Report - October 2002 for Operable Unit 7 under Contract DACA87-02-D-0007, Task Order 0001, to the U.S. Army Engineering and Support Center, Huntsville (CEHNC). This Annual Report documents the groundwater sampling and analysis activities conducted at the Defense Supply Center Richmond (DSCR) in Chesterfield County, Virginia during October 2002. In addition, the Annual Report provides a compilation of the October 2001, March/April 2002, July 2002, and October 2002 analytical results in order to evaluate trends and to assess the current nature and extent.

Ms. Angela McMath is the Program Manager for DSCR. Ms Robin Futch is the Project Manager for Task Order 0001 Ms Taura Nichols is the primary author of this document. Dr. James Wallace is the Program Principal.

The efforts of Mr. T.E. Shirley (Project Manager) from CEHNC and Mr. Steve Edlavitch from DSCR are greatly appreciated.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACLs alternate concentration limits

bgs below ground surface

BTOP below top of pump

CEERD United States Army Engineer Research and Development Center

CEHNC United States Army Engineering and Support Center Huntsville

CO₂ carbon dioxide

COPs chemicals of potential concern

CSL Chemical Systems Laboratory

CSM Conceptual Site Model

D&M Dames and Moore

DCA dichloroethane

DCE dichloroethene

DGSC Defense General Supply Center

DLA Defense Logistics Agency

DO dissolved oxygen

DPE dual phase extraction

DPT Direct Push Technology

DQE data quality evaluation

DQO data quality objective

DSCR Defense Supply Center Richmond

ES Engineering Science

ESI expanded site investigation

^oF degrees Fahrenheit

Fe²⁺ ferrous iron

FFA Federal Facilities Agreement

ft/ft feet per foot ft/day feet per day ft/yr feet per year

ft³/day square feet per day ft³/yr cubic feet per year FTA Fire Training Area

FOS fuel oil storage

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LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

FS Feasibility Study

ın/yr ınches per year

J Estimated; based on QC data

JB Estimated, possibly biased high or false positive based on blank contamination

JH Estimated, possibly biased high based upon QC data

JQ Estimated, value is between reporting limit and detection limit

LAW Law Engineering and Environmental Services, Inc.

MACTEC Engineering and Consulting, Inc

MCL maximum contaminant levels

μg/L micrograms per liter

MNA monitored natural attenuation

msl mean sea level

NCDC National Climatic Data Center

NGVD National Geodetic Vertical Datum

NM not measured
NS not sampled

NTU nephelometric turbidity unit

NWI National Wetlands Inventory

ORP oxidation reduction potential

OU Operable Unit

PAH polycyclic aromatic hydrocarbons

PCE tetrachloroethene

pH negative log of the hydrogen ion concentration

PX Post Exchange

QA Quality Assurance

RAB Restoration Advisory Board

RAOs remedial action objectives

RI Remedial Investigation

RPAs Resource Protection Areas

SCE Soils Conservation Service

TCA trichloroethane

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Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

TCE trichloroethene

TDS total dissolved solids

TOC total organic carbon

UJ Undetected, reported detection limit is imprecise

USAEHA United States Army Environmental Hygiene Agency

USEPA United States Environmental Protection Agency

USGS United States Geological Survey

VC vinyl chloride

VOCs volatile organic compounds

WBU water bearing unit

WP Work Plan

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TAB

Executive Summary

EXECUTIVE SUMMARY

MACTEC Engineering and Consulting, Inc (f/k/a Law Engineering and Environmental Services, Inc [LAW]), has prepared the Operable Unit 7 Annual Groundwater Report – October 2002 under Contract No DACA87-02-D-0007, Task Order 0001, to the United States Army Engineering and Support Center Huntsville (CEHNC). This annual groundwater report summarizes the September/October 2001, March/April 2002, July 2002, and the October 2002 sampling and analytical results for Operable Unit (OU) 7 of the Defense Supply Center Richmond (DSCR) located in Chesterfield County, Virginia

OU 7 includes contaminated groundwater within and downgradient of the Fire Training Area (FTA) near the southern boundary of the DSCR Soils associated with the FTA are OU 4. Kingsland Creek forms the southern boundary of DSCR approximately 600-feet south of the FTA. Previously, the FTAs were used for fire training exercises where obsolete and unserviceable waste chemicals were burned from the mid-1960s until the late-1970s. Several sampling and analysis programs have been performed at the FTA to evaluate the nature, magnitude, and extent of groundwater contamination.

Field activities for the fourth quarterly sampling event were performed in October 2002 in general accordance with procedures outlined in the "Final Sampling and Analysis Plan Revision 1" (LAW, 1992) and the "Final Quarterly Groundwater Sampling Plan for DSCR" (LAW, 2002a)

Twenty-seven monitoring wells were sampled at OU 7 during the fourth quarterly groundwater sampling event in October 2002. The groundwater samples were analyzed for volatile organic compounds (VOCs), metals, and monitored natural attenuation (MNA) parameters. Analytical results indicated that concentrations of VOCs were consistent with previously detected concentrations and continue to exhibit a decreasing trend in the upper and lower water bearing units (WBUs) and the fractured bedrock

Chlorinated solvent constituents were detected both in the upper and lower WBU monitoring wells at OU 7. During the October 2002 sampling event, the constituents of primary concern, tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (DCE), trans-1,2-DCE, vinyl chloride (VC), 1,1,1-trichloroethane (TCA), 1,1-dichloroethane (DCA), and 1,1-DCE, were detected within the upper WBU.

Results from the October 2002 sampling event for the upper WBU were compared to historical OU 7 data. These comparisons indicate that concentrations of PCE, TCE, *trans*-1,2-DCE, 1,1,1-TCA, 1,1-DCE, and 1,1-DCA were within the range of, and generally lower than, previously recorded concentrations. The reduction of the parent products (PCE, TCE, 1,1,1-TCA) and the presence of daughter products (*cis*,1-2-DCE, *trans*-1,2-DCE, 1,1-DCA, VC) provides evidence that natural degradation is occurring at OU 7

Mann-Kendall trend evaluations were performed for each well to assess the significance of trends observed. The results from the Mann-Kendall evaluations indicated a statistically significant decreasing trend for PCE within the upper WBU. In addition, selected wells within the upper WBU possessed statistically decreasing trends for TCE, cis-1,2-DCE, trans-1,2-DCE, VC, 1,1,1-TCA, 1,1-DCA, and 1,1-DCE. The results from the Mann-Kendall statistics, in conjunction with the time series graphs plotted for selected wells, indicate an overall reduction of contamination within the upper WBU.

For the lower WBU, the detected constituents of primary concern include PCE, TCE, cis-1,2-DCE, and VC. The constituents *trans*-1,2-DCE, 1,1,1-TCA, 1,1-DCE, and 1,1-DCA were not detected during the October 2002 sampling event. The results from this sampling event were compared to historical OU 7 data. These comparisons indicated that concentrations of PCE, TCE, 1,1,1-TCA, 1,1-DCE, and 1,1-DCA were within the range of the historical data.

Mann-Kendall trend evaluations were performed for each well within the lower WBU to assess the significance of trends observed. The results from the Mann-Kendall evaluation do not indicate statistically significant (increasing or decreasing) trends for VOCs in the lower WBU.

Only one well (MWFTA-20) located in the fractured bedrock is currently sampled as part of the quarterly monitoring program. The primary constituents detected during the October 2002 sampling event for MWFTA-20 include TCE, cis-1,2-DCE, VC, 1,1-DCA, and 1,1-DCE. The results from the October 2002 sampling event for the fractured bedrock were compared to historical OU 7 data. These comparisons indicated that concentrations of PCE, TCE, cis-1,2-DCE, 1,1,1-TCA, 1,1-DCE, and 1,1-DCA in October 2002 were within the range of, and generally less than, the historical data. Historically, trans-1,2-DCE has been detected twice in MWFTA-20 at low concentrations (<5-micrograms per liter [µg/L]); however, it was not detected in this well during the October 2002 sampling event

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Comparisons of average concentrations for 1992 and 2002 also indicated a reduction in PCE, TCE, 1,1.1-TCA, 1,1-DCE, 1,1-DCA and an increasing concentration of VC in the fractured bedrock. However, the results from the Mann-Kendall trend evaluation performed for MWFTA-20 do not indicate a statistically significant (decreasing or increasing) trend for the selected VOCs within this well.

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TAB

Section 1.0

1.0 INTRODUCTION

1.0.0.1 MACTEC Engineering and Consulting, Inc (MACTEC) (f/k/a Law Engineering and Environmental Services, Inc. [LAW]), conducted the fourth quarterly groundwater sampling activities during October 2002 at the Defense Supply Center Richmond (DSCR) (Figure 1-1) in Chesterfield County, Virginia, as part of a quarterly groundwater monitoring program currently ongoing at DSCR. Groundwater monitoring wells at Operable Units (OUs) 6, 7, 8, and the Post Exchange (PX) Gasoline Station were sampled in accordance with the procedures outlined in the "Final Sampling and Analysis Plan Revision 1" (LAW, 1992) and the "Final Quarterly Groundwater Sampling Plan for DSCR" (LAW, 2002a). This Annual Groundwater Report summarizes the September/October 2001, March/April 2002, July 2002, and October 2002 sampling and analysis results. MACTEC prepared this report under Contract No DACA87-02-D-0007, Task Order 0001, to the United States Army Engineering and Support Center Huntsville (CEHNC)

1.1 PURPOSE AND OBJECTIVES

- 1.1.0.1 Groundwater samples were collected in October 2001, March/April 2002, July 2002, and October 2002 as part of a quarterly groundwater monitoring program currently ongoing at DSCR. This Annual Groundwater Report has been prepared to document the results of groundwater elevation measurements and groundwater sampling and analysis activities conducted at OU 7 in October 2002 and to summarize the previous year's (October 2001, March/April 2002, July 2002) groundwater sampling activities. Due to funding issues, groundwater samples were not collected during the first quarter of 2002.
- 1.1.0.2 The purpose of the monitoring program at OU 7 is to monitor the groundwater contaminant plume(s) and to collect additional data to document natural attenuation as a potential component of the final remedy and exit strategy for the site. A list of the groundwater monitoring wells sampled at OU 7 during these sampling events is included as Table 1-1, monitoring well locations are depicted on the OU 7 site map (Figure 1-2)
- 1.1.0.3 The objectives of the groundwater sampling program at OU 7 include the following
 - Collect analytical data to document MNA as a component of an effective remedy and exit strategy

- Continue to monitor the current nature and extent of the groundwater contaminant plume(s).
- Collect groundwater elevation data to monitor groundwater flow

1.2 BACKGROUND

1.2.0.1 DSCR, one of three supply centers of the Defense Logistics Agency (DLA), is located at 8000 Jefferson Davis Highway, 11 miles south of Richmond, Virginia, in Chesterfield County (Figure 1-1) DSCR was originally constructed in 1941 as two separate facilities, the Richmond General Depot and Richmond Holding and Reconsignment Point. From 1962 to 1995, the facility was designated as the Defense General Supply Center (DGSC). In 1995 the name was changed to the Defense Supply Center Richmond. DSCR is the lead center for aviation within the DLA. A summary of the environmental restoration program milestones for DSCR is provided in Table 1-2.

1.2.1 Site Description – OU 7

1.2.1.1 The Fire Training Area (FTA) is located near the southern boundary of DSCR and is shown on Figure 1-1. The contaminated soils located at the FTA are designated as OU 4 and have been identified as three separate sources located in the northern portion of the FTA. The groundwater, located beneath and downgradient from these identified sources, is designated as OU 7. OU 4 was previously used for fire training exercises where obsolete and unserviceable waste chemicals were burned from the mid-1960s until the late-1970s. (LAW, 1994)

1.2.1.2 Three separate unlined pits were used for fire training purposes. Flammable liquid chemicals and petroleum products were dumped into the pits, ignited, and then extinguished during the training. Oils, solvents, pesticides, and herbicides may have been used for fuel. (LAW, 1996a)

1.2.1.3 Pit 1, which was used from the mid-1970s to 1979, was located in the eastern portion of OU 7. Pit 2, located in the central portion of OU 7 and west of Pit 1, was used from the late-1960s until it was replaced by Pit 1 in the 1970s. Pit 3, a suspected pit used for fire training activities, is present in 1969 aerial photographs and was located in the western portion of OU 7. Based on aerial photographs, the fuel oil storage (FOS) tank, used to store fuel oil, was partially constructed over Pit 3 in 1975. In 1978, the FOS tank released approximately 10,600 gallons of No. 4 fuel oil to the surface as a result of a cracked valve. Heavy rain at the time of the spill caused the oil to overflow its containment berm and flow across

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the site, ultimately discharging to Kingsland Creek This area, southwest of the FTA, has been designated as OU 13 (a/k/a Polycyclic Aromatic Hydrocarbon [PAH] Area) (LAW, 1996a).

1.2.2 Previous Environmental Studies

1.2.2.1 Previous environmental studies conducted at OU 7 identified groundwater contaminant plumes primarily consisting of volatile organic compounds (VOCs) in the upper and lower water bearing units (WBUs). The plumes extend from the FTA to the southeast. These plumes, consisting of parent compounds, tetrachloroethene (PCE), trichloroethene (TCE), and 1.1.1-trichloroethane (TCA), are considered to be associated with fire training activities at each of the three burn pits. In addition, VOC contamination has been identified within the fractured bedrock at the FTA, but due to the limited number of wells screened within the fractured bedrock, an evaluation of plume locations and boundaries in this medium cannot be made.

1.2.2.2 Multiple organizations have conducted studies at OU 7. These agencies include the Chemical Systems Laboratory (CSL) at the United States Army Toxic and Hazardous Materials Agency, the United States Army Environmental Hygiene Agency (USAEHA), Dames and Moore (D&M), Parsons Engineering-Science, Inc., LAW, and, currently, MACTEC. The studies previously conducted at OU 7 and the related findings are summarized in Table 1-3

1.2.2.3 From 2000 to 2001, LAW conducted sampling events to verify the presence or absence of persistent sources. During this time, direct push technology (DPT) sampling techniques were used to aid in providing a profile of the groundwater conditions in the upper WBU. In 2002, these data were evaluated to aid in the evaluation of the nature and extent as presented in the Summary of Findings Report (MACTEC, 2003a). During this evaluation, three separate plumes were identified downgradient from Pits 1, 2, and, 3, and/or the former FOS tank in the upper WBU at OU 7. Each plume exhibited different VOC parent/daughter product distributions. Due to the current placement of monitoring wells within OU 7, only the plumes downgradient from the Pit 1 and the Pit 3 area continue to be evaluated.

1.2.3 Scheduled Environmental Activities

1.2.3.1 As part of the DSCR Draft Supplemental Feasibility Study (FS) Work Plan (WP) (MACTEC, 2003b), additional field activities are scheduled for OU 7. The proposed field activities include the

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collection of soil and groundwater to refine the facility-wide and OU 7-specific conceptual site model (CSM) and developing realistic remedial action objectives (RAOs). The primary objectives for OU 7 presented in the WP include.

- 1 Evaluate subsurface conditions to determine if features of the bedrock surface potentially affect the distribution and migration of contaminants.
- 2 Characterize source area(s) to determine appropriate remedial action for the prevention of continued leaching to groundwater
- 3 Characterize plume boundaries to evaluate and define potential off-site migration pathways for contaminated groundwater
- 4 Characterize the hydraulic interaction between groundwater and surface water in Kingsland Creek.
- 5. Clarify pre-remedy geochemical conditions in soil and groundwater in OU 7 that are significant in remedy screening, selection, design, and implementation
- **1.2.3.2** Currently, activities are scheduled to be conducted at OU 7 during the latter part of 2003. In addition, groundwater at OU 7 continues to be evaluated under the ongoing quarterly monitoring program.

1.3 REPORT ORGANIZATION

1.3.0.1 The OU 7 Annual Groundwater Report is organized as follows. Section 1.0 describes the purpose and objectives of the Annual Report, presents the facility site description, and summarizes the historical investigations at OU 7, Section 2.0 provides a summary of the CSM including the hydrological, geological, hydrogeological, and geochemical conditions at OU 7; Section 3.0 provides a summary of the groundwater monitoring program including a summary of results for the October 2002 sampling activities, Section 4.0 provides a summary of the nature and extent of groundwater contamination at OU 7, Section 5.0 provides a summary of the conclusions; and Section 6.0 provides the references. Tables, figures, and appendices immediately follow Section 6.0

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TAB

Section 2.0

2.0 CONCEPTUAL SITE MODEL

- 2.0.0.1 The CSM presented in this section considers a broad range of physical, chemical, temporal, and spatial variables that affect the distribution and fate of contaminants. At a minimum, an adequate hydrogeologic CSM should provide a description of the regional and local climate and geology of the area as well as site-specific information to facilitate an understanding of the overall project goals. These goals include: 1) identification of additional data requirements; 2) obtaining the additional data needed, 3) use of the data to generate a model suitable to support remedy evaluation and establishment of specific performance requirements for restoration planning activities. Site-specific information that supports the CSM also includes
 - Identification of principal hydrogeologic units
 - The hydraulic properties of the different hydrogeologic units
 - The evaluations and configurations of the potentiometric and lithologic/bedrock surfaces(s)
 - Surface drainage configurations and hydrologic boundaries
 - Surface water and groundwater interactions
 - Sources of contaminants
 - Direction(s) and rate(s) of contaminant migration
 - Biogeochemical processes affecting contaminant fate
- 2.0.0.2 Available data collected during previous site characterization investigations, treatability studies, and recent monitoring events were compiled and evaluated to develop the current CSM Published literature regarding the physiography, climate, geology, and hydrology of east-central Virginia was also reviewed for the purpose of developing this CSM. The historical databases compiled by the United States Geological Survey (USGS) and data from a number of consulting engineering firms and The current CSM reflects available environmental contractors were incorporated into the CSM investigations and remedy-performance data available for DSCR

2.1 FOCUS OF THE CSM

2.1.0.1 The CSM presented herein focuses on the mechanisms of deposition, fate, and transport of site-related constituents of concern in the environment at and near OU 7. Development of the CSM was

20701-06 2-1 based on descriptions of the soil, groundwater, surface water, and atmospheric systems at the site, and the relationships among these systems, both spatially and temporally. The systems described in the CSM provide an understanding of the local processes that control the behavior of constituents of concern in the environment and will facilitate the selection of efficient and effective remedial methods to protect human health and the environment

2.1.0.2 The CSM serves as the basis for the performance "model" which will be used for the remedial alternatives evaluation and selection process. The CSM will also be used to support an analysis of exposure pathways that will be conducted to define remedial decision criteria and endpoints.

2.2 REGIONAL ENVIRONMENTAL SETTING

2.2.0.1 The regional characteristics of the environmental setting in the vicinity of DSCR that are directly relevant to the CSM and additional data requirements are discussed in the subsection.

2.2.1 Regional Physiography, Geology and Hydrogeology

- 2.2.1.1 DSCR is located in Chesterfield County, Virginia, approximately two miles east of the Fall Line in the Atlantic Coastal Plain Physiographic Province (Powell *et al.*, 1990). DSCR lies in the western margin of the coastal plain, termed the "Fall Zone" (McFarland, 1997), which separates the Atlantic Coastal Plain Physiographic Province from the Piedmont Physiographic Province west of the Fall Line (McFarland, 1997). The Fall Line is a geomorphic and hydrologic feature marking the boundary between the resistant crystalline rocks of the Piedmont to the west and the generally unconsolidated sediments of the coastal plain to the east (Appendix A, Figures A-1, A-2, and A-3). The Atlantic Coastal Plain Physiographic Province, east of DSCR, is characterized by level to gently rolling terrain, broad stream valleys, and extensive wetlands overlying an eastward-thickening wedge of unconsolidated sediments. The Piedmont Physiographic Province, west of the DSCR, is characterized by rolling terrain underlain by igneous and metamorphic rock on which have developed residual soils that range from 0- to 100-feet in thickness, the Piedmont also includes fault-bound structural basins that contain sedimentary and igneous rock (Mills *et al.*, 1987). In addition, Quaternary alluvial deposits are localized in stream valleys.
- 2.2.1.2 The Fall Zone comprises a belt several miles in width encompassing the complex margin between the clevated Piedmont and the lower-lying, more level coastal plain. The topography of the Fall

Zone is dominated by the valleys of the major rivers, which are incised into coastal plain sediments. The coastal plain to the east of the Fall Zone is an undulating lowland ranging in width from fewer than 20 miles to more than 100 miles and lying between the Appalachian Mountain system to the west and the shores of the Atlantic Ocean to the east (Walker and Coleman, 1987). Land surface elevations of the coastal plain in the vicinity of DSCR range from approximately 50- to 100-feet, referenced to the National Geodetic Vertical Datum (NGVD) of 1929 (equivalent to mean sea level [msl]) The Piedmont rises to elevations of several hundred feet NGVD within approximately ten miles to the west and northwest of DSCR.

- 2.2.1.3 The bedrock in the Piedmont of east-central Virginia is the Petersburg Granite. At the Fall Line, the surface of the bedrock dips eastward beneath a thickening wedge of largely unconsolidated sediments of the coastal plain (Appendix A, Figures A-1 through A-3). These sediments originated from erosion of the Petersburg Granite, having been reworked through successive erosional and depositional periods brought about by a series of marine transgressions and regressions resulting from changes in sea level (Meng and Harsh, 1988). The thickness of sediments in central Virginia ranges from zero at the Fall Line to more than 6,000-feet along the Atlantic coast (McFarland, 1997).
- 2.2.1.4 These eastward-dipping stratified sediments are largely undeformed and were deposited in fluvial, deltaic, and marine depositional environments. At the base of the sequence lies a thick series of fluvial and deltaic deposits of Cretaceous age medium to coarse-grained quartz sand with gravel, silt, and clay. These deposits are regionally assigned to the Potomac formation (Meng and Harsh, 1988). This formation is overlain by a much thinner sequence of marine Tertiary deposits, classified as the Aquia and Calvert Formations (from oldest to youngest). Above these formations is found a veneer of flat-lying surficial Tertiary and Quaternary deposits of the Yorktown and Eastover Formations (Figures A-1 and A-2).
- 2.2.1.5 Meng and Harsh (1988) classified the sequence of sediments in the coastal plain into a hydrogeologic framework of WBUs, or "aquifers", and confining units (Figure A-2). Permeable sediments, in the zone of saturation, are generally WBUs, while significantly less-permeable sediments that restrict groundwater movement are considered confining units. The term "aquifer" is often reserved for WBUs from which "usable" quantities of groundwater can be withdrawn.

- 2.2.1.6 Within Chesterfield County, the principal aquifers, from uppermost to deepest, (Appendix A, Figures A-2 and A-3) are reported to be the Yorktown-Eastover aquifer and the Aquia aquifer (separated by the Calvert confining unit), both Tertiary marine strata, and the middle Potomac aquifer, a mostly Cretaceous age fluvial and deltaic deposit (Powell *et al.*, 1990). However, McFarland (1999) suggested that the western limits of the Yorktown-Eastover, the Aquia, and the upper and lower Potomac aquifers may be some distance to the east of DSCR, so these units may not be present in the vicinity of DSCR and Chesterfield County, as interpreted by Powell *et al* (1990). Additionally, groundwater in the Piedmont, located in the western part of Chesterfield County, is largely present in bedrock fractures and in pores in weathered bedrock ("saprolite") overlying Petersburg Granite bedrock. Groundwater also occurs in saprolite and bedrock fractures beneath the coastal plain sedimentary deposits at DSCR.
- 2.2.1.7 Due to the present uncertainty about the classification of the aquifers in the vicinity of DSCR and the heterogeneous nature of the sediments that comprise these aquifers, making their cataloging in the field difficult if not impracticable, they have been grouped into two distinct WBUs. These WBUs are the upper WBU, previously classified as the Yorktown-Eastover aquifer, and the lower WBU, previously classified as the Aquia and the Potomac aquifers. These WBUs are separated by a largely clay confining layer, previously classified as the Calvert confining unit (Appendix A, Figure A-2).

2.2.2 Surface Water and Wetlands

- 2.2.2.1 Streams in the vicinity of DSCR are tributaries to the James River, which ultimately discharges to the Chesapeake Bay. Streams within the vicinity of DSCR include a tributary to Falling Creek located along the western property boundary in the northern portion of DSCR, No Name Creek originating on DSCR property and flowing to the east of the facility, and Kingsland Creek located along the southern property boundary (Figure 2-1)
- 2.2.2.2 Corridors of environmentally sensitive lands that lie along or near the banks of streams, rivers, and other waterways that ultimately discharge into the Chesapeake Bay have been designated as resource protection areas (RPAs) under Virginia's Chesapeake Bay Preservation Act of 1988. In response to the Act, Chesterfield County enacted the Chesapeake Bay Preservation Ordinance in 1990 to protect environmentally sensitive lands known as Chesapeake Bay Preservation Areas. RPAs are the most sensitive of these areas in Chesterfield County and include wetlands adjacent to perennial streams plus 100-feet buffer zones on the landward sides of such wetlands. This Act affords special protection to

these RPAs and prohibits certain types of activities (e.g., excavation, filling, and grading) within these zones. Potential wetlands, defined on the basis of plant communities and hydrologic conditions and listed in the National Wetlands Inventory (NWI), are associated with every stream in the vicinity of DSCR (Appendix A, Figure A-4)

2.2.3 Climate

- 2.2.3.1 East-central Virginia lies within the modified continental climatic zone, which is characterized by pronounced seasonal variability in temperature and precipitation (National Climatic Data Center [NCDC], 2000). The region usually experiences warm summers and relatively mild winters, with a mean annual temperature in the range of 55 degrees Fahrenheit (°F) to 60°F. Average monthly temperatures in the vicinity of Richmond range from 78°F in July to the 36°F in January. Prolonged periods of extreme cold or extreme warm weather are unusual
- 2.2.3.2 The amount of precipitation in the area is variable with the greatest amounts generally occurring in July and August. Mean annual precipitation for the 64-year period of record at the Richmond Airport is approximately 43.2 inches (NCDC, 2000)
- 2.2.3.3 The mean annual pan evaporation rate for the region is approximately 40 inches, and the greatest rates of evaporation occur in July and August. The prevailing wind direction in the vicinity of DSCR is southeasterly. Wind speeds generally are moderate, except during intense summer storms when localized high-speed gusts may occur.

2.2.4 Recharge/Discharge Relationships

2.2.4.1 Groundwater in the Coastal Plain and Fall Zone is recharged primarily by infiltration of precipitation and percolation to the groundwater table (McFarland, 1999). Most precipitation in naturally vegetated landscapes of the Coastal Plain and Fall Zone infiltrates the ground surface, although occasionally the infiltration capacity of the soil is exceeded and surface runoff is produced (McFarland, 1997). Part of the water that infiltrates the ground surface is returned to the atmosphere by evapotranspiration, the remainder either moves as interflow through the vadose zone to discharge directly into a surface water body, percolates through the vadose zone to the water table to recharge the uppermost, unconfined WBU, or is stored in the vadose zone as soil moisture.

- 2.2.4.2 The recharge zone for the Costal Plain aquifers is located in the Fall Zone. Groundwater in the confined aquifers moves eastward toward the ocean or locally toward discharge zones along major rivers where these major rivers have cut to the depths of the confined aquifers. Where the confined aquifer is in hydraulic communication with such a river, the confined groundwater may discharge into the river, or be recharged by the river, depending on the potentiometric surface of the aquifer relative to the river stage. If the potentiometric surface of the aquifer is above the river stage, the aquifer will discharge into the river, and the river is termed a gaining river in this reach. When the potentiometric surface of the aquifer is below the river stage, the river will discharge into the aquifer, or recharge the aquifer, and over this reach, the river is termed a losing river. These hydraulic interactions between groundwater systems and surface water bodies are more pronounced in the Fall Zone due to the shallow nature of the WBUs and the resulting incision of stream channels into the WBUs and confining units (McFarland, 1999).
- 2.2.4.3 Calculation of volumetric rates of groundwater movement indicate that approximately 10-inches per year (in/yr) of the total precipitation delivered to the ground surface arrives at the surficial WBU as recharge to groundwater in much of the Fall Zone (McFarland, 1999). Of that recharge, more than 9 in/yr discharges locally to rivers and streams, and less than 1 in/yr provides recharge to the regional confined groundwater system.
- 2.2.4.4 Knowledge of the volumetric rate of groundwater movement is integral to the development of an understanding of the mechanisms of chemical release and transport in the subsurface. Although regional calculations are adequate for initial consideration of potential remedial design options, it will be important to define the local water budget to guide final remedy selection and implementation. Calculation of the local volumetric rates of groundwater movement is required to develop the final remedy. Currently, an evaluation of site-specific infiltration characteristics is being proposed as part of the Supplemental FS field effort

2.3 LOCAL ENVIRONMENTAL SETTING

2.3.0.1 This subsection describes local characteristics of the environmental setting at the DSCR facility that combined with the regional characteristics, further refine the CSM and identifies additional data requirements

2.3.1 Surface Water Hydrology

2.3.1.1 The land surface at DSCR has been extensively altered by historical grading and filling operations and is essentially flat, with a slight downward grade from the west to northeast and southeast. Elevations range from about 140-feet above msl along the western boundary of DSCR to about 100-feet msl in the southeastern part of the facility

2.3.1.2 Surface drainage generally is toward the James River, east of the facility. The southern one-third of the installation, on which OU 7 is located, drains toward Kingsland Creek, which forms the southern boundary of DSCR. The surface run-off collected from the PX Gasoline Station, southwest warehouses, and OU 7 areas are collected and directed to the DSCR storm-sewer system and finally into Kingsland Creek. The delineated watershed areas at DSCR are illustrated in Figure 2-1.

2.3.2 Storm Water Drainage

2.3.2.1 DSCR is served by an extensive storm-sewer system, consisting of catch basins, storm drains, outfalls, and subsurface conveyance piping at depths ranging from approximately 3-feet to 14-feet below ground service (bgs). In the southern part of the facility within the FTA (OU 4), storm water run-off is directed into surface drainage ditches via storm-sewer lines that transect the FTA, and it is then discharged to Kingsland Creek south of the FTA. The location of the storm sewer lines are shown on Figure 2-2. Kingsland Creek forms the southern boundary of DSCR and discharges into the James River approximately one mile east of the facility

2.3.3 Soils – OU 7

2.3.3.1 Soils on the facility proper are classified as "Made Land," defined as areas where soil material consists of anthropogenic fill or where soil has been removed or reworked. Fill material apparently has been placed over extensive areas in the southern part of DSCR bordering Kingsland Creek, in the central eastern part of the facility near the NGA, and in areas bordering No Name Creek. Based on aerial photography prior to DSCR construction and a 1943 topographic map (which was based upon a survey conducted in 1938), these filled areas were topographically low areas at the time the facility was constructed. The ground surface elevation changes at DSCR from 1938 to 1994 are presented in Figure 2-3.

2.3.3.2 The native soils generally are silty to sandy loams, with some clay and occasional gravels, which formed by weathering of coastal plain sediments or by weathering of granite and gneiss of the Piedmont. The surface layer generally is a sandy to clayey loam, ranging in color from gray and pale brown to yellowish red. The subsoil and substratum are sandy clay with some gravel and generally are strongly to extremely acidic (USDA, 1978).

2.3.4 Direct Recharge of Precipitation to Groundwater

- 2.3.4.1 Possible sources of recharge to groundwater at OU 7 include recharge from precipitation, recharge from other sources (e.g., storm sewers or sanitary sewers) at DSCR, and movement of groundwater into OU 7 from recharge areas or other sources upgradient of DSCR. Since direct recharge from precipitation is probably the primary source of groundwater at OU 7, water levels measured in monitoring wells in OU 7 should be related to the amount of precipitation occurring at the site, with periods of increased precipitation corresponding with periods of rising groundwater levels and periods of decreased precipitation corresponding with periods of declining groundwater levels. Additional data are needed to quantify the amount of direct recharge to groundwater occurring at DSCR and fully characterize ongoing chemical release mechanisms. This information is important for the establishment of remedial endpoints and decision criteria for soil OUs as well as to identify specific criteria for remedial components designed to interrupt soil-to-groundwater chemical mobilization processes.
- 2.3.4.2 As mentioned above, storm sewers may also supply recharge to the groundwater table in the upper WBU. The full impact of these submerged water-bearing structures on groundwater flow has not been well established. Additionally, the potential for these engineered structures to act as preferential contaminant migration pathways (e.g., facilitating subsurface transport, introducing additional chemical mass to the groundwater system) needs to be clarified to provide the basis for selection of an appropriate remedy

2.3.5 Hydrologic Budget for DSCR

2.3.5.1 A hydrologic budget study has not been completed for OU 7. However, as part of earlier efforts to characterize groundwater conditions at DSCR, the USGS estimated the vertical movement of groundwater downward from the upper WBU at the Area 50 landfill, through the confining layer into the lower WBU beneath the landfill, and calculated that approximately 2.95 million gallons of water per year

(equivalent to 394,000-cubic feet per year [ft³/yr]) moved into the lower WBU through the landfill. The USGS also estimated the horizontal movement of groundwater through the lower WBU beneath the Area 50 landfill and calculated that approximately 15 million gallons of water per year (equivalent to 2 million ft³/yr) moved through the lower WBU and out of the vicinity of the landfill (Powell *et al* , 1990). While this information is useful, it represents only a partial hydrologic budget for a small part of DSCR and is not site-specific for OU 7. Therefore, additional evaluation of the hydrologic budget in the vicinity of OU 7 would be useful for a more localized assessment

2.3.5.2 A complete hydrologic budget for DSCR must consider the sources of water moving into (inflow) and out of (outflow) of the facility. Surface water run-off into the southwest corner of the Open Storage Area (OU 1), precipitation onto the land surface, imported water (municipal water from Chesterfield County delivered to the installation via a water main), and movement of groundwater onto DSCR from upgradient areas are the primary sources of water moving onto the installation. Surface runoff (into No Name Creek, Kingsland Creek, and into storm drains), evapotranspiration, point- and non-point source discharge of groundwater to storm drains, and movement of groundwater to downgradient areas past the eastern facility boundary are the primary means by which water moves off the installation. These sources of groundwater recharge and discharge, as well as the general groundwater flow regime, are presented as a graphical interpretation of the CSM for OU 7 in Figure 2-4.

2.3.6 Local Hydrogeology

- 2.3.6.1 To characterize the subsurface conditions at OU 7, geologic logs of boreholes from previous investigations were reviewed. To understand the subsurface deposits at OU 7, four hydrostratigraphic cross-sections were constructed based on the information contained in the geological logs and are presented and discussed in this section. The locations of the hydrostratigraphic cross-section transects through OU 7 are illustrated on Figure 2-5. The hydrogeologic cross-sections are provided in Figures 2-6, 2-7, 2-8, and 2-9.
- 2.3.6.2 In general, it appears that the subsurface stratigraphy at DSCR has been interpreted inconsistently through the varying drilling programs that have been conducted. Nonetheless, the subsurface stratigraphy at DSCR can be divided into three distinctive hydrogeological zones, an upper WBU, a confining layer, and a lower WBU.

- 2.3.6.3 The upper WBU at OU 7, as described on the hydrostratigraphic cross-sections, consists of 25- to 35-feet of interlayered unconsolidated deposits of clays, silts, sands, and gravels. As previously discussed, some of these materials are of anthropogenic origin and the contacts with the native soils are not clear. Visual observations of outcrops in the OU 7 area tend to indicate that most of the north-east quadrant consists of fill material from the ground surface to almost 10-feet bgs. As described in subsequent sections of this CSM, the depth to groundwater at OU 7 ranges from 5-feet bgs to 20-feet bgs. This suggests that, in select areas, the fill within the OU 7 area may be in direct contact with the water table. Based on visual observations, the fill materials at OU 7 consist mostly of loose sand, gravel, and construction debris (e.g. concrete slabs, woods, etc). Percolation in this type of fill material tends to be higher than in the native soils. Subsequently, chemicals of potential concern (COPs) are expected to migrate faster, both vertically and horizontally, in such deposits. This is important in terms of understanding migratory pathways for chemicals, as well as identifying remedial components appropriate for addressing groundwater protection needs.
- 2.3.6.4 As shown on the cross sections, a persistent layer of coarse sand and gravel is present in the base of the upper WBU. Although the sand and gravel content vary across OU 7, this layer is the most conductive layer in the upper WBU. A similar conductive layer was identified in the upper portion of the upper WBU (Figure 2-7). This layer is located in the north central portion of OU 7 and extends from approximately 9-feet bgs to a depth of approximately 12-feet bgs and appears to dip to the south. The origin of this layer (anthropogenic or native) could not be determined from the boring logs; however, it appears to be located at the base of potential fill material. These two coarse-grained layers are potential preferential pathways for the migration of chemicals in the upper WBU.
- 2.3.6.5 The cross-sections indicate that a prevalent fine-grained low permeability layer composed of clay with varied content of silts and sands is present in the subsurface across the OU 7 area. This unit ranges in thickness from four feet in the vicinity of MW112-2- to 15-feet in the vicinity of MWFTA-29B. This stratigraphic unit most likely corresponds with the Calvert Formation (Powell *et al.*, 1990). For purposes of this CSM this stratigraphic unit will be considered the confining layer. A preliminary review of the boring logs for the boreholes installed at OU 7 indicates the confining layer is not present in all locations. The presence and/or absence of this fine-grained confining unit is important in terms of understanding the nature and degree of hydrogeochemical communication between the upper and lower WBUs and the vertical transport of chemicals into the lower WBU; therefore, a more detailed review of the boring logs was conducted. The review indicated that the confining layer probably is not absent but

appears to be absent due to logging inconsistencies. Such inconsistencies include, but are not limited to, soil samples collected at irregular intervals, borings terminated before intercepting the confining layer, and failure to identify the actual confining layer.

- 2.3.6.6 This confining layer is underlain by a medium to coarse-grained layer of sands and gravels with thin, discontinuous clay interbedding. This unit ranges in thickness from 10-feet in thickness at MWFTA-20 to more than 15-feet thick at MWFTA-17. These deposits have been interpreted as the Potomac Formation, as described for the Fall Zone region (Powell *et al.*, 1990). However, due to uncertainty about the age of near-surface sediments at DSCR, the deposits underlying the relatively continuous fine-grained stratum will be referred to as the "lower WBU"
- 2.3.6.7 The unconsolidated sediments comprising the lower WBU overlie granitic bedrock (i.e., Petersburg Granite). Saprolite grades vertically downward to the upper surface of the bedrock (Powell *et al.*, 1990). The saprolite varies in thickness, but in some areas may exceed 30-feet in thickness (e.g., in the vicinity of monitoring well cluster DMW-10A/B/E). Competent bedrock, described as granite, has been encountered at depths ranging from 53- to 69-feet bgs at OU 7. A limited number of borings have been advanced to competent bedrock at OU 7. The limited information that is available suggests a general north-to-south slope of the bedrock surface. The degree to which the bedrock surface may control or influence the migration of chemical contamination is unknown.

2.3.7 Hydrostratigraphy

2.3.7.1 Groundwater is first encountered during drilling at relatively shallow depths, generally less than 12-feet bgs at OU 7. Groundwater may be encountered in the silts and clays of the upper WBU although it occurs more commonly in the coarse-grained (sand and gravel) intervals of the upper WBU under unconfined (i.e., water-table) conditions. The heterogeneous nature of deposits comprising the upper WBU suggests that movement of groundwater in the saturated zone within the upper WBU occurs primarily in the coarse-grained materials. This is an important observation, both in terms of understanding the basis for geochemical conditions observed in the upper WBU and for identifying potential mechanisms to control or influence groundwater movement and control the migration of chemicals.

- 2.3.7.2 Boreholes advanced into the lower WBU at OU 7 always encounter groundwater. Two saturated zones have been identified in the lower WBU. The first zone is located beneath the base of the confining layer and the second zone occurs in the saprolite-bedrock interphase. Groundwater elevations in monitoring wells constructed in the lower WBU are usually within the confining layer or at its basal contact with the lower unit. This indicates that the relatively continuous fine-grained stratum of the confining layer at OU 7 probably functions as a confining or semi-confining layer.
- 2.3.7.3 Visual examination of the soil samples collected within the confining layer indicate that the confining layer was dry. This further supports the interpretation that the fine grained stratum may act as confining or semi-confining layer
- 2.3.7.4 In summary, the primary hydrogeologic units at OU 7, stratigraphically from highest to lowest, are referred to in the current CSM as the "upper WBU," the "confining layer," and the "lower WBU." The confining layer separates the upper and lower WBU. The upper WBU consists of fill materials and native soils with varied content of sand and gravel. The lower WBU consists of native material with varying content of sand and gravel, in-place weathered bedrock (saprolite), and fractured bedrock.
- 2.3.7.5 Although the groundwater potentiometric surface in the upper portion of the granitic bedrock and the overlying saprolite appears to be different from the one at the upper portion of the lower WBU, the number of monitoring wells installed into the bedrock unit is not sufficient to form the basis for conclusions regarding the hydrologic characteristics of this material.

2.3.8 Monitoring Well Screened Interval

2.3.8.1 Fifty one monitoring wells are installed at OU 7, 38 are screened in the upper WBU, nine are screened in the upper portion of the lower WBU, and four are installed in the inter-phase of the lower WBU and bedrock. A summary of the monitoring wells and the associated construction details are presented in Table 2-1. In general, monitoring wells installed in the upper WBU were completed as Type II (single cased) monitoring wells and lower WBU monitoring wells were completed as Type III (double cased) monitoring wells with the outer casing terminated within the confining layer. However, there are some exceptions with lower WBU wells completed as Type II. These wells are currently under evaluation for future abandonment.

2.3.9 Groundwater Elevations, Gradients, and Flow Directions

- 2.3.9.1 The groundwater table in the upper WBU at OU 7 typically is encountered at depths ranging from about 5- to 20-feet bgs. The potentiometric surface of groundwater in the lower WBU is encountered at depths ranging from about 18- to 27-feet bgs. The saturated thickness of the upper WBU ranges from greater than 35-feet in the vicinity of monitoring well MWFOS-1/MW112-3 near the northern boundary of OU 7 (Figure 1-2) to less than 25-feet at some locations along Kingsland Creek. The entire lower WBU is saturated under confining conditions. The saturated thickness of the lower WBU ranges from 10 to 40-feet in thickness. According to boring logs, bedrock appears to dip to the east southeast at OU 7.
- 2.3.9.2 Water-level measurements obtained at OU 7 in October 2001, April 2002, and July 2002 for the upper WBU and lower WBU have been plotted and contoured on a site map (Appendix A, Figures A-5 through A-10) Water level measurements collected at OU 7 in October 2002 for the upper and lower WBUs have been plotted and contoured on a site map (Figures 2-10 and 2-11, respectively). Table 2-2 summarizes historical OU 7 water level elevations. The potentiometric maps indicate that the water table in the upper WBU generally slopes from northwest to southeast across OU 7 in the direction of Kingsland Creek, although local variation on the rates and direction of groundwater movement has been observed in the configuration of the water table in the vicinity of Kingsland Creek.
- 2.3.9.3 The hydraulic gradient for the upper WBU was calculated using October 2002 groundwater elevation data. Based on that groundwater elevation data, two areas of distinctive hydraulic gradient were calculated. A gentle hydraulic gradient was calculated in the north-west portion of OU 7 with a hydraulic gradient of approximate 0 004-feet per foot (ft/ft) (when calculated between monitoring wells MWFOS-1 and DMW-26A) and an area of steeper hydraulic gradient on the south-east portion of OU 7 with an approximate hydraulic gradient of 0 022 ft/ft (when calculated between monitoring wells DMW-19A and DMW-22A). From these hydraulic gradient calculations, it appears that the hydraulic gradient becomes steeper as it approaches Kingsland Creek. This change in hydraulic gradient may be related to changes in subsurface conditions such as changes in hydraulic conductivity (due to clay content, etc). Although there is a gradient difference between the north-west and the south-east area at OU 7, the predominant groundwater flow direction remains towards the south-east.
- 2.3.9.4 The direction of groundwater movement in the upper WBU, as indicated by the configuration of the potentiometric surface in OU 7, is towards Kingsland Creek (Figure 2-10). Kingsland Creek



appears to be hydraulically connected to the upper WBU and, therefore, directly influences the groundwater flow direction in this unit. The configuration of the water table near the creek also indicates that Kingsland Creek is usually a gaining stream.

- 2.3.9.5 Compared to the upper WBU at OU 7, fewer groundwater potentiometric elevation measurements are available for the lower WBU (Table 2-2). Based on the October 2002 groundwater elevation data, the groundwater flow direction in the lower WBU is generally toward the east (Figure 2-11). The groundwater flow direction and hydraulic gradient were determined after separating the monitoring wells screened in the upper portion of the lower WBU from the monitoring wells screened in the lower portion of the lower WBU and plotting the resulting groundwater potentiometric surfaces on a site map. After plotting the potentiometric surface of the upper portion of the lower WBU, it was apparent that groundwater in this unit flows in an easterly direction and in the lower portion of the lower WBU groundwater flow appears to flow in a southeast direction. Figure 2-10 presents the potentiometric surface contour map for the upper portion of the lower WBU for the October 2002 sampling event. A potentiometric surface map for the monitoring wells screened in the lower portion of the lower WBU (MWFTA-28B and MWFTA-29B) was not produced because the number of monitoring wells installed was not sufficient for reliable conclusions to be drawn regarding the actual groundwater conditions.
- 2.3.9.6 The hydraulic gradient between MWFTA-4 and PWFTA-2 was calculated to be approximately 0 009 ft/ft toward the east. Kingsland Creek is hydraulically separated from the lower WBU and, therefore, does not directly influence the groundwater flow direction in this unit.
- 2.3.9.7 A number of groundwater monitoring wells at OU 7 have been completed as monitoring well pairs, with one member of the pair completed in the upper WBU and the other member installed nearby and completed in the lower WBU (e.g., PWFTA-1 and PWFTA-2). Comparison of groundwater elevations measured at the same time in members of monitoring well pairs or clusters can provide insight into the functioning of the hydrologic system and the degree of communication locally between the upper and lower WBUs
- 2.3.9.8 Comparison of groundwater levels measured in members of monitoring well pairs during the same measurement event indicated that groundwater levels in the upper WBU invariably are higher than groundwater levels in the lower unit at the same location. Figure 2-12 present the comparisons of monitoring wells DMW-22A, MWFTA-20, and PWFTA-2. The downward orientation of the vertical

hydraulic gradients indicates that if there are areas where the upper and lower WBUs are in hydraulic communication (e.g., in areas where the confining layer has been breached or is absent), groundwater would move from the upper WBU into the lower WBU. Such conditions could influence the fate and transport of constituents that may need to be addressed by remedy planning activities

- **2.3.9.9** The magnitude of vertical hydraulic gradients is spatially variable at OU 7 Downward gradients (greater than 1 ft/ft) were observed at all the monitoring wells pairs (e.g. DMW-29A and DMW-29B and PWFTA-1 and PWFTA-2)
- 2.3.9.10 As previously mentioned, three groundwater monitoring wells were installed in the lower portion of the lower WBU. Two of the monitoring wells were installed in the saprolite-bedrock interface (MWFTA-28B and MWFTA-29B) and the third one in the fractured bedrock (MWFTA-20). In order to evaluate the vertical hydraulic gradients between groundwater levels in the lower WBU and bedrock, groundwater levels measured in the bedrock monitoring well (MWFTA-20) should be compared to groundwater levels measured in a monitoring well installed at the base of the lower WBU (MWFTA-28B or MWFTA-29B). However, these monitoring wells are not close enough to MWFTA-20 to calculate a vertical gradient between the lower WBU and the bedrock. Nevertheless, if we compare a monitoring well located in the upper portion of the lower WBU and adjacent to bedrock monitoring well (PWFTA-2) with the bedrock monitoring well (MWFTA-20) the calculated vertical hydraulic gradients between the bedrock and the lower WBU is directed vertically downward indicating that at these locations, groundwater moves from the lower WBU and into the bedrock. Because of the few monitoring wells completed in bedrock at the base of the lower WBU, it is uncertain whether the vertical gradient at MWFTA-2 represents a general relationship between the lower WBU and the bedrock

2.3.10 Hydraulic Conductivity and Velocity of Groundwater Movement

2.3.10.1 The hydraulic properties of the subsurface materials in the upper and lower WBUs at DSCR have been evaluated at OU 7 on several occasions by conducting pumping tests (Engineering Science [ES], 1993) and positive and negative displacement (slug) test (D&M, 1989a and 1989b; LAW, 1996a). In 1993, ES conducted a pumping test of the upper and lower WBUs at OU 7 during the Remedial Investigation (RI) activities (ES, 1993). Evaluation of the test data produced estimates of transmissivity (i.e., the capacity of the WBUs at OU 7 to transmit water) and storativity (i.e., the capacity of the WBU to store water). Data from previous aquifer testing evaluations are provided in Appendix A.

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- **2.3.10.2** Based on the information presented in the RI (ES, 1993), the minimum and maximum transmissivity calculated for the upper WBU during the pumping portion of the test ranged between 20.76-square feet per day (ft²/day) (PWFTA-1) and 538.56 ft²/day (MWFTA-3) and, during the recovery portion, transmissivity values ranging between 10.59 ft²/day (PWFTA-1) and 1.010.7 ft²/day (MWFTA-3) were calculated
- **2.3.10.3** The recovery data of the pumping test performed in the lower WBU yielded a transmissivity value of approximate 0 20 ft²/day. Because the conditions of the aquifer test at other areas within OU 7 have been questioned, the ranges presented for the transmissivity values are considered approximate (ES, 1993).
- 2.3.10.4 Hydraulic conductivity was calculated based on the calculated transmissivity divided by the saturated thickness (as measured by the length of saturated screened interval). The hydraulic conductivity values varied from 1.31-feet per day (ft/day) to 46.35 ft/day during the pumping portion of the pumping test and from 0.67 ft/day to 86.98 ft/day during the recovery portion of the pumping test in the upper WBU Calculated hydraulic conductivity values for the lower WBU ranged from 0.03 ft/day to 0.01 ft/day (ES, 1993).
- 2.3.10.5 The hydraulic conductivity values resulting from the slug test conducted in the upper WBU generally are in good agreement with the lower values of the range of values for hydraulic conductivity estimated from the results of the pumping tests at OU 7. These values range from approximately 0.4 ft/day (MWFTA-1) to approximately 6.6 ft/day (MWFTA-7). Hydraulic conductivity values calculated for the lower WBU are in good agreement with the range of values estimated from the results of the pumping test. These slug test values ranged from approximately 0.009 ft/day to 0.87 ft/day. Values for hydraulic conductivity of the confining layer, determined from the results of laboratory permeability tests, were much lower, ranging from 0.0003 ft/day to 0.005 ft/day.
- **2.3.10.6** The velocity of groundwater movement through a saturated medium (i.e., the particle velocity, or average linear velocity that a molecule of groundwater would attain) can be estimated using a modification of Darcy's Law (Freeze and Cherry, 1979). As previously mentioned, two areas of distinctive hydraulic gradient were observed at OU 7, therefore, it is expected that groundwater moves at a different linear velocity in each area. According to the water levels obtained during October 2002, the groundwater gradient on the gentle hydraulic gradient area in the northwest portion of the site was 0 004.

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ft/ft and the steeper hydraulic gradient near Kingsland Creek was 0.03 ft/ft for the upper WBU at OU 7 (Section 2.5.9). The hydraulic conductivity of materials in the upper WBU at OU 7 ranged from approximately 0.4 to 6.6 ft/day. Using these values and an approximate value of 0.25 for effective porosity (Wolff, 1982), the average linear velocity of groundwater movement in the gentle hydraulic gradient area is estimated to range from about 0.0064 ft/day to about 0.106 ft/day (equivalent to a range of about 2.3- to 38.7-feet per year [ft/yr]) and for the steeper hydraulic gradient area the average linear velocity ranged from 0.048 to 0.79 ft/day (equivalent to a range of about 17.5 to 288 ft/yr). The average linear velocity of groundwater movement in the lower WBU at OU 7 generally is lower than the range of groundwater velocities in the upper unit, ranging from about 0.00011 ft/day to about 0.0002 ft/day (equivalent to a range of about 0.004 to 0.066 ft/yr)

2.4 GROUNDWATER GEOCHEMICAL CONDITIONS

2.4.0.1 The cations calcium, magnesium, sodium, and potassium and the anions carbonate, bicarbonate, chloride, sulfate, and nitrate can be naturally-occurring constituents dissolved in groundwater and are known as "major" inorganic constituents (Hem, 1989). Natural groundwater has specific compositional characteristics related to the mineralogy of the WBU(s) and the conditions that control the dissolution of the minerals as groundwater moves through it. Evaluation of the major constituent geochemistry of groundwater can provide information regarding the origin and evolution of the constituents and can be used to compare the characteristics of waters in different locations and/or in differing hydrogeological environments (Hounslow, 1995).

2.4.0.2 Analytical results for major inorganic constituents can be compared and interpreted using point-value plots or graphical methods. The standard style of trilinear plots was described first and used by Piper. Fetter (1994) describes the process of plotting an analysis on the Piper diagrams in this manner.

"A trilinear diagram can show the percentage composition of three ions. By grouping Na † and K † together, the major cations can be displayed on one trilinear diagram. Likewise, if $CO_3^{2^{\dagger}}$ and HCO_3^{\dagger} are grouped, there are also three groups of major anions . Analyses are plotted on the basis of the percent of each cation or (anion)

Each apex of the triangle represents a 100% concentration of one of the three constituents. If a sample has two constituent groups present, then the point representing each would be plotted on the line between the apexes for these two groups. If all three constituent groups are present, the analyses would fall in the interior of the field. The diamond-shaped field between the two triangles is used to represent the composition of water with respect to both cations and amons.

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The cation point is projected onto the diamond-shaped field parallel to the side of the triangle labeled magnesium, and the anion point is similarly projected parallel to the side of the triangle labeled sulfate. The intersection of the two lines is plotted as a point on the diamond shaped field."

- 2.4.0.3 In addition to the data points being plotted on the diagram, a circle whose radius reflects the total dissolved solids (TDS) (as estimated from the concentration of the major cations and anions) is plotted and centered on the respective data points.
- 2.4.0.4 Piper diagrams are useful for distinguishing water of different histories, and can be used to identify trends in evolution of water chemistry. Groundwater samples obtained from a distinct water type will typically share similar geochemistry and, therefore, will plot in a cluster on a trilinear diagram Mixing of water from two different water types will plot as a straight line joining the clusters of data on different areas of a diagram. Piper diagrams for the upper and lower WBU groundwater at OU 7 are as shown in Figures 2-13 and 2-14, respectively.
- 2.4.0.5 Upper WBU Wells in the upper WBU of the OU7 tend to have water of the mixed cation/chloride to the mixed cation/sulfate water types. Exceptions to this include DMW-25A, which has a unique sodium/bicarbonate water type, and MWFTA-1, which has a magnesium/chloride-sulfate type. In addition, wells across Kingsland Creek (MWFTA-5 and MWFTA-10) tend to have no predominant cation or anion
- 2.4.0.6 Wells in the southern interior of OU7 tend to have higher total cation and anion concentrations (higher TDS concentration). DMW-26A, DMW-25A, MWFTA-3, DMW-22A, DMW-33A, and MWFTA-1 all have greater TDS than the wells closer to the periphery of OU7. An exception to this trend is MWFOS-1, which has an intermediate TDS. Groundwater samples taken from these wells have a negative log of the hydrogen ion concentration (pH) from 3.43 (MWFTA-7) to 6.71 (DMW-26A) with a median of 5.28.
- 2.4.0.7 Wells downgradient of the pits (as interpreted from the estimated potentiometric surface) appear to have a much higher TDS. In addition, DMW-25A and DMW-26A and to a lesser extent MWFTA-3 and DMW-22A have sodium as a major cation and chloride to bicarbonate as major anions. The origin of the high TDS and distinct water types appears to be further upgradient from DWM-26A.

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- 2.4.0.8 The group of wells DMW-33A, DMW-22A, and MWFTA-3 on the north and south banks of Kingsland Creek appear to form a related series. MWFTA-3, the furthest upstream well, is a sodium/chloride water type. DMW-22A, the next downstream well, is a mixed cation/chloride with sodium and (magnesium + calcium) in almost equal amounts. DMW-33A, the furthest downstream well, is a (magnesium + calcium)/chloride water type. This series may represent successive mixings or possibly an ion exchange series interacting with clays associated with the creek
- **2.4.0.9** Lower WBU Wells in the lower WBU of OU 7 tend to have water of the calcium-magnesium/bicarbonate-carbonate water type. MWFTA-28B is an exception, being of the magnesium/bicarbonate-chloride water type MWFTA-14 is the other exception, being of the sodium/bicarbonate water type.
- 2.4.0.10 Wells in the lower WBU are strongly differentiated by pH. Groundwater collected from these wells have a pH from 7.09 to 12 44 with a median of 10 89. There appear to be two distinct groups of wells with high pHs. In the western group are wells MWFTA-16 and MWFTA-17, while the eastern group is comprised of wells MWFTA-29B, MWFTA-19, and, to a lesser extent, MWFTA-14 (pH = 9.08). The two remaining wells between the two groupings have pHs of 7.09 and 7.34. Since the form of the major inorganic carbon anions (carbonate and bicarbonate) are controlled by pH, the anion water type for wells predominated by carbon anions are carbonate for the high pH wells and bicarbonate for the lower pH wells. The higher pH wells appear to align with the flow direction (west to east), as interpreted from the estimated potentiometric surface of the lower WBU. The lower pH wells appear to align with a parallel flow path, with some possible mixing occurring in MWFTA-14. The cause of this high pH zone is not currently known, but the origin may be further upgradient from MWFTA-16
- 2.4.0.11 A review of existing stratigraphic detail within the upper and lower WBUs compared to water types of the groundwater within the screened intervals shows no apparent patterns. From the distinctly different water types and different levels of TDS and pH, it does not appear that mixing of water from the upper WBU and lower WBU is occurring

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TAB

Section 3.0

3.0 SUMMARY OF THE GROUNDWATER MONITORING PROGRAM

3.0.0.1 Groundwater samples were collected in October 2001, March/April 2002, July 2002, and October 2002 as part of the quarterly groundwater monitoring program currently ongoing at DSCR. The results of the October 2001, March/April 2002, and July 2002 sampling results for OU 7 are presented in the October 2001 Technical Memorandum (LAW, 2002b), March/April 2002 Technical Memorandum (MACTEC, 2003c), and July 2002 Technical Memorandum (MACTEC, 2003d), respectively. The results for the October 2002 sampling event are presented as part of this Annual Groundwater Report in relation to the results from the previous events. These groundwater sampling activities were performed in general accordance with procedures outlined in the "Sampling Analysis Plan Revision 1" (LAW, 1992) and the "Final Quarterly Groundwater Sampling Plan" (LAW, 2002a)

3.0.0.2 Nineteen groundwater monitoring wells screened in the upper WBU, seven groundwater monitoring wells screened in the lower WBU, and one groundwater monitoring well screened within the fractured bedrock were selected for sampling during the October 2002 sampling event. In order to further refine the data collection effort, modifications were made and documented to the original monitoring well network initiated for the groundwater monitoring program in 2001. Changes were coordinated and approved by CEHNC. Table 1-1 provides a list of the wells sampled for the October 2001, March/April 2002, July 2002, and October 2002 sampling events and provides a summary for the well network modifications made in 2001 and 2002. Five of the nineteen wells in the upper WBU currently sampled were not included in the original sampling program. These wells were added to the quarterly monitoring program to enhance the representativeness of data collected from the monitoring well network at OU 7. For the lower WBU, two wells (DMW-29B and PWFTA-2) were removed from the original sampling program because the monitoring wells were suspected of being improperly installed.

3.0.0.3 Groundwater samples from each well sampled were analyzed for field parameters (temperature, turbidity, oxidation reduction potential [ORP], dissolved oxygen [DO], pH, ferrous iron [Fe²⁺], and specific conductance), total and dissolved metals, total and dissolved mercury, total and dissolved thallium, and total VOCs. In addition, the groundwater samples were analyzed for natural attenuation parameters (hydrogen, carbon dioxide [CO₂], methane, ethane, ethene, chloride, sulfate, total sulfide, nitrate, total alkalinity, and total organic carbon [TOC]) A summary of the analyses performed for each of the sampling events is presented in Appendix B, Table B-1 Laboratory analyses were performed by Severn Trent Laboratories of North Canton, Ohio Field duplicate samples were sent to the United States

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Army Engineer Research and Development Center (CEERD) laboratory for quality assurance (QA), and dissolved hydrogen gas samples were analyzed by Microseeps, Inc

3.0.0.4 Summary tables for the upper WBU, lower WBU, and the fractured bedrock are presented in Tables 3-1 and 3-2 for select chlorinated VOCs (PCE, TCE, cis-1,2-dichloroethene [DCE], trans-1,2-DCE, vinyl chloride [VC], 1,1,1-TCA, 1,1-dichloroethane [DCA], and 1,1-DCE) and Tables 3-3 and 3-4 for select metals (aluminum, arsenic [upper WBU, only], iron, and manganese). A summary of the Data Quality Completeness of the October 2001 through October 2002 sampling events, the Data Quality Evaluation (DQE) of the October 2002 sampling event; a summary of analytical results for the October 2001 through October 2002 sampling events; and a summary of qualified data for the October 2001 through October 2002 sampling events are provided in Appendix B, Appendix C, Appendix D, and Appendix E, respectively. This section presents sampling results for selected chlorinated VOCs, selected metals, and natural attenuation geochemical parameters for the October 2001, March/April 2002, July 2002, and October 2002 sampling events

3.1 OCTOBER 2002 GROUNDWATER ELEVATION DATA

3.1.0.1 Groundwater elevations were collected from selected wells at OU 7 during the October 2001, April/March 2002, July 2002, and October 2002 sampling events. The groundwater elevation data are summarized in Table 2-2

3.1.0.2 Water level measurements collected during October 2002 indicated that the elevation of potentiometric surface in the upper WBU at OU 7 ranged from 93.86-feet msl in AEHA-DG9 to 77.20feet msl in MWFTA-7. The potentiometric surface of the upper WBU and the direction of groundwater flow for the October 2002 sampling event are shown in Figure 2-10. North of Kingsland Creek, the water level elevations indicate that groundwater in the upper WBU generally flows to the southeast

3.1.0.3 Water level measurements collected during October 2002 indicated that the elevation of potentiometric surface in the lower WBU at OU 7 ranged from 76 17-feet msl in MWFTA-16 to 53.60feet msl in MWFTA-29B The potentiometric surface of the lower WBU and the direction of groundwater flow for the October 2002 sampling event are shown in Figure 2-11 Water level elevations indicate that groundwater in the lower WBU generally flows to the east

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3.2 OCTOBER 2002 FIELD ANALYTICAL PARAMETERS

3.2.0.1 Field analytical data (pH, DO, ORP, turbidity, temperature, and specific conductance) were collected from each well to verify stabilization of groundwater field parameters prior to sample collection Fe²⁺ was measured in the field after stabilization was achieved. Stabilization of these field parameters is required by CEHNC and the United States Environmental Protection Agency (USEPA) and procedures are documented in the Sampling Analysis Plan (LAW, 1992) and the "Final Quarterly Groundwater Sampling Plan" (LAW, 2002a). A review of the field notes indicated that stabilization was achieved for each of the wells sampled at OU 7 during the October 2002 sampling event except for MWFTA-1. Due to sampling equipment problems, MWFTA-1 was sampled at an elevated turbidity (218 nephelometric turbidity units [NTUs]). However, all other field parameters for this well stabilized prior to sampling. The final measured results for each field parameter and Fe²⁺ for each are included in Appendix C, Tables C-1 through C-3 for the upper WBU, lower WBU, and fractured bedrock, respectively. Field sampling reports for the October 2002 sampling event are provided in Appendix F.

3.3 SUMMARY OF ANALYTICAL RESULTS

3.3.0.1 The primary VOCs detected at OU 7 include PCE, TCE, cis-1.2-DCE, trans-1,2-DCE, VC, 1,1,1-TCA, 1,1-DCA, and 1,1-DCE. The concentrations of these VOCs for the last four sampling events are summarized in Tables 3-1 and 3-2 for the upper and lower WBUs, respectively. Isoconcentration maps for the upper and lower WBUs are provided in Figures 3-1 through 3-10, respectively. Background concentrations or alternate concentration limits (ACLs) have not been established for DSCR; therefore, for the purposes of data presentation only, the selected chlorinated VOC concentrations were referenced to their respective maximum contaminant levels (MCLs) as provided by the National Primary Drinking Water Regulations (USEPA, 2002). Detailed discussions of the results for each of the VOCs are provided in Section 4.0.

3.3.0.2 The isoconcentration figures graphically present the data summarized in Table 3-1 for the upper WBU (Figure 3-1 through 3-7 for PCE, TCE, *cis*-1,2-DCE, VC, 1,1,1-TCA, 1,1-DCA, and 1,1-DCE, respectively) and Table 3-2 for the lower WBU (Figure 3-8 through 3-10 for TCE, *cis*-1,2-DCE, and VC, respectively). These figures show the areal extent of each of the select chlorinated VOC plumes.

- **3.3.0.3** For the upper WBU, two VOC plumes are apparent. One plume is located downgradient from Pit 1 and is centered on AEHA-DG10 (except *cis*-1,2-DCE and 1,1-DCA, which are centered on DMW-33A) for each of the quarters (October 2001 through October 2002). The VOC concentrations detected at AEHA-DG10 are generally an order of magnitude greater than surrounding wells.
- **3.3.0.4** The other plume is located downgradient from the former FOS tank/Pit 3 and is centered on MWFTA-23 and MWFOS-3. Concentrations of TCE, *cis*-1,2-DCE, and VC detected in MWFTA-23 and MWFOS-3 are generally an order of magnitude greater than surrounding wells. These two wells may represent a continuing source area for these constituents.
- 3.3.0.5 For the lower WBU, Figures 3-8, 3-9, and 3-10 show that the VOC contamination is generally centered in the vicinity of MWFTA-16. This well is located downgradient from the plume associated with the former FOS tank/Pit 3 in the upper WBU. VOCs were not detected within monitoring well MWFTA-16 during the initial sampling event in October 1993. However, VOCs were detected during the October 2000 sampling event (the second sampling event for this well). The VOCs within this well are presumed to result from either improperly installed monitoring wells upgradient of MWFTA-16 and/or naturally occurring fractures within the confining layer.
- **3.3.0.6** Table 3-2 presents the selected chlorinated VOC results for the fractured bedrock TCE, *cis*-1,2-DCE, VC, 1,1-DCA, and 1,1-DCE were detected above their corresponding MCL. The areal extent of contamination within the bedrock is currently unknown as MWFTA-20 is the only well sampled as part of the quarterly monitoring program
- 3.3.0.7 In addition to the isoconcentration figures, pie graphs for the October 2002 sampling event showing the distribution of the primary VOCs at each well shown were placed on the cross-sections (Figures 2-6 and 2-9) to provide an indication of the vertical distribution of contamination. The size of the pie GRAPH shown on the figures corresponds to the total concentration of the primary VOCs. As shown on Figure 2-6 and 2-9, the concentrations of the primary VOCs are higher in the upper WBU than in the lower WBU along the length of the cross-sections shown.
- **3.3.0.8** Background concentrations or ACLs for metals have not been established for DSCR, therefore, for the purposes of data presentation only, the total metals data were referenced to their corresponding primary or secondary MCL (when available) Aluminum, arsenic, iron, and manganese were detected

above the reference concentrations for each of the four sampling events for the upper WBU and aluminum, iron, and manganese were detected above the reference concentration for the lower WBUs. These results are summarized in Tables 3-3 and 3-4 for the upper and lower WBUs, respectively. The summarized results for each of the metals detected are presented in Appendix C, Table C-1, C-2, and C-3. Discussions of the results for total aluminum, arsenic, iron, and manganese are provided in Section 4.0.

3.3.0.9 Figures showing the results of the total metal results for aluminum, arsenic, iron, and manganese for both the upper and lower WBUs are provided in Figures 3-11 and 3-12, respectively. The metal posting figures indicate that arsenic, iron, and manganese are widespread within OU 7, with maximum concentrations corresponding to locations with elevated VOC contamination. However, a correlation could not be made with aluminum as maximum concentrations were detected within background wells or wells without elevated VOC concentrations.

3.4 MONITORED NATURAL ATTENUATION PARAMETERS

3.4.0.1 As part of the goals of the groundwater monitoring program to collect analytical data to support the MNA program as a component of the final remedy for OU 7 and to assess the sustainability of degradation of VOCs within the subsurface, key MNA parameters were evaluated in both the upper and lower WBUs. To accomplish this goal, nineteen monitoring wells in the upper WBU and seven monitoring wells in the lower WBU were analyzed for geochemical and biochemical indicator parameters of natural attenuation (MNA parameters) for the October 2001 through October 2002 sampling events. Results for selected MNA parameters (DO, nitrate, sulfate, CO₂, hydrogen, alkalinity, TOC, ORP, pH, Fe²⁺, and sulfide) are presented on Figure 3-13 and Figure 3-14 for the upper and lower WBU, respectively. Each of the MNA parameters measured, including the other parameters (ethene, ethane, methane, temperature, and chloride) not shown on the figures, are presented in Appendix C, Tables C-1, C-2, and C-3 Each parameter presented on Figure 3-13 and Figure 3-14 was selected to provide an indication of the sustainability of natural attenuation at OU 7 Appendix G presents a discussion of the relevance of the MNA parameters presented on Figures 3-13 and 3-14 and a brief summary of the results of the October 2002 sampling event for each of the parameters shown on the figures Table G-1 presents an interpretation of the ranges for each parameter and the range used to assign a color to a parameter result.

The primary constituents of potential concern at OU 7 are the chlorinated VOCs, PCE, TCE, 3.4.0.2 and associated daughter products, cis-1,2-DCE and VC Reductive dechlorination is the primary breakdown pathway for these VOCs. After DO is consumed within the groundwater, anaerobic microorganisms typically use additional electron acceptors (as available) in the following order of preference. nitrate, ferric iron oxyhydroxide, sulfate, and finally CO2. Rates for reductive dechlorination increase as oxidation-reduction conditions decrease. However, rates are limited to the availability of electron donors (typically a carbon source) and electron acceptors. The MNA parameters evaluated, along with the presence of cis-1,2-DCE and VC, provide an important line of evidence for the occurrence and continuation of natural attenuation.

TAB

Section 4.0

4.0 NATURE AND EXTENT OF CONTAMINATION AND TREND EVALUATION

4.0.0.1 A quarterly groundwater monitoring program was unitiated to evaluate groundwater contaminant concentration trends and to evaluate MNA as a potential component of the final remedy for OU 7. Four quarters of data have been collected and are presented in this Annual Groundwater Report to evaluate the current nature and extent of the contamination at OU 7. In order to evaluate the data, a statistical trend evaluation was performed using the Mann-Kendall statistical trend analysis on historical data (1982 [when possible]) through 2002 for the purpose of evaluating selected VOC trends in groundwater. In addition, time series graphs were prepared for historical data for the purpose of providing a visual aid in determining VOC trends. The following sections provide a summary of the potential sources of contamination, summarizes the statistical trend analyses, and provides an assessment of the current nature and extent of groundwater contamination at OU 7.

4.1 POTENTIAL SOURCES OF GROUNDWATER CONTAMINATION

4.1.0.1 Figure 1-2 shows the locations of the three fire training pits documented as previously utilized at OU 7. These three pits are considered to be the primary source areas for the upper WBU groundwater contamination at OU 7. However, it is possible that other areas at OU 7 may be potential sources that have not yet been defined completely. VOCs are the primary constituents of concern; PCE, TCE, and 1,1,1-TCA and associated daughter products (cis-1,2-DCE, trans-1,2-DCE, VC, 1,1-DCA, and 1,1-DCE) account for the majority of the VOC contamination in the upper WBU. The distribution and concentrations of the VOCs originating from each of these pits is variable. Based on the current well network at OU 7, two plumes located within the upper WBU and downgradient from two of the pits (Pit 1 and Pit 3) can be described. However, historic DPT data, combined with data from the monitoring well network, indicate there are three distinguishable plumes with some co-mingling downgradient.

4.1.0.2 Figure 1-2 show the locations of the existing lower WBU wells. The source(s) for the contamination within the lower WBU are currently unknown. The VOCs located within the lower WBU are suspected to be either from the natural migration of groundwater from the upper WBU to the lower WBU via fractures within the confining layer or due to improperly installed wells, which may have caused conduits through the confining layer.

4.1.0.3 In addition to VOC contamination, elevated levels of aluminum, arsenic, iron, and manganese have been detected in the upper WBU. In the lower WBU, elevated levels of aluminum, iron, and manganese have been detected. The elevated concentrations of metals within the upper and lower WBU are generally located in areas that have elevated VOC concentrations, suggesting the inorganics have been mobilized by changes in geochemical processes associated with the chemicals that were burned within the pits

4.2 STATISTICAL TREND ANALYSIS

4.2.0.1 Time series graphs were prepared and a statistical evaluation, utilizing the Mann-Kendall statistical trend analysis, was performed on the historic data that has been collected at OU 7. The Mann-Kendall statistics and the times series graphs were used to identify and evaluate the temporal trends for each identified plume. The results of these trends were then used to support one of the first lines of evidence of MNA, mass loss. Results from the Mann-Kendall statistical trend analysis and the time series graphs were evaluated utilizing potentiometric surface and isoconcentration contour maps to identify and explain trends for wells located within and downgradient of identified source areas. This evaluation provides an assessment of the current and historical groundwater conditions at OU 7 for the purpose of supporting conclusions about the extent of contamination and the effectiveness of MNA as a component of the final remedial strategy for OU 7 groundwater. Appendix H provides a detailed discussion of the Mann-Kendall trend test.

4.2.1 Trend analysis approach

- 4.2.1.1 The Mann-Kendall statistical analysis was performed and time series graphs were prepared for select monitoring wells: upper WBU wells AEHA-DG10, DMW-20A, DMW-22A, DMW-25A, DMW-27A, DMW-33A, MWFOS-3, MWFTA-23, and MWFTA-3 (Figures 4-1 through 4-10, respectively); lower WBU wells MWFTA-16, MWFTA-18, and MWFTA-19 (Figures 4-11 through 4-13, respectively); and one fractured bedrock well, MWFTA-20 (Figure 4-14). Time series graphs are provided for existing data (not all wells evaluated within this assessment were installed in 1982) and the evaluations for each well started where data was available
- **4.2.1.2** The trend evaluation focuses on VOCs, primarily PCE, TCE, *cis*-1,2-DCE, *trans*-1,2-DCE, 1,1,1-TCA, 1,1-DCA, 1,1-DCE, and VC, the constituents of concern within the groundwater at OU 7. In

addition, although other VOC contaminants have been detected in the groundwater at OU 7, they are not prevalent within the groundwater at OU 7. The contaminants evaluated within this assessment can be considered indicators for the presence (or absence) of these VOCs and this detailed evaluation focuses on wells located within or downgradient from identified plumes

4.2.2 Trend Analysis Evaluation

4.2.2.1 Table 4-1 provides a summary of the Mann-Kendall test results for the wells previously listed This integrated approach was used since statistically significant trends can be masked with small concentration changes within the plume and because the data may not reflect actual trends when interpreting the overall plume extent. Trends determined by the Mann-Kendall test and not supported by the time series graphs are identified on Table 4-1. In addition, the time series graphs may not reflect an actual trend due to either variable data or because available data are too limited to qualify the trend Consequently, the Mann-Kendall test, which was performed for all data for each individual well, does not take into account large increases of contaminants moving through the well during migration of the plume Evaluation of the time series graphs provides evidence of increasing or decreasing trends that the Mann-Kendall statistics did not support due to the reporting of low concentrations during the initial sampling events or due to elevated reporting limits

4.2.2.2 A summary of the Mann-Kendall analyses performed for each well sampled is provided in Table 4-1 and a more detailed discussion of the isoconcentration plume trends for the selected wells is provided in the following sections. Tables 4-2 and 4-3 provides a summary of the Mann-Kendall test results and provides a description of the VOC trends within select monitoring wells for the upper and lower WBUs. Wells selected for evaluation are located within the identified plumes or located on plume boundaries and have trends that may indicate plume migration or attenuation. The evaluation for each well was based on the Mann-Kendall test results, the time series graphs, the groundwater flow directions, and plume locations

4.3 EXTENT OF VOC CONTAMINATION

4.3.0.1 Tables 3-1 and 3-2 provide a summary of results for selected VOCs for the October 2001, March/April 2002, July 2002, and October 2002 groundwater for the upper and lower WBUs (including the fractured bedrock), respectively. The temporal trends for the plumes located downgradient from Pit 1.

and Pit 3 were evaluated utilizing the Mann-Kendall statistics and time series plots. The spatial trends for the plumes located downgradient from Pit 1 and Pit 3 were evaluated utilizing the isoconcentration figures (Figures 3-1 through 3-10). The following sections provide a separate discussion for the temporal and spatial trends for each source area (Pit 1 and Pit 3) currently evaluated. As previously stated, due to the currently monitoring well network, the plume located downgradient from Pit 2 cannot be evaluated.

- 4.3.0.2 The plumes, consisting of parent compounds PCE, TCE, and 1,1,1-TCA, are associated with fire training activities at each of the three burn pits. PCE, TCE, and 1,1,1-TCA are the primary constituents of concern downgradient from Pit 1 while PCE and TCE are the primary VOCs downgradient from Pit 3. This conclusion is based upon the presence of the parent compounds and their associated daughter products downgradient from these source areas. In general, the presence of cis-1,2-DCE, trans, 1,2-DCE, and VC, daughter products of PCE and TCE, and 1,1-DCA, daughter product of 1,1,1-TCA, is considered to be due to biological degradation. However, the presence of 1,1-DCE is an indicator that abiotic degradation may be occurring.
- 4.3.0.3 The October 2002 VOC data have been compared to the October 2001, March/April 2002, and July 2002 to evaluate short term trends of the PCE, TCE, 1,1,1-TCA, and related daughter products. Isoconcentration figures for the individual constituent plumes are provided in Figures 3-1 through 3-7 for the upper WBU and Figures 3-8 through 3-10 for the lower WBU. Currently, site-specific groundwater background concentrations or ACLs have not been established for the site, therefore, for presentation purposes the concentrations presented on the plume maps are referenced to the corresponding MCLs (USEPA, 2002)
- **4.3.0.4** A discussion of the overall nature and extent, both temporally and spatially, of the plumes located downgradient from Pit 1 and Pit 3 is provided in following subsections. For ease of reading, the nature and extent evaluation of the upper and lower WBUs and the fractured bedrock for each source area are separated within the subsections provided below.

4.3.1 Plume Evaluation – Pit 1

4.3.1.1 VOCs – Elevated VOC concentrations detected downgradient from Pit 1 include PCE, TCE, cis-1,2-DCE, VC, 1,1,1-TCA, 1,1-DCA, and 1,1-DCE. The monitoring wells with elevated VOC concentrations located downgradient from Pit 1 include AEHA-DG10 and DMW-33A. Wells on the

plume boundary include DMW-22A, MWFTA-3, DMW-25A, and DMW-35A (It should be noted that due to the current monitoring well network, DMW-25A and MWFTA-3, although suspected to be downgradient of the source area from Pit 2, are identified on the plume maps as associated with the current VOC plumes located downgradient from Pit 1)

- 4.3.1.2 PCE The areal extent of the elevated (>1,000-micrograms per liter [μg/L]) PCE concentrations for the four quarters has fluctuated from each sampling event with the maximum concentrations detected at AEHA-DG10. The areal extent of the PCE concentrations (5 to 100 μg/L) appears to have remained relatively constant. However, currently, there are no monitoring wells located downgradient and to the east of DMW-33A. Because of this, the areal extent of PCE cannot be evaluated in this area.
- 4.3.1.3 The Mann-Kendall trend analysis performed indicates a statistically significant decreasing PCE trend for three (AEHA-DG10, DMW-22A, and DMW-25A) of the four wells located within or on the boundary of the plume. An exception is the increasing trend reported for MWFTA-3. The upward trend observed within this well may be due to the migration of PCE downgradient from Pit 2, the comingling of the PCE plume downgradient from Pit 1 and Pit 2, and/or the expansion of the Pit 1 PCE plume. Without additional data from wells upgradient from MWFTA-3 and downgradient from DMW-25A, the cause of this increasing PCE trend cannot be fully assessed. The Mann-Kendall results for all other wells indicates that no significant trends are apparent
- 4.3.1.4 TCE Elevated concentration of TCE are also centered on AEHA-DG10. The isoconcentration figure illustrates that TCE detected at concentrations greater than $10,000 \mu g/L$ have decreased and are no longer apparent. The areal extent for the overall TCE concentrations (5 to 100 $\mu g/L$) appears to have remained relatively constant.
- 4.3.1.5 The Mann-Kendall trend analysis results indicate a statistically significant decreasing TCE trend for three (AEHA-DG10, DMW-22A, and DMW-25A) wells located within or on the boundary of the plume. All other wells downgradient from Pit 1 did not exhibit a statistically significant trend.
- **4.3.1.6** cis-1,2-DCE The isoconcentration figure illustrates that the areal extent of the cis-1,2-DCE concentrations located downgradient from Pit 1 has exhibited fluctuations. The maximum concentrations of cis-1,2-DCE are centered on DMW-33A. Currently, monitoring wells are not located downgradient

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and to the east of DMW-33A Because of this, the areal extent of the cis-1,2-DCE concentrations cannot be evaluated. However, the areal extent for the cis-1,2-DCE concentrations (5 to 100 μg/L) throughout the plume has remained somewhat unchanged

- 4.3.1.7 The Mann-Kendall trend analysis indicates a statistically significant decreasing trend for one boundary well (DMW-22A) and no statistically significant trend for all other wells evaluated within the plume
- 4.3.1.8 VC - Elevated concentrations of VC are centered on DMW-33A Elevated reporting limits were reported for VC for the July 2002 (<170 μg/L) and October 2002 (<130 μg/L) sampling events and, therefore, a current assessment of VC within DMW-33A cannot be completed. Consequently, a VC plume centered on DMW-33A is not presented in the isoconcentration figure. Elevated reporting limits for monitoring well AEHA-DG10 have also been provided; therefore, an evaluation of the presence of VC upgradient from DMW-33A cannot be made
- 4.3.1.9 1,1,1-TCA - An evaluation of the 1,1,1-TCA isoconcentration figure indicates the areal extent of the elevated (>1,000 μg/L) 1,1,1-TCA concentrations for the four quarters have fluctuated with each sampling event with the maximum concentrations centered around AEHA-DG10. However, the areal extent of the 1,1,1-TCA concentrations (200 to 1000 µg/L) appears to have remained relatively constant.
- **4.3.1.10** The Mann-Kendall trend analysis indicates a statistically significant decreasing trend for one boundary well (DMW-22A) and no trend for all other wells evaluated within the plume
- **4.3.1.11 1,1,1-DCA** An evaluation of the 1,1-DCA isoconcentration figure indicates that the areal extent of the elevated (>1,000 µg/L) 1,1-DCA concentrations for the four quarters have decreased from the October 2001 to October 2002 sampling events with the maximum 1,1-DCA concentrations centered around DMW-33A. However, the areal extent of 1,1-DCA concentrations (10 to 100 µg/L) has remained somewhat unchanged
- **4.3.1.12** The Mann-Kendall trend analysis indicates a statistically significant decreasing trend for one boundary well (DMW-22A) and no trend for all other wells evaluated within the plume

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- 4.3.1.13 1,1,1-DCE An evaluation of the 1,1-DCE isoconcentration figure indicates the areal extent of the elevated (>1,000 μ g/L) 1,1-DCE concentrations for the four quarters have decreased from each sampling event with the maximum 1,1-DCE concentrations centered around AEHA-DG10. However, the areal extent of the 1,1-DCE concentrations (7 to 100 μ g/L) has remained unchanged
- **4.3.1.14** The Mann-Kendall trend analysis indicates a statistically significant decreasing trend for one boundary well (DMW-22A) and no trend for all other wells evaluated within the plume.
- **4.3.1.15** Summary The predominant VOCs detected within the upper WBU at OU 7 include PCE, TCE, 1,1,1-TCA and associated daughter products (*cis*-1,2-DCE, VC, 1,1-DCA, and 1,1-DCE) as discussed in earlier sections. As of October 2002, the plume downgradient from Pit 1 is comprised of approximately 41% TCE, 18% PCE, 21% *cis*-1,2-DCE, 15% 1,1,1-TCA, 1% 1,1-DCA, 3% 1,1-DCE, and 1% VC (calculations were conducted without taking into account the reporting limits and therefore, VC may be biased low by approximately 3% with TCE biased high 2% and PCE biased high 1%).
- **4.3.1.16** The vertical VOC distribution for the VOCs downgradient from Pit 1 is shown in Figure 2-8. Monitoring wells AEHA-DG10 and DMW-33A contain similar VOC distributions, with DMW-33A containing more daughter products. This indicates parent VOC compounds are degrading as they migrate through the poorly graded sand and gravel layer. Monitoring well DMW-35A, located upgradient from AEHA-DG10 and nearer to Pit 1, does not exhibit the same elevated concentrations as AEHA-DG10. This is due to the more porous gravel layers extending above a silty sand layer from Pit 1 to AEHA-DG10. The migration of the contaminants from Pit 1 are more likely to travel through this gravel layer TO AEHA-DG10 than downward through the silty sand layer to DMW-33A.

4.3.2 Plume Evaluation – Pit 3

- **4.3.2.1 VOCs** Elevated VOC concentrations detected downgradient from Pit 3 include TCE, *cis*-1,2-DCE, *trans*-1,2-DCE, and VC. The monitoring wells with elevated VOC concentrations located downgradient from Pit 1 include MWFTA-23 and MWFOS-3. Due to elevated reporting limits within both of these wells, the areal extent of PCE, 1,1,1-TCA, 1,1-DCA, and 1,1-DCE cannot be evaluated.
- **4.3.2.2** TCE Maximum TCE concentrations, located downgradient from the former FOS tank or Pit 3, are centered on MWFOS-3 For the area downgradient from the FOS tank, a plume is not apparent

on the October 2001 map. This is due to elevated reporting limits in MWFOS-3 and MWFTA-23, a monitoring well located downgradient from MWFOS-3. However, evaluation of the plume from April 2002 to October 2002 indicates that this plume has remained somewhat unchanged

- 4.3.2.3 In addition, the variability of TCE concentrations between MWFTA-23 and MWFOS-3 is likely due to the location of the screened intervals within the upper WBU for each well. MWFTA-23, which includes a 30-foot screen, is screened across the entire upper WBU in this area. MWFOS-3 was installed with a 10 foot screen, located at the upper part of the upper WBU.
- 4.3.2.4 The Mann-Kendall trend analysis performed does not detect a statistically significant trend at MWFTA-23 or MWFOS-3.
- **4.3.2.5** *cis*-1,2-DCE Maximum concentrations of *cis*-1,2-DCE are centered on MWFTA-23 with elevated concentrations detected in MWFOS-3. The presence of the *cis*-1,2-DCE within MWFTA-23 and MWFOS-3 is likely due to the natural attenuation of PCE and TCE within each of this wells. In addition, *cis*-1,2-DCE has not been detected in DMW-27A, a monitoring well located downgradient from MWFTA-23, indicating that this plume is not readily migrating.
- 4.3.2.6 The Mann-Kendall trend analysis performed does not detect a statistically significant trend for either of these wells located within the plume downgradient from Pit 3.
- 4.3.2.7 trans-1,2-DCE trans-1,2-DCE is currently detected above reporting limits and the corresponding MCL of 100 μg/L in one well, located downgradient from the former FOS tank/Pit 3. An evaluation of the trans-1,2-DCE concentrations within MWFTA-23 cannot be performed due to elevated reporting limits within this well.
- **4.3.2.8** Due to the elevated reporting limits, a historical evaluation of the *trans*-1,2-DCE concentrations within MWFOS-3 or MWFTA-23 cannot be conducted.
- **4.3.2.9 VC** Elevated concentrations of VC are centered on MWFTA-23 with elevated concentrations also being detected in MWFOS-3. The areal extent of the plume boundary located downgradient from the former FOS tank has remained unchanged, indicating that this plume is not readily migrating. The relatively flat groundwater gradient in this area of OU 7 may be a factor that contributes to this condition

- **4.3.2.10** The Mann-Kendall trend analysis performed for VC does not detect a statistically significant trend for either of these wells located within the plume downgradient from Pit 3.
- **4.3.2.11** Summary As of October 2002, the plume downgradient from the former FOS tank/Pit 3 is comprised of approximately 85% cis-1,2-DCE, 10% TCE, 4% VC, with 1% for all other constituents combined. However, calculations were conducted without taking into account the reporting limits and therefore, PCE, 1,1,1-TCA, 1,1-DCA, 1,1-DCE may be biased low by 2 percent and trans-1,2-DCE may be biased low by 1 percent with TCE biased high by 9 percent.
- 4.3.2.12 The vertical VOC distribution for the VOCs downgradient from Pit 3 is shown in Figure 2-6. Monitoring wells MWFOS-3 and MWFTA-23 do not contain similar VOC distributions as seen in monitoring wells AEHA-DG10 and DMW-33A. MWFTA-23 contains more VOC daughter products and MWFOS-3 contains more VOC parent products. The variation of VOC distributions between these two wells, located so closely together, is likely due to the screen interval within each well. MWFTA-23 is screened throughout most of the upper WBU and MWFOS-3 is screened within the top portion of the upper WBU. The likely pathway for the contaminants is downward through the sand and gravel layer. Monitoring wells located downgradient from these two wells do not have VOC concentrations above reporting limits. This is likely due to these wells being screened within a less porous silty sand layer.

4.3.3 Other VOCs - Upper WBU

4.3.3.1 Additional VOCs detected at the site, as listed in Table F-1 (Appendix F) and reported in the groundwater samples collected during the October 2001, March/April 2002, July 2002, and October 2002 were 1,2,4-trimethylbenzene, 1,2-dichlorobenzene, 1,3,5-trimethylbenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, acetone, benzene, carbon tetrachloride, chloroform, chloromethane, isopropylbenzene, methylene chloride, and naphthalene.

4.3.4 VOCs Lower WBU

4.3.4.1 Elevated VOC concentrations have been detected downgradient at one monitoring well, MWFTA-16, located downgradient from Pit 3 Due to elevated reporting limits within this well, the areal extent of PCE and TCE cannot be evaluated. The constituents *trans*-1,2-DCE, 1,1,1-TCA, 1.1-DCA, and 1,1-DCE have been historically, and are currently, not detected within the lower WBU.

- 4.3.4.2 TCE In addition to VOCs being detected at MWFTA-16, historically TCE has been detected in monitoring well PWFTA-2, a well that is currently not sampled as part of the groundwater monitoring program. PWFTA-2 was removed from the monitoring program because the installation diagrams indicated that the outer casing may have been improperly installed through the confining layer causing potential leakage of upper WBU contaminants into the lower WBU. Figure 3-8 is the TCE isoconcentration figure for the lower WBU. The plume located on this map represents the TCE contamination at PWFTA-2 for the October 2001 and April 2002 sampling events.
- 4.3.4.3 cis-1,2-DCE Elevated concentrations of cis-1,2-DCE have been detected at MWFTA-16. Since the October 2001 sampling event, the cis-1,2-DCE concentrations have fluctuated slightly, but remained generally consistent. The areal extent for this plume boundary (70 to 100 μ g/L) has remained somewhat unchanged indicating the plume is not readily migrating downgradient. The source of the contamination within the lower WBU is currently not known but may have been caused by improperly installed wells or fractures within the confining layer, which is approximately four feet thick in this area.
- 4.3.4.4 The Mann-Kendall analysis did not indicate a statistically significant trend for MWFTA-16; however, one statistically significant decreasing trend was calculated by the Mann-Kendall test for monitoring well MWFTA-19. However, the concentrations detected within this well are low ($<2.1 \,\mu g/L$), and the trend analysis is not considered to be significant for this evaluation.
- 4.3.4.5 VC Elevated VC concentrations have been detected at MWFTA-16. The isoconcentration figure illustrates that the areal extent of the plume located downgradient from the former FOS tank has exhibited slight increases of VC concentrations. In addition, the areal extent for this plume boundary (2 to $100 \mu g/L$) has remained somewhat unchanged. MWFTA-17, a monitoring well located downgradient from MWFTA-16, historically has not had, and currently does not have, detectable VC concentrations.
- 4.3.4.6 The Mann-Kendall analysis performed did not indicate a statistically significant VC trend for MWFTA-16 However, an evaluation of the time series graphs do indicate an increasing trend because VC has increased since the initial sampling event in October 1993 when a result of $<2 \mu g/L$ was reported in this well.

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4.3.5 Other VOCs – Lower WBU

4.3.5.1 Additional VOCs detected at the site, as listed in Table F-2 (Appendix F) and reported in the groundwater samples collected during the October 2001, March/April 2002, July 2002, and October 2002, were 1,2-dichlorobenzene, 2-butanone, 2-hexanone, acetone, benzene, chlorobenzene, chloroethane, chloroform, chloromethane, p-isopropyltoluene, methylene chloride, toluene, and naphthalene.

4.3.6 Summary of VOCs – Lower WBU

4.3.6.1 VOC contamination within the lower WBU at OU 7 is primarily located around MWFTA-16. This well is located downgradient from the plume associated with the former FOS tank/Pit 3 in the upper WBU VOCs were not detected within monitoring well MWFTA-16 during the initial sampling event in October 1993. However, VOCs were detected during the October 2000 sampling event (the second sampling event for this well). The contamination at this well is presumed to be caused by either improperly installed monitoring wells upgradient of MWFTA-16 and/or naturally occurring fractures within the confining layer. The areal extent of the VOC plume at MWFTA-16 is not readily expanding or migrating downgradient. In addition, VOCs have not been detected at MWFTA-17, a monitoring well located immediately downgradient from MWFTA-16. MWFTA-16 and MWFTA-17 will continued to be monitored as part of the monitoring program to evaluate the potential for migration within the lower WBU.

4.3.6.2 The VOC distribution pies for wells located downgradient from Pit 1 is shown on Figure 2-6 As shown in the figure, the confining layer within this area is approximately 4-feet in thickness MWFTA-16 is located downgradient from MWFTA-23, a monitoring well located in the upper WBU with elevated VOC concentrations. A potential source of contamination within the lower WBU downgradient from Pit 3 is possibly due the migration of contamination through fractures within the confining layer.

4.3.7 VOCs Fractured Bedrock

4.3.7.1 MWFTA-20 is currently the only well existing in the fractured bedrock sampled as part of the quarterly monitoring program and Figure 4-14 represents the time series graph. PCE, *trans*-1,2-DCE, and

1,1,1-TCA are currently not detected above reporting limits. The non-detection of these constituents is consistent with historical data.

4.3.7.2 TCE, cis,-1,2-DCE, 1,1-DCA, and 1,1-DCE at MWFTA-20 are currently detected above the corresponding reporting limits for the October 2001 through October 2002 sampling events. Mann-Kendall analysis does not indicate a statistically significant trend for the contaminants evaluated. However, an evaluation of the time series graph indicates increasing concentrations of VC. The concentration of VC has increased from <2 μg/L in October 1993 to 12 μg/L in October 2002. An areal evaluation of the plume cannot be determined for MWFTA-20 because reference points are not available. The source of the contamination within the fractured bedrock is currently not detected but concentrations may have resulted from improperly installed wells in the vicinity and/or upgradient or natural fractures within the saprolite

4.4 METALS

4.4.0.1 Upper WBU – Total and dissolved metals were measured during the October 2001, March/April 2002, July 2002, and October 2002 sampling events. Summary tables for metals detected in the upper WBU for each event are provided in Table 3-3. Currently, background metal concentrations or ACLs have not been established for DSCR and the results from the metals analysis were compared to primary or secondary MCLs. The metals exceeding these standards in the upper WBU include aluminum, arsenic, iron, and manganese and are presented in Figure 3-11

4.4.0.2 Aluminum – The maximum aluminum concentrations detected during the October 2001 and October 2002 sampling events were detected in monitoring wells DMW-13A (ranging from 794 μg/L to 1550 μg/L), a monitoring well located upgradient from Pit 1, and MWFTA-7 (ranging from 730 μg/L to 1340 J [estimated, based on QC data]), a monitoring well located on the eastern boundary of OU 7. DMW-13A and MWFTA-7 are not within an area of known VOC contamination and are upgradient and side gradient to the identified VOC plumes. Site-wide background concentrations have not been established; however, these wells have higher concentrations of aluminum than in known areas of contamination. Based on the locations of these elevated aluminum concentrations and without a site-wide background concentration, an evaluation of the significance of the elevated aluminum concentrations cannot be made.

- 4.4.0.3 Arsenic The maximum arsenic concentrations detected during the October 2001 through October 2002 sampling events were detected in monitoring well MWFTA-23, located downgradient from the former FOS tank/Pit 3, with concentrations ranging from 49 3 μ g/L to 96 6 μ g/L. The areal extent of the arsenic concentrations at MWFTA-23 and in surrounding wells is similar to the areal extent of the chlorinated solvent plume located in this area; this suggests that arsenic may have been mobilized by changes in geochemical processes associated with chemicals used in Pit 3 for fire training exercises.
- 4.4.0.4 Elevated arsenic concentrations are also located at monitoring well AEHA-DG10, located downgradient from Pit 1, with concentrations ranging from 27.9 μg/L to 81 μg/L. In addition, the areal extent of the arsenic concentrations within surrounding wells is similar to that of the chlorinated solvent plume downgradient from Pit 1. However, the areal extent of the elevated arsenic concentrations does not include DMW-33A. Arsenic concentrations decrease south of DMW-22A, suggesting that arsenic is migrating at a slower rate than the chlorinated solvents located within this area.
- 4.4.0.5 Elevated arsenic concentrations were also detected in MWFTA-1, a monitoring well located within OU 13 but originally installed to evaluate the groundwater downgradient from OU 7. The location of the elevated arsenic concentrations within this area suggests that the elevated arsenic concentrations are associated with the arsenic located upgradient and within OU 7. An arsenic source located within OU 13 has not been presently identified and arsenic concentrations from soil samples taken in OU 13 were generally low. Elevated arsenic concentrations found within the soil at OU 13 were found in surface soils and not subsurface soil. An evaluation of the MNA parameters within this well indicates reducing conditions. Because monitoring wells are currently not located immediately upgradient from MWFTA-1, a determination of the extent of these elevated arsenic concentrations within this area cannot be made.
- 4.4.0.6 Iron The maximum iron concentrations detected during the October 2001 through October 2002 sampling events were detected at monitoring well MWFTA-23, located downgradient from the former FOS tank/Pit 3, with concentrations ranging from 21,800 µg/L to 64,000 µg/L. Iron concentrations detected in monitoring well MWFOS-3 were similar to the iron concentrations detected within DMW-13A, a monitoring well located upgradient from Pit 1, but higher than the iron concentrations detected within MWFOS-1, located upgradient from the former FOS tank/Pit 3. The areal extent of the iron concentrations located within wells surrounding MWFTA-23 is somewhat similar to the areal extent of the chlorinated solvent plume.

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- Elevated iron concentrations were also detected at AEHA-DG10, located downgradient from 4.4.0.7 Pit 1, with concentrations ranging from 17,700 μ g/L to 33,700 μ g/L. The iron concentrations detected in monitoring wells located downgradient from AEHA-DG10 were an order of magnitude lower than the concentrations detected at AEHA-DG10 but similar to the concentrations detected at wells located upgradient from Pit 1, indicating that the areal extent of the iron concentrations is more localized around AEHA-DG10.
- Manganese The maximum manganese concentrations detected during the October 2001 4.4.0.8 through October 2002 sampling events were detected at monitoring well AEHA-DG10, located downgradient from Pit 1, with concentrations ranging from 658 µg/L to 1,080 µg/L. The concentration of manganese at wells located downgradient from AEHA-DG10 is similar to the concentrations within wells located upgradient from Pit 1, indicating the areal extent of the elevated manganese concentrations is localized around AEHA-DG10.
- Elevated manganese concentrations were also detected in monitoring well MWFTA-23 located 4.4.0.9 downgradient from the former FOS tank/Pit 3, with concentrations ranging from 153 µg/L to 519 µg/L. The concentration of manganese at wells located downgradient from MWFTA-23 is similar to the concentrations in wells located upgradient from the former FOS tank/Pit 3, indicating the areal extent of elevated manganese concentrations is localized around MWFTA-23.
- Summary With the exception of aluminum, the location of elevated metals concentrations 4.4.0.10 detected at the upper WBU appear to correlate with the VOC contamination downgradient from Pit 1 and the former FOS tank/Pit 3. This observation is consistent with a modification of the existing redox conditions in areas affected by VOCs If previously existing oxidizing conditions in the soils and WBU media were to be converted to reducing conditions (as would be expected from the degradation of fuel constituents), immobile metals might be mobilized. In particular, the dark reddish iron and black manganese oxyhydroxide coating on mineral grains that naturally color the sediments could be chemically reduced to their more-soluble, lower valence state. Since arsenic is reported to be strongly absorbed to these same oxyhydroxides, the dissolution of these coatings could also liberate adsorbed arsenic However, without site-wide background concentrations, the extent of the arsenic contamination is unknown

4.4.0.11 Lower WBU – Summary tables for metals detected in the lower WBU for each event are provided in Table 3-4. Currently, background metal concentrations have not been established for the lower WBU at DSCR and the results from the metals analysis were compared to primary or secondary MCLs. The metals exceeding the primary and secondary MCL standards in the lower WBU include aluminum, iron, and manganese and, are presented in Figure 3-12. In addition, few wells are available in the lower WBU at OU 7 and, consequently, a complete evaluation of the current conditions within the lower WBU cannot be performed.

4.4.0.12 The maximum concentrations of aluminum were detected in MWFTA-17 with concentrations ranging from 4,520 μ g/L to 5,380 μ g/L. The maximum concentrations of iron were detected in MWFTA-28B, a monitoring well located south of Kingsland Creek, with concentration ranging from 2,270 μ g/L to 3,130 μ g/L. MWFTA-16, which has elevated VOC concentrations, contains low level iron concentrations. The maximum manganese concentrations were detected in MWFTA-16, with concentrations ranging from 12 4 JQ (estimated; value is between the detection limit and reporting limit) μ g/L to 324 μ g/L. With the exception of manganese, elevated metals concentrations within the lower WBU do not appear to correlate with VOC contamination within the lower WBU

4.4.0.13 Fractured Bedrock – Summary tables for metals detected in MWFTA-20, the one monitoring well currently located within the fractured bedrock, is provided in Table 3-4. Currently, background metal concentrations have not been established for the fractured bedrock at DSCR and the results from the metals analysis were compared to primary or secondary MCLs. The metals exceeding the primary and secondary MCL standards in the fractured bedrock include aluminum, iron, and manganese. In addition, few wells screened within the fractured bedrock are present at OU 7 and consequently, a complete evaluation of the current conditions within the fractured bedrock cannot be performed

TAB

Section 5.0

5.0 **CONCLUSIONS**

- In October 2002, MACTEC conducted a groundwater sampling event for OU 7 at DSCR. The 5.0.0.1 following sections present conclusions developed as a result of the analysis of the groundwater monitoring data.
- Upper WBU Groundwater in the upper WBU of OU 7 has been impacted by various VOCs 5.0.0.2 from past site activities Two separate plumes, containing VOCs (parent and daughter products), have been delineated based on the results of this quarterly sampling event. The plumes, located downgradient from Pit 1 and Pit 3 or the former FOS tank, appear to be moving in the direction of groundwater flow towards Kingsland Creek Additionally, previous direct push data depict a third plume, this plume is downgradient of Pit 2. The current well network is not positioned to effectively monitor the plume from Pit 2.
- Concentrations of VOCs appear to have decreased as a result of degradation and the analytical 5.0.0.3 data suggest that reductive dechlorination is occurring. The predominant VOCs detected within the upper WBU at OU 7 include PCE, TCE, 1,1,1-TCA and associated daughter products (cis-1,2-DCE, trans-1,2-DCE, VC, 1,1-DCA, and 1,1-DCE) as discussed in earlier sections. TCE made up the majority of contamination within the Pit 1 contaminant plume and cis-1,2-DCE made up the majority of contamination within the former FOS tank/Pit 3 contamination plume. In addition, the plume located downgradient from Pit 1 also contains 1,1,1-TCA and associated daughter products. The presence of PCE/TCE daughter products (cis-1,2-DCE, trans-1,2-DCE, and VC) and 1,1,1-TCA daughter products (1,1-DCA) provides direct evidence that natural degradation is occurring.
- 5.0.0.4 The geochemical indicators for natural attenuation measured within the upper and lower WBU and the fractured bedrock at OU 7 generally indicate conditions that are favorable for sustaining natural attenuation and supporting MNA as a final remedial alternative However, the low availability of dissolved TOC in the groundwater may be limiting reaction rates
- In general, a natural progression of degradation products can be seen downgradient within the 5.0.0.5 Pit 1 plume, with elevated concentrations of parent VOC compounds detected within AEHA-DG10 and elevated concentrations of daughter products detected within DMW-33A. However, VOC concentrations located downgradient from DMW-33A needs to be assessed to ascertain potential migratory pathways

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- **5.0.0.6** Downgradient from Pit 3, *cis*-1,2-DCE makes up the majority of the contamination (within MWFTA-23 and MWFOS-3); this provides direct evidence that natural degradation is occurring. In addition, an evaluation of wells located downgradient from MWFTA-23 and MWFOS-3 does not indicate that the VOC plume is migrating.
- 5.0.0.7 Elevated arsenic, iron, and manganese concentrations have also been detected within the upper WBU at OU 7 These elevated inorganic concentrations are detected within wells containing elevated VOC concentrations suggesting the inorganics may be mobilized by changes in geochemical processes associated with the chemicals that were used within the pits.
- 5.0.0.8 Lower WBU For the lower WBU, 1,1,1-TCA, 1,1-DCA, and 1,1-DCE have not been detected. PCE, TCE, cis-1,2-DCE, and VC have historically been detected sporadically and at low levels (<10 μg). VOC contamination within the lower WBU at OU 7 is primarily located within MWFTA-16. This well is located downgradient from the contamination plume associated with the former FOS tank/Pit 3 in the upper WBU. However, the areal extent of the VOC plume at MWFTA-16 does not appear to be readily expanding or migrating downgradient. In addition, VOCs have not been detected within MWFTA-17, a monitoring well located immediately downgradient from MWFTA-16. MWFTA-16 and MWFTA-17 will continue to be monitored as part of the monitoring program to evaluate the potential for migration within the lower WBU.
- 5.0.0.9 In addition, the VOCs detected within PWFTA-2, a monitoring well no longer sampled as part of the monitoring program due to suspected improper installation, were detected at low levels (>10 μ g/L). The VOC concentrations within this area are currently not under evaluation due to the current well network for the lower WBU
- 5.0.0.10 Fractured Bedrock TCE, cis,-1,2-DCE, 1,1-DCA, and 1,1-DCE within MWFTA-20 are currently detected above their corresponding reporting limits for the October 2001 through October 2002 sampling events. Mann-Kendall analysis does not indicate a statistically significant trend for the contaminants evaluated. However, an evaluation of the time series graph indicates an increase concentration for VC. The concentration of VC has increased from <2 μg/L in October 1993 to 12 μg/L in October 2002. An areal evaluation of the plume cannot be determined for MWFTA-20 since other fractured bedrock wells have not been installed. The source of the contamination within the fractured bedrock is currently not known, this contamination may result from improperly installed wells

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TAB

Section 6.0



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TAB

Tables

TABLES

TABLE 1-1

HISTORICAL MONITORING WELLS SAMPLED

Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Center Richmond

Richmond, Virginia

	Oct-01 Monitoring Wells	Mar/Apr-02 Monitoring	July-02 Monitoring Wells	Oct-02 Monitoring Wells
Screened WBU	Sampled	Wells Sampled	Sampled	Sampled
Upper	AEHADG-10	AEHADG-10	AEHADG-10	AEHADG-10
Upper	DMW-13A	DMW-13A	DMW-13A	DMW-13A
Upper	NS	NS	DMW-20A (a)	DMW-20A
Upper	DMW-22A	DMW-22A	DMW-22A	DMW-22A
Upper	DMW-25A	DMW-25A	, DMW-25A	DMW-25A
Upper	DMW-26A	DMW-26A	DMW-26A	DMW-26A
Upper	DMW-27A	DMW-27A	DMW-27A	DMW-27A
Upper	DMW-33A	DMW-33A	DMW-33A	DMW-33A
Upper	DMW-35A	DMW-35A	DMW-35A	DMW-35A
Upper	MWFOS-I	MWFOS-1	MWFOS-I	MWFOS-I
Upper	NS	NS	MWFOS-3 (b)	MWFOS-3
Upper	MWFTA-I	MWFTA-I	MWFTA-1	MWFTA-1
Upper	MWFTA-3	MWFTA-3	MWFTA-3	MWFTA-3
Upper	MWFTA-5	MWFTA-5	MWFTA-5	MWFTA-5
Upper	MWFTA-7	MWFTA-7	MWFTA-7	MWFTA-7
Upper	NS	NS	MWFTA-9 (c)	MWFTA-9
Upper	NS	NS	MWFTA-10 (c)	MWFTA-10
Upper	MWFTA-23	MWFTA-23	MWFTA-23	MWFTA-23
Upper	NS	NS	MW112-2 (d)	MW112-2
Lower	DMW-29B	DMW-29B	DMW-29B (e) - NS	NS
Lower	MWFTA-14	MWFTA-14	MWFTA-14	MWFTA-14
Lower	MWFTA-16	MWFTA-16	MWFTA-16	MWFTA-16
Lower	MWFTA-17	MWFTA-17	MWFTA-17	MWFTA-17
Lower	MWFTA-18	MWFTA-18	MWFTA-18	MWFTA-18
Lower	MWFTA-19	MWFTA-19	MWFTA-19	MWFTA-19
Lower	MWFTA-28B	MWFTA-28B	MWFTA-28B	MWFTA-28B
Lower	MWFTA-29B	MWFTA-29B	MWFTA-29B	MWFTA-29B
Lower	PWFTA-2	PWFTA-2	PWFTA-2 (f) - NS	NS
Bedrock	MWFTA-20	MWFTA-20	MWFTA-20	MWFTA-20

Notes:

- (a) Added well DMW-20A to assess contamination prior to boundary well, MWFTA-7 per LAW memo dated June 27, 2002
- (b) Added well MWFOS-3 to monitor high concentrations and determine the potential presence of persistent sources per LAW meeting on July 24, 2002
- (c) Added wells MWFTA-9 and MWFTA-10 due to VDEQ recommendation dated July 17, 2002
- (d) Added Bidg 112 well, MW112-2, to provide additional characterization to background conditions per LAW meeting on June 24 2002
- (e) Deleted well DMW- 29B because single cased well in lower WBU may be conduit for lower WBU contamination from upper WBU per LAW meeting on June 24, 2002 and memo dated June 27, 2002
- (f) Deleted well PWFTA-2 because installation diagrams indicate that the outer casing may be improperly installed through the confining layer causing potential "leakage" of upper WBU contaminants into the lower WBU per LAW meeting on June 24 2002 and memo dated June 27, 2002
- NS Not Sampled

PREPARED/DATE EMS 4/14/03 CHECKED/DATE CMB 4/16/03

TABLE 1-2

ENVIRONMENTAL PROGRAMI MILESTONES Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

Environmental Program Milestones, DSCR

1941 Installation placed in active service as two separate facilities (Richmond General Depot and Richmond Holding and Reconsignment Point)

1962 Department of Defense consolidates missions of the 2 facilities, renames the facility DGSC and later DSCR.

1987 DSCR added to the National Priorities List

1990 FFA identified DSCR as a federal facility requiring investigation

1996 Final Focused FS completed, DPE recommended as preferred remedy for VOCs in groundwater

1996 Small-scale groundwater/vapor DPE system tested at OU 7,

1998 Small-scale density-driven convection system tested at OU 7

2001 Quarterly groundwater sampling initiated at OU 7 to evaluate MNA as a viable remedy

2002 Restoration Advisory Board (RAB) formed and first meeting held

Notes:

DGSC Detense General Supply Center

DSCR Defense Supply Center Richmond

DPE dual-phase extraction

FFA tederal facility agreement

feasibility study

OU operable units

OCs volatile organic compounds

PREPARED/DATE <u>EMS 4/14/03</u> CHECKED/DATE <u>MET 6/25/03</u>

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TABLE 1-3

HISTORICAL INVESTIGATION SUMMARY Annual Groundwater Report – October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

Year		Activity/Action
1960s- 1979	•	Flammable liquid waste chemicals and petroleum products are disposed of in three unlined pits, ignited, and then extinguished in conjunction with fire training activities
	•	Pit I, which was in use from the mid-1970s to 1979, was located in the eastern portion of what is now OU 7. This pit, located near a storm sewer line (running north-south), was circular with a 50 foot diameter and approximately 3 feet deep
	•	Pit 2, rectangular in shape with 20' X 40' dimensions, was used from the late 1960s until it was replaced by Pit 1 in the mid-1970s (1973-1975) Large flow stains are visually evident in A 1973 aerial photograph. Aerial photography indicates the pit was filled with soil in 1975
	•	Pit 3 is present in 1969 aerial photographs. The use of this pit for fire training activity cannot be confirmed. In 1971, Pit 3 is not identifiable in aerial photography.
	•	A beam surrounding a fuel oil storage tank was constructed in 1975, partially covering the Pit 3 area. In November 1978, the FOS tank released approximately 10,600 gallons of No. 4 fuel oil to the surface as a result of a cracked valve. Heavy rain at the time of the spill caused the oil to overflow its containment berm and discharge into Kingsland Creek (LAW, 1994).
1981	<u> </u>	Chemical Systems Laboratory (CSL) conducted an Installation Assessment of DSCR to evaluate the existence of toxic and hazardous materials in the subsurface environment at DSCR. The report identified the fire training area as a potential source of contamination. The report recommended further assessment of the FTA to determine the extent of subsurface contaminant migration and the establishment of a surface water monitoring program (CSL, 1981)
1982	•	In March 1982, United States Army Environmental Hygrene Agency (USAEHA) continued the study of Pit 1 and reported the pit to have a 1" layer of hquid petroleum products mixed with fire extinguishing material floating on the water. In addition, the bottom of the pit was reported to contain 1 to 4 inches of petroleum-based sludge
	•	The USAEHA installed four monitoring wells, one upgradient (DG-8) and three downgradient (DG-9, 10, and 11), in the area around Pit 1 to determine the groundwater quality at the site. Elevated levels of chlorinated solvents were detected down gradient of Pit 1. At this time, USAEHA recommended continued water quality assessment at Kingsland Creek.
	•	In September 1982, the USAEHA unitated a geohydrologic study that included a Surface Water Monitoring Program. Two locations along Kingsland Creek, SP01 located upstream and SP02 located downstream of the FTA, were selected as sampling locations for the evaluation of the impact of the FTA on surface water quality (USAEHA, 1982).
1983		Pit 1 was filled with soil leaving the petroleum layer and sludge in place (D&M, 1989b)

TABLE 1-3

HISTORICAL INVESTIGATION SUMMARY Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

Year		Activity/Action
1985	•	D&M initiated a Phase II Program following DSCR's placement on the proposed National Priority List. As part of this effort, D&M installed monitoring well DMW-13A to replace DG-8 as a background well for the FTA. In addition to the boring for DMW-13A, D&M advanced three soil borings (DMW-62, 63 and 64) and collected 9 soil samples.
	•	To evaluate the horizontal surface soil contamination, D&M collected three shallow surface samples (DMA-1 through DMA-3) to confirm the flow stain and wet areas previously identified in aerial photographs
	•	USAEHA collected sediment samples from the locations SP01 and SP02 (D&M, 1989b)
9861	•	A Phase I Soil Gas Sampling Program was initiated by D&M in October 1986 and the results were used to aid in the determination of monitoring well locations to more accurately define the extent of groundwater contamination. The results of the Phase I investigation identified a potential for additional contamination sources located west of Pit I.
	•	An aerual photographic interpretation investigation was conducted to more accurately define the areas of concern. Used in this investigation were aerual photographs taken in 1959, 1965, 1969, 1971, 1972, 1973, 1975, and 1982. An interpretation of the photographs is provided in the D&M Remedial Investigation Report (D&M, 1989b)
	•	A Phase II Soil Gas Sampling Program was initiated in November 1986 to delineate areas identified in the Phase I investigation and in the aerial photographs
	•	To confirm the extent of groundwater contamination identified in the Soil Gas Sampling program, D&M installed seven monitoring wells (DMW-19A through DMW-25A through DMW-27A) downgradient from the previously identified fire training pits.
	•	D&M advanced four soil borings (DMS-74 through DMS-77), in addition to the seven borings advanced during the monitoring well installation activity
	•	Six additional surface soil samples (DMA-9 through DMA-13 and DMH-1) were collected to assess flow stains and wet areas identified in aerial photographs (D&M, 1989b)
1987	•	A quarterly monitoring program was initiated as part of DSCR's RCRA Part B permit, which was in place at that time. This monitoring program included collection of four rounds of samples from nine surface water locations and 28 monitoring wells. The first round was conducted in the January 1987 field-sampling program, while rounds 2, 3, and 4 were conducted in April and July 1987 and November 1988, respectively (D&M, 1989b)
	•	Surface water sampling of the sewer outfall at Kingsland Creek was initiated. Samples were collected at location SWD-1 to evaluate the contamination potential and possible migratory pathway of the storm sewer, which traverses the FTA

TABLE 1-3

HISTORICAL INVESTIGATION SUMMARY Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

Year		Activity/Action
1988	•	During the fall of 1988, D&M conducted a supplemental investigation in the FTA to address data gaps identified in the Draft RI report. During this time six additional wells (DMW-22E, DMW-29A, DMW-29B, DMW-33A, DMW-33B, and DMW-35A) were installed to evaluate contamination in the upper and lower water bearing unit and in the bedrock. Soil samples were collected from each of the monitoring well soil borings for chemical analysis. In addition, two additional borings (DMS-106 and DMS-107) were advanced to assess the continuity, structures, and thickness of the clayey layer that separates the upper and lower water bearing units (D&M, 1989). An aquatic survey was performed and surface water and sediment samples were collected from three stations (SP13, 14 and SP16) during the study (D&M, 1989b).
1992	•	As part of the pre-remedial program, LAW conducted an expanded site investigation (ESI) of the Fuel Oil Storage (FOS) area. The purpose of the ESI was to provide additional support of the HRS secring, support scoping of the RI, and aid in developing the RI workplan. Five soil samples (SUFOS-1 through SUFOS-5) and four groundwater monitoring wells (MWFOS-1 through MWFOS-4) were installed in the FOS area (LAW, 1994). A remedial investigation addendum was initiated at the FTA by LAW to determine the nature and extent of contamination. This effort was conducted in two phases, the first phase being conducted from September through December 1992 by LAW and Engineering Science (FS) and the second phase being
	• •	conducted from August through October 1993 by ES In October, LAW installed 10 monitoring wells (MWFTA-1 through MWFTA-10) as five well clusters. During the installation, soil samples (SBFTA-1, SBFTA-3, SBFTA-5, SBFTA-5, SBFTA-7, and SBFTA-9) were collected from five of the borings advanced for the monitoring well installation (LAW, 1996a) ES advanced seventeen soil borings and collected 37 samples for analysis (ES, 1993)
1993	•	ES installed ten monitoring wells (MWFTA-11 through MWFTA-20) and collected 22 hydropunch samples (HPFTA-1 through HPFTA-22) as part of the Phase II RI In addition, two pumping wells (PWFTA-1 and PWFTA-2) were installed for the purpose of performing pump tests (ES, 1993)
†661	•	In May, ES abandoned two lower water bearing unit monitoring wells (DMW-22E and DMW-33B) to reduce the possibility of cross contamination between the upper and lower water bearing units (ES, 1994)

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TABLE 1-3

HISTORICAL INVESTIGATION SUMMARY Annual Groundwater Report – October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

Year	Activity/Action
1995	 In September 1995, LAW initiated a supplemental remedial investigation. The objectives of this field program were to Install well (MWFTA-21) to evaluate the presence of VOCs in the bedrock Evaluate drainage pathways from the FTA to determine if surface runoff from the site may have transported contaminated soil into the nearby wooded area through the storm sewer system and drainage features. Nine soil samples (SSFTA21 through SSFTA30) were collected from outfall locations Sample MWFTA-20 and MWFOS-3 to confirm the presence of DNAPL Collect 4 sediment samples and analyze for dioxins Assess the FTA surface water drainage. A smoke test was performed on the western storm sewer line (LAW, 1996b)
9661	To support the recommendation proposed in the Final Focused Feasibility Study, LAW initiated a DPE pilot study south of the former FOS area. Contaminant mass removals by vapor extraction were observed during the SVE and Dual Phase Test. Therefore, DPE was considered a good candidate (LAW, 1996c)
1998	LAW initiated a DDC pilot test to determine the effectiveness of source removal offsite and south of Kingsland Creek One DDC pilot test well and mine nested piezometers were installed. The DDC performed well by reducing dissolved VOC concentrations (LAW, 1999).
2000	From September 2000 to September 2001, LAW conducted a four-phase sampling event to provide data to evaluate the extent of VOC contamination, determine groundwater flow direction, and evaluate monitored natural attenuation (MNA) as a potential remedy to address residual contamination in the upper water bearing unit. The first phase of field activities included sampling of approximately 41 monitoring wells. In addition, groundwater samples were collected in the FOS area to verify the presence of absence of DNAPL. DPT sampling techniques were used to aid in providing a comprehensive profile of the groundwater conditions in the upper water bearing unit (LAW, 2002a).
2001	 In September 2001, LAW initiated a quarterly sampling program for the purpose of monitoring the nature and extent of the groundwater contaminant plume and to collect additional data to support monitored natural attenuation as a component of the final remedy for the site. In August and September 2001, the second phase of the field activities included the installation and sampling of monitoring well MWFTA-29B In addition, six wells that were not accessible in September 2000 were sampled. The third phase of field activities occurred in July and August 2001, at which time LAW conducted DPT groundwater sampling. During this event, appiloximately 53 DPT borings were advanced and 134 groundwater samples were collected. In August and September 2001, the fourth phase of the field activities conducted by LAW included the installation and sampling of monitoring well MWFTA-28B (LAW, 2002a)

TABLE 1-3

HISTORICAL INVESTIGATION SUMMARY Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

Year	l'ear Activity/Action	
	• In October 2001, LAW initiated a quarterly sampling program for the purpose of monitoring the nature and extent of the groundwater contaminant plume, to collect additional data to support MNA as a component of the final remedy for the site, and to collect groundwater data for the preparation of the potentiometric surface maps (LAW 2002a)	taminant ration of
2002	 Restoration Advisory Board (RAB) formed and first meeting held in January 2002. Quarterly sampling continued in March, July and October to collect chemical data regarding nature and extent of contamination and to collect data to support monitored natural attenuation as a component of the final remedy 	t data to
2003	2003 Quarterly sampling continued in January and April to collect chemical data regarding nature and extent of contamination and to collect data to support monitored natural attenuation as a component of the final remedy. Quarterly sampling will continue through the end of the year	support

PREPARED/DATE: TLN 9/30/02 CHECKED/DATE: RSF 6/27/03

TABLE 2-1

SUMMARY OF MONITORING WELL CONSTRUCTION DETAILS
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

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Well Casing Diameter	(methes)	,	2	2	2	4	4	4	4	4	2	7	4	-	7	,	,	9		, ,	7	2	2	7	2	2	7	. 2	2	7	2	2	7	2	2	4	2	2	2	2	2	2	2	2	2	2	2	2	2	7
Well Screen Length	(feet)	00 01	13.00	10 00	10:00	\$ 00	15.00	1500	\$00	\$ (8)	500	1500	15.00	98 51	90	89	900	800	5	8 8	Bir	9.00	9.70	9.70	200	487	\$00	200	5.00	5.00	800	100	200	5 (30	15.00	28 00	29 00	29 00	27.00	29 00	27 00	00 01	00 01	15.00	1500	8.00	15.00	8.00	200	2,00
Thickness of Continung Unit	(just)	Î									2.5		ç		,	45					0.0				L	4	,;	12.0	94	061	, ** */<: 1	الم الحديث و ا	, , , , , , , , , , , , , , , , , , ,	09	8.0	, a		F	٠,١	7, 4,5	· · · · · · · · · · · · · · · · ·	15.5	70	38. T. S.	99	がはない。	2 May 1	0.6	0.4	3.0
Depth to Top of Well Screen		9.5	3.40	0.9	010	9	9-	5 40	£ :	29.80	00 \$9		\$ 20	4 70	33.00	43.00	90.5	90 92	2.0		A .	124	724	824	01.6	× z	01.6	11 04	790	00 61				20 11	57.00	530	5.10	063	5.30		5.30	2006	99.50	5.00		24.00		35.00	35.00	35.00
Depth to Top of Dedrock	<u> </u>			•				,			×	•				,	,	=	. .			,		, ,	,	. 1		ن ن ن پ	:11 	A. (4)	•	1# A	T Jang	• • • • • • • • • • • • • • • • • • •	0		15. 15. 15. 15. 15. 15. 15. 15. 15. 15.	ji. Les	3,4		#; \			٠,٥ بـ ر.	પત ; કું	\$. \$.		34 44		10 mg
Depth to Top of Depth Saprointe Be			,			-3		-	-	<u>.</u>	29.5	go:		F.4.	.	* * *	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		نعة	, , ,,,,		ď,	1	نة الم	ip z	7.22	2.4	इं. हर्नुः	;;* ;**@		T. 18	वे - रुप्ते रिम्			0	10 mm		Ţ,	*** ****		シンガース・ディング あって	0 610		֡֝֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	, 1	が終め	はないという	が一個		Sec. 18
Depth to Bottom of Confining Layer	face)						*			,	22 2		•	**	v	, , a	· ·	\$,		***	,,	3,	12,			*		N. T. A. T.		1	3	.,	j .				ξη 2			Hr. 2017 2.	180	49	一年 一年の	140	があるが	たもの	が対対な	38.0	088
Depth to Top of Depth to Confining Layer	(feet below ground surface)								-	1	_	•		* `			5	0 28	\ <u>'</u> ,	4		F 0		, ,		VN .		25.0	<u>;</u>	320	, a	1,6		23		×.4		7. ·			A	081		大学 なんだいい				330	280	78.0
Casing Confiner	العا	17	_	-		=	,	-	ш		19.4			=		21.5	•	11 210				20 C	Ī	·,	š		. 1. 150 Z	130	, i.o.			-	1 kg	170	280	7	316	340	14.0	340	330	22.5	_	7,3	230	200	18.2	240	240	23.0
ptl of HI Outer Casing		1 yx 11	1 yre II	Type II	Tyre	lyre If		ll appe fil	Type II	[yaet]	lyrell	Type	Type ii	Tyre if		308	Type II	Type II	HyreH	3		134	# XX	Type	144	22.0	I)JPC	19.8	Type 11	150	Tyell	23.0	Iyx II	151	31.0	Type II	Type II	Type II	Tyre !!	Type II	Type II	15.5	000	**************************************	250		4	255	25	250
of Total Depti of		5 61	181	161	191	22.0	210	210	16 3	2	100	19.1	20.7	19.7	28.0	480	150	40.5	32 5	23.5	130	-		280	4	\$85	=	35.1	129	240	<u> </u>	13.1	145	24.1	720	14.0	15.0	150	110	150	110	0.69	1 69	200	400	39.0	18.5	40.0	40.0	0 07
Total Depth of Bung		20.0	18.6	16.5	17.0	340	210	210	163	140	700	21.0	210	210	90%	480	150	465	z.	260	07.1	2 2		5	051	41)	170	35.1	111	180	140	17.0	15.5	142	870	140	350	140	910	340	310	69.0	¥6.4	200	014	011	20 4	10.0	0.04	40.0
r Top of Casing Elevation	(feet MSI)	107 70	02 HOI	98.13	10140	10143	97.40	65.26	87.83	87.15	86 57	97.87	98.73	101 24	59.66	97.74	8 60 69	84 13	100 51	112.26	101 45	91 101	3 69	08401	91.32	92.81	1£ 9X	¥6 28	84.47	81 88	%6 72	85.06	85.90	86 29	81.53	103.20	102 77	10106	102 07	102 66	00 101	85 16	81 43	86.89	70.9%	101 10	92 08	8457	8106	85.77
Ground Surface Elevation	(je	105 40	99 [0]	95.72	02 101	15 66	95.45	9501	84.71	84 94	K4 70	96.31	96 27	59.86	89.56	45.73	82.50	82 <u>20</u>	97 2N	11 601	82 66	88 001	20 00	86 101	89.21	89 49	84.51	84 15	83.28	8 306	83.96	8145	8176	8145	81.67	100 15	0.001	100 64	90001	16031	98 84	82.74	81.18	7 2	81.18	97.88	89.76	×.	¥.	NA
Northing		¥	1674799 65	3674795.47	3674887.63	91 (10) 291	3674740 28	3674854 64	3674600 52	3674607 42	NA	467467329	3674722 15	1674821 49	3674797 25	3674800 60	3674605 40	VZ.	1674908 98	3675108 99	1674887 33	4674KB1 76	1434161 07	1014501	10.14 KM 84	1674114 07	1674526 04	3674517 68	1674494 15	1674509 61	1074821 78	3674811 43	3674159.91	1674175 44	1674752 24	1674881 14	3674872 72	1674880 91	3674858 20	3674881 83	1674826 28	4674199 19	4674743 04	1674618 17	1021010101	167476764	3674360.82	1074547 16	3674505 36	1674460 16
Fasting		ž	1178906196	77 91 182 11	11789062 78	11788957 94	11789055 48	11789346 44	11789267 47	11.789281 04	¥	11788885 37	1178862415	11788435 24	1178915158	1178916791	1178948121	V.	11789078 30	11788226.22	11788474 97	11788389 55	11.288474 67	CT (31597.11	71,091,00,12	11788770 27	11789105 58	11789106 14	11789646 75	11789617.63	1178981772	117898411	1178960798	11789600 28	11789710 04	07.588411	11788 196 74	11788400 25	11788402 74	117884115.69	11788417 14	1178952574	11789667 29	1178925667	11759274 12	1178819121	11788815 40	11789568 18	1178942118	11389272 18
Date of Installation	-	VI VI982	V14/1982	3/14/1982	V15/1982	\$21/1985	11/19/1986	9861/4111	11/18/1986	11/26/1986	8861/2/11	12/12/19R6	12/10/1986	12/8/1986	11/7/1988	8861/2/11	5/18/198B	88617279	11/8/1988	9/30/1992	10/1/1992	9/10/1992	100171001	10017001	261100	4/5/1993	10/2/1992	10/15/1992	10/14/1992	10/15/1992	10/2/1992	10/16/1992	10/14/1992	10/17/1992	8/23/1995	8/30/1996	871/1996	9661/67/8	8/28/1996	8/27/1996	8/29/1996	80202001	1/28/2001	1661/2/6	F001/27/P	166[/]/6		-	_	9/1 V/1903
Well ID		-			_			\dagger		+		DMW 25A 15	+	DMW 27A	DMW 29A 1	DMW 29B	DMB 33A S	DMW 338 6	DMW 35A	MALOS I 9						_	\dagger	MWF1A 4 10	MWI 1 4 10	MWT IA 6 10	MWITA 7	MW17A 8 10	MW11A 9 10	MWITA 10	MW1 [A 21 8/	MW17A 22 8/	WW 1 1 21 8"	MW11A-24 80	MW11A 25 822	+	MW1 1A-27 8/2	-	MW1 IA 29B 12	PW11A 1 90	+	+	-	+	+	NW11415 9/1

1 مر 2

SUMMARY OF MONHORING, WELL CONSTRUCTION DETAILS
Annual Groundwater Report - Oktober 2002
Operable Unit 7
Defense Supply Center Ruhmond
Ruhmond, Virginia

	Screened	Covernment Agency Available	Available		Thomas Minimiser In North In 18	Line Presence Members Line Science Inc Yes Yes	Limet Potentiae Memoring Ling Science In. Yes Yes	Luwer Program Mentitering Ing Scence Inc Yes Yes	I is a second and it	THE THEFT IS NOT THE THE THE THE THE THE THE THE THE TH	Upper Lasurer Plice Test Washin Liverconnected Yes Yes	Upper Lastower Phys Test Wasaich Environmental Se	Unca Lastoner Phin Tes Wasach Liveromeeria yes	3	THE PERSON NAMED IN COLUMN 1	United Lastower Thin less Wasaich Lavirreum Mes Yes Yes	Upper Eastower Piles Test Wassech Environmental Yes Yes	Upper Lastower Pilot Fest Wasterb Lavorentingment Yes Yes	Yo	* *	
	Well Casing Diameter Well Manager	T	(inches)	2 PV4),	2 PVC	2 PVC	2 PVC	2 2	,	2 PVC	J PVC	2 PVC) <u>\</u>	2 PVC	2 PVC) PV(
	Sof Well ween Und Length	-	(Jeel)	200		005	1001	500	5.00	255	3	001	100	100	8 -		200	00	00 -	100	
	Depth to Top of Thukness of Well Serven Confining Unit	1		45.00			44 00 12 0	35.00 9.0	70 00 69	,,,,		1900	1100	500	0.61	5	14.55		19 50	1200 44 20 25 35 35	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	Depth to Top of Bedrack		14. 15 00 5 100			8.5 · · · · · · · · · · · · · · · · · · ·	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10 S S S S S S S S S S S S S S S S S S S	ı,	- 12 3 W.Y.	() 经设施股份	7 C 26 7 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2					の対象が				を という は は は は は は は は は は は は は は は は は は は
	Depth to Bottom of Confining Saproble Laver	urface)		200	340		3/0	270 350		I)	あいい カヤル	6	1-	はないないない はいかいたい		「	. I . J	(S. 28 (S. 18))	はいまればい	Ç •	数を対している。対対
	Depth to Top of Confining Laver	(feet below ground surface)		120	29.5	030	-		23.0	210 5-455			210	<u></u>		数ない。数数	記事一次の意味が			210	230 C
\vdash	III Outer Casang Depth			ž	4.3	ž		240	240	1 yr.	Pezware		Przewyci	Purometer	Prezometer	Perometer	Phenancia		Pezometer	Piczumiter	Piczom ler
-	hof Total Depth of			0(5	00%	067	3	00	750	245	22.1	1	4	76	210	011	•	-	710	0	7.0
ļ	Asing Total Depth of Boring		_	6	0.08	1167	908		-	25.0	240	240	-		210	21.0	* 6	01,			210
ш	Firston Firston Firston	(feet MSI)	74 (0)		9763 100 15	95.47 47.49	82.21 xx4.5			NA 84.85	82.03 84.09	82.03	-		82 25 N4 61	82.25 84.59	82.25 84.56	82 23 84 57		-	84.51
	Northing Plea		W024850 VS	+-	67. 8. 8. 8.	1674612 HI 94	1674701 71 82	16726 ty 14 R.1	-	Z	3674599 57 82	1674599 52			+	3674599 74 82	%74599 74 82	1674601.74 82			
	Faving No.		178819796	 	1/88/4/197	1178889778 X67-	11789485 12 467.	758 72 NO 48711	-	-	11789465 15 3674	13789465 14 1674	11789465 35	<u> </u>	-	11789470 19 3674	11789470 19 4674	11789474 29 1674	1789474 29 3674	-	
	Date of Factoring F		5/11/993	Contraction	 -	1711	9/19/1993	4711993	12/11/199k	_	8711	87.11	12/11/1998	_	\vdash	8211 178	12/16/1998 1178	12/4/199x	12//1998	1736	-
	Well II		MW11A 16	MWI IA IZ		MWE 1A IS	MWI IA 19	MWI 1A 20	×ici	-		17.2	1 78	17.4			17.6	77.7	8 /4	6 23	

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For IMSI. for below mean as a keel.

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PREPAREDMATE JIV SOLIDS CHECKLOMATE RST MISMA

TABLE 2-2

HISTORICAL WATER LEVFL ELEVATIONS MEASURED Annual Groundwater Report - October 2002 Operable Unit 7

Defense Supply Center Richmond Richmond, Virginia

Well ID	Screened WBU	Measuring Point Flevation (in feet msl)	Oct-01 Water Level Elevations (in feet msl)	Mar/Apr-02 Water Level Elevations (in feet msl)	July-02 Water Level Elevations (in feet msl)	Oct-02 Water Leve Elevations (in feet risl)
AFIIA DG9	Upper	104 20	NM	NM	89 00	93.86
AEHA DG10	Upper	98 13	84.56	86.38	BTOP	86.98
DMW-13A	Upper	101.43	89.83	96 74	88 74	91.88
DMW-19A	Upper	97.40	NM	NM	85 24	88 44
DMW-20A	Upper	97 59	NM	NM	81.58	83.78
DMW-21A	Upper	87 53	NM	NM	80.13	83 11
DMW-22A	Uppur	87 15	80.21	82 16	79 93	82 7
DMW-25A	Uррыг	97.87	86 92	88 82	86 42	95.21
DMW-26A	Upper	98.73	90 10	90 12	89 15	90.60
DMW 27A	Uppur	101 24	90 44	90 94	89 85	91.18
DMW-29A	Upper	97.65	NM	NM	83 84	86 77
DMW-33A	Upper	85 09	78 31	79 39	78 06	79 61
DMW-35A	Upper	100.51	86 70	88 72	86 26	88 46
MWFOS I	Upper	112 26	91 87	92 70	NM.	92 93
MWFO2 3	Upper	101 20	NM	NM	89 66	91.64
MWFOS-3	Upper [103 19	NM.	NM	88 08	91.57
MWFOS 4	Upper	103 60	NM	NM	90.46	92 35
/WFTA-L	Upper	91 32	82 87	84 24	82.61	82 92
AWETA-1	Upper	86.83	81 54	83 18	81.33	83 87
AWFIA S	Upper	85 47	77 19	80 32	76 62	79 37
AWFTA 6	∪ррыг Иррыг	85 18	NM	NM	76 70	NM
AWITA 7	Upper	86 72	76 44	77 37	75 97	77 20
MWFTA-8	Upper	85 16	NM	NM	75.07	NM
MWFTA 9	Upper	85 90	NM.	NM	78 12	82.60
AWFTA-10	Upper	86 29	NM	NM	78 84	81 84
AWFTA-11	Upper	101 10	NM	NM	89 37	90.43
AWFTA-12	Upper	92 08	NM	NM	82.89	84 59
IWITA 22	Upper	103 20	NM	NM	90 10	91.60
IWITA 23	Upper	102 77	90 57	91.28	90.03	91 51
JWITA 24	Upper	103 06	NM	NM.	90 05	91 57
JWITA-25	Upper	102 07	NM	NM	89 98	91 42
1WFTA 26	Upper	102 66	NM	NM	90 03	91.62
JWF1A 27	Upper	101 00	NM.	NM	89 81	91 14
WFTA-I	Upper	86 39	NM	NM	80 38	83.76
MW 29B	Lower	97.74	61 37	66.76	66 10	64 49
IWITA 2A	Lower	92 90	NM	80 88	80 21	NM
1WFTA-4	l ower	86 37	NM	69 83	67.53	66 92
IWETA 13	Lower	84 57	NM	NM	65.95	NM
IWITA 14	Lower	85 06	61.63	66 24	66.5	65.06
IWITA 15	Lower	85 77	NM	NM	68 37	NM
IWFTA 16	Lower	103 16	75 17	78 37	78 74	76 17
WFTA 17	Lower	100 15	73 93	70 · · · 77 27	77 84	75 50
(WFTA 18	Lower	97 59	68 83	73 12	72 34	71 09
1WFLA 19	lower	84.45	58 93	64 13	64 69	63.00
1WFTA 28B	Lower [85 16	56.96	63.20	62 46	18 54
1WETA 29B	Lower L	81 59	58 07	55 01	63.82	53.60
WEIA 2	Lower	86 04	61.55	66 44	66.40	65.14
WETA 20	Bedrock	87 04	60 34	65.43	65 30	64.01

Notes *

Due to funding limit itions, the First Quarterly Sampling Event for 2002 was not initiated

mst mean scallevel
B TOP below top of pump
NM not measured
WBU water bearing unit

water bearing unit

Well needs to be resurveyed to obt in accurate top of ensing, groundwater elevation for this well not used for potentiometric maps.

PREPARED/DATE <u>EMS 1/10/03</u> CHECKED/DATE <u>RSE 6/26/03</u>



TABLE 3-1

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond

Richmond, Virginia

(Units = µg/L)	ОСТ-01	MAR/APR-0		OCT-02
		Tetr	achloroethene	
AEHADG-10	3300	1200	2800	1900
DMW-13A	< 1	< 1	< 1	< 1
DMW-20A	NS	NS	< 13	< 1
DMW-22A	2.4	4 3	3 2	19
DMW-25A	19	5	13	1.4
DMW-26A	< 5	< 1	< 1	< 1
DMW-27A	< 1	< 1	< 1	< 1
DMW-33A	430	140	360	450
DMW-35A	97	15	7 8	61
MW112-2	NS	NS	< l	< 1
MWFOS-1	< 1	< 1	< 1	< 1
MWFOS-3	NS NS	NS	< 330	< 330
MWFTA-1	< 5	< 1	< I	< 1
MWFTA-10	NS	NS	< 1	< 1
MWFTA-23	< 5000	< 1200	< 5000	< 1200
MWFTA-3	3	< 33	37	9
MWFTA-5	< t	< 1	< 1	< 1
MWFTA-7	< 1	< 1	< 1	< 1
MWFTA-9	NS	NS	< l	< 1
		Tri	chloroethene	
AEHADG-10	14000	9000	5200	2800
DMW-13A	< 1	< 1	< 1	< l
DMW-20A	NS	NS	1 3	2 5
DMW-22A	10	20	12	10
DMW-25A	56	0 74 JQ	4	< l
DMW-26A	< 5	< 1	< 1	0 81 JQ
DMW-27A	< 1	< 1	< 1	< 1
DMW-33A	3500	780	2000	2500
DMW-35A	3	33	3.1	2
MW112-2	NS	NS	< 1	< 1
MWFOS-1	< 1	< 1	< l	< 1
MWFOS-3	NS	NS	8400	7600
MWFTA-1	< 5	< 1	< 1	< 1
MWFTA-10	NS	NS	< 1	< 1
MWFTA-23	< 5000	240 JQ	2500 JQ	< 1200
	8 4	16JQ	22	9 1
		- · · · · · · · · · · · · · · · · · · ·		
MWFTA-3		< 1	< l	<
	< 1	< 1 < 1	< l < l	< <

TABLE 3-1

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond

Richmond, Virginia

$(Units = \mu g/L)$	OCT-01	MAR/APR-02	JULY-02	OCT-02
		cis-1,2-D	ichloroethene	
AEHADG-10	880	1000	780	690
DMW-13A	< 0.5	< 0.5	< 0.5	< 0.5
DMW-20A	NS	NS	40	21
DMW-22A	6 2	67	3 5	2
DMW-25A	8 8	12	6	< 0.5
DMW-26A	< 2.5	< 0.5	< 0.5	0 38 JQ
DMW-27A	< 0.5	< 0.5	< 05	< 0.5
DMW-33A	2900	690	1800	1900
DMW-35A	1.7	91	0 55	< 0.5
MW112-2	NS	NS	< 0.5	< 0.5
MWFOS-1	< 0.5	< 0.5	< 05	< 0.5
MWFOS-3	NS	NS	11000	9800
MWFTA-1	< 2.5	0 64	0 43 JQ	0 61
MWFTA-10	NS	NS	< 0.5	< 0.5
MWFTA-23	190000	34000	140000	52000
MWFTA-3	12	100	38 J	56
MWFTA-5	< 0.5	< 0.5	< 05	< 0.5
MWFTA-7	< 0.5	< 0.5	< 0.5	< 0.5
MWFTA-9	NS	NS	< 05	< 0.5
		trans-1.2-	Dichloroethene	
AEHADG-10	< 210	< 170	< 83	< 62
DMW-13A	< 0.5	< 0.5	< 0.5	< 0.5
DMW-20A	NS	NS	< 0.66	< 0.5
DMW-22A	< 0.5	< 0.5	< 0.5	< 0.5
DMW-25A	< 0.5	< 0.5	< 0.5	< 0.5
DMW-26A	< 2.5	< 0.5	< 0.5	< 0.5
DMW-27A	< 0.5	< 0.5	< 0.5	< 0.5
DMW-33A	39 JQ	7 3 JQ	< 42	< 33
DMW-35A	< 0.5	< 0.5	< 0.5	< 0.5
MW112-2	NS	NS	< 0.5	< 0.5
MWFOS-1	< 0.5	< 0.5	< 0.5	< 0.5
MWFOS-3	NS	NS	160 JQ	140 JQ
MWFTA-1	< 2.5	< 0.5	< 0.5	< 0.5
MWFTA-10	NS	NS	< 0.5	< 0.5
MWFTA-23	< 2500	< 620	< 2500	< 620
MWFTA-3	0 22 JQ	44	1 3 J	2 6
MWFTA-5	< 0.5	< 0.5	< 0.5	< 0.5
MWFTA-7	< 0.5	< 0.5	< 0.5	< 0.5
MWFTA-9	NS	NS	< 0.5	< 0.5
144.44 474.5			- V -	* **

TABLE 3-1

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

$(Units = \mu g/L)$	OCT-01	MAR/APR-02		OCT-02
		Ving	yl Chloride	
AEHADG-10	< 830	< 670	< 330	< 250
DMW-13A	< 2	< 2	< 2	< 2
DMW-20A	NS	NS	< 27	< 2
DMW-22A	0 32 JQ	< 2	< 2	< 2
DMW-25A	0 6 JQ	< 2	< 2	< 2
DMW-26A	< 10	< 2	< 2	< 2
DMW-27A	77	< 2	4 3	< 2
DMW-33A	33 JQ	7 7 JQ	< 170	< 130
DMW-35A	< 2	< 2	< 2	< 2
MW112-2	NS	NS	< 2	< 2
MWFOS-1	< 2	< 2	< 2	< 2
MWFOS-3	NS	NS	380 JQ	360 JQ
MWFTA-1	< 10	< 2	< 2	< 2
MWFTA-10	NS	NS	< 2	< 2
MWFTA-23	5400 JQ	2600	4000 JQ	2500
MWFTA-3	0 56 JQ	14	3 1 J	4 1
MWFTA-5	< 2	< 2	< 2	< 2
MWFTA-7	< 2	< 2	< 2	< 2
MWFTA-9	NS	NS	< 2	< 2
		1,1,1-Tr	ichloroethane	
AEHADG-10	7300	5800	3000	1200
DMW-13A	< 1	< 1	< 1	< 1
DMW-20A	NS	NS	< 13	< i
DMW-22A	< 1	< 1	< 1	< 1
DMW-25A	< 1	< 1	< 1	< 1
DMW-26A	< 5	< 1	< 1	< 1
DMW-27A	< 1	< 1	< 1	< l
DMW-33A	1200	160	660	680
DMW-35A	< 1	0 89 JQ	< 1	< 1
MW112-2	NS	NS	< 1	< 1
MWFOS-1	< 1	< t	< 1	< 1
MWFOS-3	NS	NS	< 330	< 330
MWFTA-I	< 5	< 1	< 1	< 1
MWFTA-10	NS	NS	< 1	< 1
MWFTA-23	< 5000	< 1200	< 5000	< 1200
MWFTA-3	< 1	< 33	< 11	< 2
MWFTA-5	< 1	< l	< l	< l
MWFTA-7	< 1	< 1	< l	< 1
MWFTA-9	NS	NS	< l	< 1

TABLE 3-1

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

(Units = µg/L)	OCT-01	MAR/APR-0	2 JULY-02	OCT-02
		1,1-D	ichloroethane	-
AEHADG-10	86 JQ	98 JQ	68 JQ	< 120
DMW-13A	< 1	< l	< 1	< 1
DMW-20A	NS	NS	< 13	< 1
DMW-22A	0.7 JQ	0 88 JQ	0 5 JQ	0 48 JQ
DMW-25A	< 1	< 1	< 1	< 1
DMW-26A	< 5	< 1	< 1	< 1
DMW-27A	< 1	< 1	< 1	< 1
DMW-33A	170	51	100	110
DMW-35A	< 1	0 43 JQ	< 1	< 1
MW112-2	NS	NS	< 1	< 1
MWFOS-1	< 1	< 1	< 1	< 1
MWFOS-3	NS	NS	< 330	< 330
MWFTA-I	< 5	0 78 JQ	1	0 79 JQ
MWFTA-10	NS	NS	< 1	< 1
MWFTA-23	< 5000	< 1200	< 5000	< 1200
MWFTA-3	0 27 JQ	1 3 JQ	0 62 JQ	0 62 JQ
MWFTA-5	< 1	< 1	< 1	< 1
MWFTA-7	< 1	< 1	< 1	< 1
MWFTA-9	NS	NS	< 1	< 1
		1.1-0	ichloroethene	
AEHADG-10	1100	570	270	140 J
DMW-13A	< 1	< 1	< 1	< 1
DMW-20A	NS	NS	< 13	< 1
DMW-22A	0 66 JQ	13	0 74 JQ	0 61 JQ
DMW-25A	< 1	< 1	< 1	< 1
DMW-26A	< 5	< 1	< l	< i
DMW-27A	< 1	< 1	< 1	< 1
DMW-33A	450 J	62	230	280
DMW-35A	< 1 UJ	16	< 1	< 1
MW112-2	NS	NS	< 1	< 1
MWFOS-I	< 1 UJ	< 1	< 1	< 1
MWFOS-3	NS	NS	< 330	< 330
MWFTA-1	< 5	< 1	< 1	< 1
MWFTA-10	NS	NS	< 1	< 1
MWFTA-23	< 5000 UJ	< 1200	< 5000	< 1200
MWFTA-3	0.45 JQ	< 33	1 2 J	0 69 JQ
MWFTA-5	< 1 UJ	< 1	< 1	< 1
MWFTA-7	< 1	< 1	< 1	< l
MWFTA-9	NS	NS	< 1	< l

Notes:

J Estimated, based on QC data

JQ Estimated, value is between reporting limit and detection limit

μg/L micrograms per liter

NS not sampled

UI undetected reported detection limit is imprecise

PREPARED/DATE <u>FLN 5/19/03</u> CHECKED/DATE <u>JAH 5/19/03</u>

TABLE 3-2

Annual Groundwater Report - October 2002 Operable Unit 7

> Defense Supply Center Richmond Richmond, Virginia

	OCT-01	MAR/A	PR-02 JUL	Y-02	OCT	-02
$(Units = \mu g/L)$		-				
			Tetrachloroeth	iene		
MWFTA-14	< 1	< 1	< 1		< 1	
MWFfA-16	< 50	< 33	< 50		< 56	
MWFTA-17	< 1	< 1	< 1		< 1	
MWFTA-18	 < 1	< 1	< 1		< i	
MWFTA-19	076 JQ	1	1 1		12	
MWFTA-28B	< 1	< 1	< 1		< 1	
MWFTA-29B	< 1	< 1	< 1		< 1	
PWFTA-2	0.4 JQ	0 25	JQ NS		NS	
MWFTA-20*	< 5	< 33	< 33		< 4	
			Trichloroethe	ne		
MWFTA-14	< 1	< 1	< 1		< l	
MWFTA-16	< 50	< 33	< 50		< 56	
MWFTA-17	< 1	< 1	< 1		< 1	
MWFTA-18	< 1	< 1	< 1		< 1	
MWFTA-19	0 44 JQ	0 65	JQ 06	JQ	0 54	JQ
MWFTA-28B	< 1	< 1	< 1		< 1	
MWFTA-29B	< 1	< 1	< 1	UJ	< i	
PWFTA-2	5 5	66	NS		NS	
MWFTA-20*	74	7.8	7.4		5 1	
		ci	s-1,2-Dichloroe	thene		
MWFTA-14	< 0.5	< 05	< 05		< 05	
MWFTA-16	1200	1100	1100		1500	
MWFTA-17	< 0.5	< 0.5	< 0.5		< 05	
MWFTA-18	2 5	2.3	2 2		2	
MWFTA-19	16	15	12		11	
MWFTA-28B	< 0.5	< 0.5	< 0.5		< 0.5	
MWFTA-29B	< 0.5	< 05	< 0.5		< 05	
PWFTA-2	5 5	4 6	NS		NS	
MWFTA-20*	150	130	150		100	

TABLE 3-2

Annual Groundwater Report - October 2002 Operable Unit 7

Defense Supply Center Richmond Richmond, Virginia

	OCT-01	MAR/A	PR-02 JULY-0	OCT-02
(Units = µg/L)				
		tra	ns-1,2-Dichloroet	hene
MWFTA-14	< 0.5	< 0.5	< 0.5	< 0.5
MWFTA-16	< 25	< 17	< 25	< 28
MWFTA-17	< 0.5	< 0.5	< 0.5	< 05
MWFTA-18	< 0.5	< 0.5	< 0.5	< 0.5
MWFTA-19	< 0.5	< 05	< 05	< 0.5
MWFTA-28B	< 0.5	< 05	< 0.5	< 0.5
MWFTA-29B	< 0.5	< 05	< 0.5	< 0.5
PWFTA-2	Qt 810	0 19	JQ NS	NS
MWFTA-20*	< 2.5	3	< 25	< 2
			Vinyl Chloride	
MWFTA-14	< 2	< 2	< 2	< 2
MWFTA-16	270	310	430	920
MWFTA-17	< 2	< 2	< 2	< 2
MWFTA-18	< 2	< 2	< 2	< 2
MWFTA-19	< 2	< 2	< 2	< 2
MWFTA-28B	< 2	< 2	< 2	< 2
MWFTA-29B	< 2	< 2	< 2	< 2
PWFTA-2	05 JQ	0 44	JQ NS	NS
MWFTA-20*	8.4 JQ		9 2	12
		1.	1,1-Trichloroetha	ne
MWFTA-14	< 1	< 1	< 1	< 1
MWFTA-16	< 50	< 33	< 50	< 56
MWFTA-17	< 1	< 1	< 1	< 1
MWFTA-18	< 1	< 1	< 1	< 1
MWFTA-19	< 1	< l	< 1	< 1
MWFTA-28B	< 1	< l	< 1	< 1
MWFTA-29B	< 1	< 1	< 1	< 1
PWFTA-2	< 1	< 1	NS	NS
MWFTA-20*	 < 5	0.53	JQ < 5	< 4

TABLE 3-2

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond

Richmond, Virginia

	OCT-01	MAR/APR-02	JULY-02	OCT-02
$(Units = \mu g/L)$				
MWFTA-14		1,1-D	ichloroethane	
MWFTA-16	< 1	< 1	< 1	< 1
MWFTA-17	< 50	< 33	< 50	< 56
MWFTA-18	< 1	< 1	< 1	< 1
MWFTA-19	< 1	< 1	< 1	< 1
MWFTA-28B	< 1	< 1	< 1	< 1
MWFTA-29B	< 1	< 1	< l	< 1
PWFTA-2	< 1	< 1	< 1	< 1
MWFTA-20*	4 1	43	NS	NS
	20	22	19	16
		1,1-Dı	chloroethene	
MWFTA-14	< 1 UJ	< 1	< 1	< 1
MWFTA-16	< 50 UJ	< 33	< 50	< 56
MWFTA-17	< 1	< 1	< 1	< 1
MWFTA-18	< 1	< 1	< 1	< 1
MWFTA-19	< 1	< 1	< 1	< 1
MWFTA-28B	<1 UJ	< 1	< 1	< l
MWFTA-29B	< 1	< 1	< 1	< 1
PWFTA-2	2 2	2 4	NS	NS
MWFTA-20*	9.3	61	11	7 6

1	N	Λ	+	n	c	ŧ
	•	u	4	۲.	. >>	

*	fractured bedrock well
JQ	Estimated, value is between reporting limit and detection limit
μg/L	micrograms per liter
NS	not sampled
UJ	undetected, Reported Detection Limit is imprecise

PREPARED/DATE TLN 5/19/03 CHECKED/DATE 1AH 5/19/03

TABLE 3-3

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

	Oct-01	Mar/Apr-02	Jul-02	Oct-02
(Units = µg/L)		4 1		
AFILADO 10	272	Alumir 85 3 JB		74.2.10
AEHADG-10	Į.		10 7 JQ 1490	74 2 JQ 831
DMW-13A	1120	1520		
DMW-20A	NS	NS	239	145 JQ
DMW-22A	< 200	< 200	60 1 JQ	78 7 JQ
DMW-25A	64 5 JQ		57 8 JQ	925
DMW-26A	196 JQ		378	443
DMW-27A	325	390	619	435
DMW-33A	< 200	32 3 JQ	81 JQ	91 2 JQ
DMW-35A	< 200	< 200 UJ	81 JQ	< 200 UJ
MW112-2	NS	NS	218	62 5 JQ
MWFOS-1	< 200	< 200 UJ	69 3 JQ	< 200 UJ
MWFOS-3	NS	NS	155 JQ	94 3 JQ
MWFTA-1	329 JH	309 JH	266	310
MWFTA-10	NS	NS	576	< 200
MWFTA-23	656	213	297	174 JQ
MWFTA-3	478	277	268	246
MWFTA-5	< 200	31 9 JQ	66 5 JQ	< 200
MWFTA-7	1360 J	857	790	757
MWFTA-9	NS	NS	125 JQ	60 1 JQ
A ELIA D.C. 10	01	Arsen	nc 47 6	20.6
AEHADG-10	81 < 5	27 9		39 6
DMW-13A	1	< 5	< 5	< 5
DMW-20A	NS 20.1	NS 18 IO	< 5	< 5
DMW-22A	20 1	4 8 JQ	164	144
DMW-25A	< 5	< 5	< 5	2 8 JQ
DMW-26A	< 5	< 5	69	2 6 JQ
DMW-27A	< 5	< 5	< 5	< 5
DMW-33A	< 5	< 5	< 5	< 5
DMW-35A	< 5	< 5	< 5	< 5
MW112-2	NS	NS	< 5	< 5
MWFOS-1	< 5	< 5	< 5	< 5
MWFOS-3	NS	NS	26 7	27 4
MWFTA-I	42.5	39 9	35 3	35 7
MWFTA-10	NS	NS	2 4 JQ	3 2 JB
MWFTA-23	96 6	49 3	94.3	77 2
MWFTA-3	51	18	6 8 J	15 L
MWFTA-5	< 5	< 5	< 5	< 5
MWFTA-7	< 5	< 5	< 5	< 5
MWFTA-9	NS	NS	< 5	< 5

TABLE 3-3

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

	Oct-01	Mar/Apr-02	Jul-02	Oct-02
(Units = µg/L)				
1	20.500	Iro		17700
AEHADG-10	33500	33700	23400	17700
DMW-13A	3380	3720	4090	2200
DMW-20A	NS	NS	2960 JQ	639
DMW-22A	5420	328	1910	4070
DMW-25A	364	500	45 3 JQ	731
DMW-26A	12800	7830	18800	12500
DMW-27A	2990	3240	1960	4020
DMW-33A	6870	1060	5360	5240
DMW-35A	1610	1 77 JQ	1220	1460
MW112-2	NS	NS	1810	1030
MWFOS-1	702	542	770	473
MWFOS-3	NS	NS	3880	3850
MWFTA-I	9920	9600	6780	7450
MWFTA-10	NS	NS	580	352
MWFTA-23	64000	24300	37000	21800
MWFTA-3	1840	4200	1970	3290
MWFTA-5	1070	901	732	518
MWFTA-7	< 200	< 200	< 200	< 200
MWFTA-9	NS	NS	345	226
-	i	Manga		į
AEHADG-10	1080	1560	997 J	658
DMW-13A	200	196	228	170
DMW-20A	NS	NS	307	297
DMW-22A	192	43 7	122	117
DMW-25A	467	8 1 JQ	183	11 4 JQ
DMW-26A	107	172	103	70
DMW-27A	16 1 JQ	26 1	10 9 JQ	20.3
DMW-33A	139	63 5	153	146
DMW-35A	48 4	50 2	49 5	49.5
MW112-2	NS	NS	613	62 3
MWFOS-1	60.8	46 1	49 1	44
MWFOS-3	NS	NS	65 4	65 5
MWFTA-1	807	912	510	531
MWFTA-10	NS	NS	80.4	62.7
MWFTA-23	519	152	428	198
MWFTA-3	43.7	106	52 6	78 4
MWFTA-5	46.8	47 2	48 7	50.5
MWFTA-7	40.5	24 2	67.8	38.4
MWFTA-9	NS	NS	27 1	26 1

Notes:

I Estimated based on QC data

IB Estimated, possibly biased high or false positive based on blank

contamination

IQ Estimated Value is between reporting limit and detection limit

μg/L micrograms per liter

PREPARED/DATE TEN 5/19/03

NS not sampled

CHECKED/DATE. JAH 5/19/03

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TABLE 3-4

GROUNDWATER SAMPLING RESULTS FOR SELECT TOTAL METALS LOWER WATER BEARING UNIT

Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Center Richmond Richmond, Virginia

	OCT-01	MAR/APR-0.	JULY-02	OCT-02
$(Units = \mu g/L)$		Alu	minum	
MWFTA-14	995	51 2 JQ	75 JQ	< 200
MWFTA-16	70 4 JQ	62 6 JB	80 4 JQ	479
MWFTA-17	5250	5580	4520	4820
MWFTA-18	257 JB	107 JQ	< 200 UJ	< 200 UJ
MWFTA-19	673	691	878	837
MWFTA-28B	279	33 7 JQ	177 JQ	< 200
MWFTA-29B	1960 JH	1110 JH	1600 JH	1200 JH
PWFTA-2	1900 J	1030	NS	NS
MWFTA-20*	301 JB	200	77 9 JQ	< 200 UJ
		1	ron	
MWFTA-14	905	< 200	259	< 200
MWFTA-16	< 200	< 200	82 4 JO	581
MWFTA-17	< 200	< 200	< 200	< 200
MWFTA-18	2910	1970	2430	1690
MWFTA-19	< 200	200	< 200	< 200
MWFTA-28B	3130	2270	2590	2330
MWFTA-29B	1970 JH	508	604 JH	600
PWFTA-2	< 200	< 200	NS	NS
MWFTA-20*	520	190 JQ	299 J	281
			·· 	
			ganese	
MWFTA-14	19 2 JQ	1.7 JQ	36 7	3 3 JQ
MWFTA-16	12 4 JQ	21 6	49 9	324
MWFTA-17	< 20	< 20	< 20	< 20
MWFTA-18	111	84	105	77 3
MWFTA-19	< 20	< 20	< 20	1 3 JB
MWFTA-28B	175	222	237	209
MWFTA-29B	71.3	15 3	12 4 JQ	15 7 JQ
PWFTA-2	1 4 JB	< 20	NS	NS
MWFTA-20*	139	71.3	152 J	96.1

Notes:

- * fractured bedrock well
- J Estimated, based on QC data
- JB Estimated, possibly biased high or talse positive based on blank contamination
- JH Estimated, possibly biased high based upon QC data
- JQ Estimated, Value is between reporting limit and detection limit
- µg/L micrograms per liter
- NS not sampled

PREPARED/DATE <u>FLN 5/19/03</u> CHECKED/DATE <u>JAH 5/19/03</u>

TABLE 4-1

<u> </u>					Number of Samples Less Than 10	Number of Samples Greater Than or Equal to 10	·
WBU	Location/Constituent	n	# of NDs	s	MK Probability	Z(calculated)	Result/Note
Upper	AEHA-DG10						
*****	PCE	9	0	-22	0 024		Decreasing
	TCE	9	0	-24	0.01386		Decreasing
	cis-1 2-DCE	6	Ö	-1	L		No Trend
	trans-1 2-DCE	7	6				2
	VC	7 _	6				2
	1 1 1-TCA	9	0	-10	0 358		No Trend
	1,1-DCA	9	2	-10	0 358		No Frend
	1,1-DCE	9	0,	-20	0 044		No Trend
Jpper	DMW-13A						
	PCE	10	10				1
	TCE	10	10				l l
	cis-1,2-DCE	5	5				1
	trans-1,2-DCE	9	9				1
	VC	10	10				i
	1 1,1-TCA	10	10				1
	I I-DCA	10	10				1
	1 1-DCE	10	10				1
Jpper	DMW-20A						
	PCE	9	3	-22	0 024		Decreasing
	ICE	9	0	-15	0 06		No Trend ^h
	cis-1 2-DCE	4	0	-2	0.75		No Trend
	trans-1 2-DCE	8	3	-18	0 032		No Frend
	VC	9	9				1
	I I I-ICA	9	8				1
	I I-DCA	9	5	-22	0 024		Decreasing
	I I-DCE	9	8				1
pper	DMW-22A						
	PCE	12	0	-50		-3 3601	Decreasing
	ICE	12	0	⊣ 17		-3 1618	Decreasing
	cis-L2-DCE	7	0	-17	0.0108		Decreasing
	trans-1 2-DCE	11	6	-43		-3 3591	Decreasing
	VC	12	8	-38		-2 6474	Decreasing
	1 1 1-ΓCA	12	5	-46		-3 2143	Decreasing
	I I-DÇA	12	0	-62		-4 1829	Decreasing
	I 1-DCE	12	0	-57		-3 8491	Decreasing
pper	DMW-25A						
	PCE	11	0	-39		-2 9583	Decreasing
	TCE	11	ı	-35		-2 6469	Decreasing
	cis-1,2-DCE	6	1	-9	0.136		No Trend
	trans-1 2-DCE	11	6	-25		-1 9706	No Frend
	VC	12	10	-34		-2 4111	Decreasing
	1 I I-ICA	12	9	-28		-1 9727	No Trend
	1 I-DCA	11	7	-20		-1 5797	No Trend
	I I-DCE	11	5	-23		-1 8064	No Trend

TABLE 4-1

					Number of Samples Less Than 10	Number of Samples Greater Than or Equal to 10	
WBU	Location/Constituent	n	# of NDs	s	MK Probability	Z(calculated)	Result/Note
Upper	DMW-26A						
Оррен	PCE	10	9				i
	ICE	10	9				1
	eis-1 2-DCE	۲ .	3				1
	trans 1,2-DCF	9	8				1
	vc	10	10				1
	l I 1-TCA	10	10				i
	1,1-DCA	10	10				1
	I I-DCE	10	10				1
Upper	DMW-27A						
	PCE	10	9				1
	ГСE	10	10	_			1
	cis-1,2-DCE	5	5				1
	trans-1 2-DCE	9	8				ı
	VC	10	6	-21	0.072		No Trend
	1 1 1-TCA	10	10				1
-	1 I-DCA	10	10				l
	I I-DCE	10	10				1
Upper	DMW-33A	-			·		
	PCE	9	0	-15	0 06		No Frend ^b
	TCE	9	0	-14	0 18		No Trend
	us-1,2-DCE	7	0	1	1		No Trend
	trans-1 2-DCE	8	4	14	0 108		No Irend
	VC	9	4	16	0 12		No Trend
	I I I-TCA	9	0	-2	0 92		No Frend
	I I-DCA	9	0	-14	0 18		No Trend
	I I-DCE	9	0	-4	0 762		No Frend
U ррег	DMW-35A					· ·	· · · · · · · · · · · · · · · · · · ·
<u> </u>	PCE	8	0	-16	0.062		No Trend
	TCE	8	0	2	0 904		No Trend
	cis-1 2-DCE	6	1	3	0.72		No Frend
	trans-1,2-DCE	7	7				1
	VC	8	8				1
	1 1 I-TCA	8	6				ì
	I I-DCA	8	7				1
	I I-DCE	8	6	5	0.36		No Irend ^b
Upper	MWFOS-1						l I
oppe.	PCE	7	7				1
	TCE	7	6			-	1
	cis-1 2-DCF	6	5		· · · · · · · · · · · · · · · · · · ·		1
	trans-1 2-DCE	7	7				· i
	VC	7	7				ī
	1 1 1-ICA	7	7				1
	1 I-DCA	7	7		1	· · · · · · · · · · · · · · · · · · ·	1
	1 1-DCE	7	7				1
Upper	MWF0S-3						
	PCF	7	5				2
	TCE	7	()	-9	0.238	ĺ	No Frend
-	us-1 2-DCE	6	0	-1	1	· · · · · · · · · · · · · · · · · · ·	No Irend
	trans 1 2-DCF	7	1				2
	VC	7	2	Į.	1	1	No Frend
	I I I-ICA	7	7				2
	I I-DC V	7	7			•	2
	I I-DCI	7	7				2

TABLE 4-1

					Number of Samples Less Than 10	Number of Samples Greater Than or Equal to 10	
WBU	Location/Constituent	n	# of NDs	s	MK Probability	Z(calculated)	Result/Note
Upper	MWF fA-1						
	PCE	7	7				ì
	TCE	7	7				1
	cis-1,2-DCE	5	1	-6	0.234		No Trend
	trans-1 2-DCE	7	7				1
	VC	7	7				1
	1,1,1-1CA	7	7				1
*	1 1-DCA	7	3				L
	1 I-DCE	. 7	7				1
Upper	MWFTA-3						
	PCE	7	4	16	0 0054		Increasing
	ICE	7	0	9	0 238		No Trend
	cis-1 2-DCE	6	0	9	0 136		No Trend
	trans-1 2-DCE	7	0	_11	0 136		No Trend
_	VC	7	1	5	0 562		No Trend
	1 1 1-ICA	7	7				1
	1,1-DCA	7	1	7	0 191		No Trend ^b
	1,1-DCE	7	3	3	0 772	——————————————————————————————————————	No Trend
Jpper	MWFTA-5						
эррч	PCE	7	7				1
	TCE	7	7				l I
	cis-1,2-DCE	6	6				ı
	trans-1 2-DCE	7	7				1
	VC	7	7				1
	1 1 1-TCA	7	7				i
	1 1-DCA	7	7				1
	1 1-DCE	7	7				i
Jpper	MWFIA-7						
	PCF	7	7				1
	ICE	7	7				1
	cis-1 2-DCE	6	6				1
	trans-1 2-DCE	7	7				I
	VC	7	7				1
	1,1 I-TCA	7	7				1
	1 1-DCA	7	7]
	1 1-DCE	7	7				1
pper	MWFTA-9						
	PCE	4	4				<u> </u>
	TCE	4	4				1
	cis-1 2-DCE	3	3				1
	trans-1 2-DCE	4	4				<u> </u>
	VC	4	4				!
	I I I-TCA	4	4				!
	I,I-DCA	4	4		-		1
	I I-DCE	-4	4				1
pper	MWFTA-10		- 1				
	PCE	4	4				1
	ICE		4		1		1
	us-1 2-DCL	3	3				1
	trans-1 2-DCE	4	4				1
	VC	4	4				- !
	1 1 1-1CA	4	4				1
	LI-DCA	4	4				1

TABLE 4-1

					Number of Samples Less Than 10	Number of Samples Greater Than or Equal to 10	
WBU	Location/Constituent	n	# of NDs	s	MK Probability	Z(calculated)	Result/Note
Upper	MWFTA-23	_				*·	*-
	PCE	5	5	-6	0 234		No Trend
	ICE	5	3				2
	cis-1,2-DCE	5	0	-6	0 234		No Trend
	trans-1 2-DCE	5	5				2
	VC .	5	ı	-8	0 084		No Frend
	I,1 I-TCA	5	5				2
	1,1-DCA	5	5		T		2
	1,1-DCE	5	5		1		
lower	MWFTA-14						
	PCE	6	6				1
	TCE	6	5				· i
	cts-1 2-DCE	-6	5				- i -
	trans-1 2-DCE	6	6				i
	VC	6	6				<u>i</u>
	I,1 I-TCA	- 6	6			_	<u>t</u>
	I I-DCA	6	6				i
	1 1-DCE	6	6				1
OHIOP.	MWFTA-16		<u> </u>				<u> </u>
ower.	PCE	7	7				2
	ICE	7	7			 .	2
	cis-1 2-DCE		0	2	0 386		No Trend
	trans-1 2-DCE		6		0.300		2
	VC	-/-	1	15	0 03		No Trend
	I,I I-TCA	7	7	-13	005		2
	I I-DCA	7	7				2
	I I-DCE	7	7			·· · · · · · · · · · · · · · · · · · ·	2
	MWFfA-17		'-				
-ower		- 6	6				1
	PCE I'CE	6	6				1 -
			5				11
	cis-1,2-DCE	6					<u> </u>
	trans-1 2-DCE	6	6				1
	VC	6	6				1
	I 1 I-TCA	6	6				<u> </u>
	1 1-DCA	6	6				11
	1 1-DCE	6	6				1
ower.	MWFTA-18						
	PCE	6	5				1
	rce	6	5				1
	us-1,2-DCE	6	0	-5	0 47		No Trend
	trans-1 2-DCE	6	6				1
	VC	6	5				1
	1,1 1-ΓCA	6	- 6				1
	L I-DCA	6	5				11
	I I-DCE	6	6				1
ower	MWF1A-19						
	PCE	6	0	-3	0.36		No Trend
	TCL	6	0				ì
	cis-1 2-DCE	6	0	-13	0.0166	\Box	Decreasing*
	trans-1 2-DCL	6	6				1
	VC VC	6	6				1
	Ι 1 1- ΓCA	6	6				<u> </u>
	1 1-DCA	6	า์		1		i
	1 1-DCE	6	6				- i

MANN-KENDALL TREND EVALUATION RESULTS

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

			# of		Number of Samples Less Than 10	Number of Samples Greater Than or Equal to 10	
WBU	Location/Constituent	n	NDs	S	MK Probability	Z(calculated)	Result/Note
Lower	MWFTA-28B						
	PCE	5	5				1
	TCE	5	5				1
	cis-L 2-DCE	5	5				1
	trans-1 2-DCE	5	5				1
	VC	5	5				1
	1,1,1-TCA	5	5				1
	l 1-DCA	5	5				1
	1 I-DCF	5	5				1
Lower	MWFTA-29B						
	PCE	5	5				1
	ICE	5	5				1
	cis-1,2-DCE	5	5				1
	trans-1,2-DCE	5	5				1
	VC	5	5				1
	I 1 1-ΓCA	5	5				1
	I,1-DCA	5	5				1
	1,1-DCE	5	5				1
Redrock	MWFTA-20						
	PCE	7	5	1	l		No Trend
	TCE	7	0_	-11	0 136		No Trend
	cis-1,2-DCE	7	0	-2	0 386		No Trend
	trans-1 2-DCE	7	5	9	0 238		No Trend
	VC	7	2	15	0 03		No Trend
·	1,1 1-TCA	7	5	-9	0 238		No Irend
	1 1-DCA	7	0	-5	0 562		No Trend
	1 I-DCE	7	0	-5	0 562		No Trend

		٠		
. "	0	t	e	١.
_	_	-	_	_

n indicates the total number of samples

calculated Mann-Kendall (MK) statistic, Indicates the strength and the direction of the frend. A positive value indicates

an increasing trend and a negative value indicates a decreasing trend

MK Probability indicates the probability that a trend truly exists. A lower MK probability value indicates a higher probability that a trend

exists and MK probability less than 0.05 (95% confidence level) area assumed to be significant. If MK probability <

 $0.05\,$ then the direction of trend is determined from S

z(calculated) measure of likelihood of trend. If abs(Z(calculated)) > 1 9774 (95% confidence level of a two-tailed distribution)

existence of a trend accepted

Irend does not appear to be supported after evaluation of the time series graphs or the concentrations of the constituents

are low and the apparent trend is not significant for this evaluation

Mann-Kendall statistics evaluation performed using the one-tailed normal distribution test due to out of range data

reported for the two-tailed distribution test

1 Results below the reporting limits

2 Elevated reporting limits frend can not be evaluated

PREPARED/DATE <u>ILN 06/22/2003</u> CHECKED/DATE <u>CMB 06/24/2003</u>

TABLE 4-2

Mann-Kendall Trend and Monitoring Well Evaluation Upper Water Bearing Unit Annual Groundwater Report – October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

			Location	
Monitoring			Relative to Identified VOC	
Well	Analyte	Trend	Plume	Trend Explanations
Pit 1 Trend Summary	nmary			
DMW-13A	PCE	AN	DO	Coated upgradient from Prt 1
	ICE	NA	DN	Background well for Of 17
	c15-1,2-DCE	NA	ng	Historically and currently does not have VOCs detected above renorting time.
	trans-1,2-DCE	NA	DO	secondary and canoning does not have a Oes detected above reporting miles
	۸C	N A	ng	
	1,1,1-TCA	NA	DO	
	1,1-DCA	NA	ng	
	1,1-DCE	NA	DO	
DMW-35A	PCE	LN	PB	• Currently located on the boundary of the elevated PCF TCF and cis. 12.DCF areas of
	TCE	LN	PB	contamination and outside the boundary of the other areas of elevated VOC contamination
	us-1,2-DCE	ĽN	PB	Located downgradient from Pit 1 and upgradient from monitoring well AFHA.DG10
	trans-1.2-DCE	AN	ΝΑ	• The PCE concentrations within this well have decreased from 16 119/1 in November 1988 to
	ΛC	NA A	ΝΑ	6 Lug/Lin October 2002 but have fluctuated up and down so no trand is discoverible
	11,1-TCA	NA	NA	The TCE concentrations within this well decreased from 4 Linux is November 1.1000
	I,I-DCA	A A	NA	Deak concentration of 33 not 1 m April 2002 to 2 not in Original 2002
	I I-DCE	۷ ۷	۷X	Screened at the bottom of the upper WBU within a silty sand layer
				• Historically has had low levels (>40 µg/L) of VOCs (when compared to AEHA-DG10)
				This is likely due to the migration of contaminants through a more porous sand and gravel
				layer located above DMW-33A and extending to AEHA-DG10

TABLE 4-2

Mann-Kendall Trend and Monitoring Well Evaluation
Upper Water Bearing Unit
Annual Groundwater Report – October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

Trend Explanations	• Currently located near the center of the PCF TCF cre. 12-DCF and 1.1.1 TCA	contamination and within the 1,1-DCA and 1,1-DCE areas of contamination	 A thorough evaluation of potential VC and trans-1,2-DCE plumes at AEHA-DG10 cannot 	be conducted as elevated reporting limits for VC and trans-1,2-DCE have historically been	The PCF concentrations, within this wall have downshall from 11,000 n	with a neak concentration of 12 000 u.g/l. in Iuly 1982, to 1 000 u.g/l. in Ostobox 2003	• The TCE concentrations within this well have decreased from 59,000 µg/L in March 1982 to	2,800 µg/L in October 2002 The PCE and TCE concentrations located downgradient from	AEHA-DG 10 does not indicate TCE is readily inigrating	• The cis-1,2-DCE concentrations within this well have increased from 400 µg/L in October	1987 to 690 µg/L in October 2002 However, the results have decreased since the peak	concentration of 1,000 µg/L was detected in April 2002	 The 1,1,1-TCA concentrations within this well have increased from 1,000 μg/L in March 	1982 to 1200 µg/L in October 2002 However, the results have decreased since the peak	concentration of 40,000 µg/L was detected in July 1982	 The 1,1-DCA and 1,1-DCE concentrations within this well have fluctuated but have 	generally decreased since elevated concentrations (>10,000) were historically detected	 Decreasing concentrations of these constituents within this well is attributed to natural 	attenuation
Location Relative to Identified VOC Plume	Ы	Δ.	<u>а</u> ;	≮	<u> </u>	P-NP	Д												
Trend	Ω	Ω	LZ	∢	LN	L	L												
Analyte	PCE	TCE	(13-DCE	nans-1,2-DCE VC	1,1,1-TCA	I,I-DCA	1,1-DCE												
Monitoring Mell	AEHA-DG10																		

TABLE 4-2

Mann-Kendall Trend and Monitoring Well Evaluation
Upper Water Bearing Unit
Annual Groundwater Report – October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

	т-														
Trend Explanations	• Currently located within the PCE, TCE, cis-1,2-DCE, 1,1,1-TCA, 1,1-DCA, and 1,1-DCE	• A thorough evaluation of potential VC and trans-1,2-DCE plumes at DMW-33A cannot be	reported for this well	 The PCE concentrations within this well have decreased from 1,500 µg/L in November 1988 to 450 µg/L in October 2002 	• The TCE concentrations within this well have decreased from 3,400 µg/L in November 1988	to 2,500 µg/L, with a peak concentration of 5,600 µg/L in November 1992, in October 2002	The PCE and TCE concentrations located downgradient from AEHA-DG10 does not indicate this plume is readily migrating	• The cis-1,2-DCE concentrations within this well have decreased from 2,300 µg/L in October	1997 to 1,900 µg/L in October 2002	• The 1,1,1-TCA concentrations within this well have increased from 560 µg/L in November	1988 to 680 µg/L in October 2002 However, the results have decreased since the peak concentration of 1200 µg/L was detected in October 2001	• The 1,1-DCA and 1,1-DCE concentrations within this well have fluctuated but have	generally decreased since elevated concentrations (>500 µg/L) were historically detected	• Decreasing concentrations of these constituents within this well is attributed to natural	attenuation
Location Relative to Identified VOC Plume	۵. ۵	. а. а.	۵.	요 요 :	ì.,										
Trend	TN	Z Z Z	LN	Z Z Z	Z										
Analyte	PCE TCE	tus-1,2-DCE	۷C	1,1,1-TCA 1,1-DCA	1,1-DCE										
Monitoring	DMW-33A														

TABLE 4-2

Mann-Kendall Trend and Monitoring Well Evaluation
Upper Water Bearing Unit
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

Monitor mg Well	Analyte	Trend	Location Relative to Identified VOC Plume	Trend Explanations
DMW-22A	PCE	D	NP	Currently located outside or near the boundaries of the PCE. 1.2-DCE. VC. 1.1-DCA
	TCE	Ω	PB	and 1,1-DCE areas of contamination and downgradient from the center of the TCE, and
	cis-1,2-DCE	Ω	ΝΡ	1,1,1-TCA areas of contamination
	trans-1,2-DCE	Ω	Y V	An isoconcentration figure was not prepared for trans-1,2-DCE as this constituent has been
	VC	Ω :	d N	detected above reporting limits within a few wells during recent sampling events
	1,1,1-TCA	Ω	PB	The PCE concentrations have decreased from 560 µg/L in January 1987 to 19 µg/L in
	I,I-DCA	Ω (d i	October 2002
	I.I-DCE	a	dN	The cis-1,2-DCE has decreased from 330 µg/L in October 1993 to 2 µg/L in October 2002
				The trans-1,2-DCE concentrations have decreased from 650 µg/L in January 1987 (with a
				maximum concentration of 1,100 µg/L in April 1987) to <0.5 µg/L within the last four
				sampling events
				• The VC concentrations, which increased from <10 µg/L in January 1987 to 30 µg/L in
				November 1992, has decreased to <2 µg/L in October 2002
				The 1,1-DCA concentrations have decreased from 280 μg/L in January 1987 to 0.48 JQ μg/L
				III October 2002.
				The 1,1-DCE concentrations have decreased from 280 μg/L in January 1987 to 0.61 JQ μg/L in October 2002
				• The TCE concentrations have decreased from 2,900 µg/L in January 1987 to 10 µg/L in October 2002
				• The 1,1,1-TCA concentrations have decreased from 48 J ug/L (with a maximum
				concentration of 170 µg/L in April 1987) in January 1987 to <1 µg/L in October 2002 In
				addition, 1.1.1-TCA has not been detected above the reporting limits since the October 2000
				sampling event
				DMW-22A is located on the outer perimeter of most of the VOC areas of concern. An
				overall reduction of these VOCs within this monitoring well indicates that the areal

TABLE 4-2

Mann-Kendall Trend and Monitoring Well Evaluation
Upper Water Bearing Unit
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

Trend Evnlanations	Located northeast of monitoring well AEHA-DG10 and currently located northeast of the	VOC plumes	• The PCE concentrations have decreased from 3.4 J µg/L, in January 1987 to <1 µg/L in	October 2002 The maximum concentration of PCE within this well occurred in April 1987 with a concentration of \$3 trail chaptly above the MCI	• The 1.1-DCA concentrations have decreased from <5 m/l in Linuary 1087 to <1 m/l in	October 2002	• The TCE concentrations fluctuated from 4.7 µg/L in January of 1987 to a slight decrease of	2 5 μg/L in October 2002 No statistically significant trend was determined	• Historically and currently, cis-1,2-DCE, trans-1,2-DCE, 1,1,1-TCA, and 1,1-DCE were not	defected above their respective MCLs	 Located west of monitoring well AEHA-DG10 and downgradient from Pit 2 within the PCE 	and TCE plumes	• PCE concentrations have decreased from 370 µg/L in January 1987, with a neak	concentrations of 1300 µg/L in November 1992, to 14 µg/L in October 2002	• VC concentrations have decreased from <10 in October 1984, with a defectable	concentration of 8 2 µg/L in November 1992, to <2 µg/L in October 2002	 TCE concentrations have decreased from 220 µg/L in January 1987, with a peak 	concentrations of 420 µg/L in November 1992, to <1 µg/L in October 2002	 Currently, cis-1,2-DCE, trans,1-2-DCE, 1,1,1-TCA, 1,1-DCE, and 1,1-DCA do not have 	detectable concentrations above reporting limits
Location Relative to Identified VOC Plume	NP	d'N	d a	A N	NP	AN S	AN				<u>م</u> ،	Δ,	dN :	Y A	a, a	N O	a Z			
Trend	Q	LN	TN	, AN	NA	Ω;	¥Z.			í	Ωί	Ω	L	Z (υĘ	Z Z	L Z	•		
Analyte	PCE	TCE	cts-1,2-DCE	VC VC	1,1,1-TCA	1,1-DCA	I,I-DCE				PCE	1CE	cn-1,2-DCE	nans-1,2-DCE	ر - د -	1,1,1-1CA	I-DCE			
Montoring Well	DMW-20A										DMW-25A									

TABLE 4.2

Mann-Kendall Trend and Monitoring Well Evaluation Upper Water Bearing Unit Annual Groundwater Report – October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

Trend Explanations	Located down gradient from Pit 2, but due to the current well network is assumed to be connected to the individual VOC plumes downgradient from Pit 1.	 The PCE concentrations have increased from <1 μg/L in November 1992 to 9 μg/L (with a maximum concentration of 37 μg/L in July 2002) in October 2002. 	• The constituents, 1,1,1-TCA, 1,1-DCE, and 1,1-DCA have historically not been detected above reporting limits or MCLs within this well	• TCE, c1s-1,2-DCE, trans-1,2-DCE, and VC have fluctuated since the initial sampling events, with current concentrations for each of these constituents higher than biscorned	concentrations An evaluation of the time series graph for this well, indicates an overall upward trend for the VOCs detected in this well	• This may be caused from the migration of the plume downgradient from Pit 2, the joining of the plumes downgradient from Pit 1 and Pit 2, or from expansion of the plume downgradient	thom in the cause of the cause of the cause of this trend within this well cannot be fully assessed
Location Relative to Identified VOC Plume	PB P	a a	g Z	Z Z d			
Trend	I TN	TN	T V V	Z Z			
Analyte	PCE TCE	cts-1,2-DCE trans-1,2-DCE	VC I.I.I-TCA	1,1-DCA 1,1-DCE			
Montoring	MWFFA-3					· · ·	

TABLE 4-2

Mann-Kendall Trend and Monitoring Well Evaluation
Upper Water Bearing Unit
Annual Groundwater Report – October 2002
Operable Unit 7
Defense Supply Center Richmond
Defense Phonond, Virginia

Trend Explanations	Currently located near the center of the TCE, cis-1,2-DCE, and VC plume downgradient from Pit 3 A thorough evaluation of potential PCE, trans-1,2-DCE, 1,1,1-TCA, 1,1-DCA, and 1,1-DCE areas of contamination at MWFOS-3 cannot be conducted as elevated reporting limits for these constituents have historically and are currently reported for this well have historically and are currently reported for this well have bistorically and are currently reported for this well have notober 2002 The Cts-1,2-DCE concentrations within this well have increased from 300,000 µg/L in November 1995 to 9800 µg/L in October 2002 The Cts-1,2-DCE concentrations within this well have increased from 200 µg/L in November 1992 to 360 JQ µg/L in October 2002	 Currently located near the center of the TCE, cis-1,2-DCE, and VC plume downgradicnt from Pit 3 A thorough evaluation of potential PCE, trans-1,2-DCE, 1,1,1-TCA, 1,1-DCA, and 1,1-DCE plumes at MWFTA-23 cannot be conducted as elevated reporting limits for these constituents have historically and are currently reported for this well. N maximum concentration of TCE 2500 JQ µg/L was detected within this well in July 2002 '10 wever, due to elevated concentrations of cis-1,2-DCE, elevated reporting limits for TCE or also reported within this well during the October 2002 sampling event. However, deviated levels of TCE are suspected to be present within this well. The cis-1,2-DCE concentrations within this well have decreased from 240,000 µg/L in October 2002. The VC concentrations within this well have decreased from 5400 JQ µg/L in October 2002. The VC concentrations within this well have decreased from 5400 JQ µg/L in October 2002.
Location Relative to Identified VOC Plume	A P P A A N A A A A A A A A A A A A A A	A a a A a A A A A
Trend	AN N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N
Analyte	PCE TCE (18-1,2-DCE 1,1,1-TCA 1,1-DCA 1,1-DCE	PCE 1CE 1CF 12-DCE 111-TCA 1.1-DCA 1,1-DCE
Monitoring Well	MWFOS-3	MWFTA-23

TABLE 4-2

Mann-Kendall Trend and Monitoring Well Evaluation Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia Upper Water Bearing Unit

		Trend Explanations	DMW-27A is located downgradient from MWFTA-23 and Pit 3 indicating the VOC	contamination is not readily migrating	VC is the only constituent historically detected within DMW_27 A	A maximum VC concentration of 7.7 unit was detacted in October 2001 and 11.	$\sim 10^{10}$ in October 2003	A HBIE III OCCUBAL 2002.		
Location Relative to	NOC NOC	Plume	• dN	dN	- dN	- AN	N _P	N O	ď	ď
		Trend	NA	AN	AN	NA A	Ä	NA V	A V	A A
		Analyte	PCE	TCE	cus-1,2-DCE	ti ans-1,2-DCE	ΛC	1,1,1-TCA	I,I-DCA	1,1-DCE
	Monitoring	Well	DMW-27A							

Notes:

not in plume ın plume P NP PB UG NA I D

located on plume boundary

upgradient from plume

increasing trend not applicable

decreasing trend

no trend

merograms per liter

maximum contaminant level (MCL for PCE and TCE is 5 μg/L, MCL for cis-1,2-DCE is 70 μg/L; MCL for nans-1,2-DCE is 100 μg/L, MCL for 1,1-1-TCA is 200 μg/L, MCL for 1,1-DCE is 7 μg/L, and no MCL is published for 1,1-DCA)

PREPARED/DATE ILN 6/30/03 CHECKED/DATE JAH 6/30/03

Table 4-3

Mann-Kendall Trend and Monitoring Well Evaluation Lower Water Bearing Unit Annual Groundwater Report – October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

Trend Explanations	Located within the lower WBU downgradient from MWFTA-23 (a monitoring well with	elevated VOC concentrations within the upper WBU) and south of Pit 3	 Suspected source of contamination is migration of contaminants through fractures within 	confining layer, which is 4 feet within this area of OU 7	• cts-1,2-DCE concentrations have increased from 2.4 J µg/L in October 1993 to 1500 µg/L in	of 1400 ug/L was detected in October 2000	• VC concentrations have increased from <2 µg/L in October 1993 to 920 µg/L in October	2002 However, the concentrations have fluctuated since a concentration of 260 μg/L was detected in October 2000	 All other constituents can not be evaluated due to elevated reporting limits 	Currently located downgradient from MWFTA-16	• Elevated concentrations of the VOCs have not been detected within this most	וואס אווווווווווווווווווווווווווווווווו						Located southeast of MWFTA-17	• Concentrations from each of the constituents has not been detected above asserting the constituents	their respective MCL.					
Location Relative to Identified VOC Plune	NA	Y Y	۵. ;	Y G	¬ X	NA	Y X			NP	AN	ď	ď	ďŽ	ďŽ	ŝ	NP	ďN	ďN	ďN	N.	dN	ďN	AZ D	NP
Mann- Kendall Trend	AN	NA V	Ż:	A Z	ZZ	Y X	Y Z			N A	A'N	NA A	NA	N A	Y.	NA	NA	Z A	NA A	Ϋ́	NA A	NA A	NA	Z'A	NA
Analyte	PCE	TCE	(18-1,2-DCE	trans-1,2-DCE	V. 1,1,1-TCA	I,I-DCA	1,1-DCE			PCE	TCE	CIS-1,2-DCE	trans-1,2-DCE	ΛC	1,1,1-TCA	I.I-DCA	1 I-DCE	PCE	TCE	cıs-1,2-DCE	trans-1,2-DCE	ΛC	1,1,1-TCA	1,1-DCA	1,1-DCE
Monitoring Well	MWFTA-16									MWFTA-17								MWFTA-18							

Table 4-3

Mann-Kendall Trend and Monitoring Well Evaluation Lower Water Bearing Unit Annual Groundwater Report - October 2002 Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

		Trend Explanations	Located downgradient from Pit 1	• Concentrations within this well have generally not been detected above reporting limits or	their respective MCLs	• cts-1.2-DCE, has a decreasing trend, however the concentrations are below the MCL and	have only clightly decreased from of 2 unit in October 1003 to 1.1 unit in October 2000	TCF has decreased from \$0 and detected in October 1003 to 0.54 10 and an October	2002	1001
Location Relative to	Identified	Plume	NP	ΝP	dN	٩N	NP	NP	NP	NP
	Mann- Kendall	Trend	LN	Ϋ́	D	Ϋ́	Ϋ́	NA AN	AZ	Ϋ́
		Analyte	PCE	TCE	crs-1,2-DCE	trans-1,2-DCE	۸C	1,1,1-TCA	1,1-DCA	I,I-DCE
	Monitoring	Well	MWFTA-19							

Notes:

ın plume P NA NI NI

not applicable not in plume

decreasing trend no trend

mucrograms per liter µg/L MCL

maximum contaminant level (MCL for PCE and TCE is 5 µg/L, MCL for cis-1,2-DCE is 70 µg/L, MCL for trans-1,2-DCE is 100 µg/L; MCL for 1,1,1-TCA is

PREPARED/DATE TLN 6/30/03 CHECKED/DATE JAH 6/30/03

200 μg/L, MCL for 1,1-DCE is 7 μg/L, and no MCL is published for 1,1-DCA)

TAB

Figures

FIGURES





0 Feet

Source of serials: University of Virgmia Library, Geospatial and Statistical Data Center Photo numbers 37007d45, 46, 47, 48, 56, and 57.

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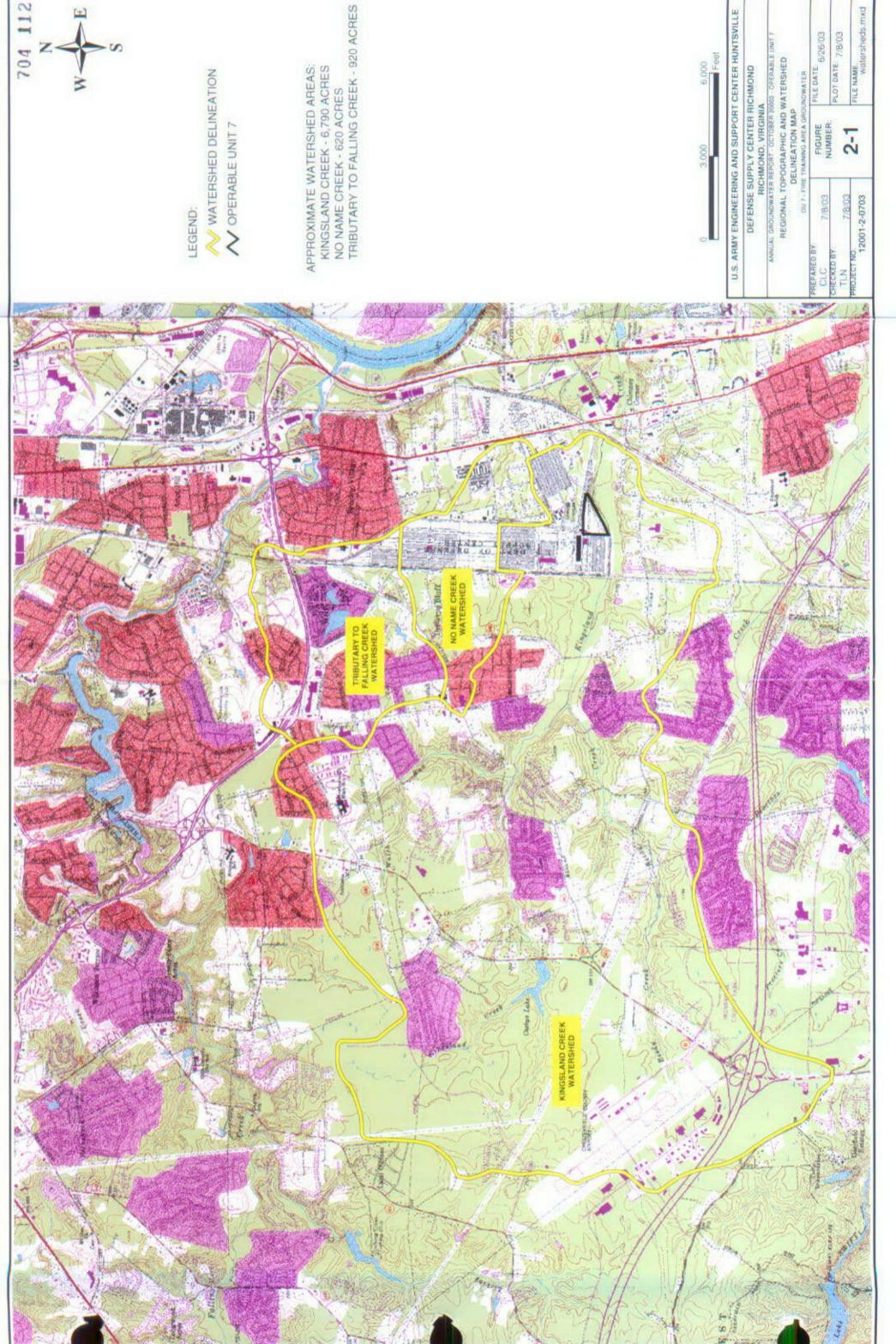
DEFENSE SUPPLY CENTER RICHMOND AND SURROUNDING AREA

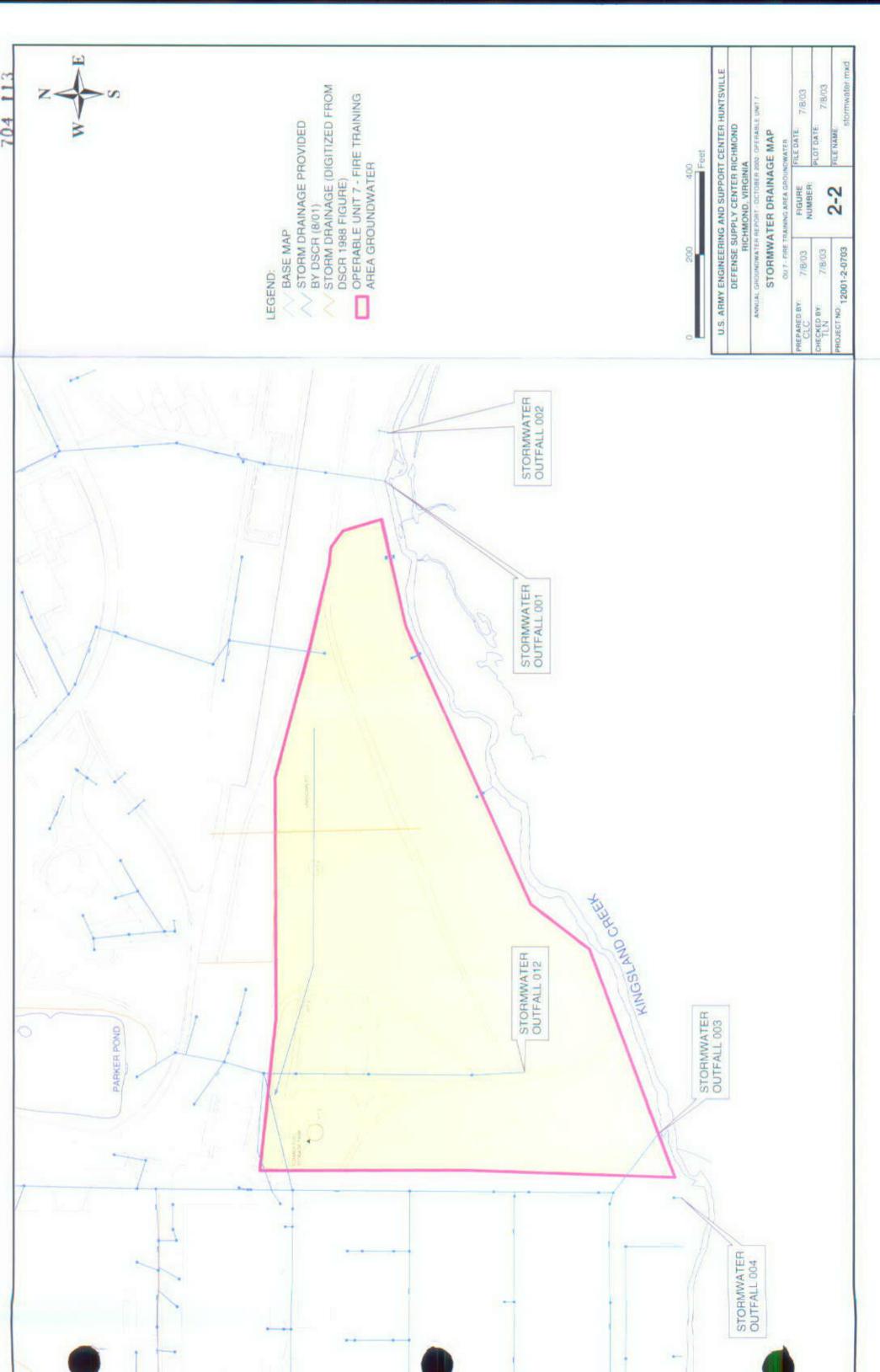
DU 7 - FIRE TRAINING AREA GROUNDWATER

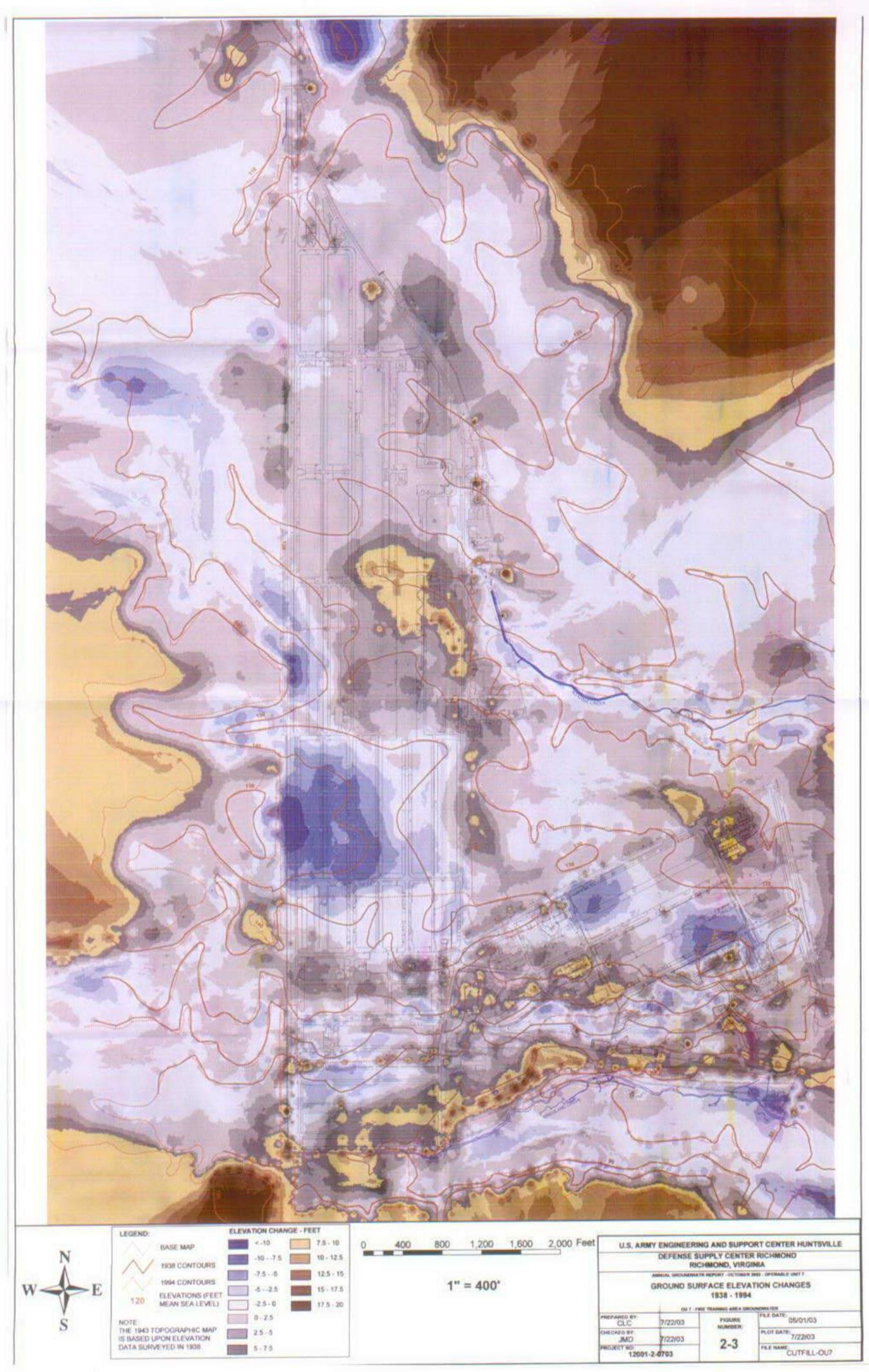
PREPARED BY: KAC 7/3/03	FIGURE - WOMBER	FILE DATE:	05/16/03
TLN 7/3/03	4.4	PLOT DATE:	06/26/03
PROJECT NO: 12001-2-0703	1-1	FILE NAME:	aerial_ou7.mxd

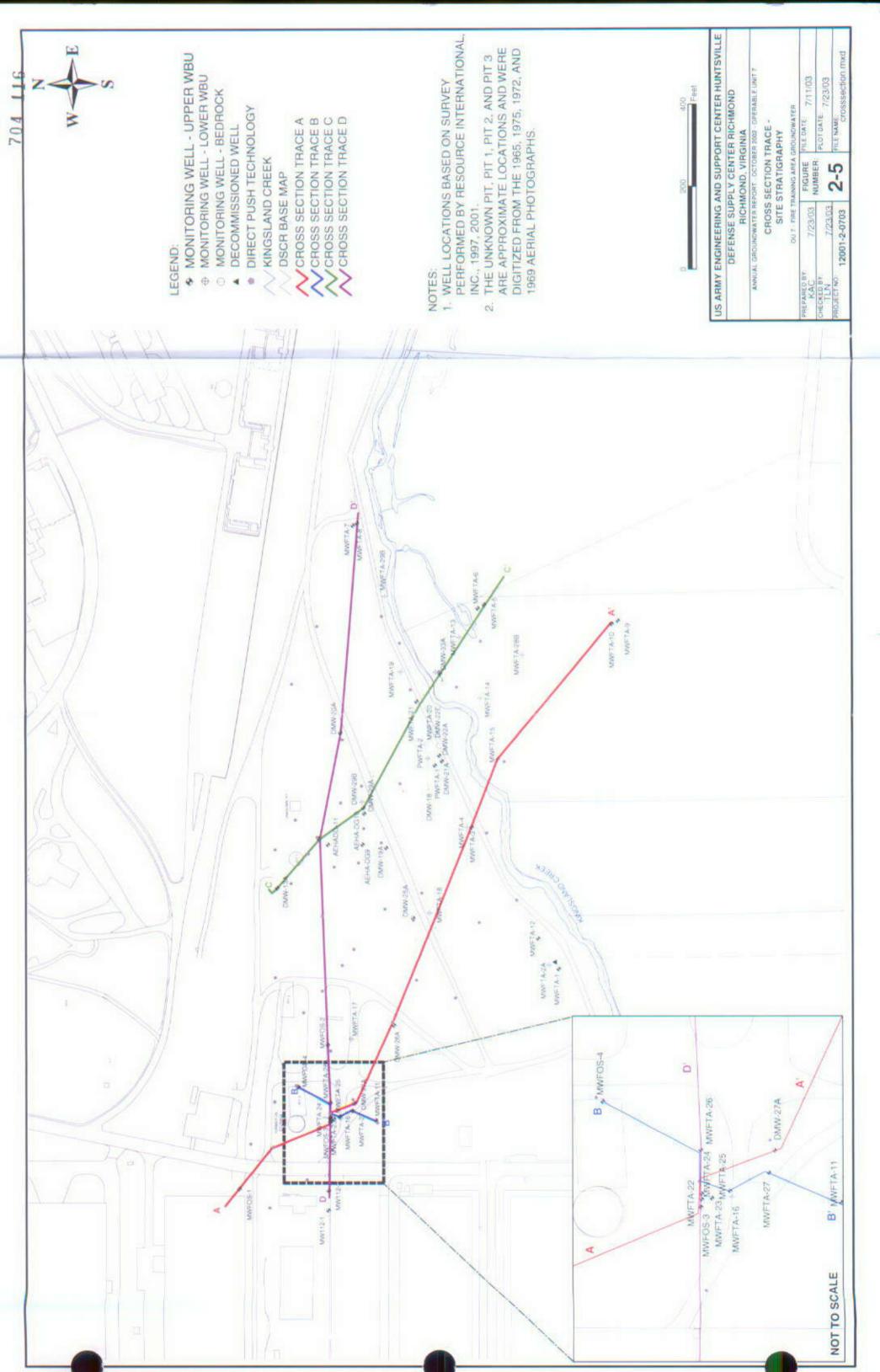
FIGURE -	FILE DATE:	05/16/03
4.4	PLOT DATE:	06/26/03
-	FR E NAME	STREET, STREET

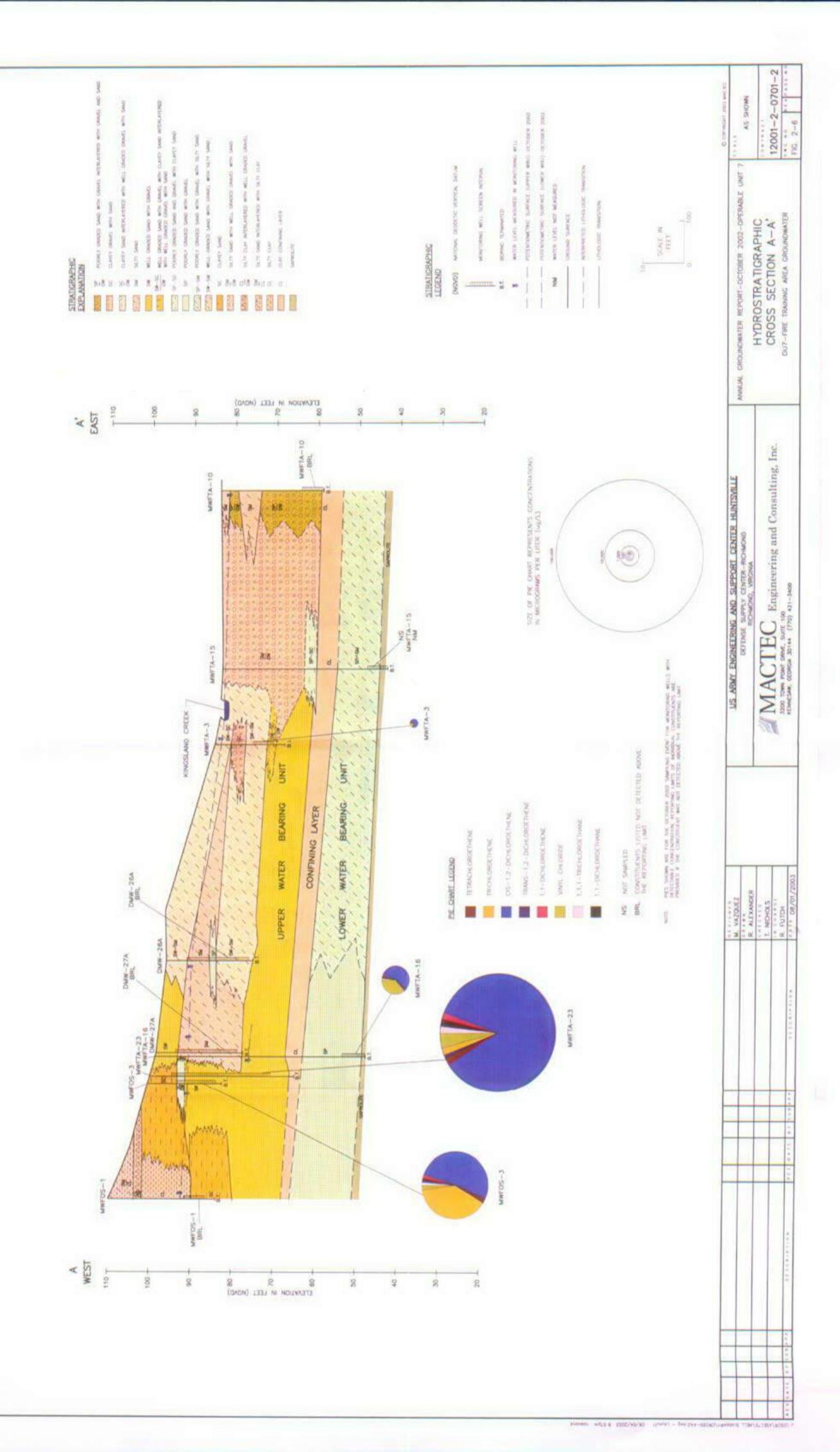


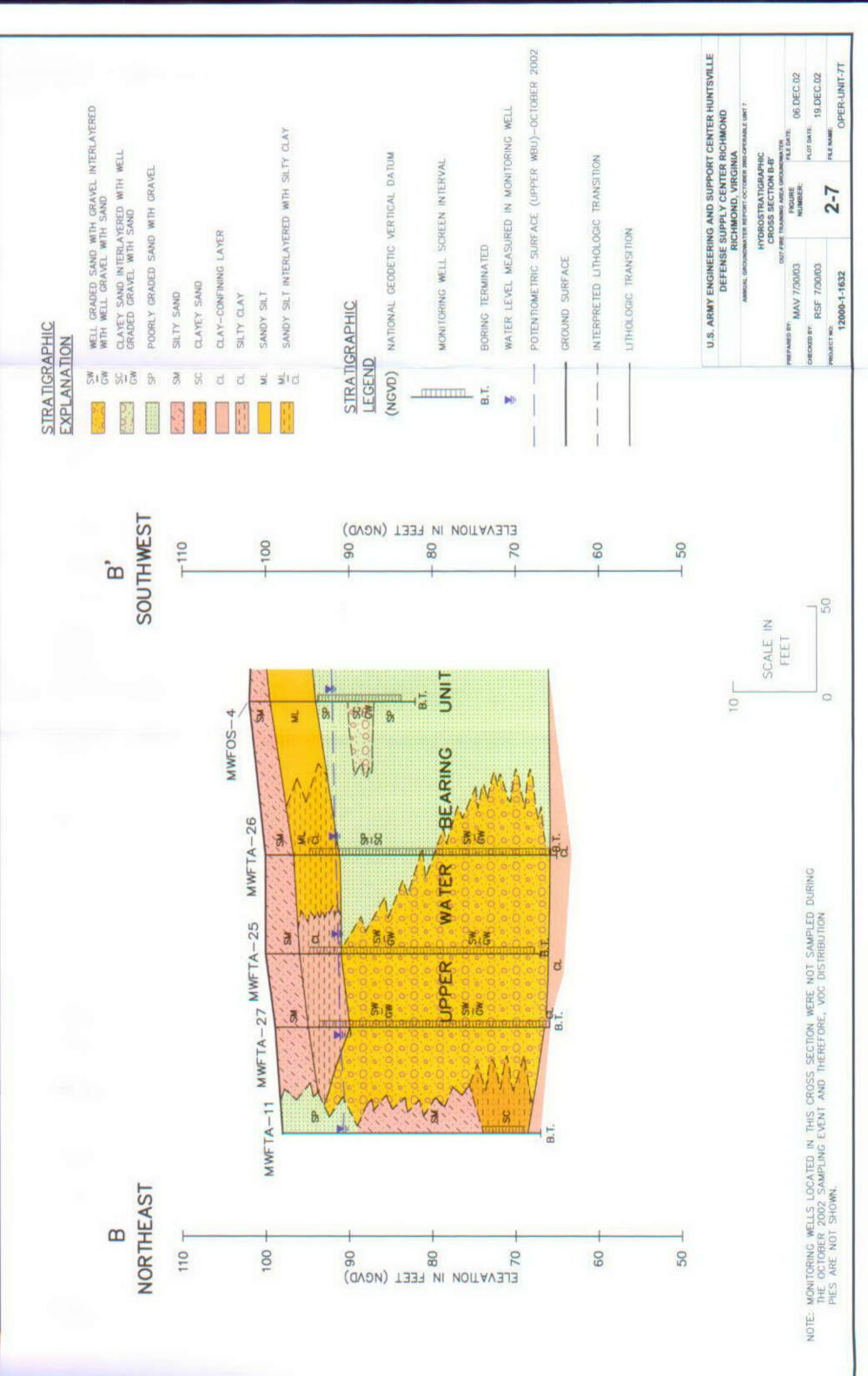


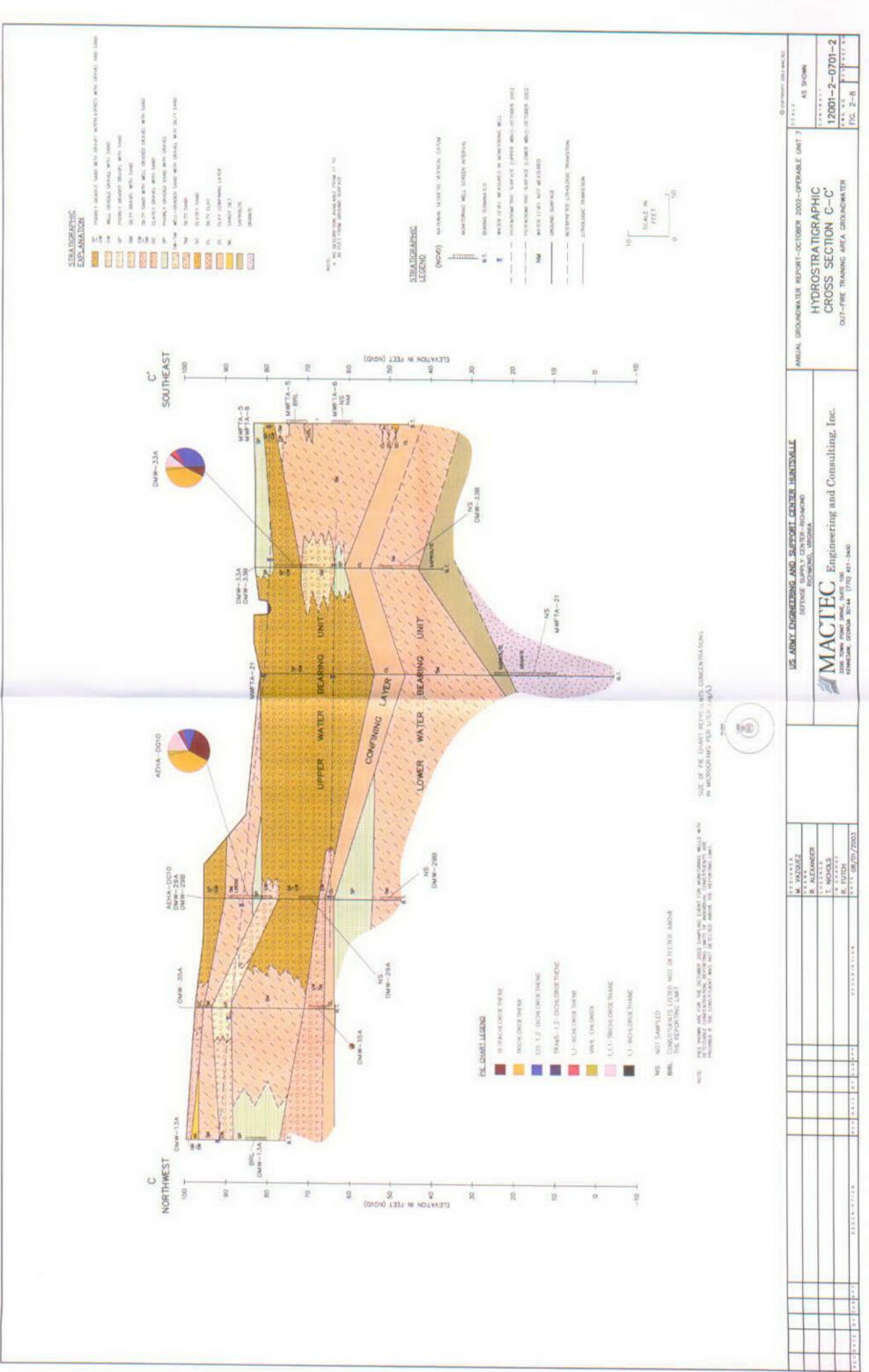












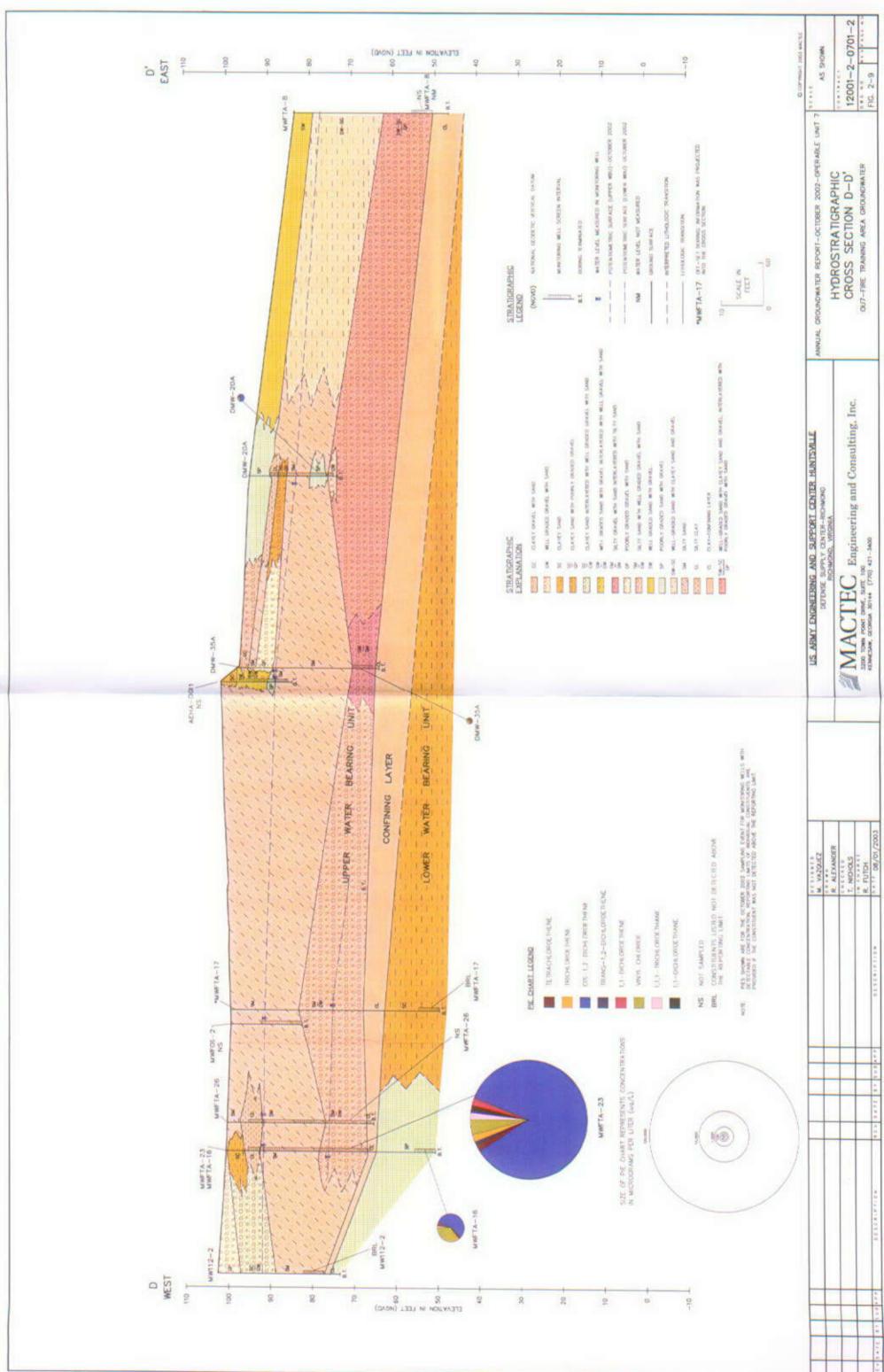


FIGURE 2-12





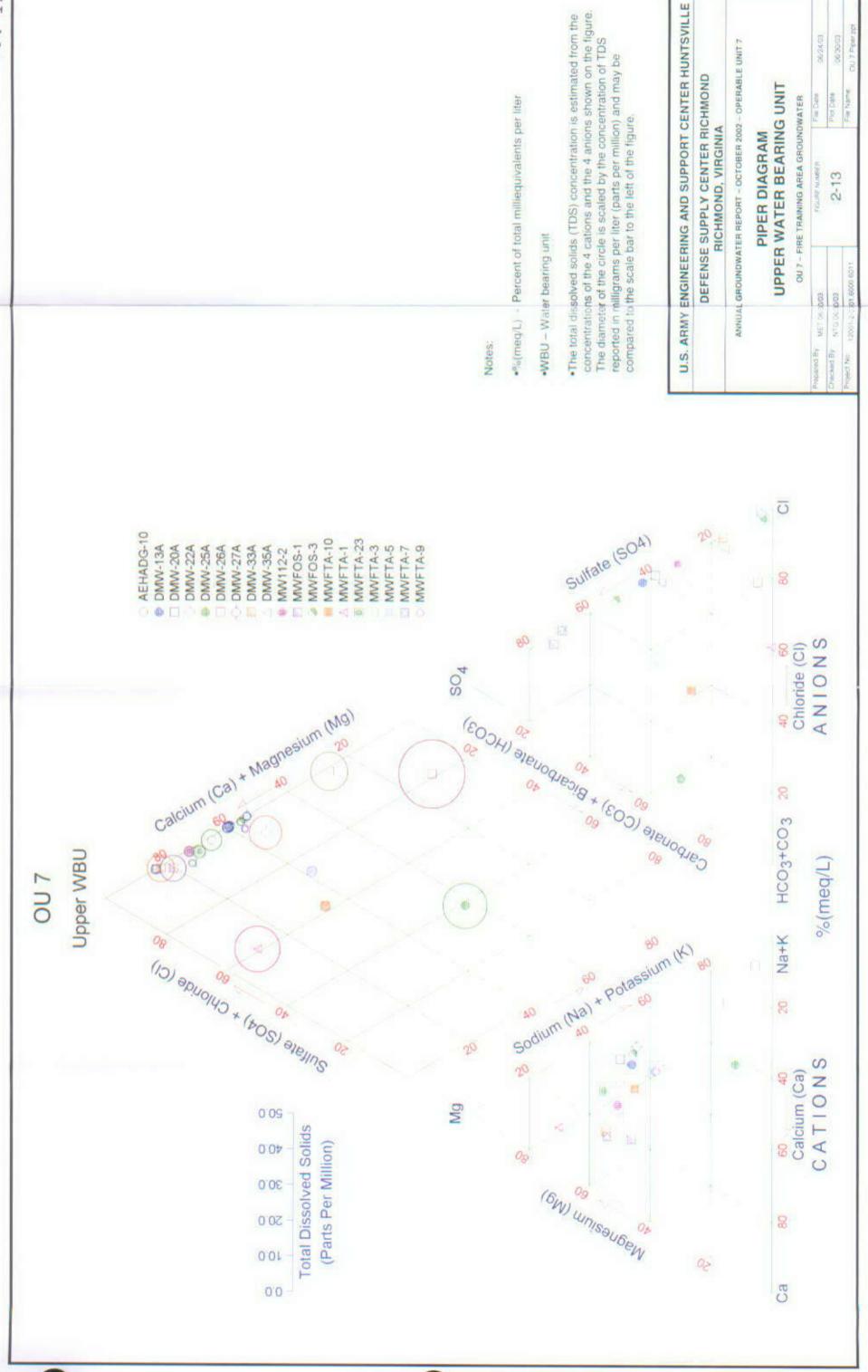
Note: WBU - water bearing unit

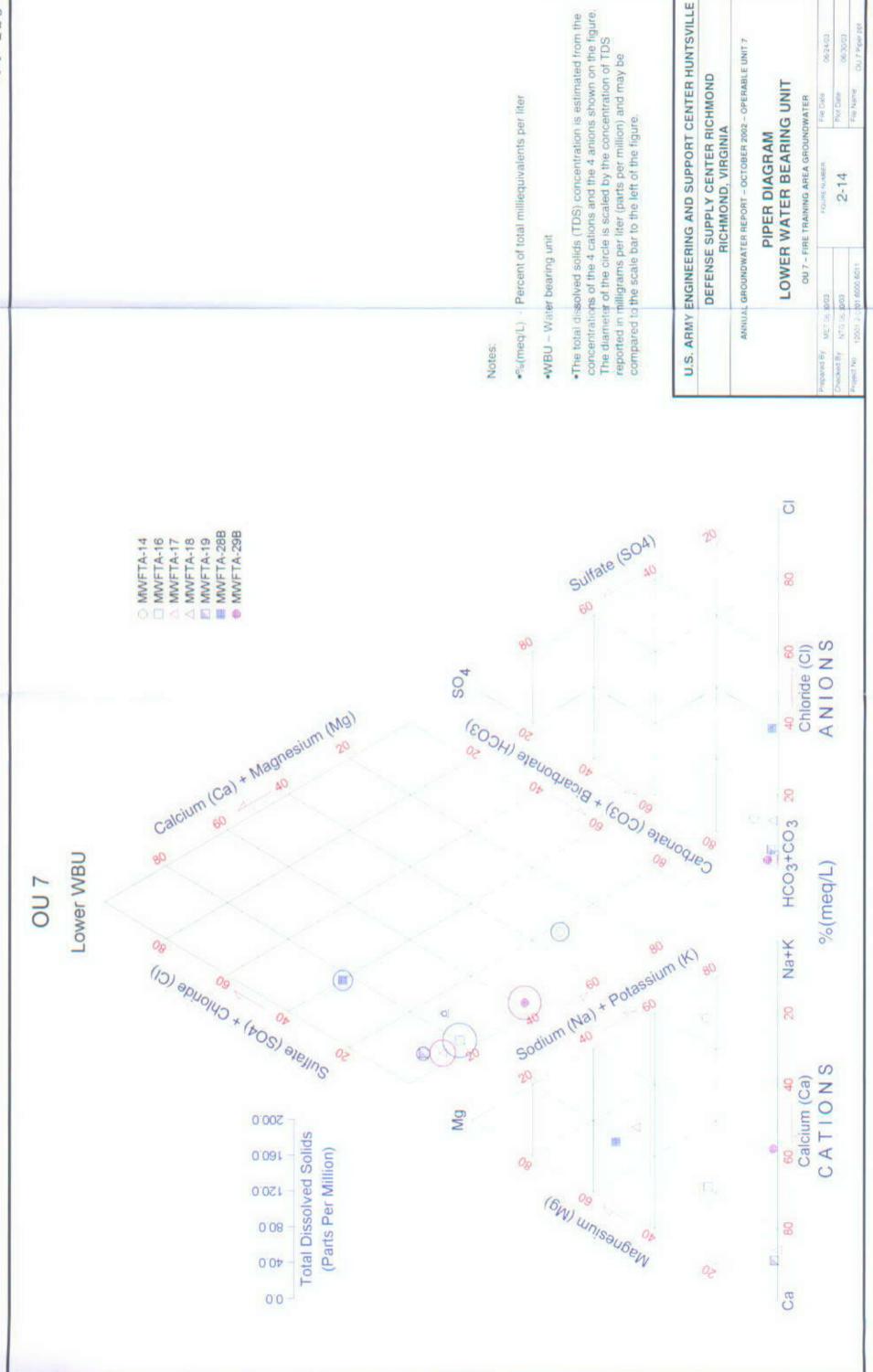
-- DMW 22A (Upper WBU) -- PWFTA-2 (Lower WBU) -- MWFTA-20 (Fractured Bedrock)

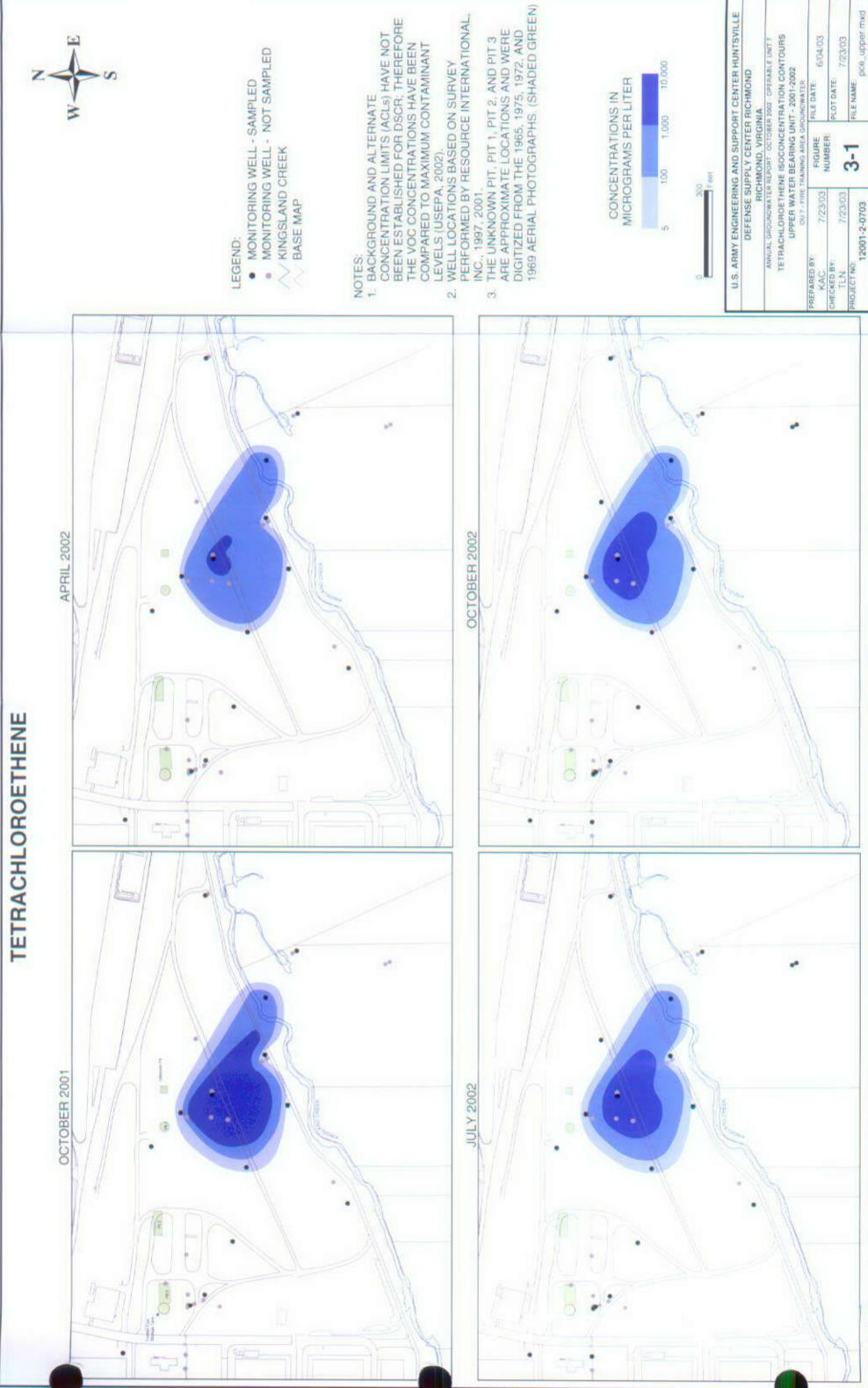
mst - mean sea level

fi feet

PREPARED/DATE: MAV 5/30/03 CHECKED/DATE: TLN 7/30/03

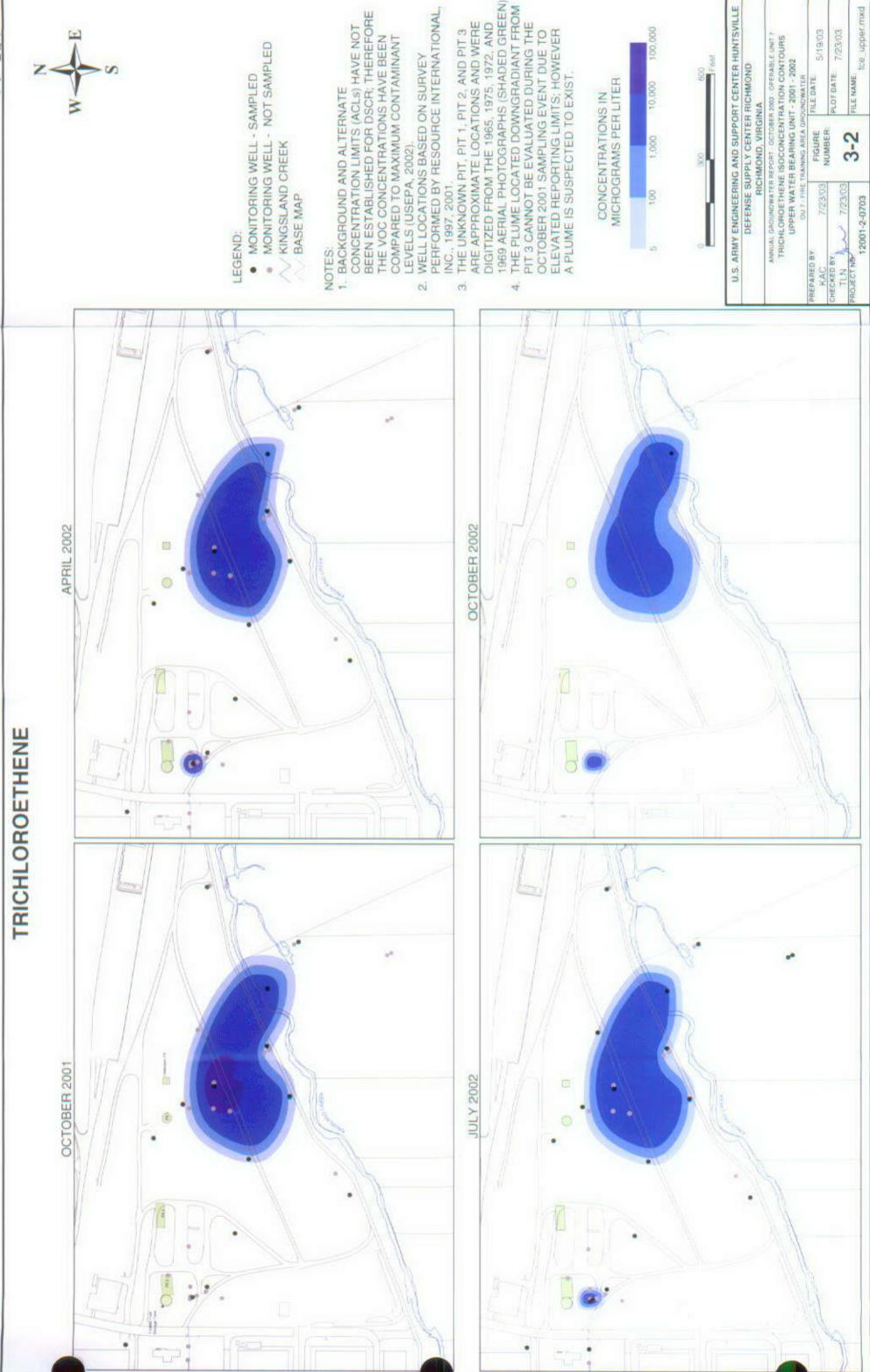






pxm raddu_avd

6/04/03 7723/03

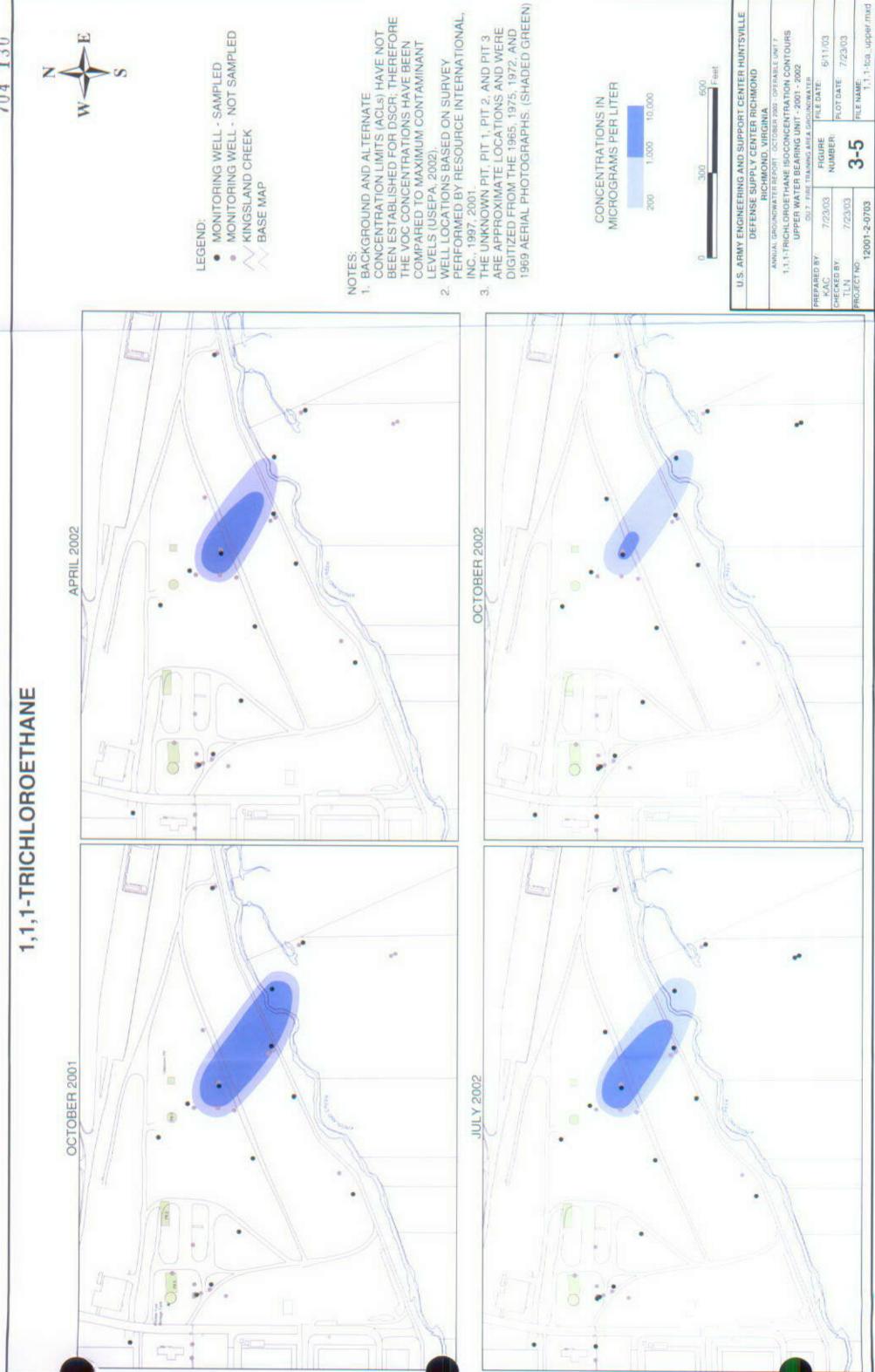


tce_upper.mxd

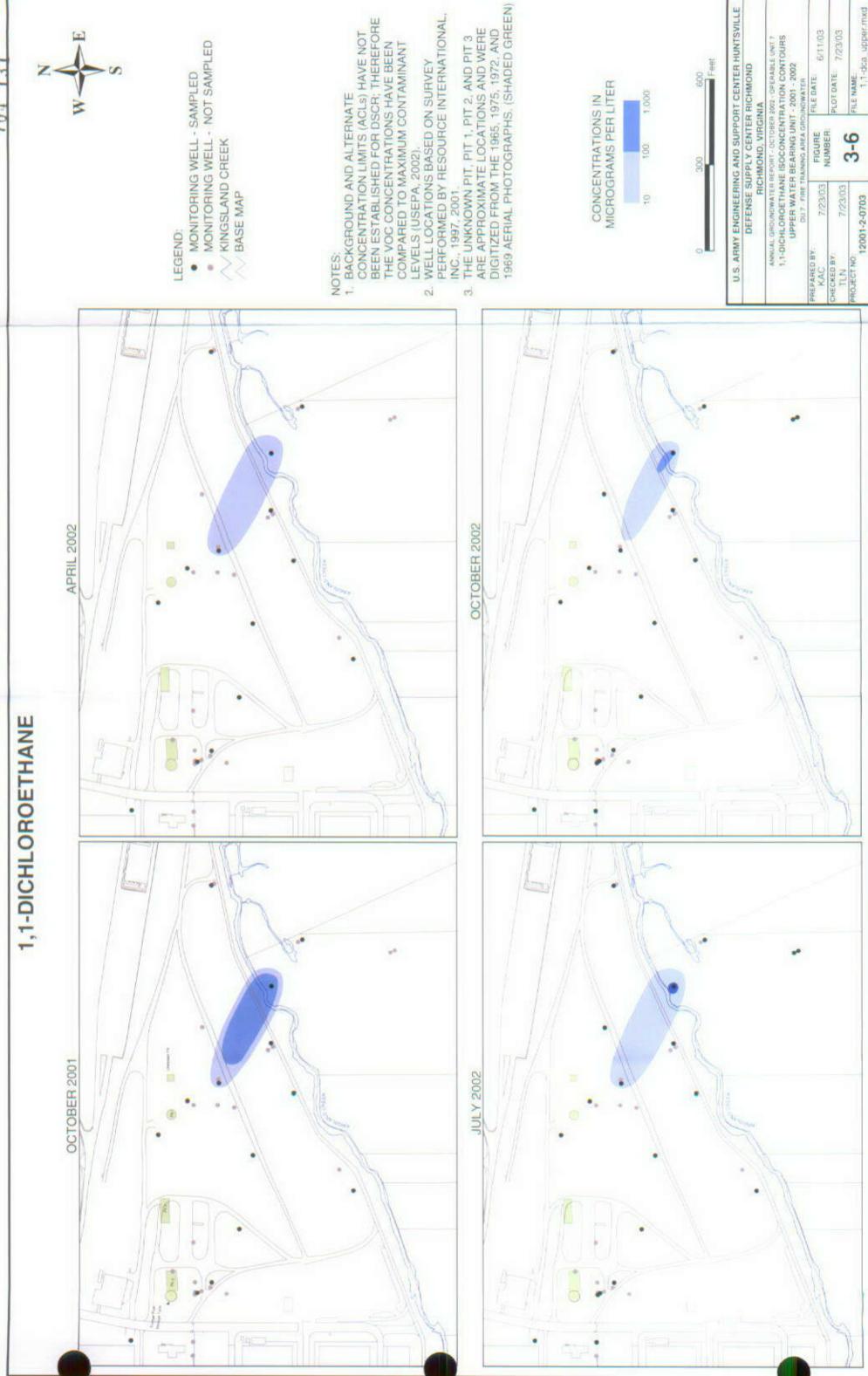
5/19/03

7/23/03

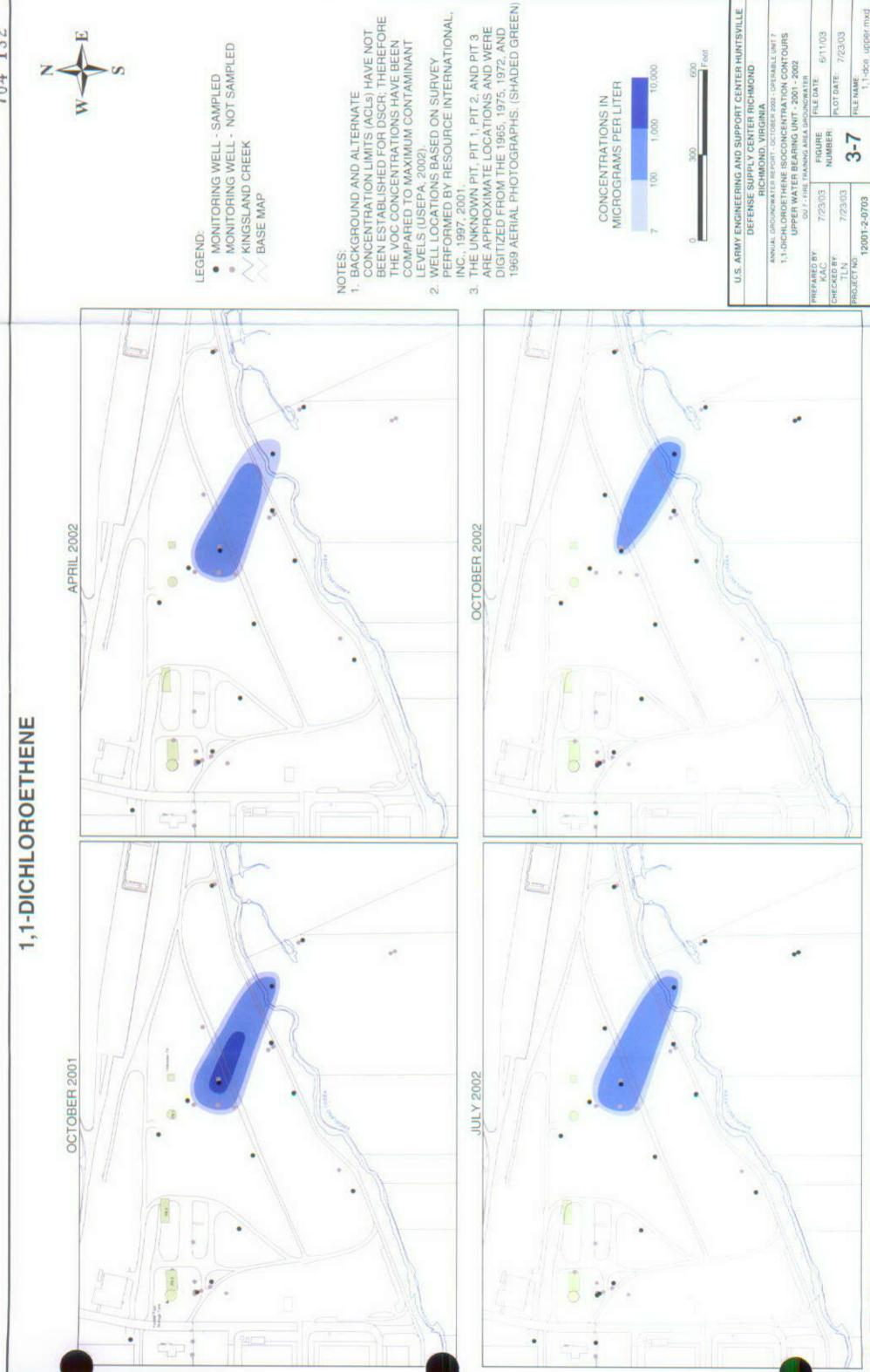
12001-2-0703



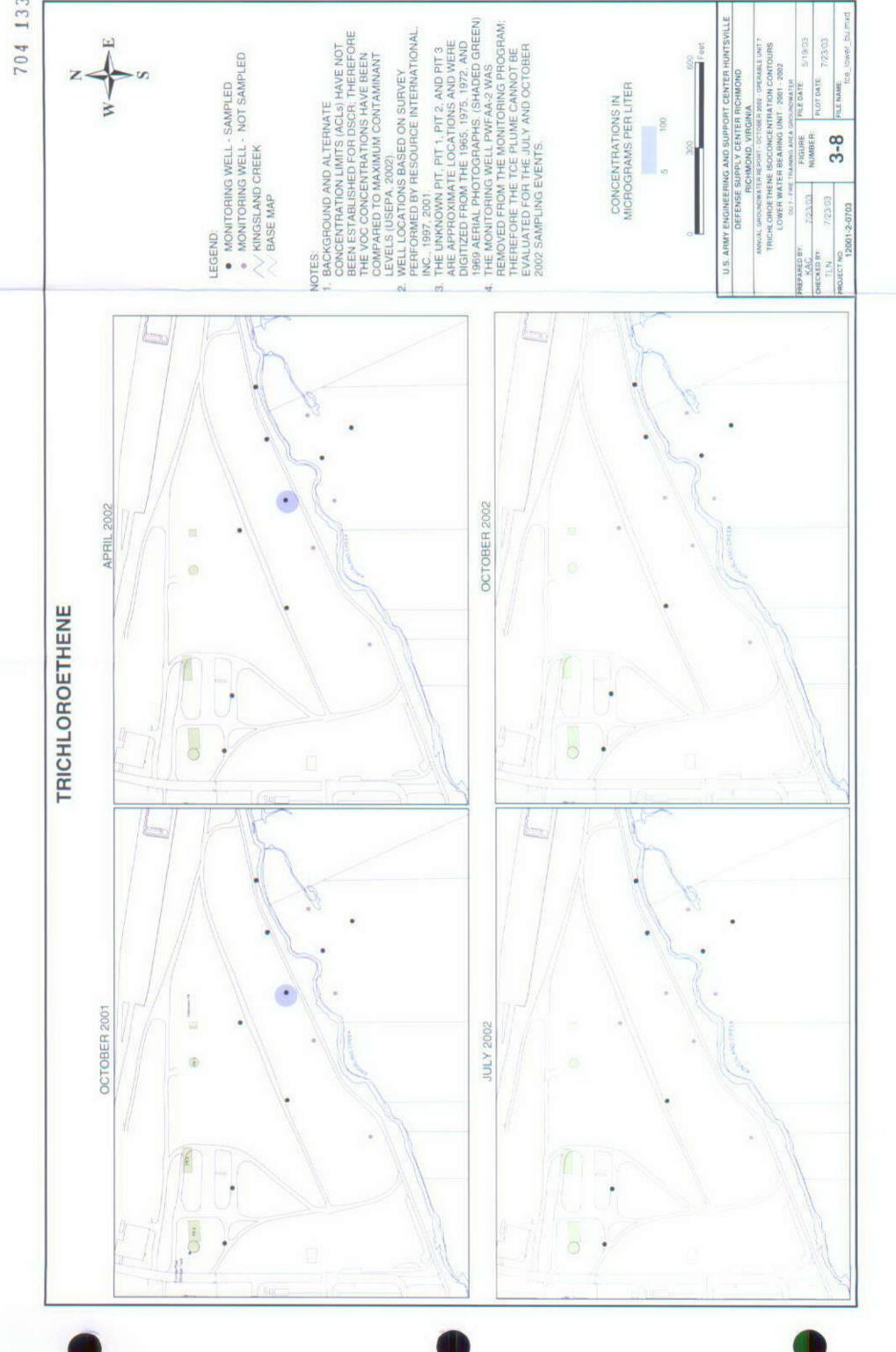
6/11/03 7/23/03



6/11/03 7723/03



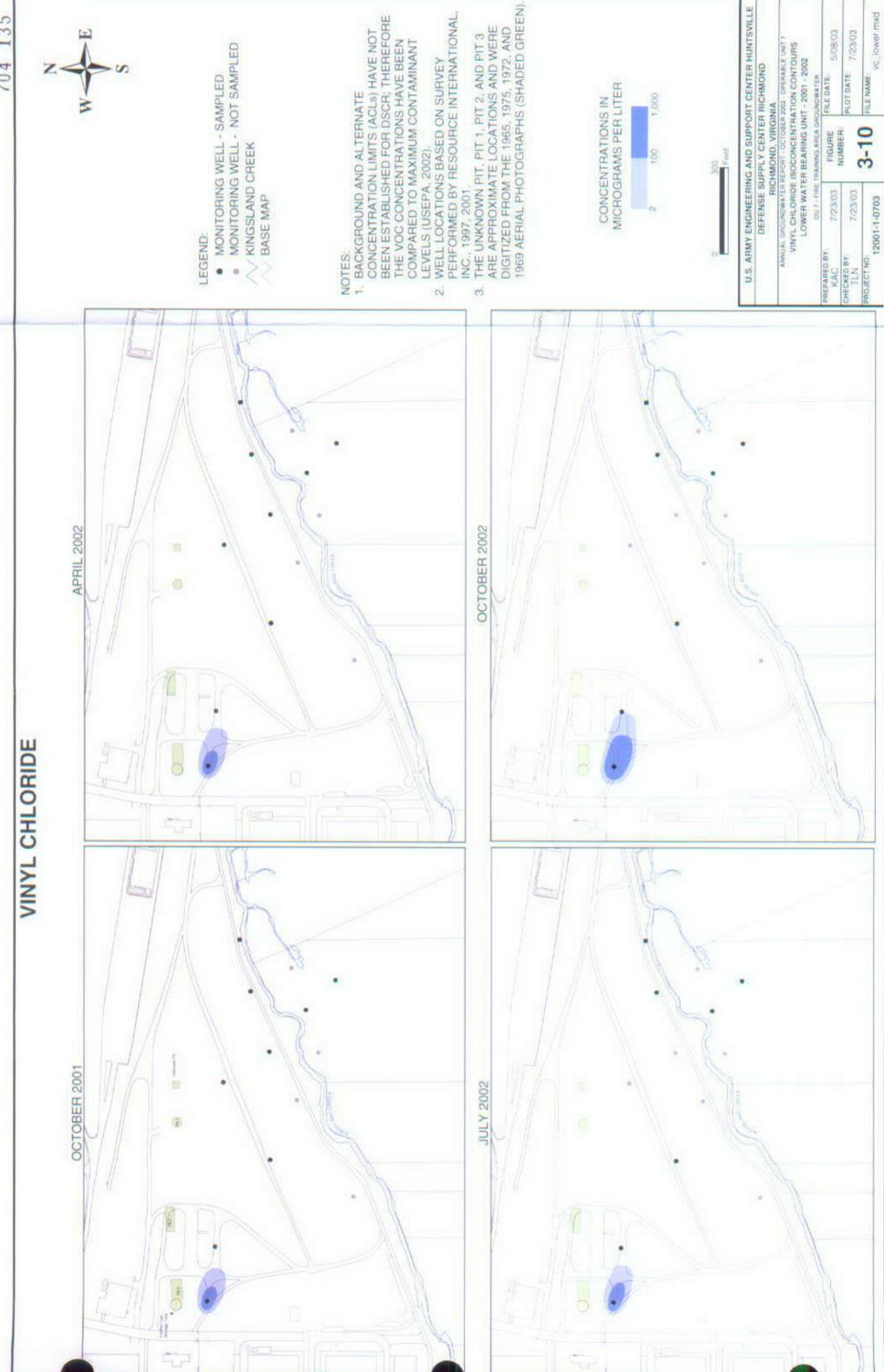
B/11/03 7723/03

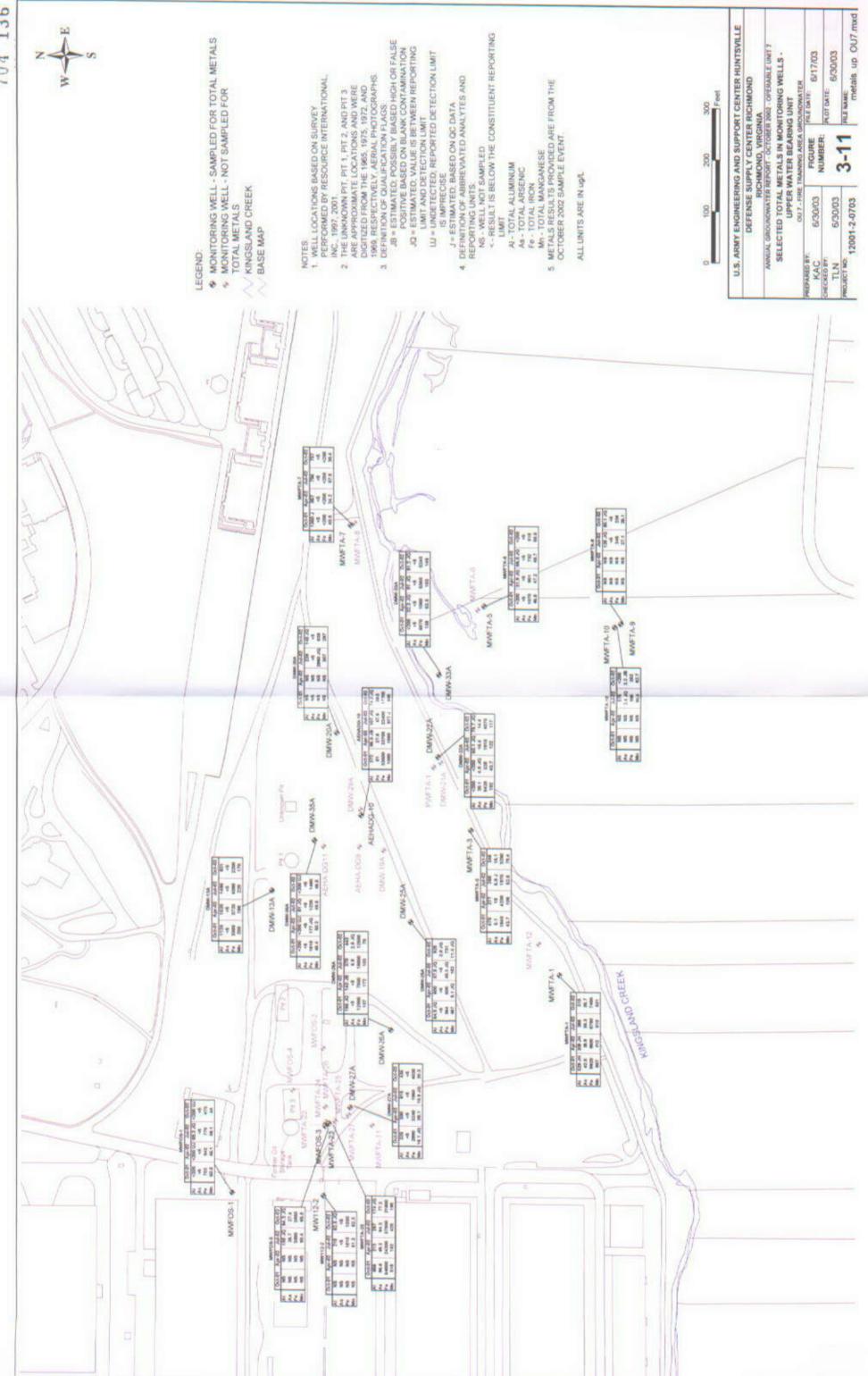


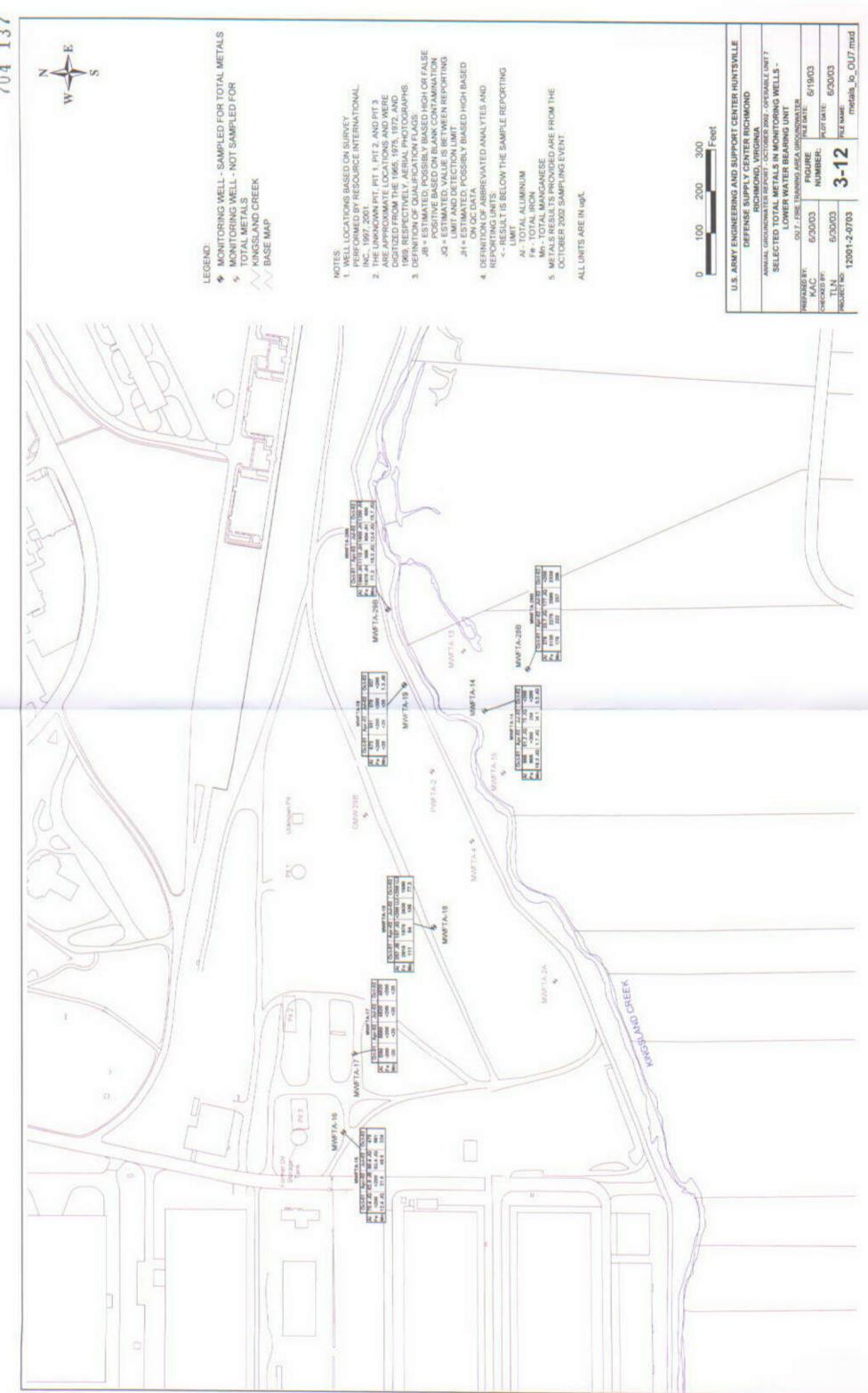
5/19/03 7723/03

R.E NAME

FILE DATE: PLOT DATE







MONITORING WELL - SAMPLED, MNA EVALUATED

1. WELL LOCATIONS BASED ON SURVEY PERFORMED BY RESOURCE INTERNATIONAL

1969, RESPECTIVELY, AERIAL PHOTOGRAPHS 3. DEFINITION OF QUALIFICATION FLAGS

JB = ESTIMATED; POSSIBLY BIASED HIGH OR FALSE POSITIVE BASED ON BLANK CONTAMINATION JQ = ESTIMATED; VALUE IS BETWEEN REPORTING LIMIT AND DETECTION LIMIT

JH = ESTIMATED, POSSIBLY BIASED HIGH BASED

4 DEFINITION OF POSTING SYMBOLS AND COLORS:

12 - SUPPORTING MNA
12 - FAVORABLE FOR MNA

MNA - MONTORED NATURAL ATTENUATION
NS - WELL NOT SUPPORTING MNA
NS - WELL NOT SAMPLED
NA - PARAMETER RESULTS NOT AVAILABLE

- - RESULT IS BELOW THE SAMPLE REPORTING

DEFINITION OF ABBREVIATED ANALYTES AND REPORTING UNITS.

ALK - TOTAL ALKALINITY (mg/L as CaCO, ORP - OXYGEN REDUCTION POTENTIAL PH - NEGATIVE LOG OF THE HYDROGEN ALL UNITS ARE IN MIGH EXCEPT ORP WHICH IS IN MV AND HYDROGEN WHICH IS IN NM.

U.S. ARMY ENGINEERING AND SUPPORT CENTER HUNTSVILLE SELECTED MONITORED NATURAL ATTENUATION PARAMETERS - UPPER WATER BEARING UNIT - OCTOBER 2001 - 2002 RICHMOND, VIRGINIA ANNUAL GROUNDWATER REPORT - OCTOBER 2002 - OPERABLE UNIT 7 DEFENSE SUPPLY CENTER RICHMOND 00.7 - FIRE TRANSMING AREA GROUNDWATER
7/202/03

MNA_up_OU7.mxd COTDATE: 7/31/03 6/12/03

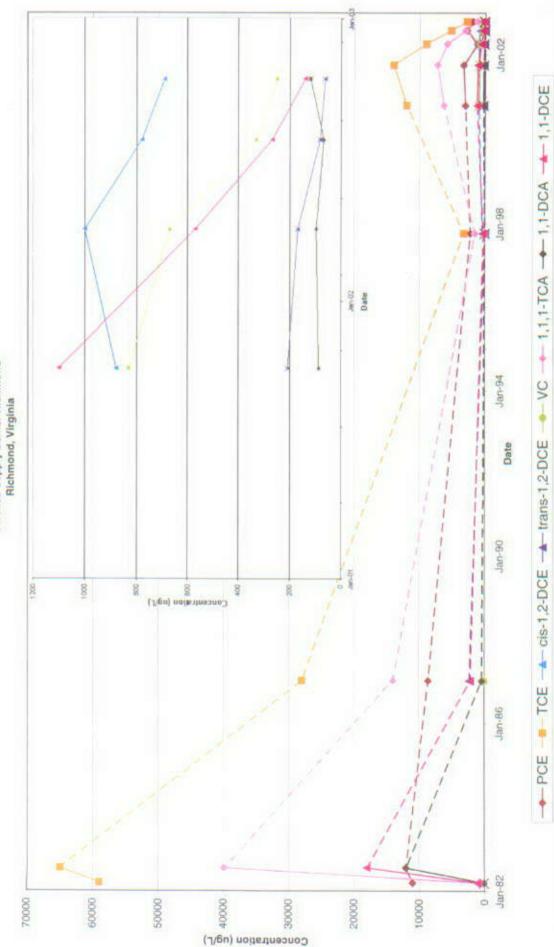


FIGURES

FIGURE 4-1

AEHA-DG10 TIME SERIES GRAPH OPERABLE UNIT 7 - UPPER WBU

Annual Groundwater Report - October 2002 - Operable Unit 7 Defense Supply Center Richmond



· · · indicates data that is discontinuous for more than one year

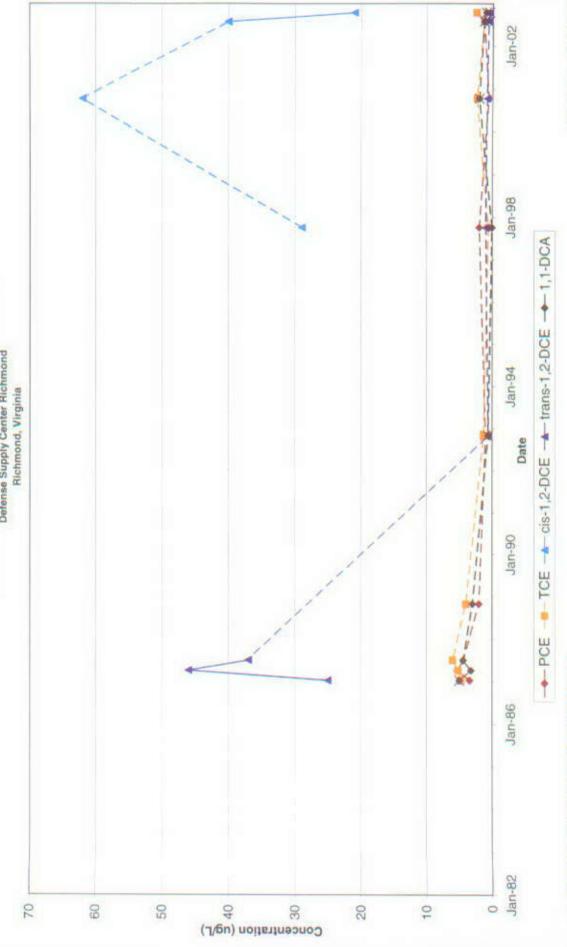
x - indicates data plotted at the sample reporting limit

Prepared By, TLN 06/22/2003 Checked By, CMB 06/23/2003

FIGURE 4-2

OPERABLE UNIT 7 - UPPER WBU DMW-20A TIME SERIES GRAPH

Annual Groundwater Report - October 2002 - Operable Unit 7 Defense Supply Center Richmond



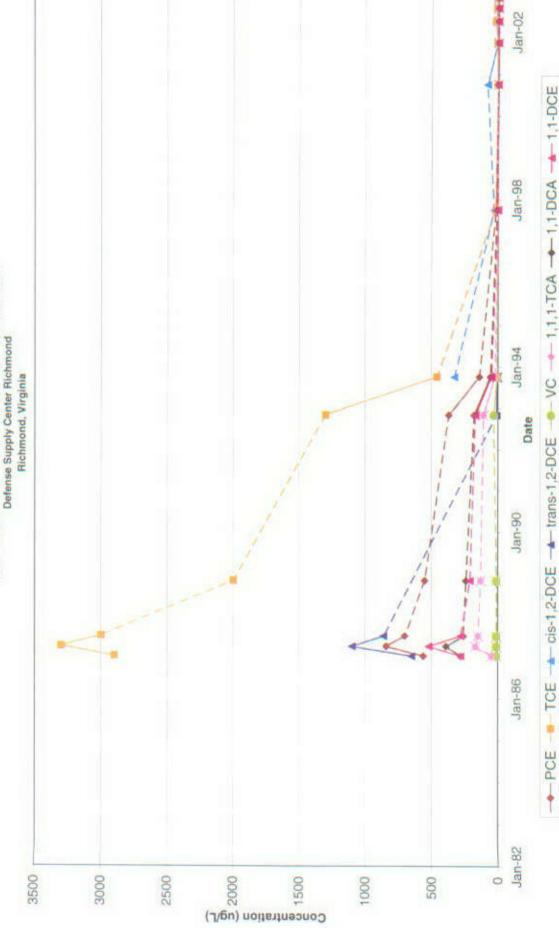
--- indicates data that is discontinuous for more than one year X - indicates data plotted at the sample reporting limit

Prepared By, TLN 06/22/2003 Checked By: CMB 06/23/2003

FIGURE 4-3

OPERABLE UNIT 7 - UPPER WBU DMW-22A TIME SERIES GRAPH

Annual Groundwater Report - October 2002 - Operable Unit 7



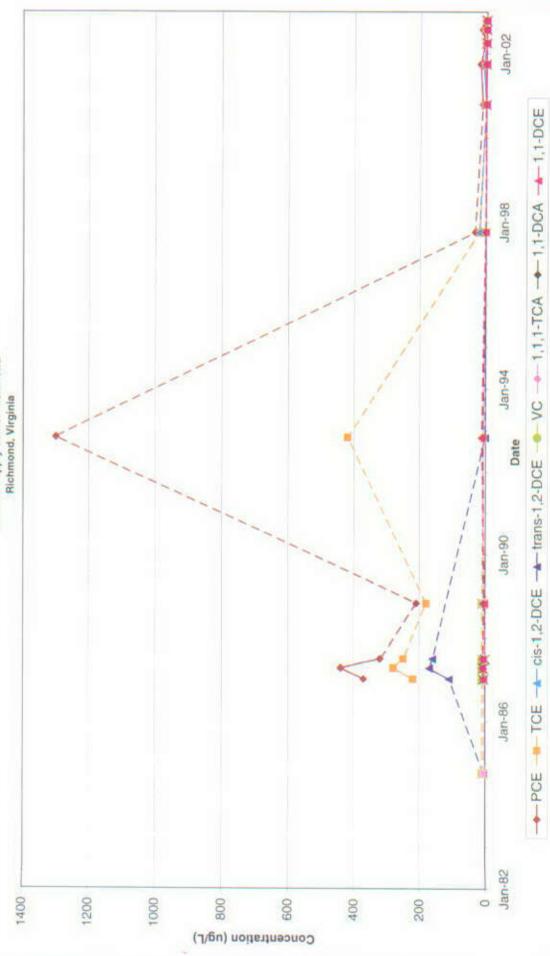
indicates data that is discontinuous for more than one year
 x - indicates data plotted at the sample reporting limit

Prepared By: TLN 06/22/2003 Checked By: CMB 06/23/2003

OPERABLE UNIT 7 - UPPER WBU DMW-25A TIME SERIES GRAPH

Annual Groundwater Report - October 2002 - Operable Unit 7





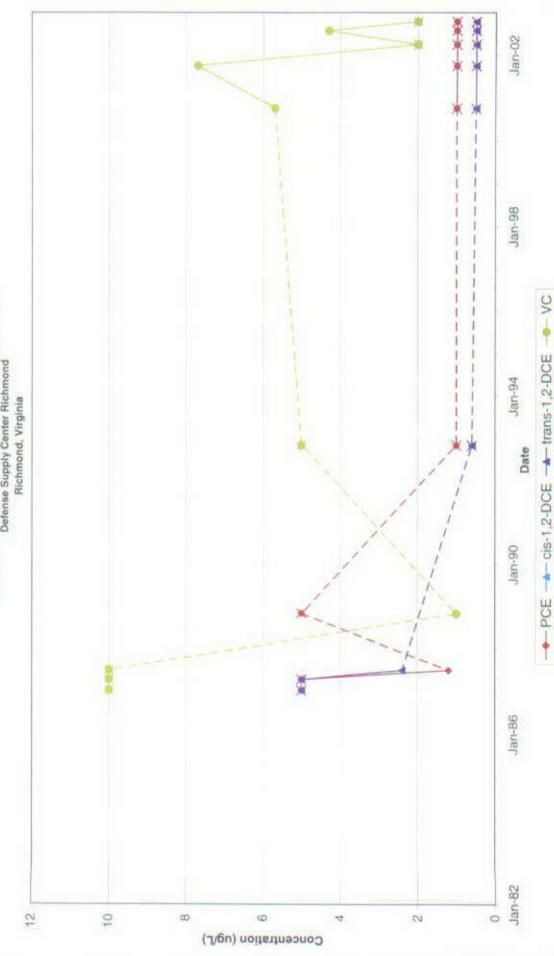
--- indicates data that is discontinuous for more than one year X - indicates data plotted at the sample reporting limit

Prepared By. TLN 06/22/2003 Checked By. CMB 06/23/2003

OPERABLE UNIT 7 - UPPER WBU DMW-27A TIME SERIES GRAPH

Annual Groundwater Report - October 2002 - Operable Unit 7 Defense Supply Center Richmond





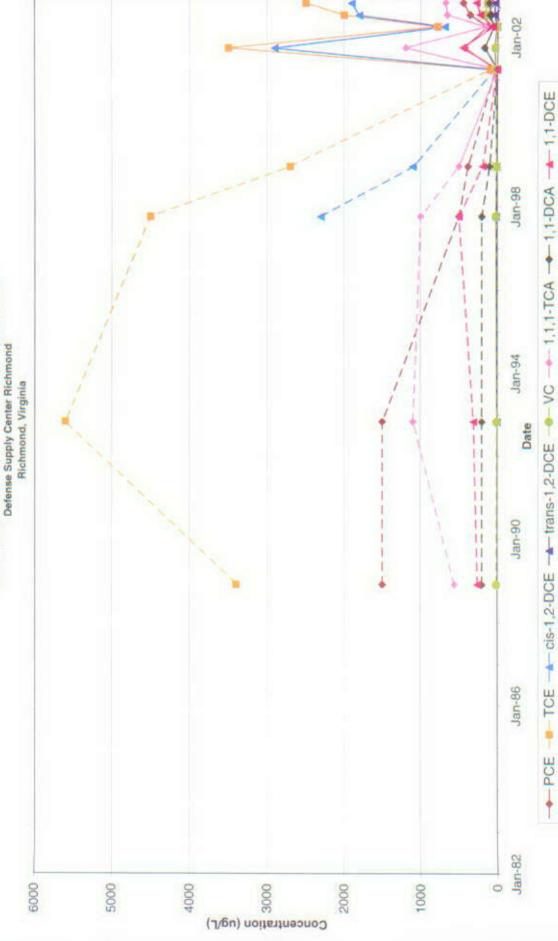
· · · indicates data that is decontinuous for more than one year

x - indicates data plotted at the sample reporting limit

Prepared By TLN 06/22/2003 Checked By CMB 06/23/2003

DMW-33A TIME SERIES GRAPH OPERABLE UNIT 7 - UPPER WBU

Annual Groundwater Report - October 2002 - Operable Unit 7



· · · indicates data that is discontinuous for more than one year

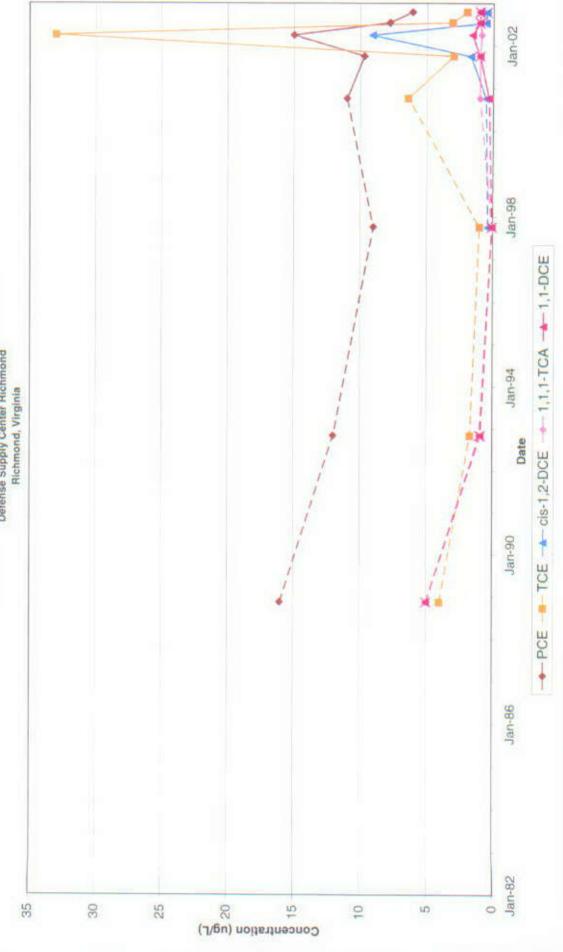
x - indicates data piotted at the sample reporting limit

Prepared By TLN 06/22/2003 Checked By, CMB 06/23/2003

OPERABLE UNIT 7 - UPPER WBU DMW-35A TIME SERIES GRAPH

Annual Groundwater Report - October 2002 - Operable Unit 7





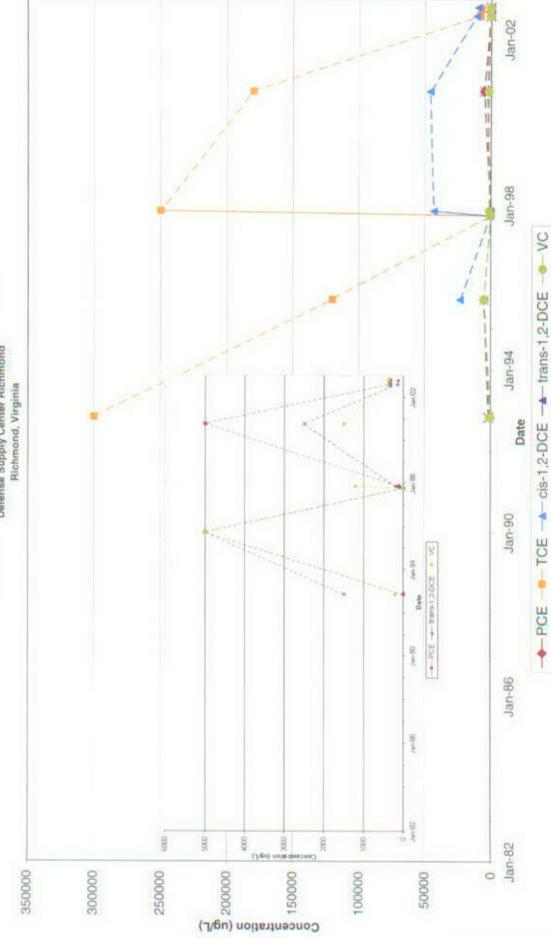
.... indicates data that is discontinuous for more than one year

x - Indicates data piotted at the sample reporting limit

Prepared By, TLN 06/22/2003 Checked By, CMB 06/23/2003

MWFOS-3 TIME SERIES GRAPH OPERABLE UNIT 7 - UPPER WBU

Annual Groundwater Report - October 2002 - Operable Unit 7
Defense Supply Center Richmond



--- indicates data that is discontinuous for more than one year

x - indicates data plotted at the sample reporting limit

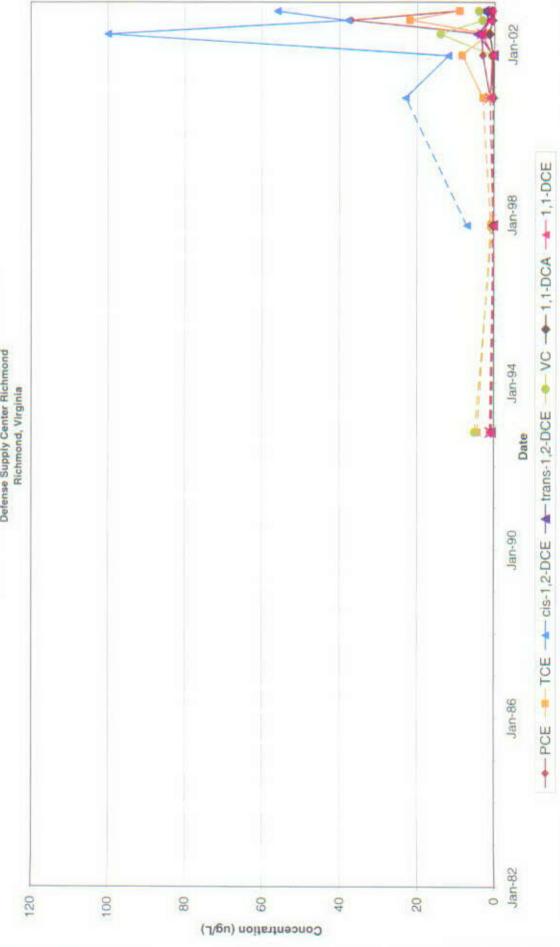
Prepared By, TLN 06/22/2003 Checked By, CMB 06/23/2003

Prepared By, TLN 06/22/2003 Checked By, CMB 06/23/2003

FIGURE 4-9

MWFTA-3 TIME SERIES GRAPH OPERABLE UNIT 7 - UPPER WBU

Annual Groundwater Report - October 2002 - Operable Unit 7
Defense Supply Center Richmond



--- indicates data that is discontinuous for more than one year

x - indicates data plotted at the sample reporting limit

Prepared By. TLN 06/22/2003 Checkled By. CMB 06/23/2003

FIGURE 4-10

OPERABLE UNIT 7 - UPPER WBU MWFTA-23 TIME SERIES GRAPH

Annual Groundwater Report - October 2002 - Operable Unit 7 Defense Supply Center Richmond



--- indicates data that is discontinuous for more than one year X - indicates data plotted at the sample reporting limit

MWFTA-16 TIME SERIES GRAPH OPERABLE UNIT 7 -LOWER WBU

Annual Groundwater Report - October 2002 - Operable Unit 7
Defense Supply Center Richmond





--- indicates data that is discontinuous for more than one year

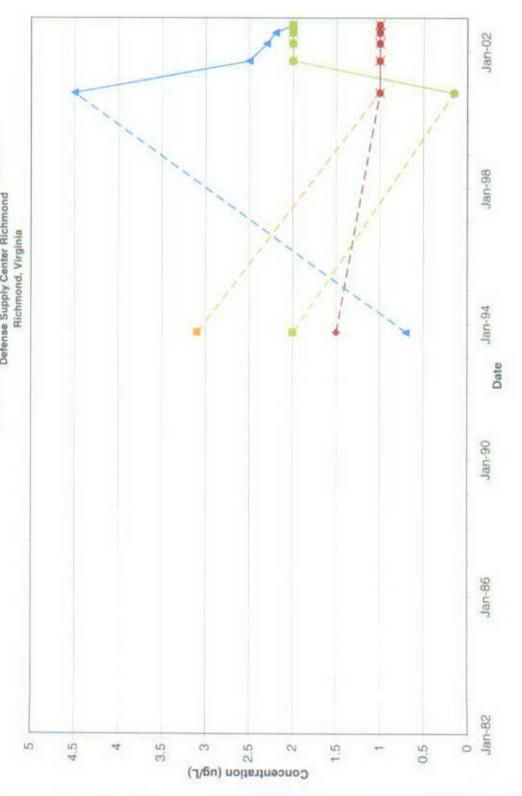
x - indicates data plotted at the sample reporting limit

Prepared By. TLN 06/22/2003 Checked By. CMB 06/23/2003

OPERABLE UNIT 7 - LOWER WBU MWFTA-18 TIME SERIES GRAPH

Annual Groundwater Report - October 2002 - Operable Unit 7





··· Indicates data that is discontinuous for more than one year

→ PCE - TCE - cis-1,2-DCE - VC - TCE DL

x - Indicates data plotted at the sample reporting limit

Prepared By, TLN 06/22/2003 Checked By, CMB 06/23/2003

FIGURE 4-13

OPERABLE UNIT 7 - LOWER WBU MWFTA-19 TIME SERIES GRAPH

Annual Groundwater Report - October 2002 - Operable Unit 7





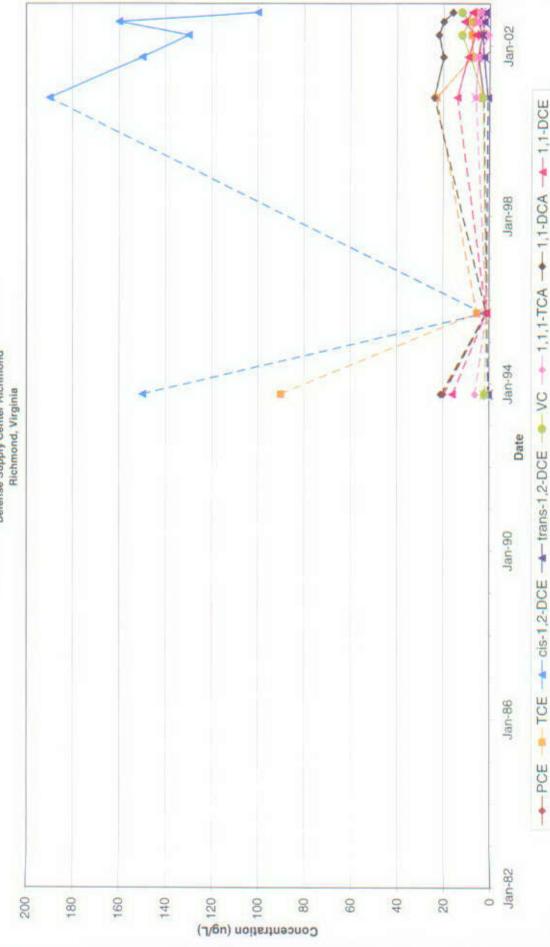
--- indicates data that is discontinuous for more than one year

X - Indicates data plotted at the sample reporting limit

OPERABLE UNIT 7 - FRACTURED BEDROCK MWFTA-20 TIME SERIES GRAPH

Annual Groundwater Report - October 2002 - Operable Unit 7

Defense Supply Center Richmond



--- indicates data that is discontinuous for more than one year

x - indicates data plotted at the sample reporting limit

Prepared By: TLN 06/22/2003 Checked By: CMB 06/23/2003

TAB

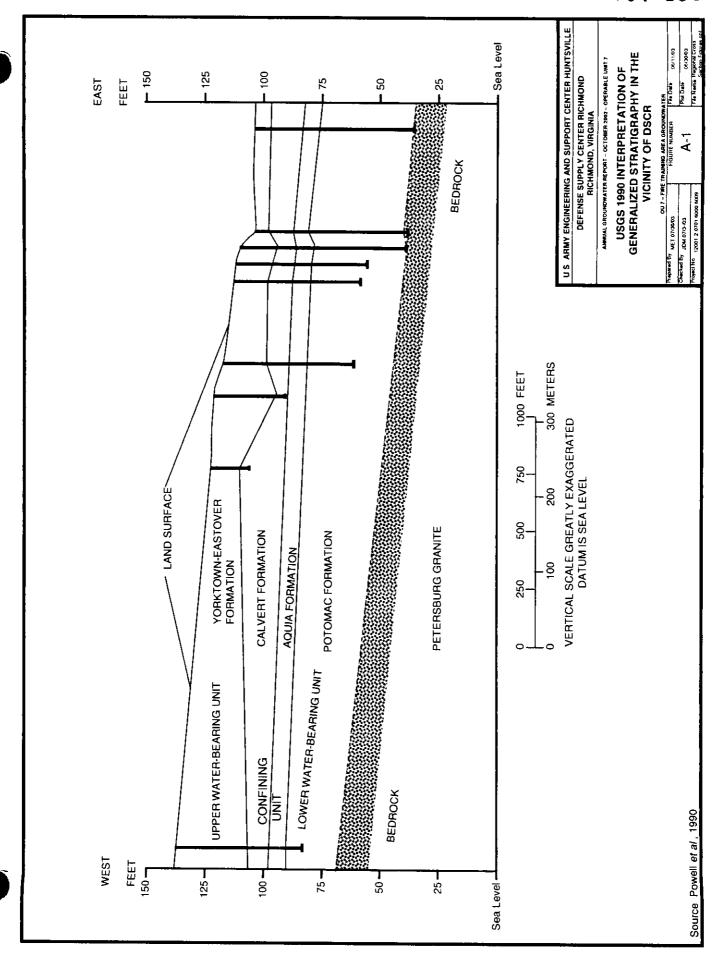
Appendix A

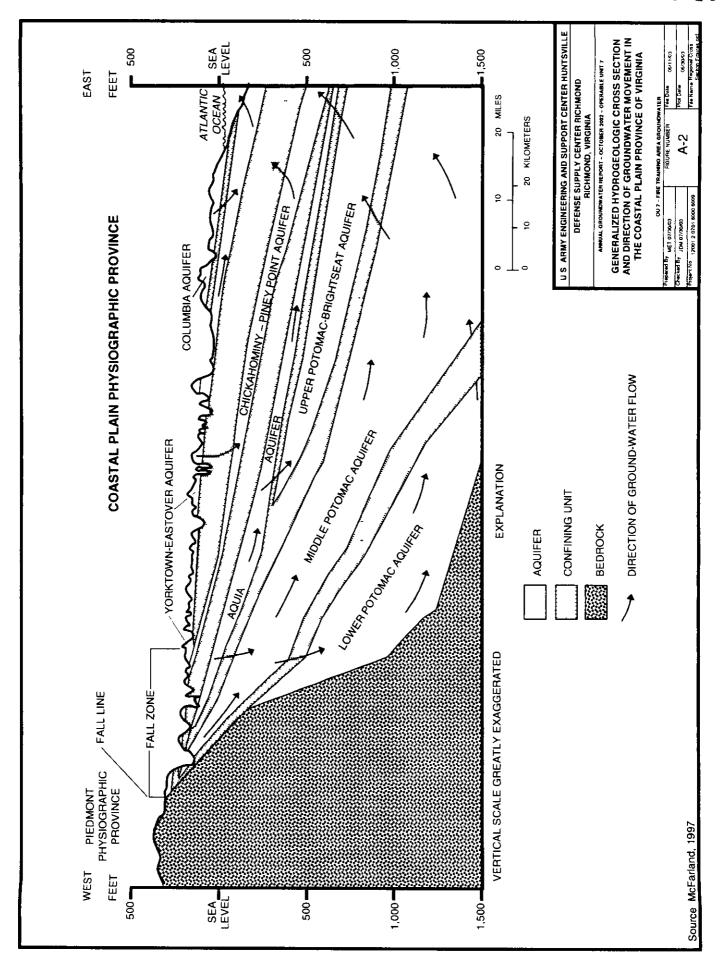
APPENDIX A: HYDROLOGIC DATA

TAB

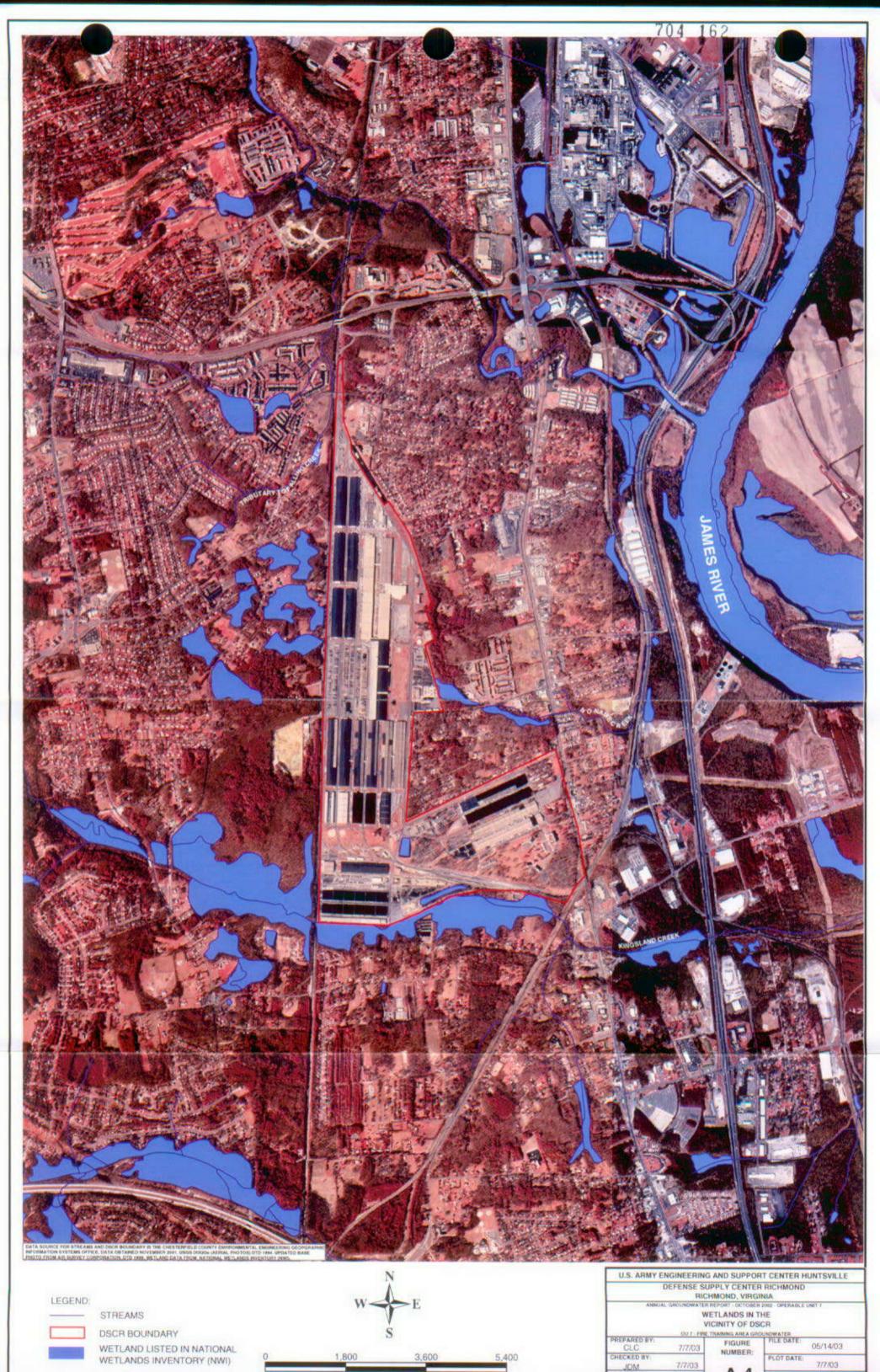
APPENDIX A FIGURES

APPENDIX A FIGURES





Y LITHOLOGIC DESCRIPTIONS FOR DSCR	Clay, sand, silt, and gravel overlain by topsoil May contain fill material in some areas	: : : : : : : : : : : : : : : : : : : :	and gray Contains a basal sand, and gravel layer Clay or silt and tine sand with clay Contains a basal sand and gravel unit Basal stratum contains charks teeth and wood framments		Grayish green sand, medium to very coarse, interbedded with clay layers varying in thickness, occasional gravels	Saprolite (weathered bedrock) biotite, amphibole, feldspar, and quartz mineral pieces in a clayey sand matrix. May not be present throughout area Granite to granodiorite, and granitic gnerss	U.S. ARMY ENGINEERING AND SUPPORT CENTER HUNTSVILLE DEFENSE SUPPLY CENTER RICHMOND	RICHMOND, VIRGINIA ANNUAL GROUNDWATER REPORT - OCTORER 2002 - OPERABLE UNITY 1988 INTERPRETATION OF GENERALIZED CTDATIC DADIIC COL SIAM IN THE WICHITY OF	DSCR DOUGH OF THE TRAMPHO AREA ORGUNION TER	Property of Mark 1, 10% of 100000000000000000000000000000000000
ПТНОГОСУ				1 11 -			ΑY			
HYDROGEOLOGIC UNITS	Unsaturated (Vadose) Zone	Upper Water Bearing Unit	Confining Unit	Confining Unit/Aquifer	Lower Aquifer	Bedrock	DIUM, OR SANDY CLAY	SAND CLAY		
STRATIGRAPHIC FORMATION	Recent Deposits/Fili Material	Eastover Formation	Calvert Formation	Aquia Formation	Potomac Formation& Other Units	Petersburg Granite	FINE, ME	CLAYEY	AND	
ЕРОСН	RECENT	ENE	MIOCE	PALEOCENE	міроге	SIC, IC(?), IC AND BRIAN	IGNEOUS/METAMORPHIC	TRIASSIC ROCKS	GRAVEL AND SAND	
PERIOD		:	үяітя	ЭТ	CHETACEOUS	TRIASSIC, JURASSIC(?). PALEOZOIC AND PRECAMBRIAN	LEGEND IGNEOU	•	GRA	



RAB

APPENDIX A TABLE

APPENDIX A TABLE

TABLE A-1

VALUES OF HYDRAULIC PARAMETERS ESTIMATED FROM RESULTS OF AQUIFER TESTS

Annual Groundwater Report – October 2002 Operable Unit 7

Defense Supply Center Richmond Richmond, Virginia

**************************************	Transmissivity (ft²/day²)							
Hydrogeologic Unit	Range in OU 6	Range in OU 7	Range in OU 8					
Upper Water-Bearing	10 – 165 (1)	10 (2)	80 – 500 (3) (4)					
Confining Layer	NA ^b	NA	0 035					
Lower Water-Bearing	68 – 115 (1)	0 3 – 25	110 – 275					
	A	verage Thickness of Unit (1	ft ^e)					
Upper Water-Bearing	12 (1),(3),(5)	16 (2),(6)(7)	15 (3)(4)					
Confining Layer	15 (1)(3),(5)	$6-10 {}_{(2)(6)(7)}$	18 (4)					
Lower Water-Bearing	30 (1),(3),(5)	30 (2),(6) (7)	15 – 40 (3)(4)					
	Estimated Horizontal Hydraulic Conductivity (ft/day ^d)							
Upper Water-Bearing	0.8 - 14 (1)	022-6 (7)(8)	6 (3),(4)					
Confining Layer	NA	NA	0 005					
Lower Water-Bearing	23-38 (8)	0 0005 – 0 97 (7) (8)	7 3 – 18.3					
	Estimated V	Vertical Hydraulic Conduct	tivity (ft/day)					
Upper Water-Bearing	NA	0 025 – 0 6 (7),(9)	NA					
Confining Layer	NA	NA	0 00027 - 0 028 (3)					
Lower Water-Bearing	NA	0 00005 – 0 097 (7) (9)	0 73 - 1 83					
		Storage Coefficient ()						
Upper Water-Bearing	0 0025 - 0 013 (1)	NA	0.01 - 0.40 (3),(4)					
Confining Layer	NA	NA	0 00000002 (3)					
Lower Water-Bearing	0.0009 - 0.071 (1)	0 0046 (2)	0 00002 - 0 00003 (3)					
	Hor	izontal Hydraulic Gradient	(ft/ft ^e)					
Upper Water-Bearing		0 004 - 0 03						
Confining Layer		NA						
Lower Water-Bearing		0 009						

¹ tr/day – square feet per day 1 NA – parameter is not available 1 ft – feet 1 tt/day – feet per day

TABLE A-1

VALUES OF HYDRAULIC PARAMETERS ESTIMATED FROM RESULTS OF AQUIFER TESTS

Annual Groundwater Report - October 2002 Operable Unit 7 **Defense Supply Center Richmond** Richmond, Virginia

	Transmissivity (ft²/daya)				
Hydrogeologic Unit	Range in OU 6	Range in OU 7	Range in OU 8		
	Ve	rtical Hydraulic Gradient (ft/ft ^e)		
Upper Water-Bearing / Lower Water-Bearing	0 03 - 2 6				
Confining Layer /Lower Water-Bearing	NA				
Lower Water-Bearing / Bedrock		NA			
	(Groundwater Velocity (ft/da	ıy ^e)		
Upper Water-Bearing	0 0064 - 0.79				
Confining Layer	NA				
Lower Water-Bearing	$1.1 \times 10^{-5} - 1.8 \times 10^{-4}$				

Notes:

Sources of Information

- (1) Law (2000)
- (2) ES (1994)
- (3) Powell et al (1990)
- (4) Law (1996a)
- (5) Dames & Moore, Inc (1989a).(6) Dames & Moore, Inc (1989b)
- (7) Law (2002).
- (8) Hydraulic conductivity estimated as the quotient of transmissivity divided by saturated thickness of transmissive unit
- (9) Vertical hydraulic conductivity in each water-bearing unit assumed (LAW, 2002) to be one-tenth the value of horizontal hydraulic conductivity in that unit

PREPARED/DATE MAV 07/31/03 CHECKED/DATE TLN 07/31/03

20701-06

ft/ft - feet per feet

TAB

APPENDIX A-PUMPING lest Results

APPENDIX A
PUMPING TEST RESULTS
SOURCE: ENGINEERING SCIENCE – 1993 – REMEDIAL INVESTIGATION FIELD
WORK – FIRE TRAINING AREA

FIGURE D.4

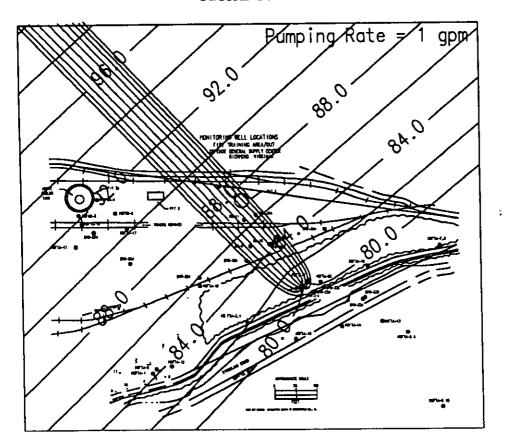


FIGURE D.5

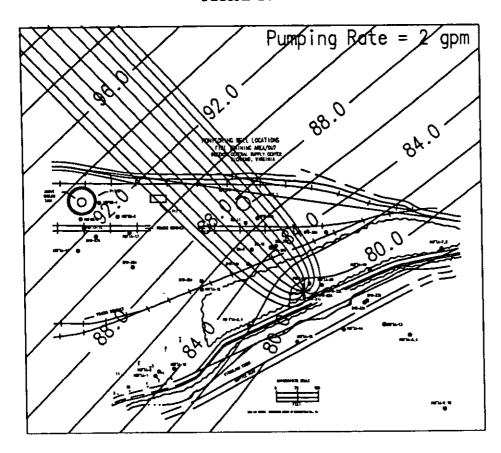
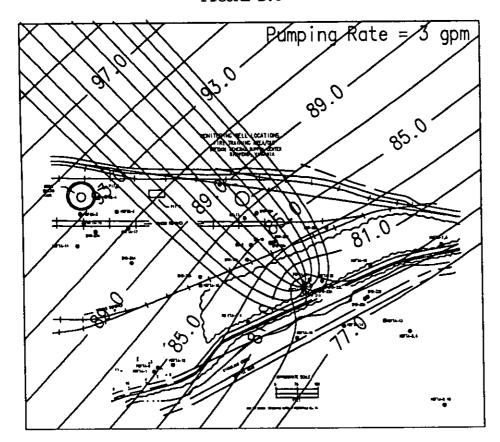
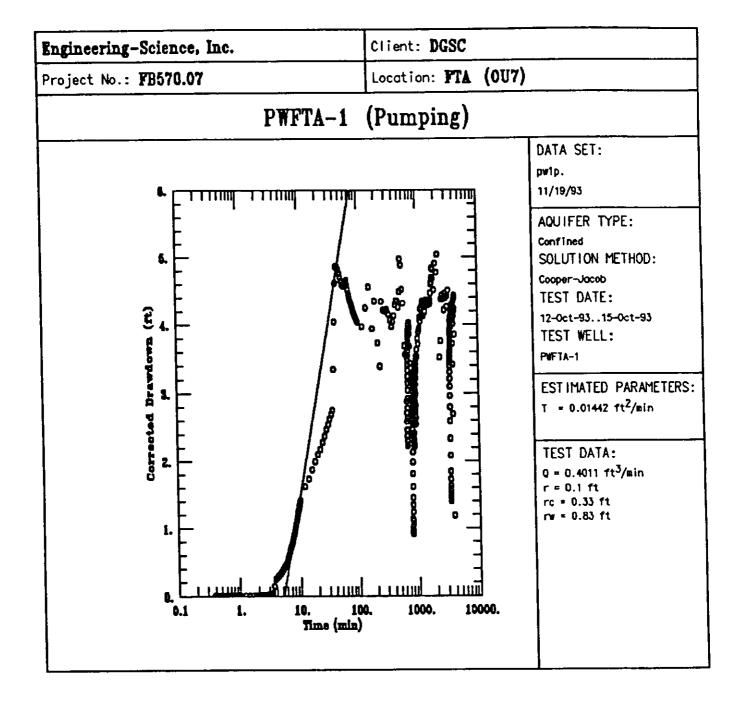
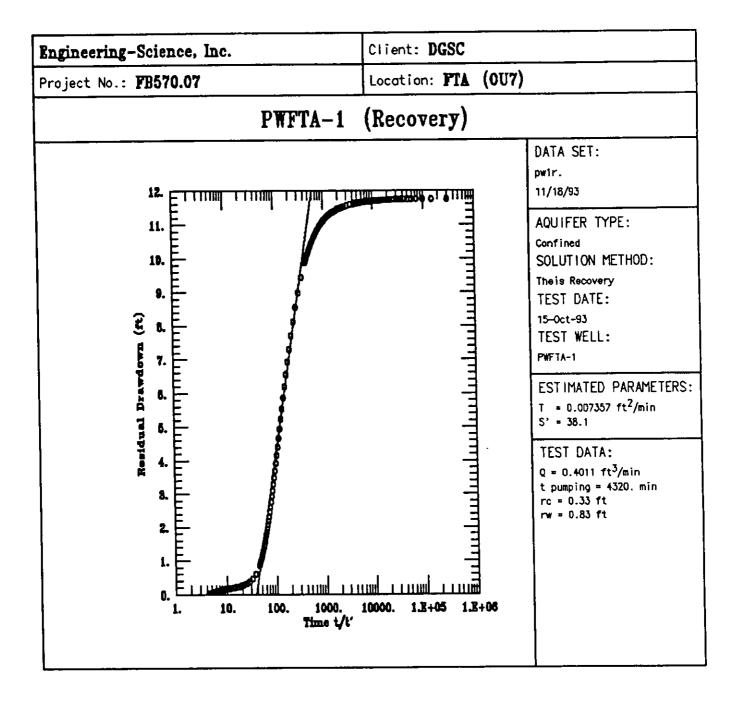
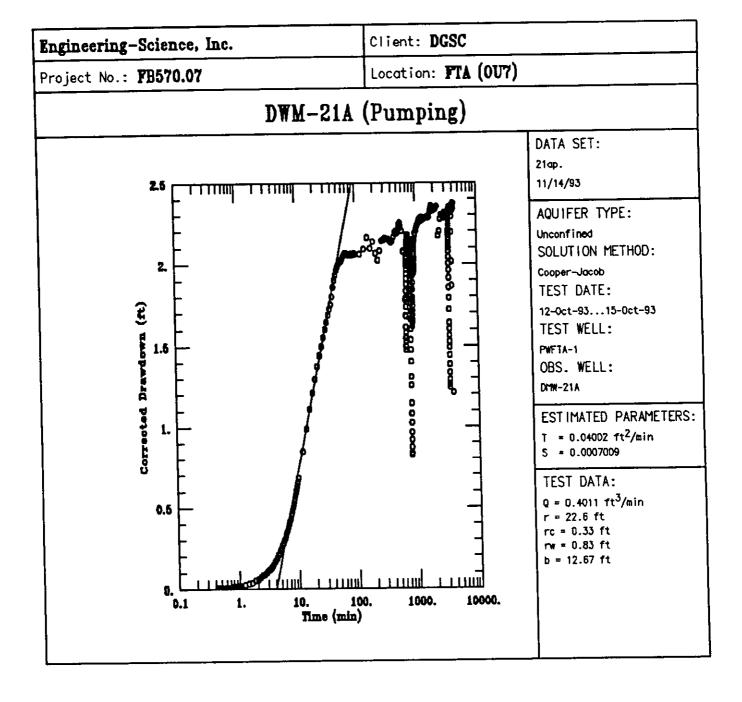


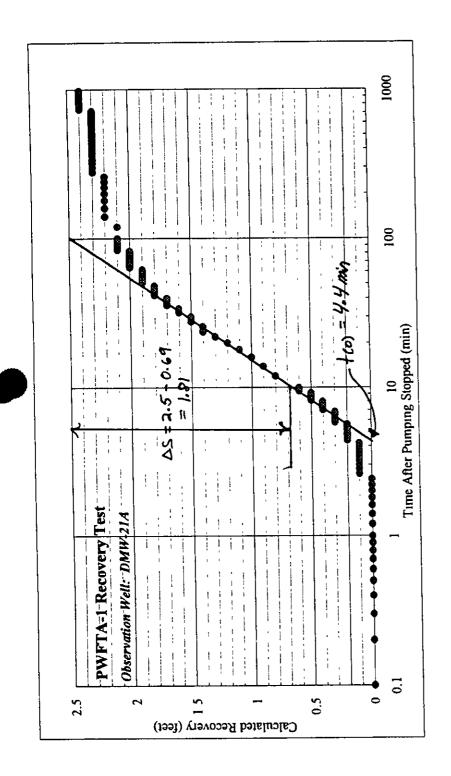
FIGURE D.6











r= 22.6 (+ tb) = 44 min = 0.00306 days S = (0.3) T +(0) range (0.00306) = (0.3) (439.3) (0.00306)

439.3 Spollt x 1.34E-1 = 58.8 ft = 1 day

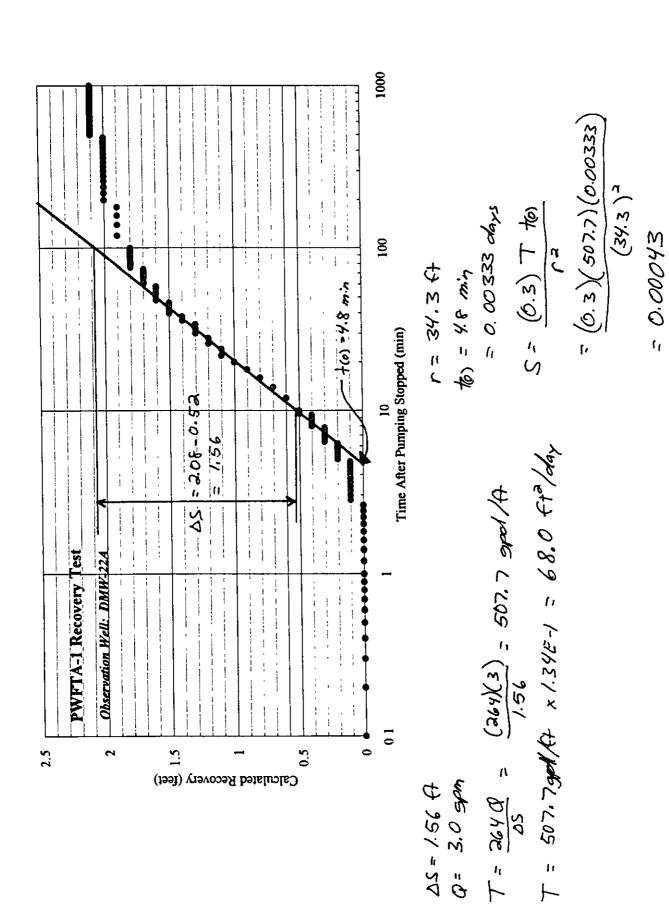
ا ا

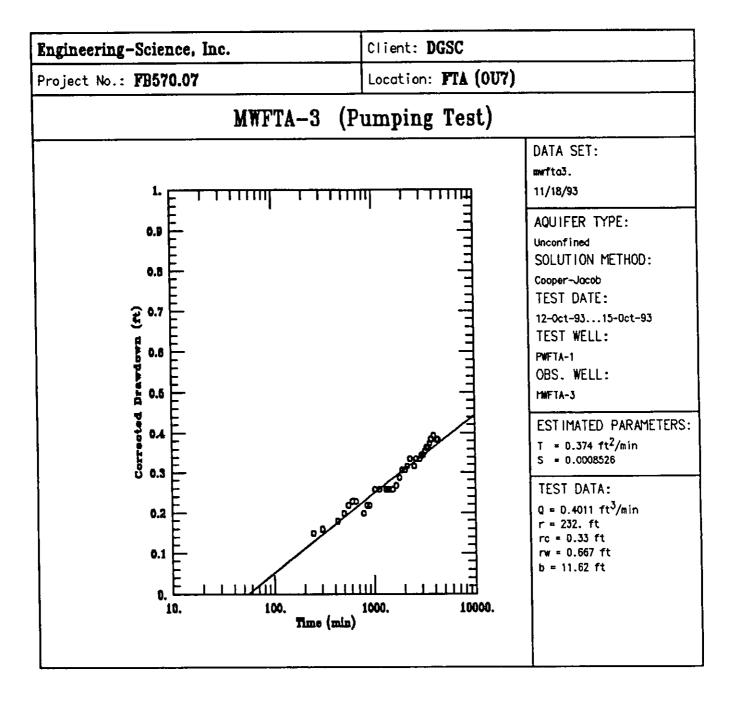
T = 264 Q = (264)(3) = 439.2 Spol/4

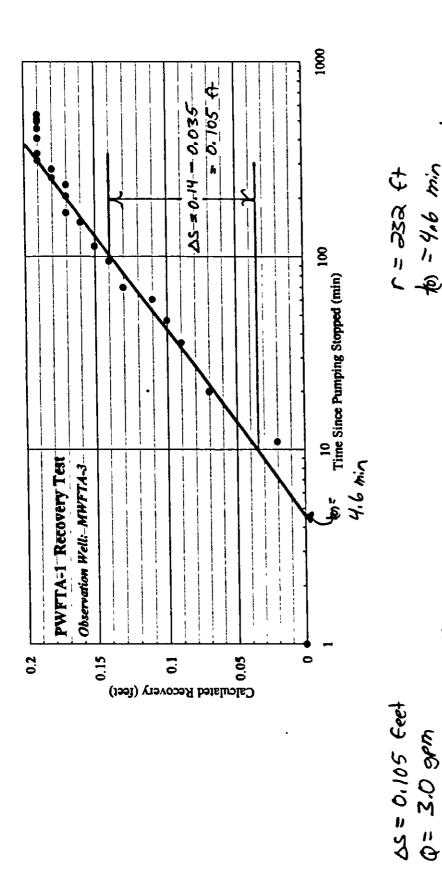
 $\Delta S = 1.81 \text{ ft}$ Q = 3.0 spm

5= 0.00079

Client: DGSC Engineering-Science, Inc. Location: FTA (OU7) Project No.: FB570.07 DWM-22A (Pumping) DATA SET: 22ap. 11/16/93 AQUIFER TYPE: Unconfined SOLUTION METHOD: 2. Cooper-Jacob TEST DATE: Corrected Drawdown (ft) 12-Oct-93...15-Oct-93 TEST WELL: 1.5 PWFTA-1 OBS. WELL: DITH-22A ESTIMATED PARAMETERS: $T = 0.04375 \text{ ft}^2/\text{min}$ 5 = 0.0003677 TEST DATA: Q = 0.4011 ft³/min 0.5 r = 34.3 ftrc = 0.33 ftrw = 0.83 ft b = 28.02 ft100. 1000. 10000. 10. 0.1 Time (min)







to = 4.6 min = 0.0032 days r = 232 (+

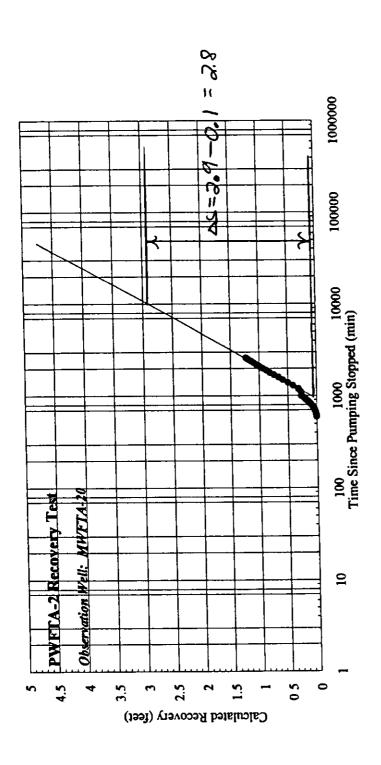
S= 0.3 T to

T= 7543 Spd/A x 134E-1 = 1,010.7 A9/Any

7= 264 Q = (3(4)(3) = 7543 graf/4

= (0.3)(7,543)(0,003) (حصر) م

5= 0.00013



$$CS = 3.8 \text{ ft}$$
 $Q = 0.35 \text{ sym}$
 $T = 364(Q) = (364)(0.35) = 33.57 \text{ sym}/\text{ft}$
 $T = 244(Q) = 3.8 \text{ ft} = 3.16 \text{ ft} \text{ fdh}$
 $T = 23.57 \times 1.34 \text{ ft} = 3.16 \text{ ft} \text{ fdh}$

Sopped (min)
$$r = -3/ \text{ feet.}$$

$$t(s) = 900 \text{ min}$$

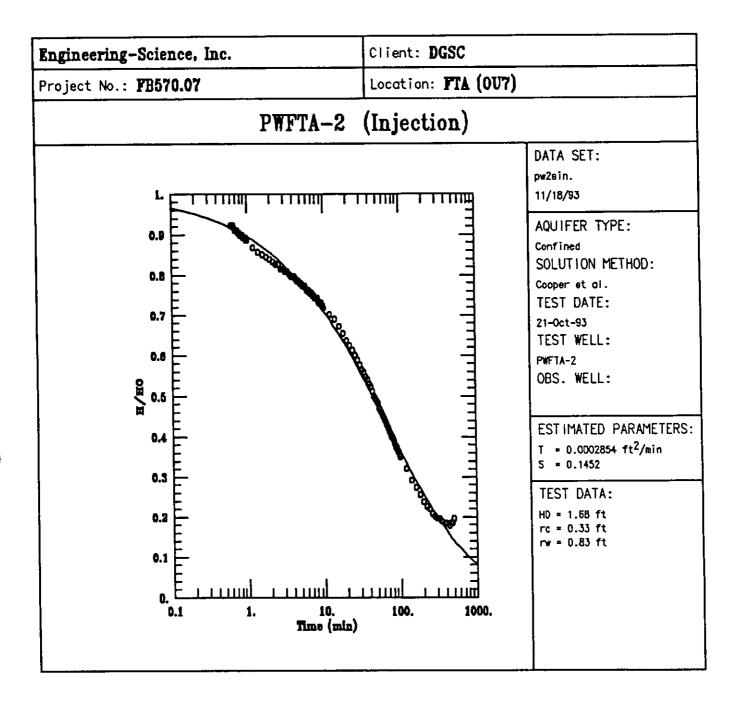
$$= 0.695 \text{ days}$$

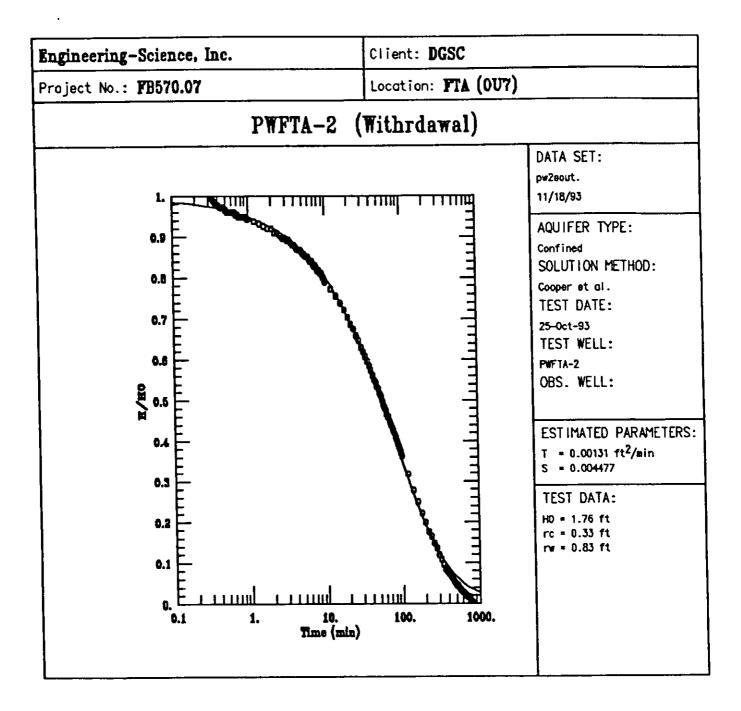
$$S = (0.3) T + t(0)$$

$$= (0.3)(23.57)(0.635)$$

$$S = 0.00460$$

$$S = 0.00460$$





TAB

APPENDIX A

APPENDIX A

MONITORING WELL DATA SUMMARY AND SLUG TEST RESULTS

SOURCE: LAW ENGINEERING AND ENVIRONMENTAL SERVICES – 1994 – DRAFT

FINAL REMEDIAL INVESTIGATION REPORT – FIRE TRAINING AREA

1538.119

TABLE 3-1

MONITORING WELL DATA SUMMARY
Fire Training Area
Defense General Supply Center, Richmond, Virginia

						,						-				70	4	191
evel msl)	Oct 93	82.94	NA	NA	82.23	74.83		77.45	77.62		76.77	76.73	1	80.12	79.81	90.13	82.83	64.28
Static Water Level Elevation (feet msl)	Dec 92	83.11	82.83	NA	82.89	75.26		80.85	80.84		77.26	77.26		83.65	83.34	TX	L	TN
Static Eleval	Oct 92	82.77	83.40	A'N	81.98	75.32		77.82	77.98		77.00	77.06		80.45	80.39	TN	ĻΝ	ŢN
olt (ft/min)	Slug-Out	2.768 x 10 ⁴	1.174 x 10 ⁵	1	4.049 x 104	1.576 x 10*		1.590 x 10³	1.022×10^3		3.790 x 10 ³	3.171 x 10 ³		6.149 x 10	6.054 x 10 ⁴	FX	ŁZ	TN
K-Test Result (ft/min)	N-gulS	2.989 x 104	6.356 x 10 ⁶	īz	3.269 x 104	1.118 x 104		1.023×10^{-3}	2.470×10^{-3}		4.587 x 10 ⁻³	5.662 x 10 ³		7.494 x 10 ⁴	5.158 x 10 ⁻⁴	LN T	LN	TN
	Aquifer/ Formation Details	Upper Aquifer. Fine- coarse sand	Lower Aquifer.	Fine-coarse sand with	Upper Aquifer.	Lower Aquifer. Fine-very coarse sand	with clay	Upper Aquifer. Clayey sand and silt	Upper Aquifer. Fine	to coarse micaceous sand	Upper Aquifer. Silty, clayey sand with gravel	Lower Aquifer. Fine to very coarse sand	with gravel	Upper Aquifer. Silty sand with gravel	Lower Aquifer. Fine to very coarse clayey cand with oravel	Upper Aquifer. Very	Upper Aquifer. Silty sand, some clay	Lower Aquifer. Clayey to silty sand
rai	Base of Screen Elevation	75.45	57.10	51.29	70.62	49.58		70.38	59.06		70.29	50.80		69.26	58.45	69.62	71.52	41.84
Screened Interv	Top of Screen Elevation	80.35	62.00	56.29	75.52	54.48		75.38	64.06		75.19	55.70		74.26	63.35	74.62	86.52	46.84
	Length of Screen	4.9	4.9	2.0	4.9	4.9		5.0	5.0		4.9	4.9		5.0	4.9	5.00	15.00	5.00
	Depth of Well	14.0	32.0	38.5	14.2	35.0		12.9	24.0	l	14.0	33.0		14.5	25.0	29.00	18.50	40.00
tion	GSL	89.45	89.10	80 70	84.82	84.58		83.28	83.06	}	84.29	83.80		83.76	83.45	ΑN	AN	Y.
Elevation	TOC	91.41	91 15	8	86.83	86.37		85.47	85 18	3	86.84	85.16		85.90	86.29	101.22	92.12	84.57
	Well No.	MWFTA-1	MWFTA-2*	MWETA 24	MWFTA-3	MWFTA-4		MWFTA-5	MWFTA-6		MWFTA-7	MWFTA-8		MWFTA-9	MWFTA-10	MWFTA-11	MWFTA-12	MWFTA-13

TABLE 3-1

Fire Training Area Defense General Supply Center, Richmond, Virginia MONITORING WELL DATA SUMMARY

	Elevation	ıtion			Screened Interval	val		K-Test Res	K-Test Result (ft/min)	Static Eleva	Static Water Level Elevation (feet msl)	evel msl)
	(II. msu)	msr)	Denth of	Length of		Base of Screen	Aquifer/ Formation					8
Well No.	тос	CSL	Well	Screen	Elevation	Elevation	Details	Slug-In	Sing-Out	Oct 92	Dec 92	Oct 33
MWFTA-14	85.06	NA	40.00	5.00	49.17	44.17	Lower Aquifer. Silty to clavey sand	Ľ	NT	TN	NT	67.21
MWFTA-15	85.77	NA	40.00	5.00	47.98	42.98	Lower Aquifer. Silty	LX TX	TN	FZ LX	LN	72.89
-							gravel					
MWFTA-16	103.25	NA	50.00	5.00	55.25	50.25	Lower Aquifer. Silty	FN	ž	L Z	i- Z	84.39
							to clayey sand with					
MWFTA-17	100.15	NA	20.00	5.00	53.15	48.15	Lower Aquifer. Silty to clavey sand	TN	TN	Ę	Z	83.12
MWFTA-18	79.76	NA	49.00	5.00	51.07	46.07	Lower Aquifer. Silty to clayey sand	Ľ	LN	Ę	L	78.68
MWFTA-19	84.47	NA	40.00	5.00	46.97	41.97	Lower Aquifer. Silty to slightly clayey	TX	L	F Z	TN	19.19
							sand with gravel grading to saprolite					
MWFTA-20	87.08	NA	75.00	5.00	14.03	9.03	Lower Aquifer. Granitic bedrock	TN	NT	L L	FX.	70.36
PWFTA-1	87.06	NA	20.00	15.00	80.66	65.66	Upper Aquifer. Silty sand. Sand and gravel	TN	TN	Ę	F	81.50
PWFTA-2	86.07	NA A	40.00	15.00	58.07	43.07	Lower Aquifer. Silty to clayey sand grading to saprolite	2.08 X10 ⁻⁵	2.08 X10 ⁻⁵	L L	TX	71.46
												İ

TOC GSL

S Z S

Top of Casing
Ground Surface Level
MW FTA-2 abandoned and re-installed due to presence of grout in the well

= Not Available
= Not Tested
= Date for wells MWFTA-11 through MWFTA-20, FWFTA-1 and PWFTA-2 obtained from Engineering Science, Inc.

CHECKED BY/DATE: APPROVED BY/DATE: PREPARED BY/DATE:

TABLE D-1

SUMMARY OF AQUIFER TEST RESULTS
FIRE TRAINING AREA (OU7)
DEFENSE GENERAL SUPPLY CENTER
Richmond, Virginia

TEST	Well ID	Transmissivity (T) (feet ^2/day)	Saturated Thickness (b) (feet)	Hydraulic Conductivitiy (K) (feet/day)	Storativity (dimensionless)	Method	Comments
Unconfined Test Well PWFTA-1	st Well PWF7	.H-1					
	PWFTA-1	20.76	15.84	131	A Z	Cooper-Jacob Theis Recovery	Pumping Recovery
		10.59	15.84	4.55	0 000 0	Cooper-Jacob	Pumping
	DMW-21A	58.80 58.80	12.67	4 64	0.00079	Driscoll	Recovery
	DMW-22A	63.00	28.02	2.25	0.00037	Cooper-Jacob	Pumping
		68.00	28.02	2.43	0.00043	Driscoll	Recovery
	MWFTA-3	538.56	11 62	46 35	0 00085	Cooper-Jacob	Pumping
		1010.70	11 62	86.98	0 00013	Driscoll	Recovery
Confined Test Well PWFTA-2	Well PWFTA.	ć,					
	PWFTA-2	0.20 0.41 1.89	15.00 15.00 15.00	0.01 0.03 0.13	NA 0.14520 0.00448	Theis Recovery Cooper et al. Cooper et al.	Recovery Slug Test (Injection) Slug Test (Withdrawal)
	MWFTA-20	0.63 23.57	28.39	0.02	NA 0.00460	Theis Recovery Driscoll	Recovery

SOURCE:

REMEDIAL INVESTIGATION FIRE TRAINING AREA

DAMES & MOORE

MAY 1989

TABLE 3-4

Results of Slug Testing Fire Training Area

Remarks	Test 1 Test 2	Confining Unit Absent	Slightly Fractured Rock	Test 1 Test 2	Test 1 Test 2	Thin Saturated Zone
Hydraulic Conductivity (cm/sec)	2.09×10^{-3} 2.21×10^{-3}	1.26×10^{-3}	4.47 × 10-6	2.43×10^{-4} 2.30×10^{-4}	1.50×10^{-3} 1.88×10^{-3}	5.68 × 10-6
Screen Elevation (feet MSL)	85.1-80.1	60.2-55.2	19.7-14.7	91.9-76.9	72.8-67.8	52.2-42.2
Screen Depth (feet)	14.5-19.5	24.8-29.8	65.0-70.0	4.3-19.3	23.0-28.0	30.0-40.0
Aquifer Interval	Тор	Bottom	Тор	Top	Bottom	Entire
Aquifer	Upper	Upper	Bedrock	Upper	Upper	Lower
Well	DMW-13A	DMW-22A	DMW-22E	DMW-25A	DMW-29A	DMW-33B

	à
HYDRAULIC CONDUCTIVITY (K)	2.09E-03 2.21E-03 1.26E-03 4.47E-06 2.30E-04 1.50E-03 1.88E-03 5.68E-06
K {t2-t1} (I#N/0)	118 0.00208642 138 0 00220534 154 0 00125549 1995 0 0000647 500 0.00024266 50 0 00024266 20 0.00149865 20 0.00189159
In(H1/H2)	0 85495 1.05684 0.67141 0 10286 0.06904 0 57247 0.13068
12	196 178 234 6000 1000 100 244 60
z	78 40 6005 500 500 134 40 40
Н2	0.18754 0.33743 0.33743 0.23039 0.23039 0.63963 0.65987 0.65987
£	0.441 0.6689 0.66835 0.78214 0.89965 0.39902 0.75199 0.89805
H#9	0 2880 0 2880 0 2860 0 0867 0 1665 0 2680 0 2680 0 2800
r2/(L#2)	0 0847 0 0847 0 0212 0 0212 0 0402 0 0847 0 0847
tn(L/r) r	3 401 3 401 3 401 3 401 4 147 6 147 6 147 3 401 4 094
1,	30.00 30 00 30 00 60 00 63.25 63.25 30 00 30.00
7.5	304.8 304.8 304.8 304.8 304.8 304.8 304.8 642.6 642.6 642.6
	152 4 152 4 152 4 152 4 321 3 321.3 152 4 152 4 152 4
2 (5#3) 1	25.806 25.806 25.806 6.452 25.806 25.806 25.806 25.806
r (cm) r2 (cm2) L (cm)	88888888888888888888888888888888888888
- - 3	134 (1) 134 (2) 224 226 254 (1) 254 (1) 294 (1) 338

TAB

Appendix B

APPENDIX B SUMMARY DATA QUALITY COMPLETENESS

APPENDIX B DATA QUALITY COMPLETENESS SUMMARY – SEPTEMBER/OCTOBER 2001, APRIL 2002, JULY 2002, AND OCTOBER 2002

B.0.0.0.1 Overall percent completeness for the data collection efforts and data quality objective (DQO) attainment for the groundwater collection efforts at Operable Unit (OU) 7 conducted in September/October 2001, April 2002, July 2002, and October 2002 ranged from 99 5 to 96.9 percent (%). A discussion of compound and/or method completeness compared to project objectives, as well as effects of field conditions on project objectives, is presented below. Table B-1 presents a summary of the analyses performed for each sampling event

B.1.1 Analytical Completeness

B.1.1.0.1 An analytical completeness goal of 90% was proposed for this project. As previously stated, the overall analytical completeness was achieved, however, some constituents did not meet the 90 % goal. The following compounds exhibited percent completeness less than 90.

Compound - Specific Percent Completeness

Sept/Oct. 200	91	April 20	002	July 20	002	Octobe	r 2002
Volatile Compo	unds	Volatile Comp	ounds	Volatile Comp	ounds	Volatile Co	ompounds
Carbon disulfide	83%	Acetone	0%	Acetone	24.3%	Acetone	80 95%
		2-Butanone	52%	2-Butanone	73.0%	2-Butanone	83 33%
		2-Hexanone	58%	2-Hexanone	24 3%	2-Hexanone	83 33%
				Dissolved	Gases		
				Ethane	74 3%	-	
				Ethene	74 3%		

B.1.1.0.2 The effect of data completeness below 90% for these compounds based on the project objectives is negligible. Carbon disulfide was not detected in the samples. Acetone, 2-butanone, and 2-hexanone are common laboratory contaminants. Acetone was detected in some samples as well as in associated method blanks and therefore, its presence in the samples is suspect. 2-Butanone and 2-hexanone were either not detected or below the practical quantitation limit (PQL) in all the samples. In addition, the data generated for carbon dioxide, 2-butanone and 2-hexanone does not adversely impact the overall risk assessment for the site due to the lack of positive results in excess of a risk-based concentration level. Carbon disulfide, acetone,

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2-butanone, and 2-hexanone are not constituents of potential concern (COPC) for OU 7. Ethane and ethene results, in addition to several other parameters, are used to evaluate the water system's ability for natural attenuation. Because an evaluation of natural attenuation processes depends on several parameters, the completeness of ethane and ethene results below 90% does not adversely impact the project objectives.

B.1.1.0.3 Thirteen groundwater samples from the lower water bearing unit (WBU) were collected in the September/October 2001 field event and assayed for pH to confirm high pH (greater than 10) measurements collected in the field during the sampling effort. The pH measurements collected in the field were confirmed by the laboratory analyses. Values of pH greater than 10 pH units are not typically found in natural groundwater and may affect microbial activity and the valence state in which certain metals may exist in the aquifer system. The basic pH values are not considered to significantly impact the project DQOs because the data shows that natural attenuation is occurring within the lower WBU at OU 7.

B.1.1.0.4 Two groundwater samples (MWFTA-16 and MWFTA-20) were collected during the July and October 2002 field events, both preserved and unpreserved for volatile organic compounds (VOCs), in order to analyze the effects of the effervescence that occurs when the lower WBU samples are preserved with hydrochloric acid (HCl). Results were compared and found to be well within VOC limits for duplicate analyses. Although the results in the unpreserved samples were equal to or slightly greater than the results for the preserved samples, there is no clear indication whether or not VOCs were lost during the bubble formation in samples preserved with HCl. One more set of data is needed to accurately assess the preservation of lower WBU samples. Project DQOs are not affected.

B.1.2 Field Sampling Completeness

B.1.2.0.1 A total of 14 upper WBU, 10 lower WBU, and 1 bedrock well was proposed to be sampled during the quarterly events to provide data to support a monitored natural attenuation (MNA) program as a component of an effective remedy at each site (LAW, 2001). However, during the collection of samples from and evaluation of monitoring wells at OU 7, changes to the quarterly events were implemented. These changes are presented below as follows

- Deleted monitoring well MWFTA-8 since monitoring well MWFTA-7 is screened within the same WBU and represents the same location as MWFTA-8
- Added well, DMW-20A, to obtain chemical/delineate contamination prior to boundary well, MWFTA-7 per LAW memo dated June 27, 2002

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- Added well, MWFOS-3, to monitor high concentrations and determine the presence of dense non-aqueous phase liquid (DNAPL) per LAW meeting on July 24, 2002
- Added wells, MWFTA-9 and MWFTA-10, due to Virginia Department of Environmental Quality (VDEQ) recommendation dated July 17, 2002
- Added Bldg. 112 well, MW112-2, to provide additional characterization to background conditions per LAW meeting on June 24, 2002.
- Deleted well, DMW- 29B, because single cased well in lower WBU may be conduit for lower WBU contamination from upper WBU - per LAW meeting on June 24, 2002 and memo dated June 27, 2002.
- Deleted well, PWFTA-2, because installation diagrams infer that the outer casing may be improperly installed through the confining layer causing potential "leakage" of upper WBU contaminants into the lower WBU per LAW meeting on June 24, 2002 and memo dated June 27, 2002.
- **B.1.2.0.2** Therefore, for added wells, DMW-20A, MWFTA-9, MWFTA-10, MW112-2, and MWFOS-3, only two quarters of analytical data have been collected. In addition, the analytical data collected from deleted wells, DMW-29B and PWFTA-2, may not be representative of conditions within the lower WBU due to improper well construction and the analytical data should be considered estimated. Water levels were collected on each of the added wells, with the exception of MW112-2, during each quarterly sampling event and complete potentiometric surface maps for the upper and lower WBUs could be defined for each quarter. However, there are not sufficient bedrock wells to determine either water quality conditions or the potentiometric surface within fractured bedrock at OU 7. See Table A2-1 for details.
- **B.1.2.0.3** In some instances, field parameters or analytical parameters were not collected/not analyzed due to inclement weather, insufficient volume of water, improper preservation, or sampling error. Ferrous iron was not collected during one of 4 quarters in groundwater samples collected from monitoring wells, MWFTA-19 (April 2002), MWFTA-28B (April 2002), MWFOS-3 (April 2002), and DMW-20A (July 2002). Ferrous iron was not collected from monitoring wells MWFTA-19 (April 2002), MWFOS-3 (April 2002), and DMW-20A (July 2002) due to sampling oversight and from MWFTA-28B (April 2002) due to insufficient volume of water. Sulfide was not analyzed for the groundwater sample collected from monitoring well DMW-27A in October 2001 due to improper preservation. Both ferrous iron and sulfide results, in addition to several other parameters, are used to evaluate the water system's ability for natural attenuation. Because an evaluation of natural attenuation processes depends on several parameters, the absence of one quarter of data do not adversely impact the project objectives.

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TAB

APPENDIX B TABLE

APPENDIX B TABLE

SUMMARY OF ANALYSES PERFORMED ORARTERLY EVENTS

		Ostober Annual Gro Befers	QUARTERLY EVENTS ber 2001 through October iroundwaler Report - Octo Operable Unit 7 Operable Conter Richm Richmond, Virginia	QUARTERLY EVENTS ORIOR 12001 Inrough October 2001 Inrough October 2002 Annual Groundwater Report - October 2002 Operable Lint 7 Beferse Supply Center Richmond Richmond, Virginia	:003							
AVALYTICAL PARANIETER AND METHOD NUMBER		First Quarter Ox tober 2001		38	Second Quarter April 2002		F	Thurd Quarter July 2002		3 C	Fourth Quarter October 2002	la cili
	Upper WBU Lower WBU	Lower WBU	l ractured Bedrock	Upper WBU Lower WBU		Bedax k	Upper WBU Lower WBU	OWLY WBU	Bedrock	Upper WBU LOWER WBU	ļ	Bedrack
FIFI D'FARANETER Ibwale <u>d Oargen - Eabol mg/l</u> Ibwaled Oayen	×	×	×	×	×	×	*	×	×	×	×	×
Ferrous Iron - A35(g)) mg/L Lenous Iron	×	×	×	×	×	×	×	×	~	×	~	×
Oxidation Redu <u>ction Potential - AZSSBA mY</u> Oxidation Reduction Potential	×	×	×	×	×	×	×	×	×	×	×	×
ր ւլ - Ե.ԼՏս, Է <u>pH Լլոււ</u>չ ր ւ ք	×	×	×	×	×	×	×	×	×	×	×	×
Specific Cynductance - F120 1 mS/cm Specific Cynductance	*	×	×	×	×	×	×	×	×	×	×	×
Temperature : E170 1 deg C 1 cmperatur	*	×	×	×	×	×	×	×	×	×	×	×
<u>1urbidin - F180 J \ \ TU</u> Turbidin	×	×	×	×	×	×	×	×	×	×	×	×
FIXED BASE I ABORAT ORY AMALYSIS Amoras - MCAWW, 400 UA mg/L (blorak Mittate de N	×	×	×	×	×	×	×	×	×	×	×	×
Droop of Gaves - Ryk SOP-175 mg/L (about diovid. 1 than. 1 th.is. Meth inc.	×	×	×	×	×	×	×	×	×	×	×	×
Hydrogen by Algrogens - AM20GAAABA Bydrogen	×	>	×	×	×	×	×	×	×	×	×	×
pH - E. 150 pH Cints pH		i ×	3 ×			·						
Total Mahmiy - MCAWW Mg LmgL. Total Alkalmiy	<u> </u>	×	×	×	×	×	×	×	×	×	×	×
Total Organic Carbon - 53/846 9860 mg/L Total Organic Carbon	×	×	×	×	×	×	×	×	×	×	×	×
Total Sulfide - Mit Alw Wife, medi. Total Sulfide	×	×	×	×	×	×	×	×	×	×	×	×
<u>Mercury - SW846 7470A (Total and Descolved) μεΩ.</u> Μεπιυή	× 	×	~	×	×	×	×	×	×	×	×	×

TABLE D-1

SUMMARY OF ANALYSES PERFORMED QUARTERLY EVENTS
October 2001 through October 2002
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virgina

				,		ſ						
ANALYTICAL PARANETER AND METICOD NIMBER		First Quarter October 2001			Second Quarter April 2002			July 2002			October 2002	
	Upper WBI	Upper WBU Lower WBU	l ractured Bedrock	Upper WBU	Upper WBU Tawer WBU	I ractored Bedrock	Upper W BU	Upper W BU 1 ower W BU	Iracture d Bedrack	Upper WBU	Upper WBU Tower WBU	J ractured Bedriek
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Metals - \$W846 6010B (Total and Dissalved) up/l	×	×	×	×	×	,	κ	<	,	<	<	,
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Thallium - SW846 7841 (Lotal and Dissolved) uvll	×	×	×	×	×	×	×	×	×	×	×	×
Thallem	-											
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327C = 34												
12 C C K												
PC B 1260												
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Polyey che Aromatic Hydrocarbons (PAHs) - 5W846 8270C SIM µg/I				×			×			×		
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ערים ולוואון אור וויכ												
Anthrucan												
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	-											

TABLE B-1

SUMMARY OF ANALYSES PERFORMED QUARTERLY EN ENTS
Ox tober 2001 through October 2002
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

ANALYTICAL PARAMETER AND METHOD NIMBER		First Quarter October 2001		35	Second Quarter April 2002			Third Quarter July 2002		E 0	Fourth Quarter October 2002	
			Inctured								:	1 rak tumd
	Upper WBU Tower WBU	- 1	Bednek	Upper WBU Tower WBU	Lower WBU	Bedrock	Upper WBU	Upper WBU Lawer WBU	Brdrek	Upper WBU TOWER WBU	1 OWLT W BU	BLUDKK
	;	;	,	;		,	>	>	>	>	>	>
Colonia Cargaint, Compounds - Sylveti agrain HD.	<	<	<	<	<	,	¢	•	ς.	•	:	•
1 t-Trichitory, thun.												
1122-Feirschlasse												
112 Inchlorachan												
I I-Dy block than												
1-Dichloracthanc												
1.2 Tarking opening inc.												
12.3 Thebloropsyane												
124 Inchlorokana												
1.2.4-Frimethylkenene												
1.2 Dibromo 3 chloropropane												
2 Dibromorthan.												
1 2 Duthoropenter												
1.2 Die Blassporenine												
13 Tomula (b. 17. 17. 17. 17. 17. 17. 17. 17. 17. 17												
1.3.19tt blorobe n.e.n.												
1 3 Dichtoropsypane												
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2 Bullmine												
2 Chloritolache												
ב אל איזוויזשר												
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4 Methyl-2 pentanone												
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Bromedic heatomethan												
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i) thromachloromethan.												
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TABLE B-1

QUARTERLY EVENTS
October 2001 through October 2002
Annual Graundvater Report - October 2002
Defense Voperable Unit 7
Defense Supply Ceater Richmond
Richmond, Virginia SUMMARY OF ANALYSES PERFORMED

Volatile Organie Compounds - SW 846 826011 pr/L (continued) p bapprapy lituluen. see-Butylkenen. kar Butylkenen. kar Butylkenen. kar Butylkenen.	First Quarter October 2001	Second Quarter April 2002		Third Quarter July 2002		Fourth Quarter October 2002	
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Volatide Organic Compounds - SW 846 8260th graft (continued) p kaprapy haluca. va-Burghs na.n. kya.n. va-Burghs na.n. va-Burghs na.n. va-Burghs na.n. va-Burghs na.n.			-				
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pH was collected and measured at the laboration on lower WBU and bedroak well locations to confirm field results on constituents of concern for OU 13.

If Bs, and PAIN were collected and analyzed on samples from monitoring wells MW1TA-1 and MW1TA-2 only to monitor constituents of concern for OU 13.

Both and preserved and unpreserved VXX samples were collected from monitoring wells MW1TA-16 and MW1TA-20 in order to analyze the effects of the effects of the effects when the lower water beauty that the analyses were collected from monitoring wells MW1TA-16 and MW1TA-20 in order to analyze the effects of the effects ¥ 3 (£ (£)

V(X VO) and Compound
WBU Water Bearing Unit
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nanomole's nephelometric turbidity unit regainse log of the hydrogen ion concentration microgi un per liter

PREPARED/DATE JAN 5/23/03
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TAB

Appendix C

APPENDIX C OCTOBER 2002 DATA QUALITY EVALUATION

APPENDIX C

DATA QUALITY EVALUATION AND DATA SUMMARY

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20701-06

LIST OF ACRONYMS

CCB continuing calibration blank

CCV continuing calibration verification

DQE data quality evaluation
DQO data quality objectives

DSCR Defense Supply Center Richmond

HCl hydrochloric acid

ICB initial calibration blank

ICV initial calibration verification

LAW Law Engineering and Environmental Services, Inc.

LCS laboratory control sample

MACTEC Engineering and Consulting, Inc.

MDL method detection limit mg/L milligram per liter

MNA Monitored Natural Attenuation

MS Matrix Spike

MSD Matrix Spike Duplicate

OU Operable Unit

PAH polycyclic aromatic hydrocarbon

PCB polychlorinated biphenyl

QA Quality Assurance
QC Quality Control

RPD relative percent difference

RL reporting limit

SAP Sampling and Analysis Plan

SDG sample delivery group
SIM selective ion monitoring
SMF sporadic marginal failure

STL Severn Tient Laboratories, Inc

TOC Total Organic Carbon

USACE United States Army Corps of Engineers

USEPA United States Environmental Protection Agency

VOC volatile organic compound

WBU water bearing unit
 μg/L micrograms per liter
 %D percent difference
 %R percent recovery

20701 06

APPENDIX C - DATA QUALITY EVALUATION AND DATA SUMMARY TABLES

C.0 INTRODUCTION

C.0.0.0.1 The following sections present the analytical laboratory used, the data quality objectives (DQOs) for the project, results of the analyses of the quality control (QC) samples, tabular summaries of the analytical data obtained, and a discussion of the quality of the analytical data for Operable Unit (OU) 7 (Fire Training Area Groundwater) at the Defense Supply Center Richmond (DSCR). This data quality evaluation (DQE) case narrative summarizes the data quality from the October 2002 quarterly groundwater sampling event at OU 7.

C.0.0.0.2 The data validation was performed in general accordance with the Final Sampling and Analysis Plan (SAP) (Law Engineering and Environmental Services, Inc. [LAW], 1992), United States Army Corps of Engineers (USACE) Shell for Analytical Chemistry Requirements (USACE, App. I, February 2001), United States Environmental Protection Agency (USEPA) and Region III National Functional Guidelines for Organic and Inorganic Data Review (USEPA, June 2001, October 1999, and February 1994, respectively), and the appropriate analytical method requirements as presented in Test Methods for Evaluating Solid Waste, USEPA SW–846, Update III and subsequent revisions (USEPA, 1996).

C.1 ANALYTICAL LABORATORY

C.1.0.0.1 Groundwater samples collected from monitoring wells in October 2002 were analyzed by Severn Trent Laboratories, Inc., (STL) of North Canton, Ohio, for volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), anions (chloride, nitrate, and sulfate), alkalinity, sulfide, total and dissolved metals, and total organic carbon (TOC). Samples were also sent to STL of Santa Ana, California for analysis of dissolved gases (carbon dioxide, methane, ethane, and ethene) In addition, Microseeps of Pittsburgh, Pennsylvania analyzed select samples for dissolved hydrogen

C.1.0.0.2 All samples collected were analyzed using USEPA SW-846 methods. VOCs were analyzed by Method 8260B, PAHs by selective ion monitoring (SIM) Method 8270C, PCBs by Method 8082, anions by Method 300 0A, alkalinity by 310 I, sulfide by 376 I, dissolved gases by Method RSK-175, total and dissolved metals by Methods 6010B, 7470A, and 7841, and TOC by Method 9060. Dissolved hydrogen was analyzed by Microseeps Method AM20GAX

C.2 DATA QUALITY OBJECTIVES

C.2.0.0.1 Project-specific DQOs are described in Section 8.0 and presented on Figure 8-2 of the Quarterly Groundwater Sampling Plan for OU 7 (LAW, 2002). Once the environmental data have been collected and analyzed, the consultants assess the laboratory data for its usability as prescribed by project goals. The criteria that measure the usability of environmental data as it relates to project objectives are data accuracy, precision, and completeness. Evaluation of these criteria ultimately reveals the representativeness and bias, if any, present in the sampling and analytical processes. These criteria are explained in detail in Section 7.1.1 of the Final SAP (LAW, 1992)

C.3 DATA QUALITY EVALUATION PROCEDURES

C.3.0.0.1 The procedures used by MACTEC Engineering and Consulting, Inc. (MACTEC) for data evaluation and validation are described in the DQE standard operating procedures (LAW, 2001/2002). The primary DQE was performed by MACTEC's staff or project chemist. The DQE narrative and qualified (flagged) data tables were reviewed by a senior chemist.

C.3.0.0.2 The laboratory data, field QC data, and field notes provide the information to evaluate the analytical data for accuracy, precision, completeness, and representativeness with respect to the project-specific DQOs. The data are first evaluated based on field notes taken during collection of the samples to assess sampling conditions and sampling procedures or determine if changes to the planned procedures were necessary. Secondly, each sample shipment sent to the laboratory is assessed for adherence to method prescribed holding times, proper chain-of-custody documentation, correct usage of sample containers, and sample integrity upon receipt by the laboratory

C.3.0.0.3 The laboratory's internal QC procedures for calibration, method validation, and performance evaluation include appraisal of method prescribed tune (for gas chromatograph/mass spectrometer) and calibration criteria, method blank analyses, laboratory control sample (LCS) analysis, matrix spike (MS)/matrix spike duplicate (MSD) analyses, and assessment of surrogate and internal standard recovery where applicable MACTEC's evaluation of the laboratory data focuses on exceptions to the planned QC activities, problems encountered, and the effectiveness of the methodologies used within the laboratory. The data are then evaluated overall with respect to the project DQOs, providing the completeness. The following sections present the evaluation procedures used for the analytical data with respect to the project-specific DQOs.

C.3.1 EVALUATION OF FIELD DATA QUALITY

C.3.1.0.1 QC and quality assurance (QA) samples were collected to assess the quality and representativeness of the field sampling activities and the accuracy of analytical results from the primary laboratory. Field QC and QA samples are required by the USACE protocols (USACE, 2001) and were specified for collection in the Quarterly Groundwater Sampling Plan for OU 7 (LAW, 2002) The QC and QA samples collected and their use were presented in Appendix C (Data Quality Evaluation and Data Summary) of the OU 7 Quarterly Groundwater Sampling Technical Memorandum (MACTEC, 2003).

C.3.2 EVALUATION OF LABORATORY DATA QUALITY

C.3.2.0.1 Laboratory data are evaluated to assess adherence to method prescribed calibration and/or continuing calibration criteria, method blank analysis results, analyte recoveries from LCS, MS/MSD recoveries and relative percent differences (RPDs), surrogate recoveries and ultimately, completeness. Except for completeness, these criteria are used to evaluate the accuracy and precision of the data generated by the laboratory. Furthermore, the USACE specified control limits for the major USEPA SW-846 methodologies are presented in the Shell document (USACE, Appendix I, February 2001) and data were evaluated based on those limits. The analytical methods and the associated limits used for analysis of the environmental samples collected during the October 2002 sampling event was included in the Shell document.

C.3.2.0.2 In general, control limits not addressed by the USACE in the Shell document default to laboratory generated limits. Laboratory-established control limits are based on the mean percent recovery plus or minus three standard deviations of the mean using a minimum population of 20 recovery values. Specific laboratory QC elements considered in the calculation of precision, accuracy, representativeness, and completeness are presented in Appendix C (Data Quality Evaluation and Data Summary) of the OU 7 Quarterly Groundwater Sampling Technical Memorandum (MACTEC, 2003)

C.4 DATA QUALITY EVALUATION

C.4.0.0.1 The comprehensive analytical results for samples associated with this site are summarized in this Appendix as Tables C-1 through C-4. Analytical results are quantitated at the reporting limit (RL) but evaluated down to the method detection limit (MDL). The MDL is defined as the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the value is above zero. The RL is defined as the lowest level that can be reliably achieved within specified limits of precision and

accuracy during routine laboratory operating conditions as defined by SW-846. Data points reported at concentrations above the MDL, but less than the RL are considered estimated quantitative values and are qualified as "JQ" RLs are adjusted by the sample weight/volume extracted and analyzed, moisture content (soils and sediments only), and/or dilution, and therefore may be different for each sample.

C.4.0.0.2 The following sections provide summary discussions of data quality for the October 2002 sampling event for OU 7 at DSCR. Each section highlights the main points of data quality indicators and identifies data points that require qualification. Data qualification flags and their descriptions are presented in the footnotes of Tables C-1 through C-4

C.4.0.0.3 DQE forms were generated and used by MACTEC to document the evaluated data components. These forms are arranged so that parameters affecting all samples are reviewed first, such as proper execution of chain-of-custody, temperature of the samples upon receipt at the lab, appropriate sample containers/preservatives, etc. These original forms and the respectively flagged data tables are filed with each sample delivery group (SDG) after senior review.

C.4.1 GROUNDWATER - OCTOBER 2002

C.4.1.0.1 A total of 27 groundwater and 5 duplicate samples (two for preservation technique) were collected at OU 7 in October of 2002. Monitoring well sample locations were selected to obtain information to determine if natural attenuation of chlorinated solvents was occurring and were assayed for VOCs, total and dissolved metals, and monitored natural attenuation (MNA) parameters dissolved gases (including hydrogen), anions, TOC, alkalinity, and sulfide. In addition, two upper water bearing unit (WBU) groundwater samples (MWFTA-1 and MWFTA-3) and one duplicate sample (OU7DUP-2) were assayed for PAHs and PCBs

C.4.1.0.2 The correct sample containers and preservatives were used for the analytical methods specified on the chains-of-custody. Lower WBU samples were collected without hydrochloric acid (HCl) preservation due to the effervescing of the samples upon their addition to the preserved sample vial. Two of the samples (MWFTA-16 and MWFTA-20) were also collected with HCl preservation to assess the effects of the preservation technique on VOC concentration. The chains-of-custody were executed properly and all hold times were met. Additionally, the correct methods were employed for both extraction/digestion and analysis as outlined in the work plan. The appropriate units, detection limits, and compounds were reported by the laboratory per the July 2002 subcontract agreement between MACTEC and STL – North Canton

C.4.1.1 Groundwater – Upper WBU

C.4.1.1.1 Nineteen groundwater and two duplicate samples were collected from the upper WBU at OU 7 in October of 2002. Each of the monitoring well sample locations from the upper WBU were assayed for VOCs, total and dissolved metals, and MNA parameters. Two of the locations (MWFTA-1 and MWFTA-3) were additionally sampled and analyzed for PAHs and PCBs

C.4.1.1.2 Volatile Organic Compounds (SW8260B) – The initial calibration tunes passed the QC requirements outlined in the Shell document and the method. VOCs were calibrated using either the average relative response factor and/or quadratic curve and were within specified limits. In the initial calibration verification (ICV) performed on 10/21/02, dichlorodifluoromethane exceeded the plus or minus 20 percent criteria. The results were qualified as estimated and flagged (UJ) in the following samples:

DMW-22A	DMW-26A	DMW-27A	DMW-33A	MWFOS-1
MWFOS-3	MWFTA-3	MWFTA-5	MWFTA-9	MWFTA-10
OU7DUP-2	TB-101502-1	TB-101702-2	TB-102902-1	

C.4.1.1.3 The continuing calibration verification (CCV) standards associated with the OU 7 groundwater samples were analyzed as appropriate and some compounds exceeded limits specified by the USACE or the method. Qualifications were made based on percent difference (%D) observed in the CCVs analyzed on the dates indicated below. Qualifications were assigned for high and low biased (J for detects and UJ for non-detects) exceedances in the CCV, unless overridden by qualifications for other QC exceedances. If the %D observed for a compound exceeded plus or minus 40% or the compound exceeding %D criteria in the CCV also exceeded percent recovery (%R) criteria in the LCS, the associated results were qualified as unusable (flagged R).

CCV Date	Affected Compounds	Associated San	nples		
10/22/02	Acetone Bromoform Dichlorodifluoromethane Hexachlorobutadiene Trichlorofluoromethane 2-Hexanone 2-Butanone	DMW-26A MWFTA-3	DMW-27A OU7DUP-2	MWFOS-1 TB-101502-2	
10/24/02	Acetone Carbon disulfide Dichlorodifluoromethane	AEHADG-10	OU7DUP-1		

CCV Date	Affected Compounds	Associated Sar	nples	
10/30/02	Acetone Dichlorodifluoromethane Hexachlorobutadiene Naphthalene n-Butylbenzene 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene 2-Butanone 2-Hexanone	TB-101702-2		
11/01/02	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene n-Butylbenzene sec-Butylbenzene Acetone (unusable) 2-Butanone (unusable) 2-Hexanone (unusable)	DMW-33A MWFTA-10	MWFTA-5 TB-102902-1	MWFTA-9
11/06/02	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene 2-Butanone 2-Hexanone Hexachlorobutadiene Naphthalene n-Butylbenzene Acetone (unusable)	DMW-22A		

C.4.1.1.4 The batch specific preparation blanks did not have analytes of interest greater than the RL. The following method blanks contained the indicated compounds at concentrations above the MDL but below the RL. The associated OU 7 samples with concentrations less than or equal to ten times the blank concentration were accordingly qualified as estimated with possible method blank contamination and flagged "JB", unless overridden by qualifications for other QC exceedences.

Blank Date	Compound	Concentration	Flagged Samples
10/22/02	Acetone	1 2 microgram per liter (µg/L)	DMW-26A
10/30/02 11/01/02	Acetone Methylene Chloride	1 4 μg/L 0 35 μg/L	No flag – results non-detect TB-102902-1

C.4.1.1.5 Batch specific LCSs were also analyzed and recoveries were acceptable, with the following exceptions. Qualifications were assigned for either high biased (JH for positive results and UJ for non-detects) or low biased (JL for positives or UL for non-detects) exceedances in the LCS, unless overridden by

qualifications for other QC exceedances. If the %R observed for a compound exceeded plus or minus 40% or the compound exceeding %R criteria in the LCS also exceeded %D criteria in the CCV, the associated results were qualified as unusable (flagged R). No qualification was necessary for LCS/LCSD failures that met sporadic marginal failure (SMF) criteria

LCS/LCSD	Affected Compounds	Associated Sar	nples
11/01/02	Acetone (unusable) 2-Butanone (unusable) 2-Hexanone (unusable) 4-Methyl-2-pentanone (low)	DMW-33A MWFTA-9 TB-102902-1	MWFTA-5 MWFTA-10

C.4.1.1.6 MS/MSDs were specified and performed on groundwater sample MWFTA-1. Acetone and 2-butanone recoveries were below QC limits, but no flags were necessary because the failures were within SMF limits.

C.4.1.1.7 Two field duplicate pairs (AEHADG-10/OU7DUP-1 and MWFTA-3/OU7DUP-2) were collected and analyzed for VOCs RPD between the parent sample and the duplicate sample is outside of specified limits (<30%) for 1.1-dichloroethene in AEHADG-10/OU7DUP-1 Both the parent and the duplicate sample were qualified as estimated and flagged "J" The surrogates and internal standards added to the samples by the laboratory were recovered within specified limits.

C.4.1.1.8 The trip blanks associated with the OU 7 samples were analyzed, but were not reported to contain VOCs above the RL. However, the trip blanks contained methylene chloride, but the associated samples were either non-detect, greater than five times the blank value, or already flagged "JB" for method blank contamination. No further flagging was necessary. An equipment blank (OU6EQB-1: SDG #A2K070276) was collected to assess possible contamination from using non-dedicated sampling equipment. Acetone, methylene chloride, and toluene were found in the equipment blank. No flags were necessary because the associated results were non-detect or greater than five times the blank value in the associated samples.

C.4.1.1.9 The following samples were diluted to place the VOC results within the range of the calibration curve, which resulted in elevated RLs.

Sample	Dilution Factor	Sample	Dilution Factor	Sample	Dilution Factor
AEHADG-10 MWFTA-3	125x 2x	DMW-33A MWFTA-23(1)	66 67x 1250x	MWFOS-3 MWFTA-23(2)	333 33x 1666 67x
OU7DUP-1	125x	OU7DUP-2	2x		

C.4.1.1.10 Additionally, the following data points were reported at concentrations above the MDL, but less than the RL and were qualified as estimated and flagged as "JQ"

Sample ID	Affected Compounds
AEHADG-10	Naphthalene, 1,1-Dichloroethene
DMW-20A	Chloromethane
DMW-22A	1,1-Dichloroethane, 1,1-Dichloroethene, 1,2-Dichlorobenzene
DMW-25A	Acetone
DMW-26A	cis-1,2-Dichloroethene, Trichloroethene
DMW-33A	Methyene chloride
DMW-35A	Acetone
MWFOS-3	Methylene chloride, trans-1,2-Dichloroethene, Vinyl chloride
MWFTA-1	1,1-Dichloroethane, Acetone
MWFTA-3	1,1-Dichloroethane, 1,1-Dichloroethene
MWFTA-7	Acetone
MWFTA-23(2)	Vinyl chloride
OU7DUP-1	Naphthalene
OU7DUP-2	1,1-Dichloroethene

C.4.1.1.11 Any value reported below the RL but above the MDL that was previously flagged "J" is subsequently overridden by the "JQ" qualifier.

C.4.1.1.12 Dissolved Gases (RSK-175) – The initial and continuing calibrations for each instrument used for the analysis of dissolved gases met acceptable criteria. Some of the laboratory batch preparation blanks (Method Blanks) contained methane or carbon dioxide. The methane result in sample MWFTA-5 was qualified as estimated with possible method blank contamination and flagged "JB". Batch LCSs for dissolved gases were within acceptable limits, and MS/MSD spikes were not performed for dissolved gases.

C.4.1.1.13 The trip blanks were analyzed and contained carbon dioxide and/or methane. Methane in samples DMW-35A, DMW-13A, DMW-20A, and DMW-25A was less than five times the blank value and qualified as estimated with possible method blank contamination and flagged "JB".

C.4.1.1.14 An equipment blank (OU6DQB-1) was collected and analyzed with SDG # A2K070276 to assess possible contamination from non-dedicated sampling equipment. Although carbon dioxide was detected in the equipment blank, the result was flagged "JB" for method blank contamination. No flagging of the data for equipment blank contamination is necessary.

C.4.1.1.15 Two field duplicate pairs (AEHADG-10/OU7DUP-1 and MWFTA-3/OU7DUP-2) were collected and analyzed for dissolved gases. RPD between the parent sample and the duplicate sample is within specified limits (<20%)

C.4.1.1.16 Results were evaluated and reported down to the MDL Flagging of dissolved gas results less than the RL but greater than the MDL (JQ) was necessary for ethane in MWFTA-23 and methane in TB-101602-1. Any value reported below the RL but above the MDL that was previously flagged "J" is subsequently overridden by the "JQ" qualifier.

C.4.1.1.17 Polynuclear Aromatic Hydrocarbons (PAHs by SW8270C SIM) – Analysis for PAHs by method 8270C SIM was performed for samples MWFTA-1, MWFTA-3 and OU7DUP-2 The initial and continuing calibration for each instrument used for the analysis of PAHs met acceptable criteria. The laboratory batch preparation blanks (method blanks) did not contain PAHs

C.4.1.1.18 The batch LCSs for PAHs were within QC limits MS/MSD recoveries in spiked sample MWFTA-1 were within specified limits

C.4.1.1.19 One field duplicate pair (MWFTA-3/OU7DUP-2) was collected and analyzed for PAHs RPD between the parent sample and the duplicate sample was not calculated because there were no positive results for PAHs. The recovery of surrogate terphenyl-d14 was above the QC limit in sample OU7DUP-2. No qualification was necessary, since the rest of the surrogates were within the QC limits, and there were no positive results for PAHs

C.4.1.1.20 Results were evaluated and reported down to the MDL Flagging of PAH results less than the RL but greater than the MDL was required acenaphthene, anthracene, and fluorene for sample MWFTA-1. Any value reported below the RL but above the MDL that was previously flagged "J" is subsequently overridden by the "JQ" qualifier.

C.4.1.1.21 Polychlorinated Biphenyls (PCBs by SW8082) – Analysis for PCBs by method SW8082 was performed for samples MWFTA-1, MWFTA-3 and OU7DUP-2 The initial and continuing calibration for each instrument used for the analysis of PCBs met acceptable criteria. The alternate source ICV was also with QC limits. The laboratory batch preparation blanks (method blanks) did not contain PCBs.

C.4.1.1.22 The batch LCSs for PCBs were within QC limits. MS/MSD recoveries for spiked sample MWFTA-1 were within QC limits.

C.4.1.1.23 One field duplicate pair (MWFTA-3/OU7DUP-2) was collected and analyzed for PCBs RPD between the parent sample and the duplicate sample was not calculated because there were no positive results for PCBs. One surrogate (decachlorobiphenyl) recovered below the QC limit in sample MWFTA-1, but no flags were necessary because the other surrogate (tetrachloro-meta-xylene) recovered within the QC limit

C.4.1.1.24 Results were evaluated and reported down to the MDL Flagging of PCB results less than the RL but greater than the MDL was not required

C.4.1.1.25 Total and Dissolved Metals (SW6010B) – The initial calibration for each instrument used for the analysis of dissolved and total metals met USACE criteria. The alternate source ICVs were within 10 percent of their true value. The low-level calibration checks performed for metals analyses exceeded QC criteria as indicated below. The associated non-detect results were qualified as estimated and flagged "UL" for low jrecoveries and "UJ" for high recoveries.

Date	Metal	Flag	Associated Samples
10/23/02	Aluminum	UJ	AEHADG-10 (dissolved), DMW-35A (both), MWFOS-1 (both), OU7DUP-1 (dissolved)
	Zinc	UL	DMW-20A (both), DMW-25A (both), DMW-26A (both), DMW-27A (both), DMW-35A (both), MW112-2 (both), MWFOS-1 (both), MWFOS-3 (both), MWFTA-1 (both)
11/12/02	Antimony	UJ	DMW-22A (both), DMW-33A (both), MWFTA-5 (both), MWFTA-9 (both), MWFTA-10 (both)

C.4.1.1.26 The CCVs were within 10 percent of their true value. The laboratory batch preparation blanks (Method Blanks) contained arsenic, calcium, copper, manganese, and/or potassium above the detection limit. The associated results less than five times the blank value were qualified as estimated and flagged "JB". Therefore, the total copper results, for DMW-22A and DMW-33A, and the dissolved copper result for MWFTA-10 were qualified as estimated and flagged "JB".

C.4.1.1.27 The batch LCSs for dissolved and total metals were within USACE prescribed limits (80-120%R) The MS/MSD recoveries for total and dissolved metals in MWFTA-1 and total metals in MWFOS-3 and MWFTA-9 were within QC limits

C.4.1.1.28 Two field duplicate pairs (AEHADG-10/OU7DUP-1 and MWFTA-3/OU7DUP-2) were collected and analyzed for metals. The RPD between the parent and the duplicate sample results was outside of control limits for total and dissolved vanadium in AEHADG-10/OU7DUP-1 and the results were qualified as estimated and flagged "J" unless overridden by other QC criteria. There were no dissolved results that exceeded the total results by more than the QC limit.

C.4.1.1.29 A serial dilution to assess new matrices was performed on samples MWFTA-1, MWFTA-9, and MWFOS-3 Recoveries were within 10 percent of their original value with the exception of total potassium in MWFOS-3, and potassium and manganese in MWFTA-9. The associated results that were greater than 50 times the MDL (potassium in samples MWFOS-3 and MWFTA-9) were qualified as estimated and flagged "J", unless overridden by other QC criteria.

C.4.1.1.30 An equipment blank sample (OU6EQB-1) was collected and analyzed (SDG # A2K070276) to assess potential contamination from non-dedicated sampling equipment. Sample OU6EQB-1 contained reportable levels of total and/or dissolved arsenic, barium, cadmium, calcium, cobalt, iron, manganese, and zinc. The following results were less than five times the equipment blank value and qualified as estimated and flagged "JB".

<u>Metal</u>	Affected Samples
Arsenic Cobalt Iron	MWFTA-10 (total) MWFOS-3 (both), MW112-2 (both), MWFTA-9 (both), MWFTA-10 (dissolved) MWFTA-9 (dissolved), MWFTA-10 (dissolved)

C.4.1.1.31 Results were evaluated and reported down to the MDL Flagging of total and dissolved metals results less than the RL but greater than the MDL (JQ) is described below.

Sample ID	Affected Metals
AEHADG-10	Aluminum (total), Barium (both), Beryllium (both), Calcium (both), Cobalt (both), Nickel (both), Potassium (both), Vanadium (both)
DMW-13A	Barium (both), Beryllium (both), Cadmium (both), Calcium (both), Cobalt (both), Lead (total), Magnesium (both), Nickel (both), Potassium (both)
DMW-20A	Aluminum (both), Barium (both), Beryllium (both), Calcium (both), Magnesium (both), Nickel (both), Potassium (both)
DMW-22A	Aluminum (both), Barium (both)
DMW-25A	Arsenic (total), Barium (both), Cobalt (both), Chromium (both), Copper (both), Magnesium (both), Manganese (both), Molybdenum (total), Nickel (both), Vanadium (both)
DMW-26A	Arsenic (both), Barium (both), Calcium (both), Magnesium (both), Vanadium (both)

Sample ID	Affected Metals
DMW-27A	Barium (both), Beryllium (both), Calcium (both), Cobalt (both), Magnesium (both), Potassium (both), Vanadium (both)
DMW-33A	Aluminum (both), Barium (both), Beryllium (both), Zinc (total)
DMW-35A	Barium (both), Beryllium (both), Calcium (both), Magnesium (both), Nickel (both), Potassium (both), Sodium (both)
MW112-2	Aluminum (both), Barium (both), Beryllium (both), Calcium (both), Magnesium (both), Nickel (both), Sodium (both)
MWFOS-1	Barium (both), Beryllium (total), Molybdenum (both)
MWFOS-3	Aluminum (both), Barium (both), Calcium (both), Copper (both), Magnesium (both), Nickel (total), Potassium (both)
MWFTA-1	Beryllium (both), Cobalt (both), Vanadium (both)
MWFTA-3	Aluminum (dissolved), Barium (both), Beryllium (both), Calcium (both), Cobalt (both), Magnesium (both), Vanadium (both)
MWFTA-5	Aluminum (dissolved), Barium (both), Calcium (both), Magnesium (both) Potassium (both)
MWFTA-7	Barium (both), Beryllium (both), Cadmium (total), Calcium (both), Cobalt (both), Chromium (dissolved), Copper (total) Lead (both), Magnesium (both), Potassium (both), Sodium (both)
MWFTA-9	Aluminum (both), Barium (both), Calcium (both), Magnesium (both), Molybdenum (dissolved), Potassium (both)
MWFTA-10	Barium (both), Calcium (total), Magnesium (both), Potassium (both)
MWFTA-23	Aluminum (both), Beryllium (both), Calcium (both), Cobalt (both), Magnesium (both), Nickel (both), Potassium (both), Sodium (both), Vanadium (both)
OU7DUP-I	Aluminum (total), Barium (both), Beryllium (both), Calcium (both), Cobalt (both), Nickel (both), Potassium (both), Vanadium (both)
OU7DUP-2	Barium (both), Beryllium (both), Calcium (dissolved), Cobalt (dissolved), Magnesium (both), Vanadium (dissolved)

C.4.1.1.32 Any value reported below the RL but above the MDL that was previously flagged "J" is subsequently overridden by the "JQ" qualifier.

C.4.1.1.33 Total and Dissolved Mercury (7470A) - The initial and continuing calibration for each instrument used for the analysis of total and dissolved mercury met acceptable criteria. The low-level check standard recovered above QC limits for mercury after the analysis on 10/25/02. Associated total and dissolved results in sample MWFTA-1 were qualified as estimated and flagged "UJ". The laboratory batch preparation blanks (Method Blanks) did not contain mercury.

C.4.1.1.34 Batch LCSs for mercury were within acceptable limits. The MS/MSD recoveries for total mercury in sample MWFTA-9 were within QC limits. Recoveries of total and dissolved mercury in spiked sample MWFTA-1 and total mercury in MWFOS-3 were outside of the QC limit. The associated results were qualified as estimated and flagged "UL".

C.4.1.1.35 An equipment blank sample (OU6EQB-1) was collected and analyzed (SDG # A2K070276) to assess possible contamination from using non-dedicated sampling equipment. Mercury was non-detect in the equipment blank

C.4.1.1.36 Two field duplicate pairs (AEHADG-10/OU7DUP-1 and MWFTA-3/OU7DUP-2) were collected and analyzed. The RPDs between the parent and the duplicate sample results were not calculated since the results were non-detect. A serial dilution was performed to assess new matrices in samples MWFTA-1, MWFTA-9, and MWFOS-3 and recoveries were within 10 percent of their original value. Results were evaluated and reported down to the MDL Flagging of total and dissolved metals results less than the RL but greater than the MDL (JQ) was not necessary.

C.4.1.1.37 Total and Dissolved Thallium (SW7841) - The initial and continuing calibration for each instrument used for the analysis of total and dissolved thallium met acceptable enteria. The low level check analyzed after the analysis of the project samples was outside of acceptable QC limits on 10/29/02 and 10/30/02 The associated non-detect total and dissolved results for MWFTA-3, MWFTA-7, and OU7DUP-2, and the dissolved result for OU7DUP-1 were qualified as estimated and flagged "UJ" Several non-detect total and dissolved results associated with the low level check analyzed on 10/29/02 were subsequently qualified as estimated and flagged "UJ", but were overridden by "UL" flags for low post digestion spike recoveries (see section C.4.1.7.4. below).

C.4.1.1.38 The laboratory batch preparation blanks (Method Blanks) were non-detect for thallium. Batch LCSs for thallium were within acceptable limits. The MS/MSD recoveries for total thallium in samples MWFOS-3 and MWFTA-9 and total and dissolved thallium in sample MWFTA-1 were within QC limits

C.4.1.1.39 Two field duplicate pairs (AEHADG-10/OU7DUP-1 and MWFTA-3/OU7DUP-2) were collected and analyzed RPD between the parent sample and the duplicate sample could not be calculated because thallium was not detected in these samples.

C.4.1.1.40 An equipment blank sample (OU6EQB-1) was collected and analyzed (SDG # A2K070276) to assess possible contamination from using non-dedicated sampling equipment. Thallium was non-detect in the equipment blank

B.4.1.1.41 A post digestion spike was performed on the samples analyzed by graphite furnace to confirm matrix effects. Recoveries were low for AEHADG-10 (both), DMW-26A, (both), DMW-20A (both), MWFTA-1 (both), MWFTA-3 (both), MWFTA-7 (total), OU7DUP-1 (total), and OU7DUP-2 (both) and results were subsequently qualified as estimated for possible matrix effects and flagged "UL". A serial dilution was performed to assess new matrices in samples MWFTA-1 and MWFTA-9 and recoveries were within 10 percent of their original value. Results were evaluated and reported down to the MDL. Flagging of thallium results less than the RL but greater than the MDL (JQ) was not necessary

C.4.1.1.42 Anions (300.0A) – The initial and continuing calibration for each instrument used for the analysis of chloride, nitrate, and sulfate met acceptable criteria. The laboratory batch preparation blanks (Method Blanks) analyzed on 10/17/02 contained nitrate at 0.11 milligrams per liter (mg/L). The associated result in sample MW112-2 was qualified as estimated with possible method blank contamination and flagged "JB". Subsequent initial calibration blanks (ICBs)/continuing calibration blanks (CCBs) contained chloride, nitrate, and/or sulfate. The nitrate results were qualified as estimated and flagged "JB" for MW112-2 and "JH" for DMW-13A. Batch LCSs for anions were within acceptable limits. The MS/MSD recoveries of chloride in MWFTA-1 were outside of acceptable limits for chloride. The associated result was qualified as estimated and flagged "J".

C.4.1.1.43 Two field duplicate pairs (AEHADG-10/OU7DUP-1 and MWFTA-3/OU7DUP-2) were collected and analyzed. RPD between the parent sample and the duplicate sample is within specified limits (<20%).

C.4.1.1.44 An equipment blank sample (OU6EQB-1) was collected and analyzed (SDG #A2K070276) to assess possible contamination from using non-dedicated sampling equipment. The equipment blank contained chloride at 2.2 mg/L and sulfate at 15.9 mg/L. The chloride and sulfate results in samples MWFTA-9, MWFTA-10, and MWFOS-3 and the sulfate result in sample MW112-2 may be qualified as estimated and flagged "JB" for possible equipment blank contamination. However, review of previous quarterly data and comparison to other groundwater samples indicate that these results are representative. Therefore, no qualification of the data due to equipment blank contamination was necessary

C.4.1.1.45 Results were evaluated and reported down to the MDL Flagging of anion results less than the RL but greater than the MDL (JQ) is described below

Sample ID	Affected Analytes	Sample ID	Affected Analytes	
DMW-26A DMW-27A	Nitrate Nitrate	MWFTA-1 MWFTA-7	Sulfate Nitrate	
DMW-27A DMW-33A	Nitrate Nitrate	WWT1A-7	Nillate	

C.4.1.1.46 Any value reported below the RL but above the MDL that was previously flagged "J" is subsequently overridden by the "JQ" qualifier.

C.4.1.1.47 Total Organic Carbon (9060) – The initial and continuing calibration for each instrument used for the analysis of TOC met acceptable criteria. The laboratory batch preparation blanks (Method Blanks) did not contain TOC. Subsequent ICBs/CCBs contained TOC, and the results less than five times the associated blank value (AEHADG-10, DMW-13A, DMW-20A, DMW-33A, MWFOS-1, and OU7DUP-1) were qualified as estimated with possible high bias and flagged "JH". Batch LCSs for TOC were within acceptable limits. The MS/MSDs recoveries of spiked sample MWFTA-1 were within acceptable QC limits.

C.4.1.1.48 Two field duplicate pairs (AEHADG-10/OU7DUP-1 and MWFTA-3/OU7DUP-2) were collected and analyzed. RPD between the parent sample and the duplicate sample is within specified limits (<20%).

C.4.1.1.49 The trip blanks associated with the OU 7 samples did not contain TOC. An equipment blank (OU6EQB-1) was collected and analyzed (SDG# A2K070276) to assess possible contamination from non-dedicated sampling equipment, and TOC was detected at 3 mg/L. MWFOS-3 contained less than five times the equipment blank value and was qualified as estimated with possible high bias and flagged "JH". Sample DMW-20A was qualified as estimated and flagged "JB" since the result was less than the equipment blank value.

C.4.1.1.50 Results were evaluated and reported down to the MDL Flagging of TOC results less than the RL but greater than the MDL was not necessary

C.4.1.1.51 Alkalinity (310.1) – The titration standardization performed for the analysis of alkalinity met acceptable criteria, as did the initial calibration and calibration check. The laboratory batch preparation blanks (Method Blanks) contained alkalinity. The associated results less than five times the method blank

value (AEHADG-10, DMW-33A, DMW-35A, MWFTA-9, MWFOS-1, MWFOS-3, MW112-2, and OU7DUP-1) were qualified as estimated with possible high bias and flagged "JH" Associated results less than the blank value (DMW-27A and DMW-20A) were qualified as estimated with possible method blank contamination and flagged "JB"

C.4.1.1.52 Batch LCSs for alkalinity were within acceptable limits. The MS/MSD recoveries for sample MWFTA-1 were within QC limits.

C.4.1.1.53 Two field duplicate pairs (AEHADG-10/OU7DUP-1 and MWFTA-3/OU7DUP-2) were collected and analyzed. RPD between the parent sample and the duplicate sample is within specified limits (<20%)

C.4.1.1.54 An equipment blank sample (OU6EQB-1) was collected and analyzed (SDG #A2K070276) to assess possible contamination from using non-dedicated sampling equipment. The equipment blank was non-detect for alkalimity. Results were evaluated and reported down to the MDL. Flagging of alkalimity results less than the RL but greater than the MDL was not necessary.

C.4.1.1.55 Sulfide (376.1) – The titration standardization performed for the analysis of sulfide met acceptable criteria. The laboratory batch preparation blanks (Method Blanks) contained sulfide at 0.49 and 0.65 mg/L. Associated results less than five times the blank value (DMW-20A, DMW-25A, MWFOS-3, and MWFTA-1) were qualified as estimated with possible high bias and flagged "JH". Associated results less than the blank value (DMW-13A and OU7DUP-1) were qualified as estimated with possible method blank contamination and flagged "JB".

C.4.1.1.56 Batch LCSs for sulfide were within acceptable limits. The MS/MSD recoveries for spiked sample MWFTA-1 were within acceptable laboratory limits.

C.4.1.1.57 Two field duplicate pairs (AEHADG-10/OU7DUP-1 and MWFTA-3/OU7DUP-2) were collected and analyzed. RPD between the parent sample and the duplicate sample was not calculated because the results were either below the RL or non-detect.

C.4.1.1.58 An equipment blank sample (OU6EQB-1) was collected and analyzed (SDG #A2K070276) to assess possible contamination from using non-dedicated sampling equipment. The equipment blank contained sulfide at 0.32 mg/L, therefore, the associated results for samples DMW-20A, MWFTA-9 and

MWFTA-10 may be estimated due to possible equipment blank contamination and flagged "JH" However, review of previous quarterly data and comparison to other groundwater samples indicate that the sulfide results reported for these samples are representative. Therefore, no qualification of the data due to equipment blank contamination was necessary

C.4.1.1.59 Results were evaluated and reported down to the MDL. Flagging of sulfide results less than the RL but greater than the MDL (JQ) was necessary for samples DMW-22A, DMW-33A, MWFTA-3, MWFTA-5, MWFTA-9, MWFTA-10, and OU7DUP-2. Any value reported below the RL but above the MDL that was previously flagged "J" is subsequently overridden by the "JQ" qualifier

C.4.1.1.60 Dissolved Hydrogen (AM20GA) – Initial and continuing calibration standards and instrument/method blanks were within method-stated control limits. LCS results were also within laboratory-established limits. MS/MSD samples were not required for hydrogen analysis

C.4.1.1.61 Two field duplicate pairs (AEHADG-10/OU7DUP-1, MWFTA-3/OU7DUP-2) were collected from the upper WBU and analyzed. RPD between the parent and duplicate samples were within QC limits Results were evaluated and reported down to the MDL. Flagging of hydrogen results less than the RL but greater than the MDL was not necessary

C.4.1.2 Groundwater - Lower WBU And Fractured Bedrock Wells

C.4.1.2.1 Seven groundwater and two duplicate samples were collected from the lower WBU at OU 7 in October of 2002. In addition, bedrock well MWFTA-20 and a duplicate sample were collected at OU 7 in October of 2002. Each of the monitoring well sample locations were assayed for VOCs, total and dissolved metals, and MNA parameters. Samples MWFTA-16P and MWFTA-20P were collected preserved with HCl and were analyzed for VOCs only to investigate the effects of HCl preservation on the VOC concentrations in samples from the lower WBU.

C.4.1.2.2 Volatile Organic Compounds (SW8260B) – The initial calibration tunes passed the QC requirements outlined in the Shell document and the method. VOCs were calibrated using either the average relative response factor and/or quadratic curve and were within specified limits. In the ICV performed on 10/21/02, dichlorodifluoromethane exceeded the plus or minus 20 percent criteria. The results were qualified as estimated and flagged (UJ) in the following samples

MWFTA-14 MWFTA-16 MWFTA-16P MWFTA-17 MWFTA-19 MWFTA-20 MWFTA-28B MWFTA-29B OU7DUP-3 TB-101502-1 TB-101702-2 TB-102902-1

C.4.1.2.3 The CCV standards associated with the OU 7 groundwater samples were analyzed as appropriate and some compounds exceeded limits specified by the USACE or the method. Qualifications were made based on %D observed in the CCVs analyzed on the dates indicated below. Qualifications were assigned for high and low biased (J for detects and UJ for non-detects) exceedances in the CCV, unless overridden by qualifications for other QC exceedances. If the %D observed for a compound exceeded plus or minus 40% or the compound exceeding %D criteria in the CCV also exceeded %R criteria in the LCS, the associated results were qualified as unusable (flagged R).

CCV Date	Affected Compounds	Associated Samples
10/22/02	Acetone Bromoform Dichlorodifluoromethane Hexachlorobutadiene Trichlorofluoromethane 2-Hexanone 2-Butanone	MWFTA-16, MWFTA-16P, MWFTA-17 MWFTA-19, MWFTA-20, MWFTA-20P MWFTA-29B, OU7DUP-3, TB-101502-2
10/24/02	Acetone Carbon disulfide Dichlorodifluoromethane	MWFTA-23
10/30/02	Acetone Dichlorodifluoromethane Hexachlorobutadiene Naphthalene n-Butylbenzene 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene 2-Butanone 2-Hexanone	TB-101702-2
11/01/02	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene n-Butylbenzene sec-Butylbenzene Acetone (unusable) 2-Butanone (unusable)	MWFTA-14, MWFTA-28B, TB-102902-1

C.4.1.2.4 The batch specific preparation blanks did not have analytes of interest greater than the RL. The following method blanks contained the indicated compounds at concentrations above the MDL but below the RL. The associated OU 7 samples with concentrations less than or equal to ten times the blank concentration

were accordingly qualified as estimated with possible method blank contamination and flagged "JB", unless overridden by qualifications for other QC exceedences.

Blank Date	Compound	Concentration	Flagged Samples
10/22/02	Acetone	1.2 μg/L	MWFTA-17
10/30/02	Acetone	1.4 μg/L	No flag – results non-detect
11/01/02	Methylene Chloride	0 35 μg/L	TB-102902-1

C.4.1.2.5 Batch specific LCSs were also analyzed and recoveries were acceptable, with the following exceptions. Qualifications were assigned for either high biased (JH for positive results and UJ for non-detects) or low biased (JL for positives or UL for non-detects) exceedances in the LCS, unless overridden by qualifications for other QC exceedances. If the %R observed for a compound exceeded plus or minus 40% or the compound exceeding %R criteria in the LCS also exceeded %D criteria in the CCV, the associated results were qualified as unusable (flagged R). No qualification was necessary for LCS/LCSD failures that met SMF criteria.

LCS/LCSD	Affected Compounds	Associated Samples
11/01/02	Acetone (unusable) 2-Butanone (unusable) 2-Hexanone (unusable) 4-Methyl-2-pentanone (low)	MWFTA-14, MWFTA-28B, TB-102902-1

C.4.1.2.6 MS/MSDs were specified and performed on groundwater sample MWFTA-29B Trichloroethene and 1,1.2,2-tetrachloroethane recoveries were above and below QC limits respectively. The trichloroethene result did not require qualification, since the sample result was non-detect. The 1,1,2,2-tetrachloroethane result was qualified as estimated and flagged "UL" for sample MWFTA-29B

C.4.1.2.7 One field duplicate pair (MWFTA-20/OU7DUP-3) was collected and analyzed RPD between the parent sample and the duplicate sample is within specified limits (<30%). In addition, unpreserved aliquots of samples MWFTA-16 (MWFTA-16P) and MWFTA-20 (MWFTA-20P) were collected to evaluate the effects of preservative on the lower WBU water. The RPD between the preserved and unpreserved samples were within QC criteria. The surrogates and internal standards added to the samples by the laboratory were recovered within specified limits.

C.4.1.2.8 The trip blanks associated with the OU 7 samples were analyzed, but were not reported to contain VOCs above the RL. However; the trip blanks contained methylene chloride, but the associated samples were either non-detect, greater than five times the blank value, or already flagged "JB" for method blank

contamination. No further flagging was necessary. An equipment blank (OU6EQB-1: SDG #A2K070276) was collected to assess possible contamination from using non-dedicated sampling equipment. Acetone, methylene chloride, and toluene were found in the equipment blank. No flags were necessary because the associated results were non-detect or greater than five times the blank value in the associated samples.

C.4.1.2.8 The following samples were diluted to place the VOC results within the range of the calibration curve, which resulted in elevated RLs.

	Dilution		Dilution		Dilution
Sample	Factor	Sample	Factor	Sample	Factor
MWFTA-16	55 56x	MWFTA-16P	62 5x	MWFTA-20	4x
MWFTA-20P	4x	OU7DUP-3	4x		

C.4.1.2.9 Additionally, the following data points were reported at concentrations above the MDL, but less than the RL and were qualified as estimated and flagged as "JQ"

Sample ID	Affected Compounds
MWFTA-17 MWFTA-19 MWFTA-28B	Acetone Trichloroethene Naphthalene

C.4.1.2.10 Any value reported below the RL but above the MDL that was previously flagged "J" is subsequently overridden by the "JQ" qualifier

C.4.1.2.11 Dissolved Gases (RSK-175) – The initial and continuing calibrations for each instrument used for the analysis of dissolved gases met acceptable criteria. Some of the laboratory batch preparation blanks (Method Blanks) contained methane or carbon dioxide. The carbon dioxide result in samples MWFTA-20 and OU7DUP-3 were qualified as estimated with possible method blank contamination and flagged "JB" The methane result in sample MWFTA-14 was also qualified as estimated with possible method blank contamination and flagged "JB" Batch LCSs for dissolved gases were within acceptable limits, and MS/MSD spikes were not performed for dissolved gases.

C.4.1.2.12 One field duplicate pair (MWFTA-20/OU7DUP-3) was collected and analyzed for dissolved gases. RPD between the parent sample and the duplicate sample is within specified limits (<20%)

C.4.1.2.13 The trip blanks were analyzed and contained carbon dioxide and/or methane. The carbon dioxide result for sample MWFTA-14 was less than five times the blank value and was qualified as estimated with possible method blank contamination and flagged "JB".

C.4.1.2.14 An equipment blank (OU6EQB-1) was collected and analyzed (SDG # A2K070276) to assess possible contamination from non-dedicated sampling equipment. Although carbon dioxide was detected in the equipment blank, the result was flagged "JB" for method blank contamination. No flagging of the data for equipment blank contamination is necessary.

C.4.1.2.15 Results were evaluated and reported down to the MDL. Flagging of dissolved gas results less than the RL but greater than the MDL (JQ) was necessary for ethane in MWFTA-29B and methane in TB-101602-1. Any value reported below the RL but above the MDL that was previously flagged "J" is subsequently overridden by the "JQ" qualifier.

C.4.1.2.16 Total and Dissolved Metals (SW6010B) – The initial calibration for each instrument used for the analysis of dissolved and total metals met USACE criteria. The alternate source ICVs were within 10 percent of their true value. The low-level calibration checks performed for metals analyses exceeded QC criteria as indicated below. The associated non-detect results were qualified as estimated and flagged "UL" for low recoveries and "UJ" for high recoveries

Date	Metal	Flag	Associated Samples
10/23/02 10/23/02 10/30/02 11/12/02	Aluminum Zinc Aluminum Antimony	UJ UJ UJ	MWFTA-18 (both) MWFTA-16 (both), MWFTA-17 (both), MWFTA-18 (dissolved) MWFTA-20 (both), OU7DUP-3 (both) MWFTA-14 (total), MWFTA-28B (both)

C.4.1.2.17 The CCVs were within 10 percent of their true value. The laboratory batch preparation blanks (Method Blanks) contained arsenic, calcium, copper, manganese, and/or potassium above the detection limit. The associated results less than five times the blank value were qualified as estimated and flagged "JB".

Metal	Associated Samples
Arsenic	MWFTA-19 (both), MWFTA-20 (total), MWFTA-29B (total)
Copper	MWFTA-14 (both)
Manganese	MWFTA-19 (total)

C.4.1.2.18 The batch LCSs for dissolved and total metals were within USACE prescribed limits (80-120%R). The MS/MSD recoveries for MWFTA-29B were outside of QC limits for total aluminum. The associated result for sample MWFTA-29B was qualified as estimated and flagged "JH".

C.4.1.2.19 One field duplicate pair (MWFTA-20/OU7DUP-3) was collected and analyzed for metals. The RPD between the parent and the duplicate sample results was within QC limits. The dissolved potassium and sodium results for sample MWFTA-16 and the dissolved arsenic result for sample MWFTA-14 exceeded the total results by more than the QC limit, and were qualified as estimated and flagged "J" ("UL" for total arsenic in MWFTA-14)

C.4.1.2.20 A post digestion spike was performed on sample MWFTA-29B (total) to confirm matrix effects and recoveries were within USACE limits. A serial dilution to assess new matrices was performed on sample MWFTA-29B. Recoveries were within 10 percent of their original value with the exception of aluminum and iron. However, the associated results were less than 50 times the MDL, and no qualification was necessary

C.4.1.2.21 An equipment blank sample (OU6EQB-1) was collected and analyzed (SDG # A2K070276) to assess potential contamination from non-dedicated sampling equipment. Sample OU6EQB-1 contained reportable levels of total and/or dissolved arsenic, barium, cadmium, calcium, cobalt, iron, manganese, and zinc. There were no results less than five times the blank values.

C.4.1.2.22 Results were evaluated and reported down to the MDL Flagging of total and dissolved metals results less than the RL but greater than the MDL (JQ) is described below

Sample ID	Affected Metals
MWFTA-14	Barium (both), Magnesium (both), Molybdenum (both)
MWFTA-16	Aluminum (dissolved), Arsenic (dissolved), Copper (total), Magnesium
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(dissolved), Vanadium (both)
MWFTA-17	Barium (both), Vanadium (both)
MWFTA-18	Barium (both), Magnesium (dissolved), Nickel (total), Zinc (total)
MWFTA-19	Barium (both), Magnesium (total), Vanadium (both)
MWFTA-20	Barium (both), Iron (dissolved), Magnesium (both), Vanadium (dissolved)
MWFTA-28B	Barium (both)
MWFTA-29B	Barium (both), Chromium (total), Copper (total), Magnesium (total), Manganese
	(total), Molybdenum (both), Nickel (both), Vanadium (both)
OU7DUP-3	Barium (both), Iron (total), Magnesium (both)

C.4.1.2.23 Any value reported below the RL but above the MDL that was previously flagged "J" is subsequently overridden by the "JQ" qualifier.

C.4.1.2.24 Total and Dissolved Mercury (7470A) - The initial and continuing calibration for each instrument used for the analysis of total and dissolved mercury met acceptable criteria. The low-level check standard recovered above QC limits for mercury after the analysis on 10/25/02. There were no associated lower WBU samples. The laboratory batch preparation blanks (Method Blanks) did not contain mercury.

C.4.1.2.25 Batch LCSs for mercury were within acceptable limits. The MS/MSD recoveries for total and dissolved mercury in spiked sample MWFTA-29B were within QC limits.

C.4.1.2.26 One field duplicate pair (MWFTA-20/OU7DUP-3) was collected and analyzed. The RPDs between the parent and the duplicate sample results were not calculated since the results were non-detect. A serial dilution was performed to assess new matrices in sample MWFTA-29B and recoveries were within 10 percent of their original value.

C.4.1.2.27 An equipment blank sample (OU6EQB-1) was collected and analyzed (SDG # A2K070276) to assess possible contamination from using non-dedicated sampling equipment. Mercury was non-detect in the equipment blank. Results were evaluated and reported down to the MDL. Flagging of total and dissolved metals results less than the RL but greater than the MDL was not necessary.

C.4.1.2.28 Total and Dissolved Thallium (SW7841) - The initial and continuing calibration for each instrument used for the analysis of total and dissolved thallium met acceptable enteria. The low level check analyzed after the analysis of the project samples was outside of acceptable QC limits on 10/29/02 and 10/30/02. The associated non-detect total and dissolved results (MWFTA-19, MWFTA-20, MWFTA-29B, and OU7DUP-3) were qualified as estimated and flagged "UJ" Several non-detect total and dissolved results associated with the low-level check analyzed on 10/29/02 were subsequently qualified as estimated and flagged "UJ", but were overridden by "UL" flags for low post digestion spike recoveries (see section C.4.2.5.4. below)

C.4.1.2.29 The laboratory batch preparation blanks (Method Blanks) were non-detect for thallium. Batch LCSs for thallium were within acceptable limits. The MS/MSD recoveries for total thallium in sample MWFTA-29B were below QC limits, therefore the total thallium result for MWFTA-29B was qualified as estimated and flagged "UL"

C.4.1.2.30 One field duplicate pair (MWFTA-20/OU7DUP-3) was collected and analyzed RPD between the parent sample and the duplicate sample could not be calculated because thallium was not detected in these samples.

C.4.1.2.31 An equipment blank sample (OU6EQB-1) was collected and analyzed (SDG # A2K070276) to assess possible contamination from using non-dedicated sampling equipment. Thallium was non-detect in the equipment blank

C.4.1.2.32 A post digestion spike was performed on the samples analyzed by graphite furnace to confirm matrix effects. Recoveries were low for MWFTA-14 (dissolved), MWFTA-16 (dissolved), MWFTA-19 (both), and MWFTA-20 (dissolved) and results were subsequently qualified as estimated for possible matrix effects and flagged "UL". A serial dilution was performed to assess new matrices in sample MWFTA-19 and recoveries were within 10 percent of their original value. Results were evaluated and reported down to the MDL. Flagging of thallium results less than the RL but greater than the MDL (JQ) was not necessary

C.4.1.2.33 Anions (300.0A) – The initial and continuing calibration for each instrument used for the analysis of chloride, nitrate, and sulfate met acceptable criteria. The laboratory batch preparation blanks (Method Blanks) analyzed on 10/17/02 contained nitrate at 0.11 mg/L. There were no associated lower WBU results less than five times the blank value. Subsequent ICBs/CCBs contained chloride, nitrate, and/or sulfate. There were no associated lower WBU sample results less than five times the blank value. Batch LCSs for anions were within acceptable limits. The MS/MSD recoveries for the spiked sample MWFTA-29B were within QC limits.

C.4.1.2.34 One field duplicate pair (MWFTA-20/OU7DUP-3) was collected and analyzed. RPD between the parent sample and the duplicate sample is within specified limits (<20%).

C.4.1.2.35 An equipment blank sample (OU6EQB-1) was collected and analyzed (SDG #A2K070276) to assess possible contamination from using non-dedicated sampling equipment. The equipment blank contained chloride at 2.2 mg/L and sulfate at 15.9 mg/L. However, there were no lower WBU samples less than five times the blank value.

C.4.1.2.36 Results were evaluated and reported down to the MDL Flagging of anion results less than the RL but greater than the MDL (JQ) was necessary for nitrate in sample MWFTA-14. Any value reported

below the RL but above the MDL that was previously flagged "J" is subsequently overridden by the "JQ" qualifier

C.4.1.2.37 Total Organic Carbon (9060) – The initial and continuing calibration for each instrument used for the analysis of TOC met acceptable criteria. The laboratory batch preparation blanks (Method Blanks) did not contain TOC Subsequent ICBs/CCBs contained TOC, and the results less than five times the associated blank value (MWFTA-16 and MWFTA-19) were qualified as estimated with possible high bias and flagged "JH". Batch LCSs for TOC were within acceptable limits The MS/MSDs recoveries of spiked sample MWFTA-29B were within acceptable QC limits.

C.4.1.2.38 One field duplicate pair (MWFTA-20/OU7DUP-3) was collected and analyzed. RPD between the parent sample and the duplicate sample is within specified limits (<20%).

C.4.1.2.39 The trip blanks associated with the OU 7 samples did not contain TOC. An equipment blank (OU6EQB-1) was collected and analyzed (SDG# A2K070276) to assess possible contamination from non-dedicated sampling equipment, and TOC was detected at 3 mg/L. There were no associated lower WBU samples less than five times the blank value, therefore, no qualification was necessary

C.4.1.2.40 Results were evaluated and reported down to the MDL. Flagging of TOC results less than the RL but greater than the MDL was necessary for sample MWFTA-14. Any value reported below the RL but above the MDL that was previously flagged "J" is subsequently overridden by the "JQ" qualifier

C.4.1.2.41 Alkalinity (310.1) – The titration standardization performed for the analysis of alkalinity met acceptable criteria, as did the initial calibration and calibration check. The laboratory batch preparation blanks (Method Blanks) contained alkalinity There were no associated results less than five times the method blank value.

C.4.1.2.42 Batch LCSs for alkalinity were within acceptable limits. The MS/MSD recoveries for sample MWFTA-29B were below QC limits, and the result for MWFTA-29B was qualified as estimated and flagged "JL"

C.4.1.2.43 One field duplicate pair (MWFTA-20A/OU7DUP-3) was collected and analyzed RPD between the parent sample and the duplicate sample is within specified limits (<20%).

C.4.1.2.44 An equipment blank sample (OU6EQB-1) was collected and analyzed (SDG #A2K070276) to assess possible contamination from using non-dedicated sampling equipment. The equipment blank was non-detect for alkalinity. Results were evaluated and reported down to the MDL. Flagging of alkalinity results less than the RL but greater than the MDL was not necessary.

C.4.1.2.45 Sulfide (376.1) – The turation standardization performed for the analysis of sulfide met acceptable criteria. The laboratory batch preparation blanks (Method Blanks) contained sulfide at 0.49 and 0.65 mg/L. Associated results less than five times the blank value (MWFTA-18) were qualified as estimated with possible high bias and flagged "JH". Associated results less than the blank value (MWFTA-16, and MWFTA-17) were qualified as estimated with possible method blank contamination and flagged "JB"

C.4.1.2.46 Batch LCSs for sulfide were within acceptable limits. The MS/MSD recoveries for spiked sample MWFTA-29B were within acceptable laboratory limits.

C.4.1.2.47 One field duplicate pair (MWFTA-20/OU7DUP-3) was collected and analyzed. RPD between the parent sample and the duplicate sample was not calculated because the results were either below the RL or non-detect.

C.4.1.2.48 An equipment blank sample (OU6EQB-1) was collected and analyzed (SDG #A2K070276) to assess possible contamination from using non-dedicated sampling equipment. The equipment blank contained sulfide at 0.32 mg/L, however, there were no associated results less than five times the blank value.

C.4.1.2.49 Results were evaluated and reported down to the MDL Flagging of sulfide results less than the RL but greater than the MDL (JQ) was necessary for samples MWFTA-20, MWFTA-29B, and OU7DUP-3 Any value reported below the RL but above the MDL that was previously flagged "J" is subsequently overridden by the "JQ" qualifier

C.4.1.2.50 Dissolved Hydrogen (AM20GA) – Initial and continuing calibration standards and instrument/method blanks were within method-stated control limits. LCS results were also within laboratory-established limits. MS/MSD samples were not required for hydrogen analysis. Holding times were met for the samples submitted to Microseeps for analysis.

C.4.1.2.51 One field duplicate pair (MWFTA-20/OU7DUP-3) was collected from the lower WBU and analyzed. RPD between the parent and duplicate samples were within QC limits.

C.5 DATA QUALITY EVALUATION SUMMARY

C.5.0.0.1 Except as previously noted, the data quality indicators were within the USACE prescribed QC limits and requires only the qualifications described. Overall percent completeness for the data collection efforts and DQO attainment is 99.5. A discussion of compound and/or method completeness compared to project objectives, as well as affects of field conditions on project objectives, is presented below

C.5.0.0.2 The following compounds exhibited percent completeness less than 90

Compound	% Complete	Compound	% Complete	Compound	% Complete	
Acetone	80 95%	2-Hexanone	83 33%	2-Butanone	83 33%	

C.5.0.0.3 The affect of data completeness below 90% for these compounds based on the project objectives is negligible. Acetone, 2-butanone, and 2-hexanone are common laboratory contaminants. Acetone was detected in some samples as well as in associated method blanks and therefore, its presence in the samples is suspect. 2-Butanone, and 2-hexanone were not detected in the samples. In addition, the data generated for 2-butanone and 2-hexanone does not adversely impact the overall risk assessment for the site due to the lack of positive results in excess of a risk-based concentration level. Acetone, 2-butanone, and 2-hexanone are not constituents of concern for OU7

C.5.0.0.4 Two samples in this SDG (MWFTA-16 and MWFTA-20) were collected both preserved and unpreserved for VOCs in order to analyze the effects of the effervescence that occurs when the lower WBU samples are preserved with HCl. Results were compared and found to be well within VOC limits for duplicate analyses. The RPD between the samples and the preserved samples were less than 14.3% Although the results in the unpreserved samples were equal to or slightly greater than the results for the preserved samples, there is no clear indication whether or not VOCs are lost during the bubble formation in samples preserved with HCl. More data is needed to accurately assess the preservation of lower WBU samples. Project DQOs are not affected.

C.6 REFERENCES

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PREPARED/DATE: JAH 5/23/03

CHECKED/DATE JAV 5/23/03

TAB

APPENDIX CTABles

APPENDIX C TABLES

TABLE C-1

DATA SUMMARY TABLE FOR GROUNDWATER
UPPER WATER BEARING UNIT - OCTOBER 2002
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Rechmond
Richmond, Virginia

	Sample ID: Sample Date	Reporting (a) Limit	Sample AEHADG-10 10/16/2002	Duplicate AEHADG-10 10/16/2002	Sample DMW-13A 10/16/2002	Sample DMW-20A 10/16/2002	Sample DMW-22A 10/30/2002	Sample DMW-25A 10/16/2002	Sample DMW-26A 10/15/2002
FIELD PARAMETER: Dayolved Oxygen - E360.1 mg/L, Dissolved Oxygen		0	8.0	8 0	80	-	0.4	2.5	10
Ferrous Iron - A3500D mg/L Ferrous Iron		0 1	<01	<01	3.5	1 0>	6	<0.1	-
Oxadation Reduction Potential - A2580A mV Oxadation Reduction Potential	0A m V	1	-31	-31	299	405	08-	157	89-
<u>pH - E150.1 pH Units</u> pH		1	5 16	5 16	3 74	3 85	587	6 63	671
Specific Conductance - E120.1 mS/cm Specific Conductance	-1	0 001	0318	0318	0 137	0 124	0 274	0 291	0 7 0 9
Temperature - E170 1 deg C Temperature		0 1	20 5	20.5	216	194	15.8	18.7	21
Turbidity - E180.1 NTU Turbidity			51	15	Ÿ	47	⊽	19	=
FIXED BASE LABORATORY ANALYSIS: Anions - MCAWW 300.3A mg/L Chloride Nutrate as N	LYSIS:	0	45 <0 1	44 9 1 0>	15.2 1.4 JB	165	45 -01	63	118 0 02 00
Sulfate		-	19.7	9 8 1	208	61	33 6	39.4	13.9
Dissolved Gases - RSK SOP-175 mg/L. Carbon droxide Ethans	. 11	0 001	120	120	110	160	85 <0 002	24 <0 002	180 <0 002
Ethene Methane		0 001	0 0 1 4 0 1 8	0.013 0.19	<0.001 0.0023 JB	<0.001 0.0011 JB	<0.001 0.075	100 0> 0 0016	<0 001 2 4
Hydrogen by Microsecps - AM20GAX nM Hydrogen	X nM	0 03	2.2	26	24	2.7	4 2	ις	29
<u>Mercury - SW846 7470A (Dissolved) нгЛ.</u> Mercury	<u>1/21/</u>	-	~	7	⊽	⊽	⊽	⊽	⊽

TABLE C-1

DATA SUMMARY TABLE FOR GROUNDWATER
UPPER WATER BEARING UNIT - OCTOBER 2002
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

	Sample ID:	Reporting (a)	Sample AEHADG-10 10/16/2002	Duplicate AEHADG-10 10/16/2002	Sample DMW-13A 10/16/2002	Sample DMW-20A 10/16/2002	Sample DMW-22A 10/30/2002	Sample DMW-25A 10/16/2002	Sample DMW-26A 10/15/2002
Mercury - SW846 7470A (Total) ug/L		-	•	*	7	7	7	7	7
Mercury			⊽	⊽	⊽	⊽	₹	7	7
Metals - SW 846 6010B (Dissolved) µg/L	-1						;	;	*
Aluminum		200	<200 UJ	<200 UJ	794	Or 601	85 6 JQ	623	260
Antimony		S	\$	Ą	Ą	φ.	S UI	ሪ	Ø
Arsenic		v	37.9	38 6	Ą	ø	15		31.10
Burun		200	Or 801	Of 601	98 2 1Q	70.7 JQ	Of 199	519 JQ	57.5 JQ
Beryllum		01	Of 61	2 JQ	l 4 JQ	Of 160	o1>	<10	٠ ۱٥
Cadmum		2	4	7	043 JQ	7	\$	\$	\$
Calcium		2000	4750 JQ	4740 JQ	1740 JQ	1460 JQ	9710	18500	4430 JQ
Chromium		10	ol>	<10	0I>	<10	ol>	2.2.10	۷I0
Cobalt		30	25 8 JQ	25.7 JQ	4 O(4	5 JB	<30	2 JQ	<30
Copper		01	</td <td><10</td> <td><10</td> <td><10</td> <td><10 <10</td> <td>85 10</td> <td>OI></td>	<10	<10	<10	<10 <10	85 10	OI>
Iron		200	17300	17400	2130	43.7 JB	4140	579	12400
Lead		3	Q	۵	3.1	Ø	\$	\$	Q
Magnesium		2000	5370	5420	2130 JQ	2670 JQ	7380	2690 JQ	OF 0851
Manganese		20	650	654	162	295	611	8 2 JQ	9 69
Molybdenum		40	<40	<40	<40	<40	<40	×40	\$ 4 0
Nickel		001	37 5 JQ	376 JQ	33.10	49 JQ	<100	44 JQ	<100
Potassium		2000	4530 JQ	4600 JQ	2220 JQ	2980 JQ	5840	14500	0816
Selenium		5	Ą	Ø	\$	δ	\$	\$	∵
Silver		01	<10	<10	01>	<10	۲I0 دا0	01>	0I>
Sodiun		2000	11600	11700	0609	0299	29900	42000	00906
Vanadium		20	07	075 JQ	0 \$>	<50	<50 <50	14 JQ	38 JQ
Zinc		20	28 8	27 4	204	<20 UL	<20	<20 NL	<20 UL
Metals - SW846 6010B (Total) µg/L									
Alenmum		200	63 4 JQ	74.2 JQ	831	145 JQ	Or 187	925	443
Antimony		5	∿	Ą	ø	\$	₩	\$	Ϋ
Arsenic		\$	39 6	39.5	Ϋ	\$	4 4	2 8 JQ	26 JQ
Barrum		200	Of 201	J10 JQ	102 JQ	70 5 JQ	\$ 9 JQ	52.3 JQ	S8 5 JQ
Beryllum		01	19 JQ	Or 61	12 JQ	O 97 JQ	01>	<10	۷ <u>۱</u> 0
Cadmium		2	\$	4	0 49 JQ	\$	^	7	7
Calcium		2000	4670 JQ	4800 JQ	DY 10171	1430 JQ	9450	18300	4440 JQ
Chromam		01	o1>	<10	<10	o1>	<10	26 JQ	o1>
Cobalt		30	24.7 JQ	26 JQ	4 JQ	5.2 JB	<30	23 JQ	<30
Copper		10	0I>	<10	<10	0I ×	19 JB	84 JQ	o1>
Iron		200	17200	17700	2200	639	4070	731	12500
Fead		e.	ŋ	₹	28 JQ	\$	7	9	7

TABLE C-1

DATA SUMMARY TABLE FOR GROUNDWATER UPPER WATER BEARING UNIT - OCTOBER 2002 Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Ruchmond, Virginia

Sample Like Reporting (iii) ARRANDG-10 DIMPASA DIMPASA<				Sample	Duplicate	Sample	Sample	Sample	Sample	Sample
sum 5000 5300 5440 2200 JQ 2500 JQ 7170 2880 JQ rece 40 40 40 40 40 40 40 40 denum 500 437 JQ 384 JQ 234 JQ 237 JQ 419 JQ 410 JQ 410 JQ denum 500 437 JQ 384 JQ 234 JQ 247 JQ 410 JQ		Sample 1D: Sample Date:	Reporting (a)	AEHADG-10 10/16/2002	AEHADG-10 10/16/2002	DMW-13A 10/16/2002	DMW-20A 10/16/2002	DMW-22A 10/30/2002	DMW-25A 10/16/2002	DMW-26A 10/15/2002
114 10 114 114			000	6369	5410	01 0022	01 0696	7170	2680 JO	Of 0191
Particle Magnesium		2000	904.7	359	7 021	797	117	114 JO	70	
100 37.1 j 37.1	Manganese		07	640	640	045	<40	o+>	37 10	<40
1900 1400 1500 1400 1400 1500	Night Night		2 OI	37.2 JO	38 4 JO	34 JO	42 JQ	<100	37 10	×100
19	Polycom		2000	Of 08++	4590 JQ	2230 JQ	Or 0762	2670	14000	9400
10	Calamin		\$, '\$,	\$	\$	\$	ζ.	φ.
1900 11300 11800 6200 6710 29200 14300	Citor		9	0	01>	<10	<10	<10	01>	<10
19 10 10 10 10 10 10 10	Sodium		2000	11300	00811	6200	6710	29200	41300	00206
Color Colo	Vincential		20	Of 180	12 JO	<\$0	Ş Ş	<\$0	Of 61	42 10
	Validation		20	24 1	24.2	47.7	<20 UL	23	<20 UL	<20 UL
N	Polychlormated Binhensis (PCBs) -	SW846 8082 ug/L								
N	DCD 1016		-	Ϋ́	Ϋ́ N	Ϋ́	Ϋ́	NA	Ϋ́	N A
0.2	PCB-1910			Y Z	X.	AZ	Y Y	ΑN	NA AN	N
NA	PCB-1332			Y Z	AN	AN	ΝΑ	Ϋ́	N A	V V
0.2	PCB-1242		-	X.	NA	AN	Ϋ́	Ϋ́	Ϋ́	NA
NA	PCB-1242		_	Y.Z	A'N	AN	NA	Y.	Ϋ́	ΝA
0.2 NA	DCB-1354		_	Ϋ́	Ϋ́	AN	Ϋ́	Y Y	Ϋ́	Ϋ́
02 NA	PCB-1250		_	Ϋ́	A'N	ΥN	٧ ٧	Ν	Ϋ́Z	Ϋ́Z
02 NA										
0.2 NA	Surrogate · %			Ž	Ž	8	Υ Z	Y.	Ϋ́Z	Ϋ́
0.2 NA	Decachioropiphenyi		1		. 2	Z	Z	ĄZ	Ą	AN
0.2 NA	Tetrachloro-m-xylene		:	¥ <u>z</u>	Y.	C.	5	1771	•	•
0.2 NA	Semi-Volatile Organic Compounds	- SW846 8270C SI	N ng/L						;	;
02 NA	Acenaphthene		0.2	X	Ϋ́	Ϋ́	Y Y	A A	¥Z	Ϋ́
02 NA	Acenaphthylene		0.2	N A	Ϋ́	Ϋ́	Y Z	¥Z.	¥Z	A.
02 NA	Anthacene		0.2	Y Z	Y Z	ΥN	Z A	Y V	¥ Z	N A
02 NA	Benzo(a)anthracene		0.2	Ϋ́Z	Y Y	Ϋ́	NA V	Ϋ́	Ϋ́	N A
02 NA	Be uzo(a)byrene		0.2	Ϋ́	Y.	Y Z	NA	Ϋ́	Ϋ́	Ϋ́
02 NA	Benzo(b)fluoranthene		0.2	A'N	Ą.	Y Y	NA	Ϋ́	Ϋ́	ΥZ
15	Benzol ahilnerylene		0.2	Ϋ́	ΑN	Ϋ́	Ϋ́	Y.	Y Z	Z Y
ne 02 NA NA<	Ben zo(k)fluoranthene		0.2	NA	ΑN	Ϋ́	N A	Ϋ́	ΥZ	NA
(a,h)Juntracene 02 NA	Christine		0.5	Ϋ́	ΑN	Ϋ́	Ϋ́	ΑN	VA	Ϋ́
tithene 02 NA NA <t< td=""><td>Orbenz(a b)anthracene</td><td></td><td>0.2</td><td>Ϋ́</td><td>ΑN</td><td>Ϋ́</td><td>Ϋ́</td><td>ΑN</td><td>NA</td><td>ΝΑ</td></t<>	Orbenz(a b)anthracene		0.2	Ϋ́	ΑN	Ϋ́	Ϋ́	ΑN	NA	ΝΑ
Included by the includence 0.2 NA NA <t< td=""><td>Choc in thene</td><td></td><td>0.2</td><td>Υ.</td><td>AN</td><td>Ϋ́</td><td>Ϋ́</td><td>NA</td><td>NA</td><td>ΥZ</td></t<>	Choc in thene		0.2	Υ.	AN	Ϋ́	Ϋ́	NA	NA	ΥZ
1,1,2,3-ed)pyrene 0.2 NA	Fluorent		0.2	Ϋ́	A'N	NA	Y Z	ΑN	Ϋ́	Ϋ́
Author D 2 NA NA <t< td=""><td>Indexes</td><td></td><td>0.2</td><td>Ϋ́</td><td>NA</td><td>ΝA</td><td>Ϋ́Z</td><td>A'N</td><td>AN</td><td>N A</td></t<>	Indexes		0.2	Ϋ́	NA	ΝA	Ϋ́Z	A'N	AN	N A
threne 0.2 NA	Naphhalene		0.2	A.	AN	ΝA	Ϋ́	AN	NA A	Y.
02 NA NA NA NA NA NA	Pheninthrene		0.2	A'N	ΑN	Ϋ́	AN	٧N	ΥN	× Z
	Deren		0.2	Ϋ́	ΑN	A'N	Ϋ́	N A	NA A	Ν

TABLE C-1

DATA SUMMARY TABLE FOR GROUNDWATER UPPER WATER BEARING UNIT - OCTOBER 2002
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virgina

	Sample ID: Sample Date:	Reporting (a)	Sample AEHADG-10 10/16/2002	Duplicate AEHADG-10 10/16/2002	Sample DMW-13A 10/16/2002	Sample DNIW-20A 10/16/2002	Sample DMW-22A 10/30/2002	Sample DMW-25A 10/16/2002	Sample DMW-26A 10/15/2002
Surrogate - %								;	;
2 4,6-Tribromophenol		;	ΥZ	۷ Z	Ϋ́	Y Y	¥ Z	Y.	ď;
2-Fluorohiphenyl		ł	Z	Y Y	X A	Y.	Y Z	¥ :	∢ :
2-Fluoruphenol		:	N A	N.A	۲X	Ϋ́Α	Y.	K Z	Y Y
Nitrobenzene-d5		;	Z V	NA	٧X	V.	NA	Υ	Y Z
Phenot-45		!	Ϋ́	Ϋ́	Ϋ́	Y Y	ΝA	Ϋ́	Y Z
Terphenyl-di4		1	٧	N A	۲ ۲	Ϋ́	Y Z	₹	Y Z
Thallium - SW846 7841 (Dissolved) µg/L. Thallium	<u>77a</u>	6	<2 UL	<2 UI	7	<2 UL	\$	\$	<2 UL
Thallum - SW846 7841 (Total) µg/L Thallum		61	<2 UL	<2 UL	7	<2 UL	\$	7	<2 UL
Total Alkalinity - MCAWW 310.1 mg/l. Total Alkalinity	<u>11.</u>	s	H E1	Hf El	\$	1 4 JB	11	76	19
Total Organic Carbon - SW846 9060 mg/L. Total Organic Carbon	<u>1/Bur</u>	-	H -	Hſ 1	H, I	- JB	2	=	91
Total Sulfide - MCAWW 376 1 mg/L Total Sulfide		-	⊽	033 JB	0 49 JB	H 1 1 H	0.32 JQ	Hf 180	69
Volatile Organic Compounds - SW846 8260B µg/L	6 8260В ив/L		·	;		•	-	7	-
1,1 1,2-Tetrachloroethane			<120	<120 1300	⊽ 7	⊽ ₹	⊽ ₹	⊽ ₹	⊽₹
1.1.1-Trichloroethane			100	1200	₹ 7	7 T	7 ⊽	7 ⊽	; ⊽
1,1 2,2-1 etrachloroethane		- -	071> <130	<120 <120	7 ⊽	7 ⊽	; ⊽	; ¬	; ⊽
L.J.Z-JIIKINOCCHAIN L.J-Dichloroethane		· -	<120	<120	⊽	~	0 48 JQ	~	⊽
L-Dichloroethene			Or 86	140 J	⊽	⊽	OC 190	⊽	7
1.1-Dichloropropene		-	<120	<120	7	~	⊽	⊽	⊽
1,2,3-Trichlorobenzene		-	<120	<120	⊽	⊽	n .	▼ '	⊽ '
1,2,3-Trichloropropane		-	<120	<120	⊽	⊽	⊽	⊽ '	⊽ '
1.2.4-Trichlorobenzene		-	<120	<120	⊽ '	⊽ '	S . ▼	⊽ .	⊽ .
1 2 4-Tranethylbenzene		_	<120	<120	⊽	⊽	<u>~</u>	⊽ '	⊽ '
1,2-Dibromo-3-chloropropane		6 1,	<250	<250	7	8	ζ.	<2	ζ.
1.2-Dibromoethane		-	<120	<120	⊽	⊽	⊽	⊽	⊽
1,2-Dichlorobenzene		-	140	140	⊽	⊽	0 44 10	⊽ '	⊽
1.2-Dichloroethane		-	<120	<120	⊽	⊽	⊽	⊽	⊽
1,2-Dichloropropane		7	<120	<120	⊽	⊽	⊽	⊽ '	⊽
1,3,5-Tnmethylbenzene		-	<120	<120	⊽	⊽	7	⊽	⊽
1,3-Dichlorobenzene		_	<120	<120	⊽	⊽ '	⊽ .	⊽ .	⊽ .
1,3-Dichloropropane		-	<120	<120	⊽	⊽ '	⊽ '	⊽ .	₹ .
1,4-Dichlorobenzene		-	<120	<120	⊽	~	⊽	⊽	⊽

TABLE C-1

DATA SUMMARY TABLE FOR GROUNDWATER
UPPER WA FER BEARING UNIT - OCTOBER 2002
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

	Sample ID:	Reporting (a)	Sample AEHADG-10	Duplicate AEHADG-10	Sample DMW-13A	Sample DMW-20A	Sample DMW-22A	Sample DMW-25A	Sample DMW-26A
	Sample Date.	Limit	10/16/2002	10/16/2002	10/16/2002	10/16/2002	10/30/2002	10/16/2002	10/15/2002
2.2-Dichloroproprine		_	<120	<120	⊽	⊽	7	⊽	~
2-Butanone		01	<1200	<1200	01>	ol>	<10 UJ	ol>	<10 UJ
2-Chlorotoluene			<120	<120	~	⊽	₹	7	⊽
2-Hexanone		10	<1200	<1200	<i0< td=""><td><10</td><td><10 UJ</td><td><10</td><td><10 UJ</td></i0<>	<10	<10 UJ	<10	<10 UJ
4-Chlorotoluene		-	<120	<120	7	⊽	7	⊽	⊽
4-Methyl-2-pentanone		01	<1200	<1200	<10	o1>	<10	0 I >	01>
Acetone		01	<1200 UJ	<1200 UJ	<10	0I>	<i0 r<="" td=""><td>2.5.10</td><td>1 6 JB</td></i0>	2.5.10	1 6 JB
Benzene			<120	<120	~	⊽	⊽	⊽	⊽
Bromobenzene		-	<120	<120	⊽	⊽	⊽	⊽	-
Bromochloromethane		-	<120	<120	⊽	7	⊽	~	⊽
Bromodichloromethane		-	<120	<120	⊽	~		⊽	⊽
Bromotorm		-	<120	<120	⊽	7	⊽	⊽	¶0 I>
Bromomethane		2	<250	<250	\$	7	7	<2	7
Carbon disultide		-	<120 UJ	<120 UJ	7	⊽	⊽	7	⊽
Carben tetrachloride		-	<120	<120	⊽	7	⊽	⊽	⊽
Chlorobenzene		_	<120	<120	⊽	~	⊽	7	7
Chloroethane		2	<250	<250	<2	7	<2	♡	\$
Chloroform		_	<120	<120	⊽	~	⊽	~	⊽
Chloromethane		2	<250	<250	<2	0 52 JQ	\$	~	\$
cis-1,2-Dichloroethene		0.5	059	069	<0.5	21	7	<0.5	0.38 JQ
cis-1 3-Dichloropropene		_	<120	<120	⊽	⊽	7	⊽	⊽
Dibromochloromethane		-	<120	<120	7	⊽	⊽	⊽	⊽
Dibromomethane		-	<120	<120	~	⊽	⊽	7	⊽
Dichlorodifluoromethane		2	<250 UJ	<250 UJ	₹	7	<2 UJ	\$	<2 UJ
Ethylbenzene		-	<120	<120	⊽	⊽	⊽	⊽	⊽
Hexachlorobutadiene		-	<120	<120	⊽	~	Sir	⊽	n ->
Isopropylbenzene		-	<120	<120	⊽	⊽	⊽	7	⊽
m-Xylene & p-Xylene		-	<120	<120	⊽	⊽	⊽	⊽	⊽
Methylene chloride		-	<120	<120	⊽	⊽	⊽	⊽	⊽
n-Butylbenzene		-	<120	<120	7	⊽	M √	⊽	⊽
n-Propylbenzene		_	<120	<120	⊽	⊽	~	⊽	~
Naphthalene		-	\$ 5	S8 JQ	⊽	⊽	r ∩	~	⊽
o-Xylene		0.5	<62	<62	<0.5	0 	<05	<0.5	<0.5
p-Isopropyltoluene			<120	<120	~	⊽	⊽	⊽	⊽
sec-Butylbenzene		-	<120	<120	⊽	⊽	⊽	⊽	⊽
Styrene		-	<120	<120	⊽	⊽	⊽	⊽	⊽

TABLE C-1

DATA SUMMARY TABLE FOR GROUNDWATER
UPPER WATER BEARING UNIT - OCTOBER 2002
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

	Sample ID: Sample Date	Sample ID - Reporting (a) ample Date - Limit	Sample AEHADG-10 10/16/2002	Duplicate AEHADG-10 10/16/2002	Sample DMW-13A 10/16/2002	Sample DMW-20A 10/16/2002	Sample DMW-22A 10/30/2002	Sample DMW-25A 10/16/2002	Sample DMW-26A 10/15/2002
		_	0.17	0.17	7	7	⊽	⊽	⊽
tert-Butylbenzene			1700	0061	7 ⊽	; ⊽	; <u>6</u>	14	~
Tolumen			<120	<120	∵ ⊽	⊽	⊽	~	v
rought 7-Dioblorosthens		0.5	<62	62	<0.5	<0.5	<0.5	<0.5	<0.5
trans 1.3 Diobloromonana		; -	<120	<120	~	⊽	⊽	~	⊽
trans-t, 7-Diction oproperit		-	2500	2800	7	2.5	01	~	Of 180
Techloroftuoromethone			<250	<250	\$	\$	♡	\$	<2 UJ
Vinyl chlorida		5	<250	<250	7	\$	7	4	7
Xylenes (total)		-	<120	<120	⊽	⊽	⊽	₹	⊽
Surrogate - %		!	×	8	87	80	06	98	92
1 2-DEMINIONE MARKETON		: :	6	S &	68	16	79	16	06
4-biginoligologuzzie			92	93	16	92	66	06	66
Toluma 49		ł	. 5	06	16	06	88	16	94

TABLE C-1

DATA SUMMARY TABLE FOR GROUNDWATER
UPPER WATER BEARING UNIT - OCTOBER 2002
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virgina

	Sample ID: Sample Date:	Reporting (a)	Sample DMW-27A 10/15/2002	Sample DMW-33A 10/29/2002	Sample DMW-35A 10/16/2002	Sample MW112-2 10/16/2002	Sample MWFOS-1 10/15/2002	Sample MWFOS-3 10/15/2002	Sample MWFTA-1 10/16/2002
FIELD PARAMETER: Dissolved Oxygen - E360.1 mg/L Dissolved Oxygen		10	-	90	0.7	-	90	8 0	2.2
Ferrous Iron - A3500D mg/L Ferrous Iron		10	0.5	24	<0.1	ю	- 0>	-0>	CI
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential	30A mV	;	-63	43	147	224	101	230	-158
pH - E150.1 pH Units pH		ļ	3 99	515	5 29	4 92	5 56	4 %	2 67
Specific Conductance - E120.1 mS/cm Specific Conductance	s)	0 001	0 123	0314	0 073	6110	0 240	0 107	0 557
Temperature - E176,1 deg C Temperature		10	22 3	981	197	6 61	20	204	20 5
Furbidity - E180.1 NTU Turbidity		-	⊽	42	⊽	26	36	=	218
FIXED BASE LABORATORY ANALYSIS- Anums - MCAWW 300.3A mg/L Chlorde	TASIS	-	20 1	53.7	11.7	164	12	9.2	348 J
Nitrate as N Sulfate		10	0 0 1 JQ 1 4	002 JQ 19 5	<0 4 2	0.06 JB 13.8	62 9	181	Or 85 0
Dissolved Gases - RSK SOP-175 mg/L Carbon droxide	⊒ I	0 001	220	66	19	70	42	200	450
Ethane		0 002	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	<0.002 0.0017	<0.002 <0.001	<0.007 <0.001	70 00 V0 000	0 00	700 O>
Einene Methane		0.001	29	0 015	0 002 JB	00 0>	0.012	1.2	8 4
Hydrogen by Microseeps - AM20GAX nM Hydrogen	Na X	0 03	24	61	2.5	ю	2.9	5.6	23
Mercury - SW846 7470A (Dissolved) µg/L. Mercury	<u> 7/2017</u>	-	⊽	⊽	⊽	⊽	⊽	⊽	NF</td

TABLE C-1

DATA SUMMARY TABLE FOR GROUNDWATER UPPER WA FER BEARING UNIT - OCTOBER 2002 Annual Groundwater Report - October 2002

			Defense R	Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia	hmond			
	Sample ID: Sample Date:	Sample ID: Reporting (a) ample Date: Limit	Sample DMW-27A 10/15/2002	Sample DMW-33A 10/29/2002	Sample DMW-35A 10/16/2002	Sample MW112-2 10/16/2002	Sample MWFOS-1 10/15/2002	Sample MWFOS-3 10/15/2002
46 7470A (Fotal) µg/L		-	⊽	⊽	⊽	⊽	⊽	~1 UL
6010В (Dissolved) µg/L	T					9	11,000	9 6 6
		200	130	S9 9 JQ	<200 OJ) 200 200	70 007×	71 4 76
		~	Ø	<5 UJ	Ą	\$	\$	Ŷ
		ς:	V	۵,	ζ.	٥	Ŋ	29.2
		200	Of 861	98 I JQ	29 5 10	31.8 JQ	136 JQ	Or 681
		9	01 00	01.78.0	Of \$9.0	25 JO	01>	<u>۱</u> ۰

	Sample ID: Sample Date:	Reporting (a) Limit	Sample DMW-27A 10/15/2002	Sample DMW-33A 10/29/2002	Sample DMW-35A 10/16/2002	Sample MW112-2 10/16/2002	Sample MWFOS-1 10/15/2002	Sample MWFOS-3 10/15/2002	Sample MWFTA-1 10/16/2002
Mercury - SW846 7470A (Fotal) ug/l.						-	7	Ē	=
Mercury		-	⊽	⊽	⊽	⊽	⊽	ZI OF	70 05
Metals - SW846 6010B (Dissolved) µg/L	<u>7</u>		!	3		0.0	111 0000	01 10	350
Aluminum		200	0£+	Dr 666	70 07>	کار ج م	2,5) + (? '
Antimony		~ •	0 4	5 v	0 4) () () 6°	35.9
Arsenic		n (i	0 2	<u>د</u> د ت	Ş 4	2 0 12	01.961	. o.: o.:	717
Ватип		200) (8) (8) (8	26 120	01 590	ر ه اد 10 م) - - -	012	071.30
Beryllium		10	کر کر در کرو	کار رہ در رہ	\$ C	\$ 65°	3 7	₹ 7	\$ 77
Calmium		20005	OI 756	13100	Of 0916	3400 JQ	15600) I 60 JQ	22200
Chroming		01) 	0f>	<101>	<10	<10	<10	oI>
Chichian		30	0 16 JO	30	<30	3.6 JB	<30	1.7 JB	1 2 JQ
Copper		10	<10	<10 <10		ol>	<10	34 JQ	0 I >
Iron		200	3950	5180	1360	994	445	3780	7540
pra-		3	Ş	Q	Ø	Q	Ø	V	۲,
Magnesium		2000	1750 JQ	9440	2350 JQ	2870 JQ	7770	Of 0661	30900
Manganese		20	21.7	145	47.9	619	43.5	\$ 2	544
Molybdenum		40	<40	<40	<40	<40	187 JQ	<40	-40
Nickel		100	×100	00I>	44 JQ	74 JQ	001×	001×	~100 ~100
Potassium		2000	2850 JQ	5540	3620 JQ	6110	6870	2080 JQ	8030
Selenum		5	Ŷ	ŋ	' ≎	Q	\$	\$	\$
Silver		10	<10	0I>	<10	<10	<10 <10	o1>	<10
Sodium		2000	5550	9050	2930 1Q	3400 JQ	9740	2980	14200
Vanadum		20	14 JQ	\$ 0	50	\$ 0	<50	~ 2 0	5.50
Zinc		20	<20 UL	<20	<20 NL	<20 UL	<20 UL	<20 UL	<20 UL
Metals - SW846 6010B (Total) µg/L									
Aluminam		200	435	91.2.10	<200 UJ	62 5 10	<200 N	943 10	310
Antimony		5	\$	<5 UI	Ą	Ö	\$	\$	\$
Archie		5	\$	\$	\$	'Ο	φ	27.4	35.7
Banism		200	Of 0+1	Of 9 18	30.9 JQ	32 1 10	J3 6 JQ	142 JQ	215
Beryllini		01	Of 980	<u>-</u> 8	071 JQ	25 JQ	0 64 JQ	OI>	Òſ -
Cadmin		7	V	7	\$	\$	\$	\$	<2
Calcum		2000	972 JQ	12900	3350 JQ	3410 JQ	15600	1220 1Q	21900
Chromian		10	<10	<10	<10	0 I>	<10	<i0< td=""><td>01×</td></i0<>	01×
Cohali		30	Of 180	30	<30	3.5 JB	30	13 JB	Of 860
Copper		10	دا 0	24 JB	<10	<10	<10	35 JQ	<10
tron		200	4020	5240	1460	1030	473	3850	7450
Lead		3	δ	Q	Ø	\$	\$	ئ	\$

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DATA SUMMARY TABLE FOR GROUNDWATER
UPPER WATER BEARING UNIT - OCTOBER 2002
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Defense Supply Center Richmond
Richmond, Virginia

Sample ID: Sample Date:	ID: Reporting (a)	Sample DMW-27A 10/15/2002	Sample DMW-33A 10/29/2002	Sample DMW-35A 10/16/2002	Sample MW112-2 10/16/2002	Sample MWFOS-1 10/15/2002	Sample MWFOS-3 10/15/2002	Sample MWFTA-1 10/16/2002
M. massessan	2000	Of 0871	9360	2430 JQ	2870 JQ	7770	Of 0961	30300
Manganese	20	203	146	49.5	623	44	65.5	531
Mon beloning	40	0 * >	<40	<40	<40	18 5 JQ	<40	<40
	100	<100	00T>	46 JQ	6 JQ	×100	3.5 JQ	<100
Potassium	\$000	2890 JQ	5520	3770 JQ	6110	6740	2090 JQ	7960
Selvanian Selvanian	5	\$	φ.	۵	\$	\$	Q	\$
Silver	01	<10	<10	<10	0 1 >	<10	O</td <td>01></td>	01>
Codim	2000	5640	8850	2910 JQ	3360 JQ	9490	6040	14200
Vanadum	20	14 JQ	<50	<50	0€>	20	<50	14 JQ
Zinc	50	<20 UL	18.2 JQ	<20 UL				
Polychlorinated Binhenyls (PCBs) - SW846 8082 ug/L	ig/L							
PCR-1016	- 	Y.	Ϋ́	Ϋ́	Ϋ́	ΑΝ	Ν	⊽
DCB-123	_	AN	×z	Ϋ́	A'N	ΥN	Ϋ́	⊽
PCB-1232	-	Ϋ́	A'N	Ϋ́	V V	Ϋ́	Ϋ́	⊽
DCB-1342	_	Ϋ́	Ϋ́Z	AN AN	ΑN	NA	Ϋ́	⊽
DCB-1248	-	Ϋ́	AN	N.	NA	Ϋ́	Ϋ́	⊽
VCB-1754	-	AZ	Ϋ́	AN	NA	NA	Ϋ́Ν	~
PCB-1260	-	NA V	N A	Ϋ́	Y.	Ϋ́	Ϋ́Z	⊽
Surrounts - %								
Der ac blombinbenvi	1	AN	ĄZ	N.	ΝΑ	Ϋ́	A'N	39
Tetrachloro-m-xylene	1	Ϋ́Z	٧Z	٧×	NA	٧Z	Ą V	95
Semi-Volatile Organic Compounds - SW846 8270C SIM ug/I	C SIM µg/L							
Acenaphhene	0.2	NA	Ϋ́	ΝΑ	N.	Ϋ́	V	O 083 1Q
Acenaphthylene	0.2	A'N	Ϋ́	N A	NA	Ϋ́	Y Z	<02
Application	0.2	N A	Ϋ́	A A	NA	ď Z	A A	0 046 JQ
Banzo(a)anthracene	0.2	Ϋ́	Ϋ́Z	ΝA	NA	Ϋ́Z	Υ V	<0.2
Benzo(a)nyrene	0.2	NA	NA AN	N A	Ϋ́	∀ Z	Z	<02
Ben and hittings antheme	0.2	NA	NA	ΥN	Z Y	Y V	Ϋ́	<0.5
Renzo(ohi)pervlene	0.2	NA	N.A	Ϋ́	Ϋ́	Ϋ́	Ϋ́	<0.2
Denoted Microanthene	0.2	Ϋ́	ΥZ	Z Y	N A	ΑN	ΑN	<0.2
Delit Cana	0.2	Y.	ΥN	Ą	N.	ΥZ	Υ	<0.2
Culystic Other (a bloothracens	0.2	Y.	Ϋ́	AN	Ϋ́	Ϋ́	Ϋ́	<02
Cluster than the contract of th	0.2	A'N	ΥN	4 Z	Ϋ́	ΑN	Y Y	<0.2
	0.5	N.	NA	Ν	A.	Ϋ́	Y Y	0.049 JQ
riabiting	0.3	N	Ϋ́	Ϋ́	ΑN	Ϋ́	Y.	<0.2
Nichthalene	0.2	Ν	NA VA	A'N	ΑN	ΥN	¥ X	2.3
Dhananthrane	0.3	AN	N A	AN	NA	Ϋ́Α	¥ Z	<0.2
Dynamic	0.5	NA	Y.	NA	Ϋ́N	V.	ΑN	<02
a state of								

TABLE C-1

DATA SUMMARY TABLE FOR GROUNDWATER
UPPER WATER BEARING UNIT - OCTOBER 2002
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Defense Supply Center Richmond
Richmond, Virginia

Surrogate - % 2 4 6-Tribromophenol 2-Fluorobiphenyl	Sample ID: Sample Date:	Reporting (a) Limit	Sample DMW-27A 10/15/2002	Sampie DMW-33A 10/29/2002	Sample DMW-35A 10/16/2002	Sample MW112-2 10/16/2002	MWFOS-1 10/15/2002	Sample MWFOS-3 10/15/2002	MWFTA-1 10/16/2002
Surrogate - % 2 4 6-Tribromophenol 2-Fluorobiphenyl									
2 4 6-1 rioromopnenoi 2-Fluorobiphenyl			Ž	Υ Z	ď	Ϋ́Z	Ϋ́Z	Ϋ́	105
z-rinoroniphenyi		1 1	Z Z	Z	. ₹	Y.Z	A'N	Ϋ́	\$
		:	ξ Z	Z Z	Y X	Z.	AN	Y.	78
2-riuorophenoi		i	C &	ζ Z	Y Z	Y Z	Ϋ́Z	AN	89
Nitrobenzene-do		1	(Į V	Z Z	Y Z	Ϋ́	Ϋ́Z	97
Phenoi-d3 Terphenyl-d14		: 1	N A	¥ Z	¥ Z	V Z	ΑΝ	Y.	84
Thallium - SW846 7841 (Dissolved) µg/L								,	:
Thallium		7	7	7	4	8	\$	4	75 OF
Thallium - SW846 7841 (Fotal) µg/L. [hallium		2	\$	\$	4	\$	\$	7	<2 UL
Total Alkalinity - MCAWW 310 1 mg/L. Total Alkalinity		8	36 JB	Н1 56	HI 11	49 JH	HI 81	62 JH	190
Total Organic Carbon - SW846 9060 mg/L. Total Organic Carbon	7		10	Hſ 1	7	⊽	Hſ -	4 JH	30
Total Sulfide - MCAWW 376.1 mg/L Total Sulfide		-	~	0 48 JQ	v	⊽	⊽	27 JH	14 JH
Volatile Organic Compounds - SW846 8260B µg/L	260B µg/L						,		•
1,1,1,2-Tetrachloroethane		- -	⊽ '	79 >	⊽ -	⊽ -	₹ ₹	æ ç Ç	⊽ √
1,1,1-Trichloroethane			⊽ .	089	⊽ ₹	⊽ 7	⊽ √) (2) (2) (3)	₹ √
1,1,2,2-Tetrachloroethane			⊽ 7	} ₹	⊽ 7	7	7 7	<330	7 ▽
I, I 2-Trichloroethane			J 7) S	7 ⊽	7 ▽	; ⊽	€530	OI 67.0
1-Dichloroethalic			; ⊽	280	⊽	~	⊽	<330	⊽
1.1-Dichloropoppe		_	~	<i>L</i> 9>	~	⊽	~	<330	7
1,1-Dichlorobenzene		_	⊽	<67 UJ	⊽	⊽	⊽	<330	⊽
2.3-Trchloropropane		-	⊽	29	7	√	⊽	<330	⊽
2 4-Trichlorobenzene		-	⊽	CO 103	⊽	⊽	⊽ '	<330	
1.2.4-Tumethylbenzene		_	⊽	<i>19></i>	⊽	⊽	⊽	<330	⊽ '
1.2-Dibromo-3-chloropropane		7	\$	<130	<2	\$	7	<670	7
1.2-Dibromoethane		-	⊽	<i>L</i> 9>	⊽	⊽	⊽	<330	⊽
1.2.Dichlorobenzene		-	⊽	29	⊽	⊽	7	<330	⊽
2-Dichloroethane		-	⊽	29	⊽	⊽	⊽ '	<330	⊽ '
1.2-Dichloropropane		-	⊽	29	⊽	⊽	⊽ '	<330	⊽ '
1.3.5-Tranethylbenzene		-	7	<i>L</i> 9>	⊽	⊽	⊽ '	<330	⊽ '
1.3-Dichlorobenzene		-	⊽	19>	⊽	⊽ '	⊽ .	<330	⊽ .
1.3-Dichloropropane		-	⊽	<i>L</i> 9>	⊽	⊽ '	⊽ .	æç>	⊽ .
1,4-Dichlorobenzene			⊽	L9>	⊽	⊽	⊽	955	⊽

TABLE C-1

			Sample	Sample	Sample	Sample	Sample	Sample	Sample
	Sample ID:	Reporting (a)	DMW-27A	DMW-33A	DMW-35A	MW112-2	MWFOS-1	MWFOS-3	MWFIA-1
	Sample Date:	Limit	10/15/2002	10/29/2002	10/16/2002	10/16/2002	10/15/2002	10/15/2002	10/16/2002
		-	7	19>	⊽	⊽	⊽	<330	~
2-Diction Optobraic		- 9	KU 01>	<670 R	<10	<10	<10 UJ	<3300	<10 <10
2-Dutailoin.		: -	~	29	⊽	⊽	⊽	<330	⊽
2-Hex mone		. 01	<10 UJ	<670 R	<10	01×	<10 UJ	<3300	<10
4-Chloradinene		-	~	<i>L</i> 9>	⊽	~	⊽	<330	7
4-Methyl-2-pentanone		01	<10	<670 UL	ol>	<10	<10	<3300	0I>
Acetobe		01	<10 UJ	<670 R	11.10	01×	<10 UJ	<3300) 8 JQ
Benzelle		-	~	<i>L</i> 9>	⊽	⊽	~	<330	⊽
Bronobenzene		_	⊽	<i>29</i>	~	⊽	⊽	<330	⊽
Bronne bloromethine		_	7	<i>L</i> 9>	⊽	7	⊽	<330	√
Bromodic blomomethane		_	~	<i>29</i> >	⊽	⊽	⊽	<330	v
Bromoform		_	ĭn I>	<i>29</i>	⊽	7	N]</td <td><330</td> <td>√</td>	<330	√
Bromomethane		2	0	<130	5	7	<2	<670	7
Carbon disulfide		_	7	<i>2</i> 9>	7	⊽	⊽	<330	⊽
Carbon retrachlonde		_	⊽	29	⊽	~	~	<330	~
Chlorobenzene			⊽	<i>L</i> 9>	⊽	⊽	7	<330	⊽
Chloroghane		2	<2	<130	7	7	<2	<670	7
Chloroform			⊽	<i>L</i> 9>	⊽	7	⊽	<330	-
Chloromethane		CI	7	<130	4	\$	<2	<670	3
cis-1,2-Dichloroethene		0.5	<0.5	1900	<0.5	<0.5	<0.5	0086	190
cis-1 3-Dichloropropene		-	⊽	<i>L</i> 9>	⊽	⊽	⊽	<330	⊽
Dibromochloromethane		-	⊽	<i>C</i> 9>	⊽	⊽	⊽	<330	⊽
Dibromomethane		-	⊽	C 92	~	⊽	⊽	<330	7
Dichlorodiffuoromethane		2	<2 UJ	<130 UJ	Ç)	7	7 CI	0/9>	4
Ethylbenzene		-	~	<i>L</i> 9>	⊽	⊽	7	<330	⊽
Hexachlorobutadiene		_	rn マ	CO 101	⊽	⊽	M ->	<330	⊽
Isopropylbenzene		-	⊽	<i>L</i> 9>	~	⊽	⊽	<330	⊽ '
m-Xylene & p-Xylene		-	~	<i>L</i> 9>	⊽	⊽	⊽	<330	7
Methylene chloride		-	⊽	29 JQ	⊽	√	⊽	310 10	7
n-Butylbenzene		_	7	(10 L9>	⊽	⊽	⊽	<330	⊽
n-Propylbenzene		-	⊽	<i>C</i> 9>	⊽	⊽	⊽	<330	⊽
Nanhthalene		_	~	(10 <i>L</i> 9>	⊽	⊽	⊽	<330	36
o-Xylene		0.5	<0.5	€	<0.5	<0.5	<0.5	<170	<0 5
n-Isopropyltoluene		-	⊽	29	7	⊽	⊽	<330	⊽
sec-Butylbenzene		-	⊽	CO 103	⊽	⊽	⊽	<330	⊽
Styrene		-	⊽	<i>L</i> 9>	⊽	⊽	⊽	<330	⊽

TABLE C-1

	Sample ID: Repor Sample Date: Lu	Reporting (a)	Sample DMW-27A 10/15/2002	Sample DMW-33A 10/29/2002	Sample DMW-35A 10/16/2002	Sample NIW112-2 10/16/2002	Sample MWFOS-1 10/15/2002	Sample MWFOS-3 10/15/2002	Sumple MWFTA-1 10/16/2002
tert. Rutulhanzena		_	⊽	<i>L</i> 9>	⊽	⊽	⊽	<330	⊽
Tetrochlorouthene		-	~	450	19	⊽	~	<330	⊽
Toluena			. △	<i>L</i> 9>	~	⊽	√	<330	⊽
react 7. Deplomethine		0.5	<05	33	<0.5	<0.5	<0.5	140 JQ	<0.5
trans. J. 2. Dichloroppingne			₩ ₩	<i>L</i> 9>	⊽	⊽	⊽	<330	⊽
Try blocostbase		_	: ⊽	2500	2	⊽	⊽	7600	⊽
The blood account to		. 3	<2 UJ	<130	\$	\$	<2 UJ	0/9>	₽
Visit bonds		2	· 7	<130	\$	\$	\$	360 JQ	4
Xylenes (total)		·	- ▼	<i>L</i> 9>	⊽	⊽	⊽	<330	7
Surrogate - %				,	ì	ţ	Š	ţ	ŗ
1 2-Dichloroethane-d4		1	\$	6	98	62	35	, 0	/0
1-Bromofliorobenzene		:	06	85	06	06	33	91	96
Physical incrementation		1	101	101	92	16	001	93	8
Toluene-d8		I	94	94	16	16	94	16	91

TABLE C-1

	Sample ID: Sample Date.	Reporting (a) Lamit	Sample MWFTA-3 10/17/2002	Duplicate MWFTA-3 10/17/2002	Sample MWFTA-5 10/29/2002	Sample MWFTA-7 10/17/2002	Sample MWFTA-9 10/29/2002	Sample MWFTA-10 10/29/2002	Sample MWFTA-23 10/15/2002
FIELD PARAMETER: <u>Dissolved Oxygen - E360.1 mg/L</u> Dissolved Oxygen		0 1	80	80	-	90	-	10>	4 9
Ferrous Iron - A3500D mg/L Ferrous Iron		10	2	2	3.4	7	3.2	ю	50
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential	10A mV	1	-28	.28	=	405	161	63	92-
<u>pH - E150.1 pH Units</u> pH		1	5 26	5 26	6.37	3 43	5.31	5 94	1 \$
Specific Conductance - E120 1 mS/cm Specific Conductance	-1	0 001	0 432	0 432	0 115	0 114	0 064	9110	0 249
<u>Temperature - E170.1 deg C</u> Temperature		10	88	18 8	159	19.8	163	151	8 61
Turbidity - E180 1 NTU Turbidity		-	'n	8	10	⊽	т.	10	84
FIXED BASE LABORATORY ANALYSIS: Amons - MCAWW 300 3A mg/L Chlorde	LYSIS:		747	73.5	4 /	7.2	7.8	46	364
Nitrate as N		0 1	10>	<0.1	<0.1	OF 90 0	<0.1	10>	10>
Sulfate		-	27.8	25.2	13.7	29.8	× ×	ο 4	×
Dissolved Gases - RSK SOP-175 mg/L Carbon droxide	- 11	0 001	96	93	39	89	49	38	210
Ethane	•	0 002	\$ 600 \$ 600	0005 0007	0 005 7 0 005	40 005 70 005	0 005 70 001	0 007 9 86 7	0 00089 JQ 0 036
Ethene Methane		0 001	0 14	0 14	0.0011 JB	0 0034	0 0021	0 004	41
Hydrogen by Microsceps - AM20GAX nM Hydrogen	X nM	0 03	3.1	2.7	ĸ	2.5	3.7	4 5	61
Mercury - SW846 7470A (Dissolved) ug/L. Mercury	ns/L	-	v	⊽	⊽	⊽	⊽	⊽	\overline{v}

TABLE C-1

DATA SUMMARY TABLE FOR GROUNDWATER
UPPER WATER BEARING UNIT - OCIOBER 2002
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

Mcrury - SW846 7470A (Total) µg/L Mercury Metals - SW846 6010B (Dissolved) µg/L Alumnum Anumony Arsens	Limit	10/17/2002	10/17/2002	10/29/2002	10/17/2002	10/29/2002	10/29/2002	10/15/2002
Metals - SW846 6010B (Dissolved) ng/L Alumum Anunony Arsenc Barum	-	⊽	⊽	~	⊽	$\overline{\lor}$	7	~
Aluminum Anumony Arsenic Banum								
Antimony Arvenic Banum	200	Of 181	228) or £11	730	S9 JQ	<200	Or 621
Arsenic Barium	5	٥	φ	m <>	Ą	<5 UJ	<5 UJ	Ÿ
Barium	\$	158	91	\$	ζ,	\$	\$	75.5
	200	65 4 JQ	67 1 10	25 5 JQ	80 5 JQ	DI 681	63 JQ	251
Beryllium	10	0.62.30	Ot 17.0	ol>	Of 61	<10	<10 <10	12 JQ
Cadmum	2	7	\$	3	4	\$	\$	7
Calcium	2000	4750 JQ	4830 JQ	3350 JQ	3680 JQ	2180 JQ	4060 JQ	2520 JQ
Chromum	0	0 1 >	o1>	<10	17 JQ	ol>	<10	<10
Cobali	30	12 JQ	0 84 JQ	<30	44 JQ	13 JB	0.74 JB	s 10
Copper	0	0I>	<10 دا0	<10	01>	ol>	1 8 JB	<10
Iron	200	3070	3130	384	<200	179 JB	329 JB	21300
Lead	33	Ÿ	Q	Q	18 10	Q	₹	٠
Magnesium	2000	3070 JQ	3120 JQ	2620 JQ	2560 JQ	1630 JQ	3240 JQ	3260 JQ
Manganese	20	739	76.2	512	393	26.2	61.1	196
Molybdenum	40	0+>	<40	<40	<40	25 10	<40	<40
Nickel	001	×100	00I>	<100	<100	00T>	<100	49 JQ
Potassium	2000	5440	5480	4300 1Q	2920 JQ	2580 JQ	3520 JQ	3580 1Q
Selemum	S	ζ.	\$	ζ.	\$	\$	\$	ζ,
Silver	01	01>	01>	<10	<10	o1>	<10	<10
Sodium	2000	43300	43600	8340	1760 JQ	5790	7780	4800 JQ
Vanadium	20	O8 1Q	0.74.10	<50	<50	<50	\$0	- ∝
Zinc	20	<20	<20	30.9	<20	<20	<20	25 1
Metals - SW846 6010B (Total) µg/L								
Aluminam	200	216	246	<200	757	OF 1 09	<200	174 JQ
Antimony	5	Ф	\$	o u	\$	m ç>	<5 UJ	ζ.
Arsenic	5	138	15.1	\$	\$	\$	3.2 JB	77.2
Barum	200	Of 9 69	70.1 JQ	27 JQ	8t JQ	JR 3 JQ	7 1 JQ	256
Berylltum	10	Of 90	0.73 JQ	OI>	18 JQ	<10	×10	5 70
Cadmun	3	₽	♡	7	0.32.3Q	7	7	7
Calcium	2000	4990 JQ	5010	3230 JQ	3730 1Q	2130 JQ	4060 JQ	2590 JQ
Chromium	01	o1>	01>	<10	01>	<10 <10	o1>	0 I >
Cobalt	30	O 78 JQ	<30	<30	44 JQ	0 93 JB	<30	S6 JQ
Соррет	01	ol>	<10	<10	Of 61	<10	0I>	<10
Iron	200	3280	3290	518	<200	226	352	21800
Lead	ю	Q	Q	Q	0 8 1	۲۶	Φ	٣

TABLE C-1

	Sample ID:	Reporting (a)	Sample MWFTA-3 10/17/2002	Duplicate MWFTA-3 10/17/2002	Sample MWFTA-5 10/29/2002	Sample MWFTA-7 10/17/2002	Sample MWFTA-9 10/29/2002	Sample MWFTA-10 10/29/2002	Sample MWFTA-23 10/15/2002
		2000	01.0105	3240 IO	2570 10	2540 JO	Of 0251	3250 JQ	1280 JQ
เปลยูกอรานาม		2000	y	7 8 7	5 0 5	38.4	76 1	62.7	861
Manganese		07	611	t (- 67	740	<40	<40
Molybdenum		94	0+	0+>	<u>0</u> + 55	} -	201	2 (01.89
Ta A Silver		901	90 V	~100 ~100	201 ×	31	001×	2017	y <u>-</u>
Polassillar		2000	5470	9919	4180 JQ	2970 1Q	2490 1Q	3510 JQ	Dr 0153
		٠	φ.	ψ	\$	\$	Q	\$	\$
Selemum		. =	÷ 5	· 10	<10	<10	0I>	<10	01>
Silver		0005	46000	45700	8240	1750 JO	2400	1670	4870 JQ
Sodium		0000	OU CO O	95	05/	950	0 ,	<50	13.10
Vanadium		96	کار ۱۹۶۵ ورز	3 8	3 (5	<20	<20	55
Zinc		07	07>	3	2	;	}	ļ	
Polychlomosted Binhends (PCBs) - SW846 8082 ue/L	SW846 8082 ue/L								
NCD 1016		_	\overline{v}	⊽	Y X	X.	Ϋ́	Ϋ́	NA V
PCB-1016			: ¬	7	Y.	Ϋ́	Ϋ́	Ϋ́	NA
FCB-1221			: 7	~	Y.	ΥN	Ϋ́N	Ϋ́	ダΖ
PCB-1232			; ¬	₹	ΨZ	Ϋ́	Ϋ́	V.	ΑN
PCB-1242			7 7	7 7	\ Z	Ϋ́Z	Ą.	Ϋ́Z	AN
PCB-1248		•	7 '	7 7	V V	Ž	. ▼ Z	42	Ϋ́
PCB-1254		_	⊽	⊽	¥Y.	V	<u> </u>		
PCB-1260		-	⊽	⊽	ď.	Z V	ď.	ď.	ζ.
8									
Surrogate - 76		1	19	09	Ϋ́	Z	A.	NA	Ϋ́
Decachlorobiphenyl		!	5 <u>=</u>	3 =	Ϋ́	Ž	ΑN	٧Z	NA
Tetrachloro-m-xylene		;	-	2	<u>:</u>				
Semi-Voluttle Organic Compounds - SW846 8270C SIM µg/L	SW846 8270C SI	M µg/L							;
Acmachthene		0.2	<0.5	<02	ΥN	Ϋ́	A'N	Y Z	N.
According		0.2	<0.2	<02	Ϋ́	Ϋ́	ΑN	NA	Ϋ́
Acetaphanytene		0.2	<0.2	<0.2	NA	Ϋ́Z	NA	ΥA	Ϋ́
Authorities and Chamber come		0.2	<0.2	<0.2	Ϋ́Z	Ϋ́	N A	Ϋ́Z	NA
		0.2	<0.2	6 02	ΑN	N.	ΑN	NA	A V
Benzolalpylene			- 0>	<0.2	Z	Ϋ́	AN.	Ϋ́Z	¥ Z
Benzo(b)Huoranniene		. C	, ç	<0.2	Y Z	Ϋ́	ΥZ	Ϋ́	Ϋ́Z
Senzo(gill)peryiene		200	, ç	<0.2	¥Z	Ϋ́	ΑN	Ν	Ϋ́
Ben70(k)HBD14HHBHE			200	<0.5	X	NA	ΥN	ΥN	A'A
Chrysene			? ?	6	Y Z	Ϋ́	Ϋ́	Ϋ́	Ϋ́
Dibenz(a h)anthracene		3 (. 6	5 6	Z	Ϋ́Z	¥Z.	ď	Ϋ́
Fluoranthene		4 (9 5	200	V N	Ž	ĄZ	Ϋ́	Ϋ́
Fluorene		70	202	7 0	Ç <u>4</u>	S Z	7	Į Z	Ϋ́
Indeno(1 2.3-cd)pyrene		0.5	7 0>	70>	¥ :	<u> </u>			5 2
Naphthalene		0.2	<0.7	<0.2	K Z	X :	Y :	4 :	¥ ;
Phen.inthrene		0.2	<0.5	<0.7	ΝA	Y V	Y Z	ď Z	YZ ·
Deresina		0.2	<0.5	<0.2	A'N	Ϋ́	Ϋ́	Y Z	Y Z
rytene									

TABLE C-1

	Sample ID: Sample Date	Reporting (a) Limit	Sample MWF1A-3 10/17/2002	Duplicate MWFTA-3 10/17/2002	Sample MWFTA-5 10/29/2002	Sample MWFTA-7 10/17/2002	Sample MWFTA-9 10/29/2002	Sample MWFTA-10 10/29/2002	Sample MWFTA-23 10/15/2002
\$ ·									
Surrogate - %			č	6	Z	Z	Ž	Ϋ́Z	Ϋ́
2.4,6-1 ribromophenoi		1	3 5	2 3	Z	¥ Z	X	Ϋ́	NA
2-Fluorobiphenyl		;	ŝ	5 5	(Y	. Z	¥2	¥ Z	Z
2-Fluorophenol		1	28	60	Ç :	ζ.,	<u> </u>	. V.	2
Nitrobenzene-d5		:	67	57	Z.	¥ ;	¥ :	¥ ;	C 2
Phenol-d5		:	46	Z	Y X	Y X	A'	ď Z	¥ :
Terphenyl-d14		1	59	310	Ϋ́	Ϋ́	Y Y	K Z	V Z
Thallium - SW846 7841 (Dissolved) 112/L	1 <u>8/L</u>					;	•	•	ć
Thallium		2	<2 UL	<3 UL	7	<2 UJ	₹	77	7>
Thathum - SW846 7841 (Total) µg/L Thallum		7	<2 UL	<2 UL	\$	<2 UL	\$	\$	\$
Total Alkalimty - MCAWW 310 1 mg/L. Total Alkalimty	<u>g/L</u>	\$	20	22	15	۵,	74 JH	26	23
Total Organic Carbon - SW846 9060 mg/L. Total Organic Carbon	<u>mg/L</u>	-	œ	œ	⊽	2	⊽	⊽	Ξ
Total Sulfide - MCAWW 376 1 mg/L. Total Sulfide	11	-	O1 870	Or 82 0	0 48 JQ	⊽	ðr 960	Of 80	⊽
Volatite Organic Compounds - SW846 8260B µg/L	46 8260B µg/L						•		9061
1,1,1 2-Tetrachloroethane		-	7	\$	⊽ '	⊽ .	⊽ -	⊽ -	0071>
I.I.I-Trichloroethane		-	7	\$	⊽ '	⊽ .	⊽ .	⊽ ′	2007
1,1,2 2-Tetrachloroethane		-	7	7	▼ .	⊽ .	⊽ ′	⊽ -	0071>
1 2-Trichloroethane		-	4	Ç	▽ '	⊽ .	⊽ -	⊽ ⁻	0071>
1, 1-Dichloroethane		_	Of 90	\$ 55	⊽ 7	⊽ 7	⊽ ¬	⊽ ₹	00217
1, 1-Dichloroethene		_	Of 69 0	0 t 10	⊽ -	⊽ 7	⊽ 7	⊽ 7	0021>
1,1-Dichloropropene		<u> </u>	ς, ,	ς,	⊽ =	⊽ √	⊽ ₹	⊽ =	<1200
1,2,3-Tnchlorobenzene			7 '	, °	5 -	7 7	3 -	3 -	71200
1,2,3-Trichloropropane			S) (Q 9	⊽ ₹	⊽ 7	- - -	√ -	1200
1,2,4-Trichlorobenzene		_	7 '	7 '	5 -	7 7	3 -	5 -	2071
2 4-Trimethylbenzene		_	7	\$.	⊽ '	⊽ ′	۲ √	۶ ۲	005C>
1,2-Dibromo-3-chloropropane		2	\$	<u>\$</u>	7	3	7	7,	0007>
1.2-Dibromoethane		-	7	7	7	7	⊽	⊽	<1200
1.2-Dichlorobenzene		-	7>	7	⊽	⊽	7	₹	<1200
1.2-Dichloroethane		-	4	7	⊽	⊽	⊽	⊽	<1200
1.2 Dichlomoronape		-	8	42	⊽	⊽	⊽	⊽	<1200
1.2 C. Trumethylbenzene		_	4	\$	⊽	⊽	⊽	⊽	<1200
1.3. Decklorobenzene			7	4	⊽	⊽	⊽	⊽	<1200
1.2 Dechoronomen		-	7	\$	⊽	~	⊽	⊽	<1200
1,3-Diciliotophypane		-	9 %	4	⊽	⊽	7	~	<1200
(4-Dichlorobenzene			;	ļ	•				

TABLE C-1

	Sample ID: Sample Date:	Reporting (a) Limit	Sample MWFTA-3 10/17/2002	MWFTA-3 10/17/2002	MWFTA-5 10/29/2002	MWFTA-7 10/17/2002	MWF1A-9 10/29/2002	MWFTA-10 10/29/2002	MWFFA-23 10/15/2002
2.2-Dic blistopropane			7	4	⊽	⊽	⊽	⊽	<1200
2-Butanone		01	<20 UJ	<20 UJ	<10 R	<10 UJ	<10 R	<10 R	<12000
2-Chlorotoluene		-	7	7	⊽	⊽	⊽	⊽	<1200
2-Hexanone		01	<20 UJ	<20 UJ	<10 R	<10 UJ	<10 R	<10 R	<12000
4-Chlorototuene		-	7	Q	~	⊽	~	⊽	<1200
4-Methyl-2-pentanone		10	<20	<20	<10 UL	<10	<10 UL	<10 UL	<12000
Acetone		01	<20 UJ	<20 UJ	<10 R	12 JQ	<10 R	<10 R	<12000
Benzene		-	\$	\$	⊽	⊽	~	⊽	<1200
Вгопкреплене		-	7	\$	⊽	⊽	⊽	⊽	<1200
Bromochloromethane		-	7	\$	7	⊽	⊽	~	<1200
Bromodichloromethane		1	<2	~	~	⊽	⊽	~	<1200
Bromoform		_	<2 UJ	<2 UJ	⊽	<1 UJ	⊽	~	<1200
Bromomethane		2	\$	4	4	7	7	7	<2500
Carbon disulfide		-	<2>	\$	~	~	⊽	~	<1200
Carbon tetrachloride		-	7	\$	⊽	⊽	⊽	~	<1200
Chlorobenzene		-	Ç	<2	~	⊽	⊽	~	<1200
Chloroethane		6	₹	4	7	\$	\$	\$	<2500
Chloroform		-	7	\$	⊽	⊽	₹	⊽	<1200
Chloromethane		2	4	4	7	7	₹	7	<2500
cis 1,2-Dichloroethene		0.5	98	\$	<05	<05	<0.5	<0.5	52000
c1s-1 3-Dichloropropene		-	7	\$	7	⊽	~	⊽	<1200
Dibromochloromethane		-	\$	7	⊽	~	⊽	~	<1200
Dibromomethane		-	7	\$	⊽	⊽	7	~	<1200
Dichlorodifluoromethane		2	<u>\$</u>	₹ П	<2 UJ	<2 UJ	<2 UJ	<2 UJ	<2500
Ethylbenzene		1	\$	7	⊽	⊽	-	⊽	<1200
Hexachlorobutadiene		-	<2 UI	<2 UJ	f n I>	i 10 10 10 10 10 10 10 10 10 10 10 10 10	7	ſn I>	<1200
Isopropylbenzene		_	7	7	⊽	⊽	-	⊽	<1200
m-Xylene & p-Xylene		-	Ç	7	~	⊽	⊽	⊽	<1200
Methylene chloride		-	7	\$	~	⊽	⊽	⊽	1300
n-Butylbenzene		-	7	\$	n∵	⊽	m ·>	r n I>	<1200
n-Propylbenzene		_	4	\$	~	⊽	~	⊽	<1200
Naphthalene		_	ζ,	\$	m I>	~	m I>	UJ</td <td><1200</td>	<1200
o-Xylene		0.5	⊽	⊽	<0.5	<05	<05	<05	<620
p-Isopropyltoluene		_	77	\$	⊽	⊽	⊽	~	<1200
sec-Butylbenzene		-	7	\$	rn I>	⊽	UJ</td <td>fn I></td> <td><1200</td>	fn I>	<1200
Character		_	C	?	7	_	~	7	/1300

TABLE C-1

	Sample ID: Sample Date:	Sample ID: Reporting (a) imple Date: Limit	Sample MWFTA-3 10/17/2002	Duplicate MWFTA-3 10/17/2002	Sample MWFTA-5 10/29/2002	Sample MWFTA-7 10/17/2002	Sample MWFTA-9 10/29/2002	Sample MWFTA-10 10/29/2002	Sample MWFTA-23 10/15/2002
tert-Butylbenzene		-	4	4	⊽	⊽	⊽	⊽	<1200
Tetrachloroethene		-	6	8 6	⊽	7	⊽	⊽	<1200
Toluene		_	8	₹	⊽	⊽	⊽	~	<1200
trans-1,2-Dichloroethene		0.5	2.5	26	<0.5	<0.5	<05	<05	<620
trans-1,3-Dichloropropene		-	7	7	⊽	~	⊽	~	<1200
Trichloroethene		-	16	8 \$	⊽	⊽	~	⊽	<1200
Trichlorofluoromethane		2	<4 UJ	<4 UJ	\$	<2 UJ	7>	7	<2500
Vinyl chloride		2	4	4	7	7	<2	7	2500
Xylenes (total)			7	<2	⊽	⊽	₹	7	<1200
Surrogate - %									
1,2-Dichloroethane-d4		1	16	92	91	93	86	93	98
4-Bromofluorobenzene		ţ	68	16	80	96	83	81	88
Dibromofluoromethane		ŀ	76	86	86	86	101	901	92
Toluene-d8		ł	\$	94	06	93	92	16	80

	٠,
	r.
	-
-	5
	7

U	Celsius
_	Estimated, based on QC data
13	Estimated, possibly biased high or false positive based on blank
	contamination
프	Estimated, possibly biased high based upon QC data
oʻ.	Estimated, Value is between reporting limit and detection limit
Λm	milhvoit
mg/L	miligrams per liter
mS/cm	milhSeimens per centimeter
μg/L	micrograms per liter
ΝA	Not Analyzed
Σ	nanoMoles
NTU	nephelometric turbidity unit
Ħ	negative log of thehydrogen ion concentration
~	unusable
⋽	undetected, Reported Detection Limit is imprecise
Π	Undetected, Data brased low - Reported Detection Limit is high-

undetected, Reported Detection Limit is imprecise Undetected, Data biased low - Reported Detection Limit is higher under normal operating procedures with the method-required sample volume extracted and analyzed. Sample reporting limits may vary due to sample volume/sample weight extracted and/or sample dilutions Reporting limits presented are the best that can be achieved than indicated

3

PREPARED/DATE JAH 5/29/03 CHECKED/DATE JAV 5/29/03

DATA SUMMARY TABLE FOR GROUNDWATER
LOWER WATER BEARING UNIT - OCTOBER 2002
Annual Greundwater Report - October 2002
Operable Unit 7

Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

	Sample ID:	Reporting (a)	Sample MWFTA-14	Sample Sample MWFTA-16	Sample MWFTA-17	Sample MWFTA-18	Sample Sample MWFTA-18 MWFTA-19	Sample Sample MWFTA-29B MWFTA-29B 10/29/2002	Sample MWFTA-29B 10/17/2002
	Sample Date:		7007177101	7007 (01 (01	7007 67				
FIELD PARAMETER: <u>Dissolved Oxygen - E360.1 mg/L.</u> Dissolved Oxygen		0	2.4	8	4	1.1	7	1.5	17
Ferrous Iron - A3500D mg/L Ferrous Iron		0.1	₽	0>	- 0	æ	9	0.5	-
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		:	195	-149	-64	68-	61-	-93	-82
pH - E150.1 pH Units pH		!	80 6	12 23	12 33	7 34	68 01	7 09	12 44
Specific Conductance - E120.1 mS/cm Specific Conductance		0 001	0 495	1 92	<u>-</u>	9510	0 725	0 697	1 9
Temperature - E170.1 deg C Temperature		0.1	14	181	981	17	161	12 4	187
Turbidity - E180 1 NTU Turbidity		-	∞	<u>4</u>	٣	∞	7	21	61
FIXED BASE LABORATORY ANALYSIS: Anions - MCAWW 300.3A mg/L Chloride Nutrate as N Sulfate			139 001 JQ 202	11 6 <0 1 7 1	56 <01 108	47 <01	64 <01 63	58 2 <0 1 5 6	2 <0 30 4
Dissalved Gases - RSK SOP-175 mg/L Carbon droxide Ethane Ethene Methane		0 001 0 002 0 001 0 001	0 22 JB <0 002 <0 001 0 0007 JB	<0.17 0.0055 0.049 0.12	<0 17 <0 002 <0 001 0 13	15 <0 002 <0 001 0 043	<0.17<0.002<0.001<0.0028	18 <0 002 <0 001 0 41	<0.17 0.00039 JQ 0.0013 0.034
Hydrogen by Microseeps - AM20GAX nM Hydrogen		0 03	3 8	7.2	4	26	16	46	26
Mercury · SW846 7470A (Dissolved) ug/L Mercury		-	⊽	⊽	7	~	⊽	⊽	⊽
Mercury - SW846 7470A (Total) ug/L Mercury		_	⊽	⊽	⊽	⊽	7	⊽	⊽
Metals - SW846 6010B (Dissolved) µg/L. Alummum		200	<200	85 4 JQ	4430	<200 UJ	616	<200	266
20701 06									Page I of 7

TABLE C-2

	S	Dominating (a)	Sample Sample	Sample MWFTA.16	Sample MWFFA.17	Sample MWFTA-18	Sample Sample MWFTA-18 MWFTA-19	Sample MWFTA-28B	Sample MWFTA-29B
	Sample Date:	Acpoi ung (a) Limit	10/29/2002	10/15/2002	10/15/2002	10/16/2002	10/17/2002	10/29/2002	10/17/2002
A reconstruction		S	44 2 J		Δ.	\$	\$	<5 UJ	٧
Allumony		. •	\ \ \	2.5.10	\$	\$	3.2 JB	Ϋ	ζ.
Arsenic		200	40.9 JO	329	Of 711	30 8 JO	63 1 JQ	137 JQ	DF 861
		01	01>	01>	, 	· 01>	<10	01×	ol>
Berymun		2 6	0	. \$	3	A	7	8	8
Cadmium		2000	7580	55500	92400	8400	52700	35300	20607
Calcium		01	01>	0 >	×10	<10	01>	01×	ol>
Chromium		90,	€30 <30	30	30	<30	<30	<30	<30
Cobail		01	23 18	o1>	01>	ol>	<10	ol>	o1>
Copper		200	<200	<200	<200	1470	<200	2210	<200
Total		3	V	φ	\$	Q	۵	Ø	Q
Mornogram		2000	6470	326 JQ	< > 2000	4920 JQ	<5000	23300	<5000
Magnesium		20	29 JO	<20	<20	71.9	<20	204	<20
Maingailese Maint-domina		40	86 JO	<40	<40	<40	<40	<40	68 30
Menyinderidiri		100	<100	VI00	<100	00I×	<100	~1 00	3 10
Michel		2000	46500	92500 J	21300	5590	9870	12500	57400
rotassiumi Solomine		5	Ą	φ	۵	ζ.	۵,	ŋ	\$
Schuum		10	<10	<10	<10	o1>	0 I >	0 I>	01>
Survei		2000	49700	37600 J	12600	7740	5370	23500	49000
Nonedum		50	<50	3.2 JQ	72 JQ	<50	2 8 JQ	<50	l 4 JQ
Zinc		20	<20	<20 UL	<20 NT	<20 NL	² 50	~ 50	<20
Metals . SW 846 6010B (10tal) HBL		200	<200	479	4820	<200 UJ	837	<200	1200 JH
Aluminum		v	m \$	₹ \$	٠ <u>٠</u>	\$	\$	<5 UJ	δ
Amiliony		· v o	٧.	δ	۵	Ϋ.	2 i JB	۵	2.2 JB
Alscilic		200	39.7 JQ	557	127 JQ	345 JQ	67 2 JQ	141 JQ)36 JQ
Barollium		9	oI>	<10	01>	<10	<10 <10	<10	<10
Dety main		2	7	7>	\$	7	4	7	\$
Cadmin		2000	7250	111000	101000	8800	57800	36300	00089
Christian		01	01>	<10	oI>	<10	0I>	<10	33 10
Cultinum		30	<30	<30	<30	<30	<30	<30	<30
Cobain		01	2 JB	2.3.30	<10	0I>	<10	o1>	0f 61
Cupper		200	<200	581	<200	0691	<200	2330	009
1011		3	\$	♡	Ø	Q	Ø	Δ	\$
Magneting		2000	6350	00191	<>0000	5180	230 JQ	23800	S99 JQ
Magnesian		20	33 JQ	324	<20	773	13 JB	209	15.7 JQ
Malabdanim		40	75 10	<40	<40	<40	<40	<40	71 JQ
Motypuction:		100	<100	01×	00 1 ×	12 JQ	00I>	~10 0	3.8 JQ
MICHE									

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1,3-Dichloropropane

LOWER WATER BEARING UNIT - OCTOBER 2002 DATA SUMMARY TABLE FOR GROUNDWATER

Annual Groundwater Report - October 2002 Defense Supply Center Richmond Operable Unit 7

Silver

MWFTA-18 NIWFTA-19 MWFTA-28B MWFTA-29B 10/17/2002 0 62 JQ <5 <10 <10 <146200 </p>
1 4 JQ <20 </p> 340 JL Sample 2 UJ 2 UL 10/29/2002 Sample 12800 5 <10 24100 50 50 3 $\triangledown \ \triangledown \ \nabla \ \nabla \ \nabla \ \nabla$ V Ø 10/17/2002 10200 <5 <10 5520 25 JQ <20 <2 UL 07 JH Sample <2 UL 120 ⊽ 10/16/2002 Sample 5820 <5 <10 8110 <50 ů V 53 2 MWFTA-17 10/15/2002 049 JB 13500 7.1 JQ <20 UL 23200 <5 <10 250 \Diamond \Diamond MWFTA-14 NIWFTA-16 10/15/2002 78900 J <5 <10 24700 J 0.87 JQ <20 UL 049 JB 2 UL 1 JH 270 V Richmond, Virginia 10/29/2002 Of 80 Sample <2 UL \$ \big \ \frac{10}{50} \quad \ $\begin{picture}(20,10) \put(0,0){\line(1,0){10}} \put(0$ 9 14 A Reporting (a) 5 10 5000 50 20 Lumit Sample ID: Sample Date: Volatile Organic Compounds - SW846 8260B µg/L Fotal Organic Carbon - SW846 9060 mg/L Thallium - SW846 7841 (Dissolved) ug/L Fotal Alkalinity · MCAWW 310.1 mg/L Total Sulfide - MCAWW 376.1 mg/L Fhallium - SW846 7841 (Total) ug/L 1,2-Dibromo-3-chloropropane .1.1,2-Fetrachloroethane 1 2,2-Tetrachloroethane 1,3,5-Trimethylbenzene 1,2,4-Transethylbenzene ,2,3-Trichlorobenzene 1,2,3-Trichloropropane 1,2,4-Tnchlorobenzene Total Organic Carbon 1.1-Tuchloroethane .,1,2-Trichloroethane 1,2-Dichloropropane 1,1-Dichloropropene 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,2-Dibromoethane 1,2-Dichloroethane 1,1-Dichloroethane .1-Dichloroethene Total Alkalınıty Total Sulfide Vanadium Potassium Fhallium Thallium Seleminin Sodium

DATA SUMMARY TABLE FOR GROUNDWATER LOWER WATER BEARING UNIT. OCTOBER 2002

Annual Groundwater Report - October 2002 Operable Unit 7

Operable Onli / Defense Supply Center Richmond Richmond, Virginia

									Siemes.
	Sample ID:	Reporting (a)	Sample MWFTA-14	Sample MWFFA-16	Sample MWFTA-17	Sample MWFTA-18	Sample MWFT A-19	Sample MWFTA-28B	Sample Sample MWFTA-28B MWFTA-29B
	Sample Date:	Limit	10/29/2002	10/15/2002	10/15/2002	10/16/2002	10/17/2002	10/29/2002	10/17/2002
		=	7	95/	7	⊽	⊽	⊽	⊽
1,4-Dichlorobenzene		-	7 7	9	7 7	; 7	; 7	. ∠	~
2,2-Dichloropropane		- ·	√ 5	600	7 (7 5	; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	20 K	<10.11
2-Butanone		o.	<iuk< td=""><td>to 000></td><td>50017</td><td>? ¬</td><td>3 7</td><td>÷ 7</td><td>; -</td></iuk<>	to 000>	50017	? ¬	3 7	÷ 7	; -
2-Chlorotoluene			⊽ :	00		7 9	7 5	7 5	; ;
2-Hexanone		0	<10 R	C) 095>	(n n)	V	<u>5</u> .	40F	5 -
4-Chlorotoluene		-	⊽	2 6	⊽ :	⊽ :	⊽ :	V 5	- -
4-Methyl-2-pentanone		10	<10 UL	<\$60	0 <u>-</u>	×10	~I0	<10.0L	01>
Actione		01	<10 R	<560 UJ	1 i JB	0I>	<10.01>	<10 R	<0.01>
Benzene			⊽	9 \$>	⊽	⊽	⊽	⊽	⊽
Reymobenzene		-	7	2 6	⊽	⊽	V	⊽	~
Romochlogmethane		-	⊽	~ 56	⊽	⊽	⊽	⊽	⊽
Bronzelekloromethine		-	⊽	56	⊽	⊽	⊽	⊽	⊽
Brownloam		-	⊽	<56 UJ	S ∨	~	īn I∨	⊽	√ 1 CI
Bromomethane		2	\$	<110	7	4	8	0	4
Divinority of the Control of the Con		-	⊽	9 \$>	⊽	⊽	⊽	⊽	⊽
Carbon tarmobloods			⊽	<56	⊽	⊽	⊽	⊽	⊽
California maria		_	7	<56	⊽	⊽	⊽	⊽	⊽
Chlorosthion		61	<2	<110	4	7	4	\$	7
Chloroform		-	~	<56	⊽	7	⊽	⊽	7
Chloromathan		2	8	<110	\$	ß	Ç	\$	7
circl 2-De bloosefron		0.5	<0.5	1500	<0.5	2		<0 >	<0.5
CIS-1, 2-12 Compared to the Management		-	⊽	<56	7	~	⊽	⊽	⊽
Cisci, Stranschops		-	⊽	<56	~	7	~	⊽	~
Differences		-	⊽	<56	⊽	7	⊽	⊽	~
Die klassdellustranischung		3	<2 UJ	<110 UJ	<2 UJ	7	<2 UJ	<2 UJ	rn ≎
Difficilities and		-	7	< 2 0	⊽	⊽	⊽	⊽	⊽
Eurytochzen. Useschlaschundepe		-	IU 1>	<56 UJ	(1 ∪	⊽	Π V	n ⊳	IU I>
Teach Horaconstant		-	7	<56	~	√	⊽	⊽	~
isopicipy received to a Xulene		-	~	<56	⊽	⊽	⊽	7	⊽
Maybe tops oblonds		-	~	9 \$>	~	<u>~</u>	⊽	⊽	⊽
Melliyelle cinorae		-	M I>	<56	⊽	⊽	⊽	<1 UJ	⊽
II-Dulylocatean		_	⊽	<56	7	Ÿ	<u>_</u>	⊽	⊽
n-raopyidenzene Mi-rich dissi		_	r nī	<56	7	v	⊽	043 JQ	⊽
Nathanial enc.		0.5	<0.5	<28	<0.5	<0.5	<0.5	<0.5	<0.5
U-Aytelle a Issuesaultolijene		-	⊽	5€	⊽	⊽	⊽	⊽	⊽
p-180/n0p/moracia-		-	<1 UJ	<56	⊽	⊽	⊽	(n l>	⊽
St. Duly Inchients		-	⊽	<56	⊽	⊽	7	7	⊽
Stylene Buttelbenzene		-	7	55	⊽	⊽	7	⊽	⊽
וכון-סתולווסרויים									

							-	7 - m - V	Sem. 3
			Sample Sample	Sample	Sample MWFTA.17	Sample MWFTA-18	Sample MWFTA-19	Sample MWFTA-28B	MWFTA-28B MWFTA-29B
	Sample Date:	Reporting (a)	10/29/2002	10/15/2002	10/15/2002	10/16/2002	10/17/2002	10/29/2002	10/17/2002
		-	7	95>	⊽	⊽	1.2	7	⊽
i elfactionocthene		-	; √	Ş. Ş.	⊽	⊽	⊽	⊽	⊽
l oluene		· •	505	<28	<0.5	<0.5	<0.5	<0.5	<0.5
U.M. 1.2-Dichioroginghe		. –	. ✓	- 20 20 20 20 20 20 20 20 20 20 20 20 20	⊽	~	⊽	7	⊽
The forest boxes		_	⊽	\$€	⊽	⊽	0.54 JQ	~	⊽
The hope discussions to the second to the se		. 7	: 🗸	<110 UJ	<2 UJ	7	<2 UJ	Q	<2 UJ
Uncitotoliuorolliciliane Vissal alderda		2 6	7	920	7	<2	2>	Q	\$
Xylenes (total)		-	⊽	<56	⊽	⊽	⊽	⊽	⊽
Surrect of									į
1.3 Dishlower in dd		;	93	16	96	98	94	95	16
1.2-1710.iioloculaire-04		;	83	06	88	06	06	84	68
4-DIUMINIUM UDCIIIC		;	101	96	82	92	93	103	7.7
Dibiolikitationicimans Toluene-d8		}	92	95	92	93	95	92	92
Lon SHAGNE ROSCS SERVICE SECTION OF THE PROPERTY OF THE PROPER	1/8/13								
Volatile Organic Compounds - 3 (1840 02002) Contract		_	Ϋ́Z	<62	AZ.	Ϋ́Ζ	Ϋ́Z	Ϋ́	ΥZ
1,1,1,2-1 et 3-nioroetnane			Z.	<62	Ϋ́	Ϋ́Ζ	Ϋ́	NA AN	Ϋ́
1,1 1-1 richloroemane		_	Ϋ́ Z	<62	Ϋ́	Ϋ́Z	Ϋ́	NA	N A
1,1,2,4-1 citacinotectuane		_	ΥZ	<62	Ϋ́	Ϋ́Z	ΥZ	Ϋ́	ΥZ
L.L.Z-THERROGERIAND		_	Y Z	<62	ΥZ	₹ Z	ΥZ	Ϋ́Z	Ϋ́
L. F. Dienbergerhalte			Ϋ́Z	<62	Ϋ́	Ϋ́	Z A	ΥZ	Y V
1,1-t/tchokucukuk		_	A.	<62	Ϋ́	ΑN	Ϋ́	Ϋ́Z	Y Z
1,1-Dismolopholymic		-	Y.	<62	Ϋ́	Ϋ́	ΥZ	Y Z	Ϋ́
1,2,3-111Ciliotecticsic 1,3,3 Theblocomming		-	ΑN	<62	۲Z	ΥN	Y Z	Ϋ́	Ϋ́
1.2 of Tachlorabenzine		-	ΥN	<62	Y.	ΥN	Y Z	Ϋ́	Z Z
1,2,4-1 Dillion Octions 1,3, A. Tannai bulbenzene		-	ΥZ	<62	ΥZ	Ϋ́	AN	Ϋ́	N'A
1.2.1-1 illustria de la compositione de la composit		2	A'N	<120	Ϋ́Z	A'N	Y V	Ϋ́	Ϋ́
1.2-Distriction of the second		-	NA	<62	Ϋ́Z	A'N	Y.	Y Z	Y'A
1.2. Div blorobenzene			A'N	<62	Ą Z	ΝΑ	∢ Z	Ϋ́	Y X
1.2.Dehloroethane		-	NA	<62	Ϋ́	Y Z	۲Z	Y Z	∀ Z
1.2-Dichloropoppine		-	Ϋ́Z	<62	A'A	A N	Ϋ́Z	A A	Ϋ́Z
1,2 S Tamethylbenzene		-	Y.	<62	Ϋ́	ΥZ	۲ ۲	ΥZ	Z V
1.2.D. Alarahenzene		-	N A	<62	Y.	Ϋ́	۷ Z	Ϋ́	Y Z
Lys-Dichloropents		_	Ϋ́	<62	Ą.	۲Z	Ϋ́	ΝA	ΥZ
1,3-L)Citotopropanc		-	Ϋ́	<62	ΝA	∢ Z.	ΥN	Ϋ́	Y Y
1,4-Dichigototatic		_	AN	<62	ΥN	Ϋ́	ΥZ	ΥN	×Z.
2,2-Distribution operation		10	Y.	<620 UJ	NA NA	Ϋ́	A Z	A'N	Y X
2-Dutanous			N A	<62	A'N	Ϋ́	Ϋ́	ΝΑ	Y Y
Z-Chiginging		01	Ϋ́	<620 UJ	NA	Ϋ́	Y Y	NA NA	Ϋ́
Z-11CALIDORO									Page 5 of 7
20701.06)

TABLE C-2

DATA SUMMARY TABLE FOR GROUNDWATER LOWER WATER BEARING UNIT - OCTOBER 2002 Annual Groundwater Report - October 2002

Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

								Campio	
	Sample ID- Sample Date:	Reporting (a) Limit	MWFTA-14 10/29/2002	Z =	MWFTA-17 10/15/2002	MWFTA-18 10/16/2002	MWFFA-19 10/17/2002	MWFTA-28B 10/29/2002	MWFTA-29B 10/17/2002
Chlorotolposes		_	Ą.	<62	Ą.	Ϋ́	Š	N A	Ϋ́
-Cilioratoliuciic			Ž	000	A	Ą	Y.	Ϋ́	Ϋ́Z
4-Nicthyl-2-pentanone		2 9	C X	1110097	Z Z	Ž	Z	Y X	Z
Acetone		2 -	V .	10 070×	<u> </u>	. ž	Z	Z	Z Z
Benzene		_	¥¥ ;	705	ξ:	<u> </u>	2 2	. ·	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
Bromobenzene ,		_	Ϋ́Z	<95	ď.	Y :	₹ ;	Y :	ζ;
Bromochioromethane		_	N A	<62	Ϋ́	Y Z	¥Z	Y Z	K :
Bromodichloromethane		1	YZ.	<62	Ν	∀ Z	Υ	Y.	Y Z
Bromoform			ΝĀ	<62 UJ	Ϋ́	Ϋ́	Ϋ́	۷ Z	Υ Σ
Bromontahine		2	Ϋ́Z	<120	Ϋ́Z	Ϋ́	Y Y	Ϋ́	Y Z
Carbon disulfide		-	Ϋ́	<62	Υ Z	Ϋ́	Ϋ́	Y Z	۷ Z
Carbon tetras blonde		-	Ϋ́	<62	ΥZ	Ϋ́Z	Ϋ́	Ϋ́	ΥZ
Calloon terrationer			Ϋ́	<62	A'N	Ϋ́	Y Z	Ϋ́Z	ΥZ
Chloroghana		2	Ž	<120	A'N	Ϋ́	Ϋ́	Ϋ́	Ϋ́
Chloroforms		_	YZ.	<62	Ϋ́	Ϋ́	Ϋ́	K Z	ΥZ
Chloromathane		5	Z.	<120	Ϋ́Z	Ϋ́	Ϋ́	Y Z	Ϋ́
one 1.3 Doblowythene		0.5	Ž	1400	Ϋ́	Ϋ́Z	Ϋ́	Ϋ́	∢ Z
on 1.3 Da bloomonion		-	ď Z	<62	Ϋ́Z	Ϋ́	₹ Z	Ϋ́Z	Y Z
User (2) Common property		-	Ϋ́	<62	٧Z	ΥN	٧Z	۲ Z	ΥZ
Dibramamethine		-	Ϋ́	<62	Ϋ́Z	Ϋ́Z	Ϋ́	Y X	Y Z
Deblored Inorganishane		2	Ϋ́Z	<120 UJ	Ϋ́	Ϋ́Z	Y Z	Y Z	Y Y
Fibulbenzene		-	Ϋ́Z	<62	٧X	Ϋ́	Y Y	Y Y	Ϋ́
Languerrent		_	AN.	<62 UJ	٧ X	Ϋ́	Ϋ́	۲ Z	Υ Ζ
Lopropylhings		-	V Z	<62	۷	Ϋ́Ζ	Ϋ́	Ϋ́	Y Z
isofnofficerione m. Xvdene & n. Xvlene		1	¥Z.	<62	٧X	ΑN	Ϋ́	Ϋ́	ΥZ
Mothylene chloride			Ϋ́Z	<62	Ϋ́	Ϋ́	Ϋ́	Y Y	Y X
Market June Construction But Albert 2012		-	Ϋ́Z	<62	¥Z	Ϋ́	Ϋ́	V V	Ϋ́
n-Dariy Denzene D-Pana (benzene		-	ΥN	<62	Ϋ́	Ϋ́Z	ΥZ	Ϋ́	ΥX
Mark bank		_	₹ Z	<62	Ϋ́Z	N.	ΥZ	NA	N A
Napitulatene Velesio		0.5	X	₽	ΥN	Ϋ́	Ϋ́Z	Y.	۷Z
p-Ayiciic Teomooufielimm			Y Z	<62	ΥN	Ϋ́	Ϋ́Ζ	Ϋ́	ΥZ
p-tyoptopynoracine		. 	Ϋ́Z	<62	AN AN	Ϋ́	ΑN	ΝA	A Z
Sec-Butyloenzene		-	Y Z	<62	A'N	NA	Ϋ́	ΝA	Y.
Styletic		_	Y.	<62	Y'N	N.A.	Ϋ́	NA	Ϋ́
terr-bulymenterne Torrest leavest here		_	AN	<62	NA A	ΝA	Ϋ́Z	ΝΑ	Ϋ́Z
Teliation		_	Ϋ́	<62	AN.	NA A	۲Z	A'N	Ϋ́Z
Totache 		0.5	Ϋ́	₽	AN	ΝA	Ϋ́Z	NA	Y Y
trans-1,2-Dichloropropene		_	AN	<62	ΥN	A'N	Ϋ́Z	Ϋ́	Ϋ́
				•	: :		:		::3

TABLE C-2

LOWER WATER BEARING UNIT - OCTOBER 2002 DATA SUMMARY TABLE FOR GROUNDWATER Annual Groundwater Report - October 2002

Defense Supply Center Richmond Richmond, Virginia Operable Unit 7

Sar	Sample ID: Sample Date:	Reporting (a) Limit	Sample MWFTA-14 10/29/2002	Sample 1 MWFTA-16 10/15/2002	Sample MWFTA-17 10/15/2002	Sample Sample MWFTA-18 MWFTA-19 10/16/2002	Sample MWFTA-19 10/17/2002	Sample MWFTA-28B 10/29/2002	Sample MWFTA-29B 10/17/2002
Trichlorofluoiomethane Vinyl chloride Aylenes (total)		- 5 5	Z Z Z	<120 UJ 920 <62	e e e z z z	Z Z Z	4 4 4 2 2 2	K K K Z Z Z	Z Z Z
Surrogate - % 1,2-Dichlorocthane-d4 4-Bromofluorobenzene Dibromofluoromethane Toluene-d8	1	1 1 1 1	N N N N N N N N N N N N N N N N N N N	94 91 100 95	2 2 2 2 4 4 4 4	A Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	A Z Z Z	& & & & & & & & & & & & & & & & & & &	A A A A

negative log of thehydrogen ion concentration Z E ~ 2 2 3

undetected, Reported Detection Limit is imprecise unusable

Undetected, Data brased low - Reported Detection Limit is higher than indicated
Reporting limits presented are the best that can be achieved under normal operating procedures with the method-required sample volume extracted and analyzed. Sample reporting limits may

vary due to sample volume/sample weight extracted and/or sample dilutions

PREPARED/DATE JAH 5/29/03 CHECKED/DATE JAV 5/29/03

DATA SUMMARY TABLE FOR GROUNDWATER FRACTURED BEDROCK - OCTOBER 2002

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

	Sample ID: Sample Date:	Reporting (a) Limit	Sample MWFTA-20 10/17/2002	Duplicate MWFTA-20 10/17/2002
FIELD PARAMETER:				
Dissolved Oxygen - E360 1 mg/L				
Dissolved Oxygen		0 1	3 5	3 5
Ferrous Iron - A3500D mg/L				
Ferrous Iron		0 1	4	4
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential			15	15
			13	
<u>рН - E150.1 pH Units</u> pH			941	9 41
Specific Conductance - E120,1 mS/cm		0.001	0.215	0.215
Specific Conductance		0 001	0 215	0 215
Temperature - E170,1 deg C Temperature		0 1	18	18
•		•		
<u>Turbidity - E180.1 NTU</u> Turbidity		1	10	10
FIXED BASE LABORATORY ANALYSIS:				
Anions - MCAWW 300.3A mg/L				
Chloride		1	37	3 8
Nitrate as N		0 1	<0 1	<01
Sulfate		1	4 4	4 5
Dissolved Gases - RSK SOP-175 mg/L				
Carbon dioxide		0 001	0 12 JB	0 13 JB
Ethane		0 002	< 0 002	< 0 002
Ethene		0 001	0 01	0 011
Methane		0 001	0 027	0 031
Hydrogen by Microseeps - AM20GAX nM		0.00	2.7	2.0
Hydrogen		0 03	27	2 8
Mercury - SW846 7470A (Dissolved) ug/L Mercury		1	<l< td=""><td>< i</td></l<>	< i
·				
<u>Mercury - SW846 7470A (Total) ug/L</u> Mercury		1	<1	<1
Metals - SW846 6010B (Dissolved) ug/L				
Aluminum		200	<200 UJ	<200 UJ
Antimony		5	<5	<5
Arsenic		5	<5	<5
Banum		200	68 2 JQ	65 3 JQ
Beryllium		01	<10	<10
Cadmum		2	<2	<2
Calcium		5000	14900	14300
Chromium		10	<10	<10
Cobalt		30	<30	<30
Сорреі		10	<10	<10
Iron		200	193 JQ	97 I JQ
Lead		3	<3	<3
Magnesium		5000	4780 JQ	4640 JQ
Manganese		20	97.5	917

DATA SUMMARY TABLE FOR GROUNDWATER FRACTURED BEDROCK - OCTOBER 2002 Annual Groundwater Report - October 2002

Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

	Sample ID: Sample Date:	Reporting (a)	Sample MWFTA-20 10/17/2002	Duplicate MWFTA-20 10/17/2002
	2121717 22101		. 10/1//2002	10,1,1,2002
Molybdenum		40	<40	<40
Nickel		100	<100	<100
Potassium		5000	7040	6870
Selenium		5	<5	<5
Silver		10	<10	<10
Sodium		5000	10500	10100
Vanadium		50	0 69 JQ	<50
Zinc		20	<20	<20
Metals - SW846 6010B (Total) ug/L				
Aluminum		200	<200 UJ	<200 UJ
Antimony		5	<5	<5
Arsenic		5	2 2 JB	<5
Banum		200	65 8 JQ	68 2 JQ
Beryllium		10	<10	<10
Cadmum		2	<2	<2
Calcium		5000	14200	15100
Chromium		10	<10	<10
Cobalt		30	<30	<10 <30
Copper		10	<10	<10
ron		200	281	259
.ead		3	<3	<3
Magnesium		5000	4540 JQ	4400 JQ
Manganese		20	96 1	918
Molybdenum		40	<40	<40
Nickel		100	<100	<100
Potassium		5000	6830	7180
Selenium		5	<5	<5
Silver		10	<10	<10
Sodium		5000	10200	10400
Vanadium		50	<50	<50
Zinc		20	<20	<20
Challium - SW846 7841 (Dissolved) ug/L				
Thallium		2	<2 UL	<2 UJ
Thallium - SW846 7841 (Total) ug/L				
Challrum Cha		2	<2 UJ	<2 UJ
Fotal Alkalınity - MCAWW 310,1 mg/L Fotal Alkalınıty		5	74	74
•		5	,,	7-1
Total Organic Carbon - SW846 9060 mg/L Total Organic Carbon		1	<1	<1
Fotal Sulfide - MCAWW 376.1 mg/L				
otal Sulfide		I	046 JQ	03 JQ
olatile Organic Compounds - SW846 8260B ug/L				
,1,1,2-Tetrachloroethane		1	<+	<4
,1,1-Trichloroethane		1	<4	<4
,1,2,2-Tetrachloroethane		1	<4	<4
,1,2-Trichloroethane		1	<4	<4
,1-Dichloroethane		1	15	16
, I-Dichloroethene		1	7.5	7 6
1-Dichloropropene		1	<4	<4
2,3-Trichlorobenzene			<4	<4

DATA SUMMARY TABLE FOR GROUNDWATER FRACTURED BEDROCK - OCTOBER 2002

Annual Groundwater Report - October 2002 Operable Unit 7

Defense Supply Center Richmond Richmond, Virginia

	Sample ID: Sample Date:	Reporting (a) Limit	Sample MWFTA-20 10/17/2002	Duplicate MWFTA-2 10/17/2002
				4
,2,4-Trichlorobenzene		1	<4	<4
1,2,4-Trimethylbenzene		1	<4	<4
,2-Dibromo-3-chloropropane		2	<8	<8
,2-Dibromoethane		1	<4	<4
,2-Dichlorobenzene		1	<4	<4
,2-Dichloroethane		1	<4	<4
,2-Dichloropropane		1	<4	<4
.3,5-Trimethylbenzene		1	<4	<4
.3-Dichlorobenzene		1	<4	<4
,3-Dichloropropane		1	<4	<4
,4-Dichlorobenzene		1	<4	<4
2,2-Dichloropropane		1	<4	<4
-Butanone		10	<40 UJ	<40 UJ
Chlorotoluene		1	<4	<4
		10	<40 UJ	<40 UJ
-Hexanone		1	<4	<4
-Chlorotoluene		10	<40	<40
-Methyl-2-pentanone		10	<40 UJ	<40 UJ
Acetone				
Benzene		1	<4	<4
Bromobenzene		1	<4	<4
Bromochloromethane		1	<4	<4
Bromodichloromethane		1	<4	<4
Bromoform		1	<4 UJ	<4 UJ
Bromomethane		2	<8	<8
Carbon disulfide		1	<4	<4
Carbon tetrachloride		1	<4	<4
Chlorobenzene		1	<4	<4
Chloroethane		2	<8	<8
Chloroform		1	<4	<4
Chloromethane		2	<8	<8
us-1,2-Dichloroethene		0.5	92	100
rs-1,3-Dichloropropene		1	<4	<4
Dibromochloromethane		1	<4	<4
Dibromomethane		1	<4	<4
		2	<8 UJ	<8 UJ
Dichlorodifluoromethane		1	<4	<4
thylbenzene		1	<4 UJ	<4 UJ
lexachiorobutadiene				<4
sopropylbenzene		1	<4	
n-Xylene & p-Xylene		1	<4	<4
Methylene chloride		1	<4	<4
a-Butylbenzene		1	<4	<4
n-Propylbenzene		1	<4	<4
Naphthalene		1	<4	<4
o-Xylene		0.5	<2	<2
o-Isopropyltoluene		1	<4	<4
ec-Butylbenzene		l	<4	<4
Styrene		l	<4	<4
ert-Butylbenzene		L	<4	<4
Fetrachloroethene		i	<4	<4
Foluene		i	<4	<4
		0.5	<2	<2
rans-1,2-Dichloroethene		1	<2 <4	<4
rans-1,3-Dichloropropene		1	<4 4 8	5 l
Frichloroethene				
Frichlorofluoromethane		2	<8 UJ	<8 N1
√inyl chloride		2	12	12
(vlenes (total)		1	<4	<4

Surrogate - % ~

TABLE C-3

DATA SUMMARY TABLE FOR GROUNDWATER FRACTURED BEDROCK - OCTOBER 2002

Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Center Richmond Richmond, Virginia

	Sample ID: Sample Date:	Reporting (a) Limit	Sample MWFTA-20 10/17/2002	Duplicate MWFTA-2 10/17/2002
			91	94
1,2-Dichloroethane-d4			88	90
1-Bromofluorobenzene			97	99
Dibromofluoromethane			92	96
Toluene-d8			72	30
Volatile Organic Compounds - SW846 8260B,	UNPRES vg/L			27.4
1,1,1,2-Tetrachloroethane		1	<4	NA
1,1,1-Trichloroethane		1	<4	NA
1,1,2,2-Tetrachloroethane		1	<4	NA NA
1,1,2-Trichloroethane		1	<4 12	NA NA
1,1-Dichloroethane		1	13 6 6	NA NA
1,1-Dichloroethene		=	0 0 <4	NA NA
1,1-Dichloropropene		1 1	<4 <4	NA NA
,2,3-Trichlorobenzene		1	<4 <4	NA NA
1,2,3-Trichloropropane		1	<4 <4	NA NA
1,2,4-Trichlorobenzene		1	<4 <4	NA NA
1,2,4-Trimethylbenzene		2	<8	NA NA
,2-Dibromo-3-chloropropane		1	<4	NA NA
1,2-Dibromoethane		1	<4	NA NA
1,2-Dichlorobenzene		1	<4	NA NA
1,2-Dichloroethane		i	<4	NA NA
1,2-Dichloropropane		1	<4	NA NA
1,3,5-Trimethylbenzene 1,3-Dichlorobenzene		i	<4	NA
		1	<4	NA
1,3-Dichloropropane		1	<4	NA
1,4-Dichlorobenzene		i	<4	NA
2,2-Dichloropropane 2-Butanone		10	<40 UJ	NA
z-Butanone 2-Chlorotoluene		l	<4	NA
2-Cinorototuene 2-Hexanone		10	<40 UJ	NA
2-nexanone 4-Chlorotoluene		1	<4	NA
4-Chlorotoluene 4-Methyl-2-pentanone		10	<40	NA
Acetone		10	<40 UJ	NA
Benzene Benzene		1	<4	NA
Bromobenzene		1	<4	NA
Bromochloromethane		1	<4	NA
Bromodichloromethane		1	<4	NA
Bromoform		1	<4 UJ	NA
Bromomethane		2	<8	NA
Carbon disulfide		1	<4	NA
Carbon tetrachloride		į	<4	NA
Chlorobenzene		1	<4	NA
Chloroethane		2	<8	NA
Chloroform		1	<4	NA
Chloromethane		2	<8	NA
cis-1.2-Dichloroethene		0.5	87	NA
cis-1,3-Dichloropropene		i	<4	NA
Dibromochloromethane		1	<4	NA
Dibromomethane		1	<4	NA
Dichlorodifluoromethane		2	<8 UJ	NA
Ethylbenzene		Ī	<4	NA
Hexachlorobutadiene		1	<4 UJ	NA
Isopropylbenzene		1	<4	NA
m-Xylene & p-Xylene		1	<4	NA
Methylene chloride		Ì	<4	NA
n-Butylbenzene		Ī	<4	NA
n-Propylbenzene		1	<4	NA
Naphthalene		1	<4	NA

DATA SUMMARY TABLE FOR GROUNDWATER FRACTURED BEDROCK - OCTOBER 2002

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

	Sample ID: Sample Date:	Reporting (a) Limit	Sample MWFTA-20 10/17/2002	Duplicate MWFTA-20 10/17/2002
		0.5	<2	NA
o-Xylene		1	<4	NA NA
p-Isopropyltoluene		1	<4	NA NA
sec-Butylbenzene		1	<4 <4	NA NA
Styrene		1		
tert-Butylbenzene			<4	NA
Tetrachloroethene		1	<4	NA
Toluene		1	<4	NA
trans-1,2-Dichloroethene		0.5	<2	NA
trans-1,3-Dichloropropene		1	<4	NA
Trichloroethene		1	4 2	NA
Trichlorofluoromethane		2	<8 UJ	NA
Vinyl chloride		2	11	NA
Xylenes (total)		1	<4	NA
Surrogate - %				
1,2-Dichloroethane-d4			16	NA
4-Bromofluorobenzene		••	87	NA
Dibromofluoromethane			94	NA
Toluene-d8			90	NA _

Notes.	
С	Celstus
JB	Estimated, possibly biased high or false positive based on blank contamination
JQ	Estimated, Value is between reporting limit and detection limit
mV	millivolt
mg/L	milligrams per liter
mS/cm	milliSeimens per centimeter
μg/L	micrograms per liter
NA	Not Analyzed
nМ	nanoMoles
NTU	nephelometric turbidity unit
pН	negative log of thehydrogen ion concentration
UJ	undetected, Reported Detection Limit is imprecise
UL	Undetected, Data biased low - Reported Detection Limit is higher than indicated
(a)	Because house precented are the best that can be achieved under normal operating procedures with the

Reporting limits presented are the best that can be achieved under normal operating procedures with the method-required sample volume extracted and analyzed Sample reporting limits may vary due to sample volume/sample weight extracted and/or sample dilutions

PREPARED/DATE JAH 5/18/03
CHECKED/DATE JAV 5/18/03

DATA SUMMARY TABLE FOR GROUNDWATER CONTROL SAMPLES

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

		Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample ID	Reporting (a)	TB-101502-2	TB-101602-1	TB-101702-2	TB-102902-
Sample Date	Limit	10/15/2002	10/16/2002	10/17/2002	10/29/2002
Dissolved Gases - RSK SOP-175 r	ng/L				
Carbon dioxide	0 001	02	0 63	11	0 89
Ethane	0 002	< 0 002	< 0 002	< 0 002	< 0 002
Ethene	0 001	< 0 001	< 0 001	< 0 001	<0 001
Methane	0 001	<0 001	0 00069 JQ	100 0>	<0 001
Total Organic Carbon - SW846 9		.1	1	-1	<l< td=""></l<>
Total Organic Carbon	1	<l< td=""><td><1</td><td><1</td><td><1</td></l<>	<1	<1	<1
Volatile Organic Compounds - SV			•		
1,1,1,2-Tetrachloroethane	1	<1 -1	< <u>l</u>	<l< td=""><td><!--</td--></td></l<>	</td
I,I,I-Trichloroethane	1 1	<1 -1	<1 <1	<1 <1	</td
1,1,2,2-Tetrachloroethane	1	<1 <1	<1 <1	<1 <1	<br </td
1,1,2-Trichloroethane	1	<1 <1	<1	<1 <1	<1
1,1-Dichloroethane	1	<1 <1	<1	<1 <1	<1 <1
1,1-Dichloroethene 1,1-Dichloropropene	1	</td <td><1 <1</td> <td><1</td> <td><1</td>	<1 <1	<1	<1
1,2,3-Trichlorobenzene	i	<1	<1	<1 UJ	UJ</td
1,2,3-Trichloropropane	i	<1	<1	<1	<1
1,2,4-Trichlorobenzene	i	<1	<1	<i td="" uj<=""><td><1 UJ</td></i>	<1 UJ
1,2,4-Trimethylbenzene	1	<1	<1	<l< td=""><td><1</td></l<>	<1
1,2-Dibromo-3-chloropropane	2	<2	<2	<2	<2
,2-Dibromoethane	1	<1	<1	<1	<1
1,2-Dichlorobenzene	1	<1	<1	<1	<1
,2-Dichloroethane	1	<1	<1	<1	<1
,2-Dichloropropane	1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	1	<1	<1	<1	<1
1,3-Dichlorobenzene	1	<1	<1	<1	<1
,3-Dichloropropane	1	<l< td=""><td><1</td><td><1</td><td><1</td></l<>	<1	<1	<1
1,4-Dichlorobenzene	1	<1	<1	<1	<1
2,2-Dichloropropane	1	<1	<1	<1	<1
2-Butanone	10	<10 UJ	<10	<10 UJ	<10 R
2-Chlorotoluene	1	</td <td><1</td> <td><1</td> <td><1</td>	<1	<1	<1
2-Hexanone	10	<10 UJ	<10	<10 UJ	<10 R
1-Chlorotoluene	1	<1	<1	</td <td><l< td=""></l<></td>	<l< td=""></l<>
1-Methyl-2-pentanone	10	<10	<10	<10 <10 UJ	<10 UL
Acetone	10	<10 UJ	<10 <1		<10 R
Benzene	l 1	<1 <1	<1 <1	<1 <1	<br </td
3romobenzene	1	<1 <1	<1 <1	<1 <1	<1 <1
Bromochloromethane Bromodichloromethane	1	< l	<t< td=""><td><1 <1</td><td><1</td></t<>	<1 <1	<1
Bromoform	•	<1 UJ	<1	<1	<1 <1
Bromomethane	2	<2	<2	<2	<2
Carbon disulfide	1	<1	<1	<1	<1
Carbon tetrachionde	i	<br </td <td><1</td> <td><1</td> <td><1</td>	<1	<1	<1
Chlorobenzene	i	<1	<1	<1	<1
Chloroethane	2	<2	<2	<2	<2
Chloroform	Ī	<1	<1	<1	<1
Chloromethane	2	<2	<2	<2	<2
ers-1 2-Dichloroethene	0.5	< 0.5	< 0.5	< 0.5	<0.5
ris-1,3-Dichloropropene	1	<l< td=""><td><1</td><td>< l</td><td><1</td></l<>	<1	< l	<1
Dibromochloromethane	i			<1	<1
Dibromomethane	i	<1	<i< td=""><td><1</td><td><1</td></i<>	<1	<1
Dichlorodifluoromethane	2	<2 UJ	<2	<2 UJ	<2 UJ
Ethylbenzene	ī	<1	<l< td=""><td><1</td><td><1</td></l<>	<1	<1
Hexachlorobutadiene	Ĩ	<i td="" uj<=""><td><l< td=""><td><1 UJ</td><td><!--</td--></td></l<></td></i>	<l< td=""><td><1 UJ</td><td><!--</td--></td></l<>	<1 UJ	</td
sopropylbenzene	i	<1	<1	<1	</td
n-Xylene & p-Xylene	i	<1	<i< td=""><td><1</td><td><1</td></i<>	<1	<1
Methylene chloride	i	3.1	3 3	3 1	2 6 JB
n-Butylbenzene	1	<1	- <i< td=""><td><1 UJ</td><td><1 UI</td></i<>	<1 UJ	<1 UI

TABLE C-4

DATA SUMMARY TABLE FOR GROUNDWATER CONTROL SAMPLES

Annual Groundwater Report - October 2002 Operable Unit 7

Defense Supply Center Richmond Richmond, Virginia

Sample ID Sample Date	Reporting (a) Limit	Trip Blank TB-101502-2 10/15/2002	Trip Blank TB-101602-1 10/16/2002	Trip Blank TB-101702-2 10/17/2002	Trip Blank TB-102902-1 10/29/2002
n-Propylbenzene	1	<i< td=""><td><1</td><td><1</td><td><1</td></i<>	<1	<1	<1
Naphthalene	1	<i< td=""><td><1</td><td><1 UJ</td><td><1 UJ</td></i<>	<1	<1 UJ	<1 UJ
o-Xylene	0.5	< 0.5	<0.5	<0.5	< 0.5
p-Isopropyltoluene	1	<1	<l< td=""><td><1</td><td><1</td></l<>	<1	<1
sec-Butylbenzene	1	<1	<1	<1	<1 UJ
Styrene	1	<1	<1	<1	<1
tert-Butylbenzene	1	<1	<1	<1	<1
Tetrachloroethene	1	<1	<1	<1	<1
Toluene	1	<l< td=""><td><1</td><td><1</td><td><1</td></l<>	<1	<1	<1
trans-1,2-Dichloroethene	0.5	<0.5	<0.5	< 0.5	<0.5
trans-1,3-Dichloropropene	1	<l< td=""><td><!--</td--><td><1</td><td><l< td=""></l<></td></td></l<>	</td <td><1</td> <td><l< td=""></l<></td>	<1	<l< td=""></l<>
Trichloroethene	1	<1	<1	<1	<1
Trichlorofluoromethane	2	<2 UJ	<2	<2	<2
Vinyl chloride	2	<2	<2	<2	<2
Xylenes (total)	1	<1	<1	<1	<l< td=""></l<>
Surrogate - %					
1,2-Dichloroethane-d4		94	85	96	89
4-Bromofluorobenzene		88	88	83	82
Dibromofluoromethane		99	95	105	100
Toluene-d8		93	92	93	92

MCL

P	monitoring well is located within the plume
NP	monitoring well is not located within the plume
PG	monitoring well is located on the plume boundary
NA	not applicable

Mann-Kendall results indicate a statistically significant increasing trend
Mann-Kendall results indicate a statistically significant decreasing trend

μg/L micrograms per liter

maximum contaminant level (MCL for PCE and TCE is 5 μg/L, MCL for cis-1,2-DCE is 70 μg/L, MCL for trans-1,2-DCE is 100 μg/L, MCL for 1,1-TCA is 200 μg/L, MCL for 1,1-DCE is 7 μg/L, and no MCL is

published for 1,1-DCA)

PREPARED/DATE JAH 5/18/03
CHECKED/DATE JAV 5/18/03

TAB

Appendix D

APPENDIX D SUMMARY OF CONSTITUENTS DETECTED FOR THE OCTOBER 2001 THROUGH OCTOBER 2002 SAMPLING EVENTS

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

				me in the second						
	Sample ID. Sample Date	Reporting Limit (a)	Sample AEHADG-10 10/5/2001	Duplicate AEHADG-10 10/5/2001	Sample AEHADG-10 4/5/2002	Duplicate AEHADG-10 4/5/2002	Sample AEHADG-10 7/30/2002	Duplicate AEHADG-10 7/30/2002	Sample AEHADG-10 10/16/2002	Duplicate AEHADG-10 10/16/2002
FIELD PARAMETER Dixolited Oxygen - E360 J mg/L Dixsolved Oxygen		0.1	& _	8	13	13	12	12	80	80
Ferrous Lon - A3500D mg/L Perrous Iron		0	36	36	6.2	62	<u>\$</u>	8	8	8
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		ı	38	38	£4	43	6	6	-31	48
pH - E(50 1 pH Units pH		;	557	5.57	56	56	5 37	537	5 16	5 16
Specific Conductance - E120 1 mS/cm Specific Conductance	,	0 001	0 278	0 278	0 344	0 344	0 221	0 221	0.318	0 318
lemperature - F170 1 deg C Temperature		10	20.4	204	12.7	12.7	213	213	20.5	20.5
Turbidity - E180 1 NTU Turbidity		-	76	26	m	3	⊽	⊽	15	51
FINED BASE LABORA FORY ANALYSIS- Arions - MCAWW 300 0A mg/L Chloride Nutrate Sulfate		0 1	75 2 40 1 20 1	73 8 40 1 20 4	119 401 183	120 <0.1 186	65 8 40 1 20 8	65 40 - 20 2	45 40 I 197	44 9 00 86
Dissolved Gases : RSA SOP-175.mg/L. Carbon diovide Ethane Filts ne Methane		0 001 0 002 0 001 0 001	94 J <0 002 0 005 0 023	100 J <0.002 0.0049 0.023	92 <0.002 0.0063 0.035	86 <0.002 0.0054 0.03	100 <0 002 0 01 0 045	110 <0.002 0.011 0.05	120 <0.002 0.014 0.18	120 <0.002 0.013 0.19
Dissolved Hydrogen by Microseeps AM20GAY nM Bydrogen		0 03	83	01	7	1.2	80	7	22	26
forat Alkalinty - AICAWW 310 1 mg/L Total Alkalinty		S	16	17	13 JH	H 1H	15	15	13 JH	Hf 51
Jujal Organic Carbon - SW846 9060 mg/L. Total Organic Carbon		-	1 18	er i	Òr 60	-	-	-	1 116	H. 1
Total Sulfide - MCAWW 376 1 mg/L Total Sulfide		-	39.J	₹	⊽	⊽	⊽	Of \$90	⊽	033 JB

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TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WA I'ER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

				artimonia, tilgina	•					
	Sample ID		Sample AEHADG-10	Duplicate AEHADG-10	Sample AEHADG-10	Duplicate AEHADG-10	Sample AEHADG-10	Duplicate AEHADG-10	Sample AEHADG-10	Dupheate AEHADG-10
	Sample Date.	Limit (a)	10/5/2001	10/5/2001	4/5/2002	45/2002	1130/2007	70070C//	10.10.500.5	7007 (01 01
Mercury - SW846 7470A (Dissolved) np/L. Not Detected		-	⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽
Nercury - SW846 7470A (Fotal) 11g/L. Mercury		-	⊽	⊽	⊽	⊽	⊽	⊽	⊽	7
Metals - SW846 6010B (Dissolved) µg/l.										
Аминат		200	<200	<200	82 1 JB	66.5 JB	Or 669	745 JQ	<200 UJ	<200 UJ
Arsenic		٠ :	\$9	63.7	29 \$	30.2	999	1 5	9/ y	\$ 90 C
Влпи		500	07 75 137 10	125 JQ	2 S	O 56	0 6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	35.55) (8)	<u> </u>
Berythum		2 -	09 JB	0.92.18	٠ کار	5. 4.	5,7	5,0	50	χ., ζ
Cadmium		2 2000	2.5 0.5.7.\$	5800	3 20 20	00801	2830	5720	4750 JO	4740 10
Chromin		9	01>	01>	015	01>	01>	V-10	01>	, V
Cobal		2 2	29 9 JO	Of 612	463	45.7	32.2	31.5	25 8 JQ	25.7 JQ
Conner		2	01>	<10	ol>	<10	<10	<10	01>	· 01>
Iron		200	27200	26100	33300	33500	23600	23000	17300	17400
per			D	Ø	Ø	۵	ъ	Ø	Ø	\$
Maresium		2000	7880	7500	11100	11100	7370	7190	5370	5420
Manganese		20	1080	586	1550	1540	1 166	696	059	654
Molybdenum		40	<40	<40	40	<40	<40	<40	<40	°40
Nickel		100	42.4 JQ	38 5 JQ	55 3 JQ	55 1 10	41.7 JQ	402 10	37.5 JQ	37 6 JQ
Potassium		2000	6410	6230	4610 JQ	4620 JQ	5280	5170	4530 10	700 JO
Sodium		2000	15000	14100	20000	00861	16400	0009	0091	92/11
Vanadium		. SO	8	₹ ;	OK 980	? ₹	8	کار 89 م م	γ.; -	ر در ا ا
Zinc		50	25.1	24	94 4 J	493 J	356	37.7	28.8	27.4
Metals - SW846 (6010B (Total) ug/L										
Aluminum		200	<200	272	85 3 JB	74.4 JB	97.3 JQ	Or <i>1</i> 01	63 4 10	74.2 JQ
Arsenic		5	71.5	18	27.8	27.9	45.9	47 6	39.6	3 68
Banum		200	<u> </u>	130 JQ	Or 581	194 JQ) S 10	141 JQ	Or 101	Or 011
Betythum		10	- 1B	13 JB	14 10	14 10	14 10	Or 9 I	Of 61) or 61
Cadmium		2	4	0.59 JB	7	7	3	\$	7	7
Calcium		2000	\$730	5920	10700	10500	5600	5790	4670 1Q	Of 0087
Chromum		2 %	010	010 S)) }	ols F) v	יייי ליני ביייי	010
Cobalt		ड़ :	# S	77 4 V	. 67	4 ·	5 5	75	20,75) o
Copper		2 2	20502	33500	00218	33700	21.60	0077	12200	17200
110th		} ~	5	Ö	7	Ø	D	v	v	7
M. comes mill		2000	7890	7650	00901	11200	7080	7280	2300	\$440
M mo ipest		20	1080	1010	1420	1560	951 J	J 779	639	859
Molydenum		9	°40	°40	<40	04>	<40	0 1 >	<40	<40
Nickel		<u>00</u>	431.10	₹0 € JQ	548 JQ	54 8 10	39.2 JQ	426 JQ	37.2 JQ	18.4 JQ
Potassium		2000	6430	9009	4630 JQ	4640 JQ	2050	2360	4480 JQ	4590 JQ
Sodium		2000	15100	14400	90081	00861	15700	16200	1300	11800
Vanadium		8	14 18	16 JB	€ ;	₹ ;	ê ;	o ₹ ;	Of 180	2 10
Zinc		23	252	27 4	49.7	516	36 1	ス	24	24.2
Thallium - SW846 7841 (Dissolved) µg/L. Thallium		2	2 i JB	â	<2 UL	<2 UL	<2 UJ	<2 UJ	<2 UI.	~5 NI
Elitable State Andrews										
Thailium - 533346 7841 (10141) µg/L Thailium		Ċ1	2.2 JB	a	<2 UL	<2 UL	<2 UJ	<2 UJ	<2 UL	<2 UL
										or wed

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

								•		
	Sample ID. Sample Date	Reporting Limit (a)	Sample AEHADG-10 10/5/2001	Duphcate AEHADC-10 10/5/2001	Sample AEHADG-10 4/5/2002	Duplicate AEHADG-10 4/5/2002	Sample AEHADG-10 7/30/2002	Duplicate AEHADG-10 7/30/2002	AEHADG-10 10/16/2002	AEHADG-10 10/16/2002
Polychkurnated Biphenyls (PCBs) - SW846 8082 µg/L.							:	;	ž	Ž
Not Detected			Ϋ́	ΑN	Y Y	Y Z	K Z	₹ Z	ď Z	ď.
Polycyclic Aromatic Hydrocarbons (PAHs) - SW846 8270C µP/L	OC ug/L			į	į	ž	2	2	2	X
Acenaphthene		0 2	¥ Z	Y Z	Y :	¥ ;	¥ :	Ç 4	Ç - Z	Ž
Anthracene		03	Y Z	Y.	¥ :	Y :	4 :	Ž Ž	2 2	. A
Fluorene		0.2	٧Z	Ϋ́	Y Y	¥.Z	KZ.	KZ :	* ;	4.
Naphthalene		0.2	N A	V	K K	Ϋ́	Š	₹	Y Z	Š
Volatily Organic Compounds - SW846 8260B µg/L							1	Ç.	9	200
1 F. Perchloso, thuga		-	7300	7300	2800	4200	2800	3000	3	700
F. D. Marselbare		-	Of 98	83 10	Or 86	74 JQ	ور او و	OK 89	<120	<120
1. De bleverhous		-	1100	0011	570	510	270	270	% 76 86	140
1 1-Dichiologicalisms			<420	<420	<330	€330	<170	OZ >	<120	<120
1.2 4-1 initialization 1.3 Du bloodharana		_	130 JO	Of 051	Q1 17	74 JQ	140 JQ	150 JQ	140	140
1,4 Diction operation		-	<420	<420	<130	330	o/1>	<170	<120	<120
1.3.7-1 miletiny technicale		_	<420	<420	St 10	<330	<170	<170	<120	<120
L's Dicilidiopenicie		-	<420	<420	<330	C330	<170	<170	<120	<120
I,4 Dichlorobenzene		. 01	<4200	<4200	<3300 R	840 R	<1700 R	<1700 R	<1200 UJ	<1200 UJ
Acelone			<420	<420	<330	<330	<170	<170	<120	<120
Delizene Cartan		-	120 JO	130 JO	S9 JQ	Or 69	<170 UJ	<170 UI	<120	<120
C albeit lett actitionide		-	130 JB	140 JB	Of 68	Or 59	<170	Or 59	<120	<120
Calcada de la ca		2	<830	<830	· 0/9>	0/9>	<330 UJ	4330 UJ	<250	<250
C DIODINICATAN		0.5	880	870	0001	066	780	780	650	069
tis 1'z-Dichiologuiche		-	<420	<420	30	<330	<170	<170	<120	<120
Isopropytoenzene		-	<420	<420	Of 011	<330	130 18	110 JB	<120	<120
Methylene chloride		. –	Of Off	<420	330 UI	<330	<170	<170	¥ S	S8 1Q
Naphlhalene			3300	3300	1200	1200	2800	2700	1700	0061
l etrachiotoetiiche		0.0	<210	<210	<170	<170	-83	~ 83	<62	<62
trans-1 2 Dictionaguicine		; ~	14000	14000	0006	8600	\$100	5200	2500	2800
Lichoteelhuie			00.0	023/	0292	<670	<330	6330	<250	<250

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02

Annual Groundwater Report - October 2002

Operable Unit 7

Dufense Supply Center Richmond

Richmond, Virginia

			_	Richmond, Virginia	a.					
	Sample ID. Sample Date:	Reporting Limit (a)	Sample DMW-13A 10/5/2001	Sample DMW-13A 4772002	Sample DMW-13A 7/17/2002	Sample DMW-13A 10/16/2002	Sample DMW-204 Oct 2001	Sample DMW-20A Apr 2002	Sample DNIW-20A 7/30/2002	Sample DMW-20A 10/16/2002
FIFLD PARANIE IER Disolved Oxygen - E360 1 mg/L Disolved Oxygen		10	10	1 8	8 0	80	SS	S.	60	-
Ferrous Ir <u>on - A3500D mg/L.</u> Perous Iron		0 1	23	26	13	3.5	Š	SZ	ΑΝ	\
Oxidation Reduction Potential - A2580 (mV Oxidation Reduction Potential		:	308	335	319	299	SN	SN	349	405
pH - E150 1 pH Units pH		1	39	4 02	361	3.74	NS	NS	3 95	385
Specific Conductance - E120 1 mS/cm Specific Conductance		0000	0 162	0 144	0 138	0 137	SN	NS	0 085	0 124
Temperature - £170 1 deg C. Temperature		0 1	21.9	16.2	24	216	SN	SS	22.5	194
<u>furbidity - E180 1 NTU</u> Turbidity		-	-	⊽	æ	⊽	SN	SS	4	4,
FIXED BASE LABORATORY ANALYSIS. Anions - NICAWW 300 0A mg/L. Chloride Nuraie Sulface		- 0	208	213 11 23 \$	25 4 JH 0 51 19 7 JH	15 2 1 4 JB 20 8	S S S	NS NS NS	16 6 0 12 10 9	16.5 0.17 19
Dissolved Gases - RSK SOP-175 mg/L Carbon dioxide Ethane Filtu ne Methane.		0 001 0 002 0 001 0 001	110 J <0.002 <0.001 0.0013 JB	40 002 40 002 40 001 0 002	130 <0.002 R <0.001 R 0.0011	40 002 <0 002 <0 001 0 0023 JB	8 8 8 8 8 8 8 8 8 8	X	120 <0.002 <0.001 0.0013	091 0005 0001 0001 18
Dissolved Hydrugen by Microseeps AM20GAX, nM Hydrogen		0.03	91	13	24	24	SN	SN	2.2	2.7
Total Alkalimty - MCAWW 310 1 mg/L, Total Alkalimt)		S	ъ	У	Q	۵	S.	S	2.1.JB	14 JB
Total Organic Carbon - SW846 9060 mg/L Total Organic Carbon		-	8f 90	ðr 90	⊽	н -	NS	N.	⊽	1 18
Total Sulfide - MCAWW 376.1 mg/L Total Sulfide		-	⊽	⊽	⊽	0 49 JB	Š	NS	Of 760	11 JH

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IABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 03, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7

ense Supply Center Richmond	Richmond, Virginia
efens	

Sam Mercura - 5W846 74704 (Dissolved) µg/L Not Detected Mercury Mercury Mercury Aluminan Ausenc Bartun Berylluum Cadmum Calcum Calcum	Sample ID Ke	Keporting Limit (a)	10/5/2001	471/2002	70121717	10/16/2002	001 2001	Apr 2002	7/30/2002	10/16/2002
Mercury - 5W846 7470 1 (Dissolved) ug/L Not Detected Mercury - 5W846 7470 A (Total) ug/L Mercury Mercury Mercury Aluminum Assence Bartum Berrylium Cadmum Cale um					1111111111	IN IN EUR	Off. 2001			
Mercury - 5W846 7470A (Total) 122/L Mercury Metals - 5W846 6010B (Dissolved) 112/L Aluminan Arsena Bartuan Gerylluum Cadenum Cadenum Calenum		-	⊽	<1 UJ	⊽	. ^	SN	S.	⊽	⊽
Mtdsh - SW846 6010B (Dissolved) µg/L. Alumnum Assen. Bartum Resylium Cakumm Cakumm		-	⊽	I 0 1 0 1	⊽	⊽	Š	SN	⊽	7
Aluminun Aisenk Bartun Rezijluun Cadenum Cakium								;	9	3
Aisenc Bartum Rezylluum Cadenum Caktum		300	<u>81</u>	1360	1550	Z 4	S S	Z Z) (<u>}</u> {
Battum Berylluum Cadenum Caktum		٠ <u>١</u>	0 8	0 <u>=</u>	0 2	08.7	2 2	e v	Of 2 86	Of 707
Bery litum Cadenium Cakium		§ 9	2 e	200	<u> </u>	% - 7. 4. □	SZ	SZ	063 10	Of 160
(akıum		<u> </u>	0.88 18	0 73 18) O	043 10	SN	SZ	2	, 52
dr. inn		2000	Or 0112	2330 JQ	2820 JQ	1740 JQ	NS	SN	Je50 JQ	1460 JQ
Chromium		10	01>	<10	<10	0I>	NS	NS	۷I۰ دان	012
Cobati		30	5 2 JQ	46 JQ	Of 65	4 JQ	SN	SZ	58.10	5 18
Copper		9	0I>	۱۰ دان دان	3.2 JB	9 5	X X	Z Z	200	A10
Iron		8 -	308U	3090	3 2	3.1	SX	ž Z	₹ ಌ	\$
Lead		2005	2510 JO	2460 JO	2650 JO	Of 0812	SN	SZ	2860 JQ	2670 1Q
Managara		20	195	\$81	221	162	NS	SN	304	562
Molybdenum		40	<40	<40	<40	<40	SN	SZ	0 4 0	0 1 >
Nickel		9	2 9 JQ	812	001×	33.1Q	SN	SN	51 JQ	49 10
Polassium		2000	2960 JQ	Of 0861	2020 JQ	Or 0222	S Z	S Z	7800 JQ	Dr 0867
Sodum		2000 2000 2000 2000	950	3 5	977	3 F	2 %	S Z	} }	20
Vandaum Zanc		2 2	4 5	366	57.1	204	SS	SZ	14.4 JQ	<20 UI,
Benefit start of the form of the start of th										
Aluminum		200	1120	1520	1490	831	NS	SZ	239	145 JQ
Arsanic		κυ	Q	Ф	ø	Ş	SN	SZ	ď	Ą
Barum		200	115 JQ	01 211	126 JQ	102 JQ	SZ	SN	Of 688	70.5 JQ
Beryllium		2 '	9 5	Of 260	Of 81	12 30	X Z	X Z	9 ₹	کر <i>ا</i> دو
Cadmium		, 2005	21 OPC5	2570 JO	240 10	Of 01/1	SZ	S Z	Of 0551	1430 JO
Cactum		00	017	01>	<10	<10	SZ	SN	, 01>	· 01>
Cobali		30	S7 JQ	5.2 JQ	5.7 JQ	4 JQ	SZ	SZ :	57 JQ	5.2 JB
Copper		2 ;	01×	۱۰۰۰ دا0	34 JB	01> مودو	S	Z Z	010 2006	010
Iron		902	338U	37.20	4 9	2.8 JO	s S	S Z	}r 9867	° °
רכות		2009	2700 JO	2540 JO	2780 JO	2200 10	NS	SN	2790	2690 JQ
Nighteaum		20	200	961	228	0/	SN	SN	307	297
Mokydenuti		40	0 1 >	9₹	<40	<40	SN	SN	o+0	<+10
Zickel		8	2 8 JQ	3.7 JQ	8 V	34 JQ	SN	NS	47 JQ	42 JQ
Potassium		2000	3070 JQ	Ör 0681	Or 0161	2230 10	SN	SZ	2750 JQ	2970 JQ
Sodium		2000	6620	0869	0519	9700	S	S S	6210	6710
Vanadium		S 5	8	08/20 24/20	0 5 5	0 7 7	2 2	s z	00 8 PI	
Zinc		3	7	ř	2		?	2	?	
<u>Thallium - SW846 7841 (Dissolved) µg/L.</u> Thallium		2	24 JB	<2 UL	<2 UL	2	SN	SN	4	<2 UI.
Thallum - SW846 7841 (Total) ug/L		2	2 JB	2 UL	<2 UL	8	SN	SN	\$	Z UI
I delitera										

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

	Sample 1D	Reporting Limit (a)	Sample DMW-13A 10/5/2001	Sample DMW-13A 4772002	Sample DMW-13A 7/17/2002	Sampte DMW-13A 10/16/2002	Sample DMW-20A Oct 2001	Sample DMW-20A Apr 2002	Sample DMW-20A 7/30/2002	Sample DMW-20A 10/16/2002
Polychlormated Biphenyle (PCBs) - SW846 8082 ug/L. Not Datecked			Ϋ́Z	V	Ν	V V	SN	S.	¥ _N	N A
Polycyclic Aromatic Hydrocarbons (PAHs) - SW846 8270C µg/L Accessorately	Cug/L	0.3	2	¥	¥.	Ą	SN	S. S.	¥ Z	¢ Z
Authorene		02	Ž	Ž	Š	¥ Z	Š	SN	۷ Z	Ϋ́
		0.5	ď Z	Ϋ́	V.	Ϋ́	SN	SN	N.	NA
Naphthalene		0.5	Ϋ́	V.	Υ V	Ϋ́	SN	SN	N A	₹ Z
Volattle Organic Compounds - SW846 8260B ug/L										
1.1-Truble we share		-	⊽	⊽	⊽	⊽	SN	SN	4.3	⊽
1 Dehlomethane		-	7	⊽	⊽	⊽	SN	SN	<i 3<="" td=""><td>7</td></i>	7
1 i-Dehlorethene		-	⊽	⊽	⊽	⊽	SN	SN	۵,	⊽
2 4-Timethylbenzene		-	⊽	⊽	⊽	⊽	SN	SN	< 3	⊽
1 2-Dit hlorobenzene		-	⊽	⊽	⊽	⊽	SN	SN	<13	⊽
1,3,5-1 nmethylbenzene		-	⊽	⊽	⊽	⊽	SN	SN	43	⊽
1.3-Dichlorobenzene		-	⊽	⊽	⊽	⊽	NS	SN	<13	⊽
1.4-Dichlorobenzene		-	⊽	⊽	⊽	⊽	SN	SN	۲.	⊽
Acetone		10	<۱0 دا٥	17 R	<10 UJ	0I>	SN	SN	18 R	0 >
Benzene		-	⊽	⊽	⊽	⊽	SZ	SN	<i 3<="" td=""><td>⊽</td></i>	⊽
Carbon retrachloride			⊽	⊽	⊽	⊽	SX	SN	<1307	⊽
Chlorotorn			0 36 JB	⊽	⊽	⊽	SN	SN	3</td <td>⊽</td>	⊽
Chloromethane		2	8	\$	2 UJ	7	SN	SN	W 7.2>	0.52 JQ
CIS-1 2-Dichloroethene		0.5	\$05	<05	\$	\$6	SN	SZ	40	21
Pomonsiprusane		-	⊽	⊽	⊽	⊽	SN	SN	۲ >	<u>_</u>
Methylene chloride		-	⊽	⊽	⊽	⊽	SN	SN	₹ 7	⊽
Naphhalene		-	⊽	⊽	ſ∩ V	⊽	SN	SN	<13 UJ	⊽
Tenachlorouthene		-	⊽	⊽	⊽	⊽	SN	SN	<13	⊽
trans-1 2 Duhlorethene		0.5	\$ \$	80	& & 5	<0.5	SN	SN	99	⇔
Trichlatethene		-	⊽	⊽	⊽	⊽	SN	SN	13	2.5
Vinoto blande		2	7	77	4	7	SN	NS	<2.7	9

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

				Kichmone	Kichmond, Virginia						
	Sample ID. Sample Date	Reporting Limit (a)	Sample DNIW-22A 10/5/2001	Sample DMW-22A 47/2002	Sample DMW-22A 7/36/2002	Sample DMW-22A 10/30/2002	Sample DNIW-25A 10/5/2001	Duplicate DNIW-25A 10/5/2001	Sample DMW-25A 4/5/2002	Sample DMW-25A 7/29/2002	Sample DMW-25A 10/16/2002
FIELD PARAMETFR <u>Dissolved Oxygen - E360 1 mg/L</u> Dissolved Oxygen		0 1	9	2.2	13	0.4	6	8	£.	9.0	2.5
Ferrous Iron - A3500D mg/L. I errous Iron		10	3.7	0.35	ଚ	2	₹	Ø 1	<u>8</u> -	6	8
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		1	£1-	98	-14	08-	99	99	231	310	151
<u>pH - E150 1 pH Աուն</u> pH		1	5 95	1 9	6 82	5 87	5 16	5 16	59	4 92	663
Specific Conductance - F 120 1 mS/cm Specific Conductance		1000	0.43	0 267	0 23	0 274	0 103	0 103	5810	0 125	0 291
Temperature - E.170 I. deg. C. Temperature		10	164	104	194	158	6 81	6 81	651	23.1	18.7
<u>Furbidity - E180.1 NTU</u> Turbidity		-	⊽	⊽	œ	⊽	œ	œ	91	4	61
FIXED BASE LABORA FORY ANALYSIS Aneus - MCAWW 300 0A mg/l. Chloride Nutate Sultate		10	809 <01 137	63 1 0 54 14 6	4 - 0 - 8	45 <01 33 6	117 8 1 74	12.9 <0.1 7.1	6 15 36.1	124 0 17 18 7	63 - 394
Dissolved Gases - RSK SQP-175 mg/L. Carbon doxide I thane Ethene Mcthane		0 001 0 002 0 001 0 001	73 J <0 002 <0 001 0 22	39 40 002 60 001 0 01	70 <0.002 <0.001 0.021	85 <0.002 <0.001 0.075	130 J <0.002 <0.001 0.013	140 J <0 002 <0 001 0 012	68 <0.002 <0.001 0.00059 JQ	100 <0 002 <0 001 6 0022	24 <0.002 <0.001 0.0016 JB
Dissolved Hydrogen by Microset ps AM20GAX, nM Hydrogen		003	6.8	96 0	27	4.2	9.5	8 2	1.5	2	vs
Total Alkalınity - MCAWW 310 1 mg/L Total Alkalınıty		so.	55	31	44	31	23	22	45	27	76
Total Organic Carbon - SW846 9960 mg/L. Total Organic Carbon		-	м	7	2	2	81 80	8f 90	4	2	Ξ
Total Sulfide - MCAWW, 376 J.mg/L. Foul Sulfide		-	12 J	⊽	O65 JQ	0 32 JQ	⊽	⊽	⊽	⊽	HL 180

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

				Richmond	Richmond, Virginia						
	Sample ID: Sample Date	Reporting Limit (a)	Sampte DMW-22A 10/5/2001	Sample DMW-22A 47/2002	Sample DMIW-22A 7/30/2002	Sample DMW-22A 10/30/2002	Sample DMW-25A 10/5/2001	Duplicate DNIW-25A 10/5/2001	Sample DMW-25A 4/5/2002	Sample DMW-25A 7/29/2002	Sample DNIW-25A 10/16/2002
Mercuri - SW846 7470A (Dissolved) 119/L. Not De leged		<u>-</u>	⊽	<1 UJ	7	⊽	⊽	7	⊽	⊽	⊽
Mercury - SW846 7470A (Evial) ug/L. Mercury		-	⊽	n .	⊽	-	⊽	⊽	0 094 10	⊽	7
Metals - 5W846 6010B (Dissolved) µg/L		٤	900	200	11000	01 9 58	<200	<200	<200 UJ	<200 UJ	623
Aluminum		200	19.7	3 0	146	15	\$	8	Ŋ	\$	۵
Alstant		200	93 8 JQ	816 JQ	Of 5.6t	Of 199	71.9 JQ	55 1 10	513.10	481 JQ	51.9 JQ
Beryllium		10	<10	~10	۹۰۰ دان	۹۰,	0 > ~	<10 31.0	01>	9 ?	€ς
Cadmium		5000 5000	۵ ا	2 <u>5</u>	2 §	\$2 97.10	2930 IO	2470 JO	14800	4520 JQ	18500
Calcium		2000	012	2005 <10	01>	01×	<10	<10	<10	<10	2.2 JQ
Cobale		2 02	99	3 0	85	89	12.2 JQ) I I JQ	<30	21.10	2 JQ
Copper		01	<10	<10	o4>	o10	01×	01>	01>	0 ₹	85 JQ
Iron		200	5130	311	1770	4140	210	5. 5.4) (5)) (20	e 4
1.cad		£ 0003	<u>.</u> و د	V .	7) E	2 25	330 10	1810 10	3010	1530 JO	2690 JO
Magnesium		2000	185	37.3		119	490	440	55 JB	151	8 2 JQ
Manganese Molshet pum		9	9	0 4 0	<40	¢40	8	O † >	0 1 √	<40	04
Nickel		100	oo1>	49 10	×100	00T>	38.10	32.10	00T>	00T> 1	44 10
Potassium		2000	8910	0809	4780 JQ	3840	4440 JQ	3960 JQ	71300	O 00081	42000
Sodrum		2000	32/00	20402	00/87	250	200	8 8	\$0 \$0	0\$>	14.30
Vanadium Zinc		88	² 07	8	₹ ?	8	² 50	12.8 JB	Or 921	147 JQ	<20 UL
Metals - SW846 MidB (Total) µg/L		200	<200	<200	Of 109	JR 7 JQ	645 JQ	<200	009	57 8 JQ	925
Aluminian		8	20 1	48 JQ	16 4	144	b	Ø	Ą	О	2.8.10
Barum		200	Of 96	86 1 JQ	51 JQ	2. 5.	58 I JQ	55.7 10	52.7.30	515 JQ	52.1.10
Berythun		<u>0</u> '	e 9 ₹	<10 032 10	€ ?	ξ ?	\$ ₹	€ 0	€ ?	0 62 62) 7
Cadmium		20005	15300	14400	8060	9450	2560 JQ	2460 JQ	15100	4740 JQ	00£81
Calcium		01	<10	ol>	<10	<10	01>	<10	17 18	<10	2 6 JQ
Cobalt		30	€30	<30	<30	99	Or 121	Of 611	Q; ·	24 10	23.10
Cupper		<u> </u>	0 0 5	√10 27°	0 v	8f 6 I	9 ₹	91×	2 %	453.10	31.70
lion		۳ آ	7. T	8.50 .20) (S	\$ 7	₹ ♡	\$ 70	\$ ₹	, v	₹ 5
Lead		2000	12300	0636	2890	7170	Or 0881	Or 0181	3000 JQ	J650 JQ	2680 JQ
Magnesium		20	192	43.7	122	111	467	455	8 1 JQ	183	Q(1 ::
Molybdenum		9	<40	<40	0 1 °	07>	, ¢0	Q- ;	0 7 ;	000	3.7 JQ
Nickel		8	V 100	7.2 JQ	×100	001>) or or	28.70	24 JB	45 JQ	<u> </u>
Potassium		888	986	0690	79200	29200	16600	16200	21600	0061	41300
Sodium		\$	18 B	00 70	Of 81	ş	85	Ş	\$0	0\$	Of 61
Vandium Zine		20.2	\$20	Dr 641	4 70	23	<20	50	14 9 JQ	<20	<20 UI
Thallium - SW846 7841 (Dissolved) 112/L		2	19 JB	70 C	2	4	2	Q	<2 UL	3	V
Linatilum		ı									
1hall.um - 5W846 (Total) µg/L Ihall.um 2070! 06		2	21 JB	70 C	<2 UJ	7	۵	~	<2 UL	8	<2 Page 8 of 33

TABLE D-1

SUNIVIARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02

UPPER WATER-BEARING UNIT

Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Center Rethmond

Rethmond, Virginia

				Richmond	Richmond, Virginia						
			Sample	Sample	Sample	Sample	Sample	Duplicate	Sample	Sample	Sample Daywork
	Sample ID: Sample Date.	Reporting Limit (4)	DMW-22A 10/5/2001	DMW-22A 477/2002	DMW-22A 7/30/2002	DMW-22A 10/30/2002	DMW-25A 10/5/2001	DMW-25A 10/5/2001	45/2002	7/29/2002	10/16/2002
Polychlormated Biphenyls (PCBs) - SW846.8082 µg/L			ž	× z	Ą	Ϋ́	Ϋ́	¥ Z	Y Z	Ϋ́	Š
ואסן דהבנהי נגם			1767	<u> </u>	•	:					
Polycyclic Aromatic Hydrocarbons (PAHs) - SW846 8270C ug/L	OC NE/L	į	;	į	;	ž	2	2	4 2	Ą.	Ž
Accomphiliene		0.5	V :	V :	£ ;	<u> </u>	2 2	(<u> </u>	- ×	¥	¥Z
Anthracene		0.5	ď.	Y :	¥.	<u> </u>	£ 2	C 4	. 2	. A	Ž
Пиопе		0.2	K Z	Y Z	NA NA	YZ	ď.	K	K :	2 2	5 2
Naphthalene		0.2	N A	Ϋ́Α	٧×	Ϋ́Ζ	∢ Z	ď Z	ď.	₹ Z	W
Volatile Organic Companies - SW846 8260B ug/L											
1.1. Lichborg thing		_	⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽
1 1-Dic blomestens			07 10	0.88 0	0 S JQ	048 10	⊽	⊽	7	⊽	~
i 1-Dichforghene		-	Of 990	. 13	0.74 10	Of 100	⊽	⊽	7	⊽	₹
1.3.4 Turneth Benefits		-		⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽
1 2-10 hlorobenzene		-	0 62 JQ	Of 610	⊽	0 44 JQ	⊽	~	⊽	⊽	⊽
1.3.5 Franchylls nzene			⊽	⊽	⊽	⊽	7	⊽	⊽	⊽	⊽ '
1 3.Dichlochenzene		-	⊽	⊽	⊽	⊽	7	⊽	⊽	⊽	⊽
1.4-Dichlorobenzene		-	⊽	⊽	⊽	⊽	7	⊽	⊽	⊽	⊽ ;
Acelunc		10	<10 <10	17 R	<10 R	<10 R	0 >	۰ ₁₀	<10 R	<10 R	2.5.10
Benzine		1	⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽ '
Carbon tetrachloride		-	⊽	⊽	m >	⊽	⊽	₽.	⊽ '	f n .	₹ '
Chloroterm			⊽	⊽	⊽	7	▽ '	⊽ '	⊽ '	⊽ ;	⊽ '
Chloromethane		ĻΙ	7	3	42 UJ	7	7	7 ;	3 :	Ω ?>	7 3
cis-1 2-Duhloroethane		0.5	62	6.7	3.5	7	œ œ	30 SC	1.2	٠ د	€.
Isomonylbenzene		-	⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽
Mathylana chlorida		-	⊽	⊽	⊽	⊽	⊽	~	⊽	⊽	⊽
Northball me		-	7	~	7	(U)	⊽	⊽	n v	⊽	⊽
Tour Manualture		-	5	44.3	3.2	61	19	16	v	13	- 4
remain 1.3 De Moroath oa		0.5	\$05	<05	€ \$	\$0\$	Š	& &	<05	40 \$	<0.5
Tan bloomban		_	01	20	12	01	56	54	0.74 JQ	4	⊽
Vanil ablanda		7	0 32 JO	\$	Ø	8	06 JQ	O6 JQ	4	<2	<2
V RIVI CRIONIUC								i			

)

⊽

032 JQ

⊽

۲

69

0 97 JQ

⊽

<u>Fotal Sulfide - MCAWW 376 1 mg/L</u> Total Sulfide

TABLE D-1

SUMMARY OF CONSTITUENTS DE FECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond

			Defense 1	Defense Supply Center Richmond Richmond, Virginia	chmond			;		
	Sample ID Sample Date.	Reporting Limit (a)	Sample DMM-26A 10/4/2001	Sample DMW-26A 4/5/2002	Sample DMW-26A 7/31/2002	Sample DMW-26A 10/15/2002	Sample DMW-27A 10/5/2001	Sample DMW-27A 4/4/2002	Sample DMW-27A 7/30/2002	Sample DMW-27A 10/15/2002
FIELD PARAMETER- <u>Dissolved Oxygen - E360 1 mg/L</u> Dissolved Oxygen		10	\$	77	1 36	10	8	<u>*</u>	8 0	Ξ
Ferrous Iron - A3500D mg/L Lurous Iron		0.1	3.8	3.2	8	-	2.2	2	₹	9.8
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		;	81	691	81.	89-	8 0	386	-31	£9-
pH - E.150 1 pH Units pH		1	195	471	5 86	11.9	4 35	4 26	4 2	3 99
Specific Conductance - 1120 1 mS/cm Specific Conductance		100 0	0 822	0 827	94.0	0 709	6800	880 0	860 0	0.123
Temperature - E1701 deg C Femperature		0	23.5	166	33.9	21	22.5	16.2	27	22.3
Turbidity F180,1 NTU Lurbidity		-	⊽	71	•	=	2	30	⊽	⊽
FIXED BASE LABORATORY ANALYSIS Annors - MCAWW 300 6A mg/L Chlorde Nitrae Sulface		- 0	258 <01 <1	210 0 29 53 3	224 <0.1 2.7	118 002 JQ 139	2 2 17	204 <01 25	16.5 3.1	20 l 0 0 l JQ 1 4
Dissolved Gases - RSK SOP-175 mg/L Carbon droxide Librane Filtene Methane		0 000 0 000 0 000 0 000	170 J 40 002 40 001 5 4	120 <0 002 <0 00 1 1 8	150 <0 004 <0 002 0 29	180 <0 002 <0 001 2 4	240 J 0 00038 0 0031 3 7	90 40 002 46 001	200 40 004 40 002 0 26	220 <0.002 <0.001 2.9
Dasolved Hydrogen by Microseeps AM20GAX nM Hydrogen		0 03	 oo	-	36	29	11	10	22	24
Total Alkalimity - MCAWW 310 1 mg/L Total Alkalimity		S)	33	ъ	43	19	3 18	2.1.18	1 8 JB	3.6 JB
Total Organic Carbon - SW846 9060 mg/L fool Organic Carbon		-	11	4	51	91	12	œ	13	01

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TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

			-	Kienmond, virgim	•					
	Sample ID	Reporting	Sample DNIW-26A	Sample DMW-26A	Sample DVIW-26A 7/31/2102	Sample DMW-26A 10/15/2002	Sample DMW-27A 10/5/2001	Sample DNIW-27A 4/4/2002	Sample DM1W-27A 7/30/2002	Sample D\1W-27A 10/15/2002
Mercury - SW846 7470A (Dissolved) µ2/L.	and adding	-	-	_	7	_	⊽	⊽	⊽	⊽
Not Defected		-	7	7	;	ţ	;			
Mercury - SW846 7470A (Total) µg/L. Mercury		-	⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽
Metals - 5 W 846 6010B (Dissolved) ug/L									;	Š
Alummun		200	137 JQ	86 9 B	292	500	33	⁷⁹⁸	§ (₹ <i>1</i>
Arsenic		S	∵	ზ :	£ 9 %	5. 1. 5. 5. 1. 5.	0 :	Q <u>5</u>	2 2	28.5
Вагит		200	06 2 JQ) (oi	7 0 0	کر د <i>ا</i> د	Of 211	2 5	07 17 0	Of 60
Beryllium			0 23 IR	9 °	€ 0	3	2	7	2	4
Cadmium		2005	4830 JO	2690	3940 JQ	4430 JQ	Of 119	JS0 JQ	S91 JQ	Ot 726
Chromum		9	01>	<10	37.10	<10	01>	<10	32 JQ	0 1 >
Cobalt		30	\$	6.2 JQ	13 JB	6 5	8	3 0	OF 26.0	0 76 JQ
Copper		2	<10	۱۰ ۱۷	28 10	ol>	o1>	0 >	01>	01>
lon		200	13600	2890	17400	12400	3110	2700	0881	0r6;
Irad		e.	7	7	7	Ş 6	Ş	C 030C	2 92	01 0521
Magnesium		5000 3000	2190 10	3800 JQ	Of 0502) o o o o	OL 0/51	Dr 0002	5 8 6	21.7
Manganese		R \$	<u>0</u> 5	<u> </u>	76 U	03.0 C40	4	40	07	<40
Medybdenum		₽ <u>E</u>	₽ 50 7	88 18	007	90F V	8 2	23 JQ	S1 JQ	<100
Nickel		2000	\$ 50	4510 JQ	4300 JQ	0816	Of Otte	2540 JQ	2670 JQ	2850 JQ
Sodum		2000	151000	120000	129000	00906	4640 JQ	5620	4740 JQ	5550
Vanadium		\$	2 i JB	₹	44 JB	38 JQ	2 I JB	€ ;	O83 JQ	4.10
Zmc		20	<20	26 1	<20	<20 UL	07 V	123 JQ	Q5	<20 UL
Marial - Struct All OR (Date)										
Alexandra		200	Or 961	140 JB	378	443	325	390	619	435
Arean		S	۵,	Ŋ	69	26 JQ	ŋ	\$	δ	ζ.
Barum		200	62.2 JQ	112 JQ	734 JQ	S8 5 JQ	Of 801	JS8 JQ	Of 011	140 10
Beryllium		9	V 10	<10	0 , 60	0¦ √	8f 690	Of 27.0	5 5 5	7 98 0
Cadmium		2	0.433	2 0	7 907	27 974	7 7 7	1330 10	984 IO	01 72 6
Calcium		9000	44W JC	5/4C	*020 *C	2 0	<u> </u>	2021	2 %	2017
Chomium		<u>9</u>) \ \ \	01.59	χ <u>=</u>	8	13.18	OF 91	01.2.1	Of 180
Cobalt		R 9	3 5		OI>	?; O	01>	000	01>	01>
Copper		200	12800	7830	18800	12500	2990	3240	1960	4020
Ilon Lead		•	ŋ	Ø	V	Ø	٧٠	Þ	Q	۲۶
Magnesium		2000	2050 JQ	3970 JQ	2120 JQ	Of 0191	Of 0151	2000 JQ	1460 JQ	1780 JQ
Manganese		20	107	172	103	0/	Of 191	261	Of 60I	203
Molybdenum		9	<40	6 €0	64.	Q\$;	유 *	, 440 , ,	94.	<u> </u>
Nickel		<u>00</u>	×100	5 3 JB	001×	001	×100	24 JQ	44 30	2012
Potassium		2000	5210	4670 JQ	4430 JQ	9400	33 O OC	2470 JQ	7/00 JQ	2830 10
Sodium		2009	145000	25000	ones:	20,00	2 2 2	3 5) (I	040°
Vanadiuni		2 8	9f 17	₹ 5) * *	77 6	24.70	3 5	₹ 5	7 = 5
Zinc		₽7	0 ₹	0.67	3	3	}	}	}	
Thailium - SW846 7841 (Dissolved) µg/L. Thailium		2	8f 6 l	<2 UL	<2 UL	<2 UL	2.2 JB	<2 UL	<2 UJ	<2
Thallium - SW846 7841 (Total) µg/L Thallium		2	2 JB	<2 UL	m &	<2 UL	\$	<2 UL	<2 UJ	٥

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02

UPPER WATER-BEARING UNIT

Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Center Richmond

Richmond, Virginia

Sample Date		Michigana Til Game					
270C Lug/L 02 NA	Sample Reporting DMW-26A Limit (a) 10/4/2001		Sample DMW-26A 10/15/2002	Sample DMW-27A 10/5/2001	Sample DMW-27A 4/4/2002	Sample DMW-27A 7/30/2002	Sample DMW-27A 10/15/2002
NA N							
92 NA	V V		¥ Z	Y Y	č	ď Z	Y Z
10 10 10 10 10 10 10 10			∜ Z	Ϋ́	Š	ď.	Ϋ́Z
Same Compounds - SW 846 8260B µg/L) r		Y.	¥ Z	NA.	Ϋ́Z	NA
Same Compounds - SM 846 8260B µg/L			V.	Y.	ΑN	Ϋ́Z	Y Z
\$\circ\$ \circ\$			Y N	Ϋ́	Y.	Y Y	Ϋ́
C C C C C C C C C C							•
1	- 2		⊽	⊽	⊽	⊽	⊽
	- ~		⊽	⊽	~	⊽	⊽
	- ~		⊽	⊽	⊽	⊽	7
	ر م		⊽	⊽	⊽	⊽	⊽
	- 2		⊽	7	⊽	⊽	7
1	- 5		⊽	7	⊽	⊽	⊽
1	- v		⊽	⊽	⊽	⊽	₹
10	- 2		⊽	⊽	⊽	⊽ }	⊽
\$\circ\circ\circ\circ\circ\circ\circ\cir	10 \$0		1 6 JB	985 JB	<10 R	33 R	<0 OI>
1	_ _		⊽	⊽	⊽	⊽	⊽ .
\$\circ \cdot \cd	-	•	⊽	⊽	⊽	T	-
2 6.0 6.2 6.0U 0.5 6.25 6.5 6.1 1 6.5 6.1 6.1 1 7 6.1 6.1 1 7 6.1 6.1 1 7 6.1 6.1 1 7 7 7 7 7 1 6.1 1 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	~		⊽	⊽	⊽	⊽	⊽
05 425 405 405 405 405 405 405 405 405 405 40	2 <10	·	7	7	\$	<2 UJ	\$
			0 38 1O	9	\$ 8	\$ \$	6 5
1	- \$		⊽	⊽	⊽	⊽	⊽
1	- 2		⊽	⊽	⊽	⊽	⊽
1	- \$	Ť	⊽	7	⊽	⊽	v
05 <25 <05 <05 <05 <05 <05 <05 <05 <05 <05 <0	- 2		⊽	₹	⊽	⊽	₹
· · · ·			40.5	89	60 S	\$05	9
;	- د		Of 180	⊽	⊽	⊽	⊽
2 <10 <2 <2	2 <10		7	7.7	\$	4.3	٧,

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

										Camala
	Sample 1D. Sample Date	Reporting Limit (a)	Sample DMW-33A 10/8/2001	Sample DMW-33A 4/8/2002	Sample DMW-33A 7/17/2002	Sample DMW-33A 10/29/2002	Sample DMW-35A 10/5/2001	Sample DMW-35A 4/5/2002	54mpre DMW-35A 7/17/2002	DMW-35A 10/16/2002
FIELD PARAMETER Dissolved Oxygen - E360 1 mg/L Dissolved Oxygen		01	4 4	=	4-	90	8	6.2	80	0,
Ferrous Iron - A3500D mg/L. Ferrous Iron		10	3.5	-	0.5	2.4	-	0 1		8
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		•	74	7.7	101-	43	153	298	<u>8</u>	147
<u>рН - F150 1 рН Units</u> pH		f	\$ 06	52	5.2	\$15	5 22	53	5 34	5 29
Specific Conductance - E120 J mS/cm Specific Conductance		0 001	0 235	0116	0 202	0314	0.073	0 074	90 0	0 073
Temperature - E170 deg C Temperature		1 0	17.1	8 61	197	186	61	14.2	20 5	19.7
<u> Turbidiy - E180 1 NTU</u> Turbidiy		-	17	53	2	42	61	⊽	28	⊽
FIXED BASE LABORATORY ANALYSIS. Amoust. MCAWW 300 0A mg/L. Chloride Nuraire Sultate		- - -	453 <01 216	10.5 <0.1 21.4	50.4 <0.1 16.3 JH	53.7 002 JQ 19.5	= 8 + 4 = =	116 401 47	11.2 JH 6 028 JQ 4 8 JH	11.7 40.1 42
Dissolved Gases - RSK SOP-175 mg/L Carbon droxde Ethane Friene Methan.		0.001 0.002 0.001 0.001	110 J <0 002 <0 001 0 024	71 <0.002 <0.001 0.15	81 <0.002 R 0.00038 K 0.03	99 <0.002 0.0017 0.015	78 J <0 002 <0 001 0 0012 JB	53 <0.002 <0.001 0.00063 JQ	72 <0.002 R <0.001 R <0.001	61 <0.002 <0.001 0.002 JB
Dissolved Hydrogen by Microscops AM20GAX nM Hydrogen		0.03	16	077	<u>-</u>	61	6 8	1.5	2.8	2.5
Fotal Alkalınıtı - MCAW'N 310 1 mg/L. Fotal Alkalınıty		٧٠	15	Hf 01	13 JH	95 JH	8f 01	ſ 6	=	H II
<u>Yotal Organic Carbon - SW846 9060 mg/L.</u> Total Organic Carbon			2 JB	7	-	HI I	⊽	⊽	⊽	⊽
Total Sulfide - MCAWW 376 1 mg/L Total Sulfide		-	8 7	⊽	⊽	0.48 JQ	_	⊽	⊽	⊽

TABLE D-1

				riciniona, ingilia						
	Sample ID: Sample Date:	Reporting Limit (a)	Sample DNIW-33A 10/8/2001	Sample DNIW-33A 4/8/2002	Sample DMW-33A 7/17/2002	Sample DM W-33A 10/29/2002	Sample DVIW-35A 10/5/2001	Sample DMW-35A 4/5/2002	Sample DMW-35A 7/17/2002	Sample DMW-35A 10/16/2002
Mergury - 5W846 7479A (Dyssolved) BB/L. Not Detected		_	⊽	m Þ	7	⊽	⊽	⊽	⊽	⊽
<u>Mercury - SW846 7470A (Twal) pg/L</u> Mercury		_	⊽	m ⊳	⊽	7	7	7	⊽	⊽
Metals - SW846 6010B (Dissolved) 112/1		Ş	8	00,7	01.10	01 605	0067	111062	01.10	<2001)
Arsen		λ.	\$ 5	\$ 5	\$ 5	8	ر د (\$	Š	۵.
Barium		200	79.2 JQ	34.7 JQ	93.5 JQ	Of 188	27.3 JQ	30 3 JQ	30.7 JQ	29.5.1Q
Beryllium		2 ′	0.85 JB	9 9	- 5 5	087 JQ	۲ داه	ر 9 ر	ę,	065 JQ
Calcium Calcium		2000	12500	5470	14300	001E1	2800 JQ	01 00₹£	3400 JQ	3160 JQ
Сиотип		01	<10	ol>	<10	0I>	°10	OI>	<10	<10
Cobalt		Ω :	9	30	0 89 JB	8	₽,	Q. 9	14 18	& (
Copper		<u> </u>	0[> 650 3	01×	<10 UL 5770	2. <u>2.</u>	0.5 0.5	01 151	17.10	1360
Lion		3 "	Ş	8	, D	\$ 0	7	7	9	₽
Magnesum		2000	88	3950 JQ	10300	9440	2240 10	2370 JQ	2460 JQ	2350 JQ
Manganese		20	137	57.7	163	145	4	468	512	47.9
Molybdenum		우	<40	040	<40	°40	40	0 1 °	c40	0 7 :
Nickel		<u>2</u>	00 V 00 V 00 V 00 V 00 V 00 V 00 V 00 V	01.00 01.00 01.00	△100 4789 10	0012	×100 4240 10	3370	010055	5.4.5
Potassum Sectum		2005	2010	5210 5210	9170	9050	2160 30	Of 062	2380 10	2930 JQ
Vandrum		99	<50	8	Of 18.0	8	, 050	, 0\$>	%	P
Zinc		20	15.2 JQ	<20	<20	\$20	0 7 >	<20	² 50	<20 UL
Metals - 5 W846.6010B (Fotal) µg/L						;			;	
Alumann		200	<200	32.3 10	0f 18	91 2 10	, 500 5	<200 UJ	81 JQ	<200 UJ
Arsenic		, 5 <u>5</u>	874 10	37.2 10	Or 698	Of 9 28	30 7 10	32 8 JO	30 - 30 Or - 08	30 PO
Beryhum		2	1.1 JB	01>	13.10	07 1	01>	<10	<10	Or 120
Садшеш		2	7>	42	7	IJ	8	د	7	7
Cakium		2000	12900	6050	3100	12900	Of 0815	3500 JQ	3310 JQ	3350 JQ
Chromum		≘ ⊊	⊋ ₹	2 %	0.17) (2)	3 8	€ ₹	18 18	€ ₹
Coball		2) ₹	07 7	<0 OF C	2.4 JB	017	01>	2.2 JB	? ?
lion		200	6870	0901	5360	5240	1610	QL 171	1220	1460
קדין		£	Ø	Q	Q	Q	7	Q	В	۶
Мадпезин		\$000 3	9610	4270 JQ	9540	9360	2490 JQ	2510 JQ 50.3	2410 JQ	2430 JQ
Mangantse		07 9		65.9	(C)	€ ₹	÷ Ç	2 O	(A)	(6)
Molybdenum		8	2 2 2	8 7	007×	2 7	27.30	5.2 JB	3 t JO	46 JO
Potassilal		2000	6250	3300 JQ	4590 JQ	5520	ðr 065†	3550 JQ	3210 JQ	Qt 077f
Sodium		2000	7130	5860	7940	8850	2510 JQ	2960 JQ	2400 10	3910 JQ
Vanadium		S	9	8	07.10	\$	Ş ;	0 , 5	\$ ₹	0\$>
Zinc		ଛ	17	22 6	? ;>	Df 7.81	07>	OF)	07>	<20 O.L
Challium - SW846 7841 (Dissolved) µg/L. Thallium		7	۵	<2 UL	<2 UL	8	2	<2 UL	8	7
:										
Thailium - SW846 7841 (Total) µg/L. Ihailium		2	7	<2 UL	<2 UL	8	2	<2 UL	<2 UL	5
00 00										Page 14 of 33

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

			2	Alcinologi, viigiiia						
	O shows	Daniel	Sample	Sample DMW.33A	Sample DATW-33A	Sample DMW-33A	Sample DMW-35A	Sample DMW-35A	Sample DMW-35A	Sample DMW-35A
	Sample Date	Limit (a)	10/8/2001	4/8/2002	7/17/2002	10/29/2002	10/5/2001	4/5/2002	7/17/2002	10/16/2002
Polychlornnated Biphenyls (PCBs) - SW846,8082 ug/L			;	÷	į	2	2	2	¥ Z	Ž
Not Detected			Š	č Ž	ď Z	ζ.	Ş	Š		į
Polyevelic Aromatic Hydrocarbons (PAHs) - SW846 8270C µg/L	OC µg/L						,	;	j	ž
At chumbth; Its		0.5	YZ.	ΥN	A'N	Y Z	Y Z	Y Y	Y.	YZ :
Anthucan		0.5	ď	Ϋ́	Ϋ́	٧Z	V	K Z	Ϋ́	YZ.
However		0.2	×z	Ϋ́	٧X	NA NA	Ϋ́	K.	K Z	ΥZ.
Naphthalene		0.2	N.	Ϋ́	۲ Z	٧Z	₹ Z	٧X	ď Z	∀ Z
Volatile Organic Compounds - SW846 8200B µg/L		-	1200	9	099	089	⊽	Of 68 0	7	⊽
1.1.1.1 Heritage than		-	170	15	81	011	⊽	043 JQ	⊽	⊽
1 De Monaghana		-	450 J	62	230	280	⊽	91	7	⊽
1.2.4.7 unsthelbergene		-	×100	<20	68 3	C 92	⊽	⊽	7	₹
1.2-Debendenzen		-	29 JQ	27 10	<83	29 2	⊽	⊽	⊽	⊽
1.3 S.Tronethylburgene		-	×100	07>	<83	<i>L9></i>	⊽	⊽	⊽	⊽
1 3. Dichlorobenz, ne			90 <u>1</u> 00	Ç5	<83	<i>L</i> 9>	⊽	⊽	⊽	⊽
1 4-De Housbeazene		-	×100	42 10	€83	<i>L</i> 9>	⊽	⊽	⊽	⊽┆
Action		01	<1000	<200 R	<830 UJ	<670 R	01×	<10 R	14 J	Or
Builden		-	×100	85	€3	<i>L</i> 9>	⊽	⊽	⊽	⊽
Cyton terroblonde		-	×100	<20	<83	<i>L</i> 9>	7	⊽	⊽	⊽ '
Chlanform		-	27 JB	S 9 JQ	<83	2 92	⊽	⊽	⊽	⊽ '
Chloroum thane		2	<200	<40 <40	<170 UJ	<130	7	4	<2 UI	7
Civil 2-Du bloroethene		0.5	2900	069	1800	0061	-	9.1	0.55	ş
Isonopulbenzene		-	8 <u>1</u> >	<20	<83	<i>L</i> 9>	⊽	⊽	⊽	⊽
M. rhylene chloride		-	00I>	07>	34 JB	29 JQ	⊽	⊽	⊽	⊽
Noshhalan		_	90₹>	<20 UJ	<83 UJ	(n <i>L</i> 9>	⊽	m ⊽	37	⊽
fraginisher. Est schlossethere			430	140	360	450	66	15	7.8	19
trans-1 3-Dachfornethers.		0.5	39 JQ	73 JQ	<42	Ġ	805	\$6	902	405
Techtorse thene		-	3500	780	2000	2500	e	33	31	7
Vious blonde		2	33 JQ	J1 JQ	<170	<130	<2	<2	42	42
The state of the s										

TABLE D-1

SUMMARY OF CONSTITUENTS DE TECTED IN GROUNDWA IER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

										-
	Sample ID Sample Date	Reporting Limit (a)	Sample MW112-2 Oct 2001	Sample MW112-2 Apr 2002	Sample MW112-2 7/31/2002	Sample MW112-2 10/16/2002	Sample MWFOS-1 10/9/2001	Sample MWFOS-1 4/5/2002	Sample MWFOS-1 7/29/2002	Sample MWFOS-1 10/15/2002
FIELD PARAVIETER Diviolised Oxygen - E360 1 mg/L Dissolved Oxygen		10	SS	NS.	2.5	-	0.4	0 4	1.26	90
Ferrus Iron - A3500D mg/L. Ferrus Iron		0 1	SN	NS	8	۴.	0.5	F 0	0	8
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		‡	NS	SN	228	224	57	-15	191	101
2H - 2.150 1 pH Units pH		1	SX	N.	4 56	4 92	613	638	2 87	5 56
Specific Conductance - E120 1 mS/cm Specific Conductance		100 0	X	SN	0 104	0 119	0 145	0 347	0 171	0 240
<u>Iemperature - E.170 1 deg C.</u> Temperature		01	ž	SN	24 8	661	21.5	19.2	208	92
Turbidity - E189 I NTU Turbidity		-	S	S	∞	56	⊽	⊽	601	36
FIXED BASE LABORATORY ANALYSIS. Anons - MCAWW 300 0A mg/L Chlorde Nurate Sultate		-	X X X	X X X	13.9 0.15 9.1	164 0 06 JB 13 8	. 3 0 5 3	16 8 40 1 114	151 <01 616	12 <0.1 62.9
Dissolved Gases - RMK SQP-175 mg/L Carbon dioxide Ethane Ethene Mcthane		0.001 0.002 0.001 0.001	X	2	69 <0.002 <0.001 0.0003	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	22 J <0 002 <0 001 0 0038	9 1 <0.002 <0.001 0.0092 JQ	32 40 002 40 001 40 001	42 <0.002 <0.001 0.012
Dissolved Hydrogen by Microseeps AM20GAX, aM Hydrogen		0 03	SZ	SZ SZ	99	ы	30 36	13	23	5.6
Fotal Alkalimty - MCAWW 310 1 mg/l. Total Alkalimty		*5	S. S.	SN ,	43 JH	49 JH	61	Hf 61	2	H E1
Fotal Organic Carbon - SW846 9060 mg/L Total Organic Carbon		-	SZ SZ	SN	⊽	⊽	06 JB	ðr 90	⊽	=======================================
Total Sulfide - MCAWW 376 1 mg/L. foul Sulfide		-	Š	SN	Or 59 0	⊽	⊽	⊽	⊽	⊽

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNI
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

			•	Sur famoura						
	Sample ID	Reporting	Sample MW112-2	Sample MW112-2	Sample MW112-2	Sample MW112-2	Sample MWFOS-1	Sample MWFOS-1	Sample MWFOS-1	Sample MWFOS-1 10/15/2002
	Sample Date.	Limit (a)	Oct 2001	Apr. 2002	7/31/2002	10/15/2007	10/2/6/01	*2070	***************************************	
Mercury - SW846 7470A (Dissolved) ug/L. Not Detected		-	ž	S.	⊽	⊽	⊽	⊽	⊽	⊽
Mcrury - SW846 2470A (Total) µg/L. Mercury		-	NS	SZ	⊽	⊽	⊽	⊽	⊽	⊽
Marele . SW 846 6010B (Decolood) until										:
Almmin		200	SN	SV	81 I JQ	Or 8 99	<200	<200 UJ	Or 991	<200 CJ
Arsh		S	SN	SZ	\$	Ś	ς :	٠ :	0 :	0 4
Вапи		200	SS	SN	30 e 1Q	318 JQ	13.7 JQ	25.9 JQ	154.30) (1911
Berlin		2	SZ	SN	1 8 JB	25 10	95	ol>	0j ·	ol»
Codminm		2	NS	NS	Q	4	7	\$	7	7>
Calcum		2000	SN	SN	3460 JQ	3400 JQ	00981	34200	16500	15600
Carrier		0	SN	SN	0 I >	<10	9	<10	۷I0 دا0	<10
		Ş	SZ	SN	4 JB	36 JB	30	30	°30	<30
ר טעיוו		2 €	SZ	SN	×10	01>	۷I۰	0I>	01 >	<10
Laddo) (0,	S Z	SZ	879	75	649	517	675	445
non .		*	2	ž	V	\$	Ø	Ф	ŋ	۵.
par		COUR	2 2	SZ	2830 10	2870 JO	0299	10200	8320	0777
Magnesium		995	2 2	S Z	50.5	619	898	47	49.5	43.5
Manganese		3 \$	2 2	2 2	9	- OT	3.7 JB	147 JO	154 JO	18.7 JQ
Molybdenum		9 8	514	2 2	01.05	74 10	001	001>	×100	· 00/>
Nickel		3 8	<u> </u>	2 2	25.85	7 1 5	8220	0188	6840	6870
Potassium		900	2 2	S N	2400 10	3400 10	2030	11600	9240	9740
Sodium		3 5	2 2	2 2	3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	, o	\$ \$	95	8	<50
Vanadium		£ 5	2 2	ž) 	<20 UL	386 J	4 50	219	<20 UL
Zinc		707	S.	2	3			}		
Marata: SW846 6010B (Total) ug/L										
Aluminio		200	SZ	SN	218	62.5 JQ	700	<200 UJ	69 3 10	<200 UJ
Arenic		\$	SN	SN	ሪ	Ŋ	۵.	\$	0	\$:
Randin		200	NS	SN	31.9 JQ	32 1 10	137.10	24 % 30	کار لادا	0, 9,
Berlium		9	SN	SS	8 JB	25 JQ	0I>	0[>	9,	27 %
(admust		2	SN	SN	0 29 18	77	7	7	3 5	7>
Calcium		2000	SN	SN	7430 JQ	7410 JQ	00861	32500	00 s	0000
Chromium		01	SN	SN	0I>	\$\frac{10}{2}	01× °	2 €	Q	010
Cohalt		30	SN	SN	43 JB	35 JB	Q; >	⊋ :	₹ :	0\$\ ?:
Copier		2	SN	NS	0l> 	0 V	010		2 5	
Lou		200	Š	SN	1810	1030	707	7,	, v	413
i end		3	SN	SN	V	♥ :	ָּי ס	V	₹ ≎	· ·
Марперия		2000	SZ	SN	2900 10	2870 JQ	71.70	9/10	8240	0//
Managarese		20	SN	SZ	613	623	89	97	49	44 ::
Molybdenum		40	SZ	SN	₹ 90	0 1	39 JB	14.5 JQ	Or 151	S 10
- Single Park		8	SZ	SN	Or 6.9	Of 9	0012	2.7 JB	0012	Q)[V
Popagailit		2000	SZ	NS	0009	0119	088	8 520	08/9	6/40
Coding		2000	SN	SN	3440 JQ	3360 10	7670	1000	0616	9490
Vanadum		35	SN	SN	9	₹	Ş	05°	\$	\$\$0 \$\$0
Zinc		20	NS	SZ	<20	<20 UL	m 02>	<20	0 5 5	<20 U.L
!!										
Thallium - SW846 7841 (Dissolved) µg/L Thallium		2	SN	NS	<2 UJ	å	۵	<2 UL	5	77
The Hinm · SW846 7841 (Total) ug/L								;	,	
Lhallun		2	SZ	SN	€2 UJ	4	4	<2 UI.	a	\$
90 10.										Page 17 of 33

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02

Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Center Richmond

Richmond, Virginia

									- I C	Cample
	Sample ID: Sample Date	Reporting Limit (a)	Sample MW112-2 Oct 2001	Sample MW112-2 Apr. 2002	Sample MW112-2 7/31/2002	Sample MW112-2 10/16/2002	Sample MWFOS-1 10/9/2001	NWFOS-1 4/5/2002	NWFOS-1 7/29/2002	MWFOS-1 10/15/2002
Polychlurnated Biphenyls (PCBs) - SW\$46 8082 µg/L. Not Detected			SN	SN	Ϋ́	Ϋ́Υ	¥.	N A	¥ Z	K Z
Polycyclic Aromatic Hydrocarbons (PAHs) - SW846 8270C µg/L	XC ug/1.					;		į	ž	ž
Acenaphthene		0.2	SS	SN	Y X	Ϋ́	۷ ۲	ď	K :	<u> </u>
Anthracene		0.2	SZ	SN	¥ X	Ϋ́	Ϋ́Z	¥ Z	NA	ž
Tustene		0.5	SN	SN	۲ ۲	¥Z	¥Z	₹ Z	Y.	Ž
Naphthaltne		0.2	SN	NS	NA	Y.	Ϋ́	Ϋ́	Ϋ́	∢ Z
Volatile Organic Compounds - SW846 8260B µg/L									,	,
1.1 Treplomethane		-	SN	SN	⊽	⊽	⊽	⊽	⊽	⊽
I-Dublocethane		-	SN	NS	⊽	⊽	⊽	⊽	⊽	₹
1-De blorochene		-	SN	SN	⊽	⊽	f 0 t >	⊽	⊽	⊽
2 4-Trimelhylbenzene		-	NS	SN	7	⊽	⊽	⊽	⊽	⊽
2-Dichlorobenzene		-	NS	SN	⊽	7	⊽	7	⊽	⊽
3 5-Trimethylbenzene		-	SN	SV	⊽	⊽	⊽	⊽	⊽	⊽ '
3.De blooksprene		-	SN	SN	⊽	⊽	⊽	7	⊽	⊽
4 Dichhrobenzune		-	SN	SN	⊽	⊽	⊽	7	⊽	⊽
Actione		9	SZ	SN	<10 R	01×	01>	<10 R	<10 R	<10 UI
September		-	SZ	SN	⊽	⊽	⊽	₹	⊽	₹
Carbon tetrachloride		-	SN	SN	u ⊳	7	⊽	⊽	5	⊽
honoram		_	SZ	SN	⊽	7	⊽	⊽	⊽	⊽
Hotomy thank		2	NS	SN	<2 UJ	J	4	4	<2 UJ	7
cset 7 Da bloosethene		0.5	SN	SS	8	805	S Ø S	\$	⊕	8
London/Penzene		-	SN	SN	⊽	⊽	⊽	⊽	⊽	⊽
Machine chloride		-	SN	NS	⊽	⊽	⊽	⊽	⊽	⊽
North its state		-	NS	SN	m⊽	⊽	⊽	n⊽	⊽	⊽
Service lorrest bene-		-	SN	SN	⊽	⊽	⊽	7	⊽	⊽
rans-1.2 Da bloroethene		0.5	SS	SN	Ø 5	& &	40.5	905	<0.5	40.5
c. Howerhous		-	SZ	SN	⊽	⊽	⊽	⊽	⊽	⊽
		•	514	312	ς	7	?	ç	ç	Ç

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

			-	Richmond, Virginia	•					
	Sample ID Sample Date.	Reporting Limit (a)	Sample MWFOS.3 Oct 2001	Sample MWFOS-3 Apr 2002	Sample MWFOS-3 7/31/2002	Sample MWFOS-3 10/15/2002	Sample NIWFTA-1 10/4/2001	Sample MWFTA-1 4/4/2002	Sample MWFTA-1 7/30/2002	Sample MWFTA-1 10/16/2002
HELD PARANIETER <u>Dissolved Oxigen - E360.1 mg/L</u> Dissolved Oxygen		10	Š	N	8 -	80	<u>8</u>	1 2	047	22
Ferrous Iron - A3500D mg/L Ferrous Iron		0 1	NS	Š	Ϋ́	 	3,6	26	₹	2
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		;	SN	N.	280	230	-23	-23	-147	-158
PH - E.15<u>0.1</u> pH Unuts pH		1	SX	S	4 72	8	65 9	581	5 67	295
Specific Conductance - E120 1 mS/cm Specific Conductance		0000	SX	SN	0.077	0 103	0 673	0 686	0 444	0.557
Temperature • £170 1 deg C Temperature		0.1	SX	S	253	204	961	14 8	22 6	20.5
Turbidity - E180 1 NTU Lurbidity		-	SN SN	SZ	17	Ξ		œ	æ	218
FIXED BASE LABORATORY ANALYSIS. Amons - MCAWW 300 0A mg/L Chlonde Nutrate Sulface		- 0	NS NS	8 8 8 8 8 8	95 1 2 1	9.2 <0.1 18.1	30.4 <0.1 1.2	34.3 0.02.1Q 0.54.1Q	33.1 <0.1 0.56.1Q	14.8 J 05.1 JQ
Dissolved Gases - RSK SOP-175 mg/L Carbon dioxude Ethane Ethene Methane		0 001 0 002 0 001 0 001	S S S S	8 8 8 8 2 2 2 2 2 3 8 8	190 <0.002 0.0035 0.29	200 <0 002 0 0! 1 2	510 J <0 002 <0 001 4 4	280 <0.002 <0.001 5.2	440 <0.01 <0.005 0.51	450 <0.002 <0.001 4.8
Dissulted Hydrogen by Microsceps AM20GAY nM		0 03	SN	SN	2.9	56	91	=	2.6	23
Total Alkalınıty - MCAWW 310 1 mg/l. Lotal Alkalınıty		S	SN	Ş	7.2 JH	62 JH	280	270	061	190
Total Organic Carbon - SW 846 9060 mg/L. Total Organic Carbon		-	NS	Š	3	4 JH	36	37	27	30
Total Sulfide - MCAWW 376 1 mg/L Total Sulfide		-	NS	S	⊽	2.7 JH	▽	⊽	0 12 JQ	14 JH

42 UL

4

<2 UL

2 JB

J

<2 UJ

S

Š

Thallium - SW846 7841 (Dissolved) 199/L Thallium

<2 UI.

à

<2 UL

2 1 JB

A

<2 UJ

SN

SZ

TABLE D-1

			~	Richmond, Virginia						
	Sample ID: Sample Date	Reporting Limit (a)	Sample MWFOS-3 Oct. 2001	Sample MWFOS-3 Apr 2002	Sample MWFOS-3 7/31/2002	Sample NIWFOS-3 10/15/2002	Sample MWFTA-1 10/4/2001	Sample MWFTA-1 4/4/2002	Sample MWF1A-1 7/30/2002	Sample \$1WFTA-1 10/16/2002
McCurr - SW846 7470A (Dissolved) ug/L. Not Detected		-	SN	SN	⊽	⊽	~! U.	<1 UL	□ UL	<1 UI.
Mercury - SW846 7470A (Total) µ2/L.		-	SS	SN	⊽	<i td="" ul<=""><td>o or</td><td>8f 110</td><td><1 UL</td><td><1 0.1.</td></i>	o or	8f 110	<1 UL	<1 0.1.
Metals - \$W846 6010B (Dissolved) ug/L								•	ì	V Sec
Aluminum		200	SN	SZ	Of 821	914.10	163 1Q	219	240 36.9	057
Атсепи		\$ 200	SZ	SZ Z	24.4	29.2	127	30 8 323	ربر 13	217
Bailuin		200	S Z	S Z) (1) (1)) or o	259 0.87 JR	9 °	01>	Of 17.0
Beryllium		5 (e S	SZ	₹ 7	; 7	0 42 JB	3	\$	2
Cadmium		2005	SZ	S	1320 JQ	Of 0911	15200	34200	20500	22200
Catcion		2	×	SN	<10	<10	OI>) 6 JQ	<10	~ 10
Coball		30	SN	SN	2 JB	1.7 JB	2.2 JB	2 JQ	Or 91	12 10
Copper		01	SN	SN	24 JQ	34 JQ	رام دورون	01×	01>	012 25.
lion		200	SN	SN	3920	3780	00701	206	00 /g	£ 4
Lead		m	SZ	S	5.5	Ç	7 E	3 8	28500	30900
Magnessum		900	S Z	e v	989 J.C	24 2 24 2	32 rw 822	87.1	510	5
Manganese		3 9	SZ	ž	0	40	¢40	~ 1 0	0 1 >	O \$ >
Mony buching		201	SZ	SZ	×100	×100	<100	<100	00I>	×100
Polyseium		2000	SN	SN	2010 JQ	OS 10	10400	0269	7430	8010
Simpo		2000	NS	SN	0019	5980	15600	13500	14500	14200
Vanadum		90	SN	SN	8	\$ \$	16 JB) 2 JQ	07 -	01 5 1
Zin		20	SZ	SS	32.3	<20 UL	308	8	DZ>	<20 UL
Metals - SW846 6010B (Lotal) 112/L							;	;	ì	•
Alununum		200	NS	SX	155 JQ	83 JQ	329 JII	109 JH	266	310
Arsenic		S.	SZ	SN	26.7	27.4	42.5	39.9	555	5.5
Влівт		200	SN	SS) (1)	142 JQ	187	\$ 5 T	787	OF 1
Beryllium			2 2	S N	ξς	? ?	81 TF 0	? ?	? 0	3
Cadmium		20005	Z Z	2 2	Or 0811	Of 0221	14200	36000	20500	21900
Calcium		01	ź	SZ	0I>	, 0I>	<10	<10	o1>	O</td
Chromian		: R	SN	SN	1 9 JB	13 JB	2 JB	15 JQ) S JQ	Of 860
Connection		92	SX	NS	25.2	35 10	01>	<i0< td=""><td>۲<u>۱</u>0</td><td>0l></td></i0<>	۲ <u>۱</u> 0	0l>
lon		200	SN	SN	3880	3850	0266	0096	6780	7450
Lead		m	SN	SX	-8 -1	Ø	Ø .	Ð	0	۳.
Magnesium		2000	SS	SN	Of 0161	960 JQ	51900	54300 513	28300	30300
Manganese		50	S.	S	65.4	65.5) S	912	25	50
Molybdenum		9	SZ.	S	O# 55	\$. 5 .	O# 50	0 4 5	OF 5	Q 50
Nickel		00 5	Z Z	8 5	200	55 J	0000 0000	015 0155	2 < COD	0702
Potassium		0000	2 z	S S	2007) (200)	00051	14600	0.54	14200
Sodium		2000	S Z	SN N	0470	} {	, 1 m	OI F	12.50	01 F
Vanadium		S &	g z	S N	8 () (20 (11) (11)	20 m	, 5 20 20 20	\$ 07°	730 CE >
Zinc		3	?	2	•					

TABLE D-1

SUMMAR) OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

			2	richinosa, virginia						
	Sample ID:	Reporting Limit (a)	Sample NIWFOS-3 Oct 2001	Sample MWFOS-3 Apr. 2002	Sample MWFOS-3 7/31/2002	Sample MWFOS-3 10/15/2002	Sample MWFTA-1 10/4/2001	Sample MWFTA-1 4/4/2002	Sample MWFTA-1 7/30/2002	Sample MWFTA-1 10/16/2002
Polychlornated Biphensh (PCBs) - SW846 8082 ug/L Not Detected			NS	SN	Υ V	V Z	ν V	Ϋ́ Y	N A	¥ Z
Polycyclic Aromatic Hydrocarbons (PAHS) - SW846 8270C ug/L. Az etrophisma	.1/ar 20.	0.2	SZ	SN	Ϋ́	A'N	Z V	O 073 JQ	0.066 R	QU 1800
Anthracas		0.5	SN	SN	NA NA	Ϋ́Z	Ϋ́	40 2	0 057 R	Of 9400
Fluxen		0.5	NS	NS	Ϋ́Z	YZ.	Y.	97	0041 R	Or 6#0 0
Naphthalene		0.2	NS	SN	NA	V.	¥Z	2.5	2 R	23
Volatile Organic Compounds - SW846 8250B µg/L										
1 1.1-Truchlogoethane		-	SN	SN	330	C330	\$	⊽	⊽	⊽
1 I-Dichlorecthane		-	SN	SN	Or €>	<330	Ъ	0 78 JQ	_	0 79 1Q
1 Dichloroethene		-	NS	NS	<330	<330	٥	⊽	⊽	⊽
1.2.4-Trimethylbenzene		-	NS	NS	330	3 30	Ф	013 JQ	⊽	⊽
L2 Dichlorobenzene		-	SN	SN	<330	<330	Ϋ	⊽	⊽	⊽
1,3 5 Trimethylbenzene		-	SN	SN	<330	<330	ΰ	0 L7 JQ	⊽ '	⊽ '
1 3 Duhlorobenzene		-	SZ	SN	<330	<330	Ö	⊽	⊽	⊽ '
i 4 Dichlorobenzene		-	SN	SN	<330	<u>چ</u> 5	ď	⊽	⊽ ;	⊽ :
Acetone		01	SS	SN	<3300 R	<3300	70 OS	<10 R	2 R	Ο΄ <u>«</u>
Benzenc		-	SZ	SN	<330	<330	\$	0 18 JQ	⊽	₹
Carbon tetrachloride		-	SN	NS	<330 UJ	<330	' 0	⊽	a .	⊽ .
Chlorotorm		-	SN	SN	<330	530	ዏ	⊽	⊽	₹
(hloromethane		2	SZ	NS	<670 UJ	0/9>	<10	\$	<2 UL	9
cis-1.2-Dichloroethene		0.5	SN	NS	11000	0086	425	0 3	043 JQ	061
Typerony (benzene		-	SN	SN	€330	C330	٧	-	⊽	⊽
Methylene chlonde		-	SN	SX	Of 051	310 JQ	39 JB	⊽	⊽	⊽
Nochhalene		-	SN	SN	<330 UJ	<330	46	3.6	32.1	3.6
Tetrachlocethene		-	Ş	SX	330	<330	ø	⊽	⊽	7
rays 1.2-Dehlorethene		0.5	NS	SN	Of 091	140 JQ	<2.5	902	8	₹ 0 2
Tuchloroethene		-	SN	S.V.	8400	2000	8	⊽	⊽	⊽
Vincly blonds		2	SN	SN	∂f 08£	360 JQ	×10	<2	<2	<2

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WA IER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

	Sample ID	Reporting Limit (a)	Sample MWFTA-3 10/4/2001	Sample MWFTA-3 4/4/2002	Duplicate MWFTA-3 4/4/2002	Sample MWFTA-3 7/30/2002	Duplicate MWFTA-3 7/30/2002	Sample MWFTA-3 10/17/2002	Duplicate MWFTA-3 10/17/2002
				i					
FIFLD PARAMETER Dissolved Oxygen - E360 1 mg/L Dissolved Oxygen		0	8	0.7	0.7	-	-	80	80
Ferrous Iron - A3500D ung/L. Ferrous Iron		01	<u>-</u>	\$	8	<u>&</u>	\$	2	'n
Oxdation Reduction Potential - A2580A mV Oxdation Reduction Potential		;	49	8	96-	42	42	-28	-28
<u>рн - Е150 1 рН Units</u> рН		1	11 9	5.6	56	5.54	5.52	5 26	\$ 26
Specific Conductance - E120 1 mS/cm Specific Conductance		0 001	0 121	0 394	0.394	910	0 15	0 432	0 432
Temperature - £170 1 deg C Temperature		10	194	123	12.3	61	61	80 80 80	80 82
Turbidin - E <u>180 LNTU</u> Lurbidin		-	2	7	4	æ	۳	ĸ	vs.
FIXED BASE LABORA FORY ANALYSIS Amous - MCAWW 300 0A mg/L Chloride Nitate Suffate		1 0	17.8 <0.1 5.3	103 0 02 JQ 3 l 3	104 0 02 JQ 31 3	31.7 40.1 97	Ht 9 ff 1 0> 01	74.7 <0.1 27.8	73.5 <0.1 25.2
Dissolved Gaves - RNK SQP-175 mg/L. Carbon dioxide Ethane Ethane Ethane Methane		0.001 0.002 0.001 0.001	93 J 40 002 40 001 0 061	14 J 0 00046 JQ 0 0014 0 37	38 J 0.00059 JQ 0.0014 0.42	100 <0.002 <0.001 0.036 J	110 <0.002 <0.001 0.026 J	96 <0 002 <0 001 0 14	93 <0.002 <0.001 0.14
Dissub ed Hydrugen by Microseps AM20GAX, nM Hydrogen		0 03	74	17	14	23	22	31	2.7
<u>Fotal Alkalınıty - MCAWW 310 1 mg/l.</u> Total Alkalınıty		ν.	17	H 21	Hf 91	78	33	20	22
Total Organic Carbon - SW846 9060 mg/L. Total Organic Carbon		-	٣	01	0	4	4	35	∞
Total Sulfide - MCAWW 376 1 mg/L foral Sulfide		-	⊽	⊽	⊽	032 JQ	0 32 JQ	OT 87.0	Or 81.0

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TABLE D-1

			Richmon	Richmond, Virginia					
	Sample ID: Sample Date:	Reporting Limit (a)	Sample MWFTA-3 10/4/2001	Sample MWFTA-3 4/4/2002	Duplicate MWFTA-3 4/4/2002	Sample MWFTA-3 7/30/2002	Duplicate MWFTA-3 7/30/2002	Sample MWFTA-3 10/17/2002	Duplicate MWFTA-3 10/17/2002
Mercury - SW846 7470A (Dissolved) µg/L		-	 	⊽	⊽	⊽	⊽	⊽	₹
NOT DETECTED Note that the second of the se		-	;						
Mercury			⊽	⊽	⊽	⊽	⊽	⊽	⊽
Metals - SW846 6010B (Dissolved) µg/L									
Alumman		200	로 : 알 :	204	303 2 2 3	154 JQ	231 5	187 JQ	14
Aisense		, 50°	77 76	671	771	37.2 10	Of 688	65 4 30	Of 1 29
Balum		007) (1 0 1 1	₹ <u>0</u>	010	010	<10	0.62 JQ	Or 1/20
Detymon Colomb		2	\$ 4	7	4	<2	4	a	7
Calcum		2000	2520 JQ	5710	5780	2860 1Q	Of 080t	4750 JQ	Ø 0.8₽
C hromium		<u>o</u>	01×	0!» *	<u>9</u> 8	0 V	2 5	QF	
Cobalt		30	3	⊋ ₹	⊋ Ş	₽ €	3 8	Σ 7 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	? 0 ₹ ⊽
Copper		2 00	1570	3590	3650	0 7 91	0991	3070	3130
lron Lead		3	7	Ö	3	۵	b	Ø	\$
Magnesium		2000	Or 0561	3580 10	3650 10	Or 0202	2080 JQ	Ot 0705	3120 JQ
Manganese		02 9	39.8	89.2	906	# \ 	46.5	5,00	? 9/
Molybdenum		2 5	⊋ € ₹	200	45 JO	8 8	200	00 V	00 1 >
Polassum		2000	5320	4020 10	4130 JQ	4290 JQ	4540 JQ	2440	5480
Sodium		2000	13900	51500	52500	20600	22000	43300	43600
Vanadium		200	9 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 -	₹ ₹	8	€ 5	8	γ ο γς <20 <	250 52
Zine		3	9)	ì	ì	}		
Metals - SW846 6010B (Total) u2/1,		į	į	ě	Ç	,	Sec	216	7
Aluminum		200	478	200	717	807	, ç	210	047
Arsenic		v Sr	30.8 10	86.4.10	18 92.2.10	44.5 JO	40 6 JO	Of 969	Of 1.07
Barum		3 ≥	010	010) (10	01>	V 01>	Or 90	0.73 JQ
Cadmum		, CI	<2	V	\$	4	₹	3	\$
Calenum		2000	2780 JQ	6430	0089	3390 JQ	3040 JQ	4990 JQ	90108
Сһготып		01 5	0l> %	0F %	~10 ~38	000	OI va o	01 × 0	<u> </u>
Cobali		₹ 5	⊋ ?	9 °	₹ ₹	98 <u>8</u>) (1) (1)	200	9 5
Copper		2002	1840	4040	4200	1970	1760	1280	1290
ייים		3	₽	۵	\$	٦	Ф	\$	₽
Magnestum		9000	2190 1Q	Of 0261	4230 JQ	2330 JQ	2120 1Q	Of 0121	3240 JQ
Manganese		20	43.7	101	<u>8</u>	52.6	47.7	677	78.4
Molybdenum		유 :	9 ?	9	0 4 ° €	<u> </u>	₹ {	₹ ₹	\$ \
Nickei		90.5	2 2 2 2 2 2 2 3)) (1) (2) (3) (4)	7 S S S S S S S S S S S S S S S S S S S	01 01 17 P	4530 10	3 S	90135
Potassium		B02 5	3/20	\$8600	4510 50	20192	22000	46000	45700
Sodium		3	15 IB	05>	or 11	8	\$	0 92 JO	05
Zinc		50	<i>5</i> 70	<20	, 82	65 57	5 0	<20	<20
Thallium - SW846 7841 (Dissolved) ng/L. Thallium		2	1 8 JB	<2 UL	<2 UL	₩ 52 UJ	<2 UJ	<2 UL	<2 UL
Thallium · SW846 7841 (Total) ug/L [hallium		2	2.4 JB	<2 UL	<2 UL	<2 UJ	<2 UI	<2 UL	<2 UI.

TABLE D-1

SUMMARY OF CONSTITUEN IS DELFCTFD IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNI F
Annual Groundwater Report - October 2002
Operable Unit 7

			Michigan, 111 gins	, B					
	Sample ID: Sample Date	Reporting Linut (a)	Sample MWFTA-3 10/4/2001	Sample MWFTA-3 4/4/2002	Duplicate MWFTA-3 4/4/2002	Sample MWFTA-3 7/30/2002	Duplicate MWFTA-3 7/30/2002	Sample MWFTA-3 10/17/2002	Duplicate MWFTA-3 10/17/2002
Polychlorinated Biphenyls (PCBs) - SW846 8082 ug/L Not Detected			X X	¥ Z	Y.	Y.	! V	Y Z	٧
(6 7) 6 N.S. (Fired)	Jon								
A constituent	A PRINT	0.2	×Z	8	& 50 20	402R	A0 2 R	<0.2	<0 5
Author ene		0.2	Š	802	\$ 50	<02R	A0 2 R	40.2	40 2
Fliorens		0.2	×	8	<0.5	<02R	402R	Q 2	9
Naphthalene		0.2	Z Y	8	97	<02R	<0.2 R	<0.5	97
Volatile Organic Compounds - SW846 8260B µg/L									
1.1. Luchloroethane		-	⊽	<33	33	⊽	7	\$	\$
1 Dichloresthane		-	0 27 JQ	13.10	òr II	0 62 JQ	4 14	Of 90	\$
[1-Dichtoroethene			0.45 JQ	633	63 3	12.1	O 19 1Q	Of 690	9 2 3
1.2.4 Trimethylbenzene		-	⊽	4 3	<33	⊽	6 1 4 1 4	7	\$
12-Da hlorobenzene		-	⊽	93	€33	⊽	^ 4	\$	7
13.5 Trimethylbenzene		-	⊽	33	G 3	⊽	<u>^</u>	\$	4
1 3 Dr. hlorobenzene		-	⊽	33	€33	⊽	>	4	4
1.4 Dichlorobenzene		-	⊽	4	G3	⊽	** ▽	4	\$
Actione		<u>o</u>	<10	43.R	<33 R	<10 R	39 R	<20 UJ	<20 UJ
Benzene		-	⊽	33	63	⊽	<u>√</u>	ð	7
Carbon tetrachloride		-	⊽	G3	Ġ3	: 10 I>	<1 4 UJ	\$	7
Chlorotorm		-	⊽	<33	<33	⊽	7 ▽	\$	ζ;
Chloromethane		2	3	467 UJ	<67 UJ	r 2 ₪	<29UJ	₹	\$
cis 1.2-Dichloroethene		0.5	12	100	\$	18 J	Z8 J	99	3.
Isonropy(benzene		-	⊽	G 3	લુર	⊽	<u>^</u>	\$	\$
Methylene chloride		-	⊽	€33	Ġ	⊽	0 87 JB	\$	7
Naphthalene		-	⊽	43	33	⊽	^ 4	7	8
Tetrachloros thene		-	'n	43	<33	33	3	5	9 8
uans-1 2-Dichloroethene		0.5	0 22 O	44	42	13.1	0.76	2.5	26
Trichloroethene		-	8.4	Or 91). I	22	<u>8</u>	9 1	8.5
Vinyl chloride		2	0.56 JQ	14	13	31.J	2 10	1 7	Ŧ

TABLE D-1

			•	AK BIRDING, 4 ILKNIS						
	Sample 1D. Sample Date	Reporting Limit (a)	Sample MWFTA-5 1078/2001	Sample MWFTA-5 4/8/2002	Sample MWFTA-5 7/17/2002	Sample MWFTA-5 10/29/2002	Sample MWFTA-7 10/1/2001	Sample MWFTA-7 47/2002	Sample MWFTA-7 7/29/2002	Sample MWFTA-7 10/17/2002
FIELD PARAMETER										
Dissolved Oxygen - E360 1 mg/L. Dissolved Oxygen		10	9	90	60	-	80	3.7	2.7	90
<u>Perrous Iran - A3500D mg/L.</u> Ferrous Iran		0.1	90	0.7	0.5	34	9	₽	\$	2
Oxidation Reduction Potential - A2580A mV. Oxidation Reduction Potential		1	69	115	62	Ξ	389	438	411	402
<u>pH - E150 1 pH Unus</u> pH		ŀ	5 48	5 13	80 9	637	4 08	38	541	143
Specufic Conductance - F120 1 mS/cm Specufic Conductance		000	0 08\$	0 00	0 074	0115	910	160 0	0.1	0114
Temperature - <u>F170 i deg C</u> Temperature		0 1	159	11 9	169	15.9	£ 81	11.2	21.1	8 61
<u>Jurbidity - F180 I NTU</u> Furbidity		-	13	36	۳	01	=	⊽	81	⊽
FIAED BASE LABORATORY ANALYSIS. Anions - MCAWW 300 0A mg/L. Chloride Nitrate Sulfate			4.5 40.1 6	48	46 JB △01 63 JH	74 <0.1 13.7	10.2 0.71 29.2	5 0.08 JQ 29.8	7.2 0.02 JQ 19.9	72 006 JQ 298
Diviolved Gases - RSA, SOP-175 mg/L, Carbon dioxide I thane Ethene Methane		0 001 0 002 0 001 0 001	40 J <0 002 <0 001 0 0018	39 <0.002 <0.001 0.0029	40 <0.002 R <0.001 R 0.00071 JQ	39 -0.002 -0.001 -0.001	97 J <0 002 <0 001 0 00085 JB	40 002 40 000 40 001 0 001	50 60 00 60 00 60 00 60 00 70	68 <0.002 <0.001 0.0034
Dissolved Hydrogen by Microseeps AM20GAX nM Hydrogen		0 03	7.8	86 0	- 2	۶.	ණ රේ	9 \$	2 1	2.5
Total Alkalinity - MCAWW 310 1 mg/L Total Alkalinity		₩.	24	20 JH	24	23	16 JB	2 6 JB	۵	۵.
Total Organic Carbon - SN 846 9060, mg/L Total Organic Carbon		-	81 TO	04 10	⊽	⊽	-	2	-	2
Total Sulfide - MCAWW 376 1 mg/t. I otal Sulfide		-	63	7	⊽	048 10	7	⊽	⊽	⊽

TABLE D-1

			•	reminaro, en grad						
	Sample ID Sample Date.	Reporting Limit (a)	Sample MWFTA-5 10/8/2001	Sample MWFTA-5 4/8/2002	Sample NIWFTA-5 7/17/2002	Sample MWFTA-5 10/29/2002	Sample MWFTA-7 10/1/2001	Sample MWFTA-7 47/2002	Sample MWFTA-7 7/29/2002	Sample MWFTA-7 10/17/2002
Mercury - SW846 7470A (Dissolved) ug/L. Not Detected		_	₹	(U)	⊽	⊽	⊽	4 UJ	⊽	⊽
Mercury - SW846 7470A (Total) µg/L Mercury		-	⊽	IN 12	⊽	⊽	⊽	0 t4 JB	⊽	⊽
Metals - 5 W846 6010B (Dissolved) ug/L			;		9	9		•	371	Q:F
Aluminum		, 200 200	8 4	8 8 7	3 2 7 7) (- - - - -	<u> </u>	§ 2	€ જ
Alsellic		, פֿר) 50 E	19.7	20 5 10	25.5.10	Of 2.79	714 30	Of 7.99	SO 5 JQ
Beryhum		2 2	0.57 JB	<10	0 >	V 01>	2.5 JB	06 91	17.10	Or 61
(adminm		2	4	8	8	\$	\$	0 38 JB	\$	\$
Calcium		2000	3460 JQ	3310 JQ	3330 JQ	3350 JQ	2665	9160	2350 JQ	3680 JQ
Сиопип		0	0 >	o1>	<10	°10	0₹	0I>	<10 <10	7.70
Cobalt		9	3 0	% %	0 % JB	8	56.10	39 JQ	S 6 JQ	44 JQ
Copper		01	<10	¢10	2 JB	01>	0 5	۱۰ ۱۳	0 >	0 >
Iron		200	730	695	658	, 88	~200 ~	, 200 ,	200 ,	375
lead		m	8	7	5	٠ ن	Ç :	9 9 9	() ()	کار 8 ا 10 م
Magnesum		2000	2770 JQ	2600 JQ	2670 JQ	2620 JQ	57.0 JC	Or 0117) 000 000 000	Je 700.7
Manganese		92 94 94	9 9	7 4 7	8 8 6	7 17	41 -	657	8 8	, e
Molybdenum		3 5	⊋ ₹) (1)	⊋ { }	€ ₹	0*5 F	2 -	42.10	901>
Nic kel		8 5	4650 10	3640 10	1390 JO	4300 JO	21.90 TO	2690 JO	Of 0191	2920 JO
College		2000	0109	6440	5840	8740	2630 JQ	Or 0651	2200 JQ	JV0 1Q
Vanadum		2	8	8	\$	\$	05	0\$>	85	- 0€>
Zını		20	<20	4 20	~ 20	30.9	<20 <	~ 50	<20	07>
Elizabeth Manager Statement										
Alemania		200	<200	31.9 JO	Of 5 99	<200	1360 J	857	967	757
Arspir		5	۵.	\$, V	\$	ъ	۵	Ŋ	Φ
Barium		200	25 9 JQ	23 6 JQ	216.10	27 JQ	or es	73 J JQ	67 1 10	81 JQ
Berythum		01	<to></to>	OC 890	<10	°10	25 JB	Of 81	٥٠ <u>8</u> .	Or 81
Cadmium		2	7	0.39 JB	7	\$ \$3	\$ 5	7 7	۵ د	O. 27.0
Cak ium		2000	3650 JQ	3190 JQ	3300 JC	3230 JQ	26.5	0775	Or 0077) of 0;
Сhrotmun		2 9	9 €) V	OIV O	9 %	3.10	13.10	2 F.2	44.0
Cobalt		2 3	3 5	9 5	11 OLV	3 5	₹ =	₹ 0) (Y C
Copper		20.5	0201	60	732	218	<200 <200	<200	<200	\$00°
- Per-		E	Ą	Ø	Ö	۶	۵	IJ	ΰ	Of 81
Magnestum		2000	2870 JQ	2750 JQ	2660 1Q	2570 JQ	3280 JQ	2150 JQ	Or 089£	2540 JQ
Manganese		20	46.8	47.2	48.7	50.5	40.5	24.2	8 (9	38.4
Molybdenum		9	O†\	×40	Q+V	OF>	OF>	×40	<40	<40
Nickel		100	×100	90I>	001×	00 V	44 JB	34 10	35 JQ	V100
Polassium		2000	Of 018t	3770 JQ	3400 10	4180 JQ	22.40 JQ	Of 0572	Of 0881	Of 0267
Sodium		2000	6310	9 5 5	5/75	8240	or 0652	or ord	کار 1210 مور	Or 04/1
Vanadium		3 8	o :	7 7	₹ ₹	₹ 5	8 9	00.5	₹ ₹	ē 7
Zinc		8	≥	3	075	3	3 	2	3	17
Thailium - SW846 7841 (Dissolved) Hg/L Thailium		71	\$	<2 UL	4	2	4	<2 UL	? >	<2 UJ
How therety that A										
[hallun		2	4	<2 UL	<2 UL	4	4	<2 UL	\$	<2 UI.
91 09										Page 26 of 33

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02

Annual Groundwater Report - October 2002

Annual Groundwater Report - October 2002

Defense Supply Center Richmond

Richmond. Virginia

			PE,	Richmond, Virginia			;			
	of the state of	Description	Sample	Sample MWFTA.5	Sample MWFTA-5	Sample MWFTA-5	Sample MWFTA-7	Sample MWFTA-7	Sample MWFTA-7	Sample MWFTA-7
	Sample Date	Limit (a)	10/8/2001	4/8/2002	7/17/2002	10/29/2002	10/1/2001	4/7/2002	7/29/2002	10/17/2002
Polychlormated Biphenyls (PCBs), SW846 8082 ug/L			Š	Y.	ΑN	¥.	Υ Z	Ϋ́	ΑN	V V
ואסן באופנינים			<u>:</u>							
Polycych, Aromatic Hydrocarbons (PAHs) - SW846 8270C ug/L	0C µg/L	,	;	;	;	ş	ž	2	Ž	Ϋ́
Acetaphthene		0 2	۲ Z	YZ:	Y :	¥ ;	V.	2 7	C ×	ž
Authracene		0.5	۲Z	Y.	Y.	K Z	Š.	< :	V .	<u> </u>
Linguistic		0.2	٧Z	Ϋ́Z	NA	Y _N	∢ Z	ď Z	ď Z	Z :
Naphthalene		0.2	NA	Y Z	۷ ۷	∀ Z	Y.	¥ Z	ď Z	e Z
Ham dozed status -t										
rotatile Organic Compounds - Smort of the Light		-	7	7	~	⊽	⊽	⊽	⊽	⊽
1.1.1-Inchloroethane			7 7	7 7	7 7	; 7	: ⊽	⊽	⊽	⊽
1 - Dichloroethane			7 =	7 7	7	; ⊽	. ⊅	⊽	⊽	⊽
1 1 Dic hloroethene			3 - 7	7 7	7 7	; 7	; ,	₹	7	⊽
1,2,4-Trimethylbenzene			₹.	J 1	7 7	7 7	7 7	; 7	: 7	⊽
1,2-Dichlorobenzene		-	₹ '	₹ .	7	7 -	; 7	; 7	: 7	7
1.3 5-Trim, thy lbenzene		-	⊽	⊽	⊽ '	⊽ .	⊽ -	⊽ -	7 7	; 7
1 3-Dichlorobenzene		-	⊽	⊽	<u>~</u>	⊽	⊽	₹ '	⊽ .	₹ -
1.4 Dehlorobenzine		-	⊽	⊽	⊽	⊽	⊽	⊽	⊽	₩ :
Aceton		01	<10	18 R	<10 UJ	<10.R	9	2 1 K	<10 R	کار <u>۲</u> ا
Burgan		-	7	⊽	⊽	⊽	⊽	⊽	⊽	⊽ '
Corbon to teachlonde		_	7	⊽	⊽	⊽	⊽	⊽	G . ▼	⊽ .
(bloodern		-	⊽	⊽	⊽	⊽	⊽	⊽	⊽.	⊽ '
Choose that		2	\$	4	Z UI	4	<2 JL	\$	<2 UJ	7
Calloronic manachens		0.5	\$05	& &	905	. 05	8	& &	ଚ	605
CIST, 2-Diction of the contract of the contrac		-	V	⊽	⊽	⊽	7	⊽	⊽	⊽
Isopropylocitzene		-	⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽
Niethylene chloride		• -	; ₹	⊽	ín ⊳	ſ∩ I>	~	⊽	⊽	⊽
Naphinaleire		-	; ⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽
Lunuloroethene		. 6	÷ ~	\$ \$	\$05	805	405	\$05	Q 5	8
trans-1 2 Dichloroethene		· -	;	i t	₹	⊽	⊽	⊽	⊽	⊽
Truhloroethene			7 5	7 5	; ;	,	?	S	0	<2
Vmvl.hionde		7	7	ל	;	,	,	,	!	

TABLE D-1

SUNIMARY OF CONSTITUENTS DETECTFU IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

			_							
	Sample ID	Reporting	Sample MWFTA-9	Sample MWFTA-9	Sample MWFTA-9 7/17/2002	Sample MWFTA-9 10/29/2002	Sample MWFTA-10 Oct 2001	Sample MWFTA-10 Apr. 2002	Sample MWFTA-10 7/17/2002	Sample MWFTA-10 10/29/2002
	Sample Date	LIMII (4)	OC1 2001	TOTAL INV						
FIELD PARAMETER <u>Dissolved Oxygen - EMO 1 mg/L</u> Dissolved Oxygen		0.0	SS	SN	0.38	-	Š	SN	26	8
Pyrous Iran - A3500D mg/L Ferrous Iran		0.1	SN	SN	₹	3.2	SN	SN	₹	۳
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		I	SX	SN	189	161	SN	SN	313	19
<u>pH - E.150 1 pH Units</u> pH		:	SN	SN	5.26	531	NS	S.	5.7	5 94
Specific Conductance - E120 1 mS/cm Specific Conductance		0000	SN	SN	8900	0 064	SN	SN	0 094	0 116
Femperature - E170 1 deg C Femperature		0 1	S. S.	SN	18 2	163	SS	S	18.2	151
Turbidity - E180 I N FU Turbidity			S	SN	7	ю	SS	SN	ю	01
FIXED BASE LABORATORY ANALYSIS. Annors - MCAWW 300 0A mgL, Chloude Nitade Sulfare		0 1	N N N N N N	% % % % % %	63 JB <0-1 8 JH	78 -01 85	X	X X X N N N	4 3 JB <0 I 62 JH	46 401 64
Dryadved Gases - RNA SOP-175 mg/L Carbon droxide Ethane Ethene Methane		0 001 0 002 0 001 0 001	X	8 8 8 8 8 8 8 8	54 <0.002 R <0.001 R <0.001	49 <0.002 <0.001 0.0021	N N N N N N N N N N N N N N N N N N N	X X X X X X X X X X X X X X X X X X X	34 <0.002 R <0.001 R 0.00064 JQ	38 <0 002 <0 001 0 004
Dissolved Hydrogen by Microseeps AM20GAX nM Hydrogen		0 03	SZ SZ	S	13	3.7	SN	SN	15	4.5
Total Meahouts - MCAWW310 1 mg/L. Total Alkahouty		S	NS	SN SN	H 11	7.4 JH	SN.	SN	¥.	26
Total Organic Carbon - SW846 9060 mg/L Total Organic Carbon		-	S.S.	SN	-	7	SN	SN	⊽	⊽
Total Sulfide - MCAWW 376 1 mg/L Total Sulfide		-	SN	SN	⊽	Or 960	SN	SN	⊽	QL 80

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TABLE D-1

			-	KKnnon, vigur						
	Sample 1D	Reporting	Sample MWFTA-9	Sample MWFTA-9	Sample MWF1A-9	Sample MWFTA-9	Sample NIWFTA-10 Oct 2001	Sample MWFTA-10 Apr 2002	Sample MWFTA-10 7/17/2002	Sample MWF1A-10 10/29/2002
	Sample Dale	Limit (a)	700	7007 100	7071111					
Mercury - SW846 7470A (Dissolved) 112/L Not Detected		-	SN	SV	⊽	⊽	S	S	⊽	⊽
<u>Mercury - SW846 7470A (194al) 112/L.</u> Morcuny		-	S S	S. S.	⊽	⊽	S.	S	⊽	⊽
Metals - 53/846 6010B (Dissiglyed) <u>112/L</u>						\$		512	20 1 82	0000
Alumnum		200	SZ	SZ	Or 801) 65 3-	2 2	S Z	? • •	} ∵
Arsenic		ν ς ;	SZ :	SNS	0 \	0 2	g y	g X	01.69	01 63
Barrum		200	S	SS	7 67) (49)	ę v	ž	01	0 >
Bcryllum		01	s i	S	0 s	۲ ک	2 2	2 2	3	3
Cadmium		2	S ?	SS	Ş ç.	01 0817	S N	ž Z	4340 10	Of 090b
(alcium		900°	S 2	S Z	2,027	010	SN	SZ	V 01∨	, 01>
Chromium		10	2 2	2 ×	81.81	13 JB	SZ	SZ	8f I I	0.74 JB
Cobalt		3 5	Ç V	2 2	5. 5. EB	01>	SZ	SN	<10 U.	1 8 JB
Copper		2 6	Ç X	2 2	114 10	8L 671	SX	SN	209	329 JB
lron		33	Z Z	S	7	ŋ	SN	SN	\$	Þ
Lead		, oos	Z	S	Of 0951	J630 JQ	SN	SN	7420 JQ	1240 JO
Nagocsium		20	SZ	SS	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	26.2	SN	SN	70.5	1 19
Mangalacse		· 무	SZ	SN	640	2.5 JQ	SN	SN	<40	C40
Mod Journal		001	SN	SN	<100	×100	SN	SS	×100	v100
Polacetrem		2000	SN	SN	2120 JQ	2580 JQ	SN	NS	3050 JQ	3520 3Q
Sodium		2000	NS	NS	4630 JQ	5790	SN	SN	0509	7780
Vanadum		\$	SN	SN	δ 8	Ş	SN	SZ.	9	Ş Ş
7.190		20	SN	SN	23.1	<20	SS	SZ	7	~ 50
Metals - SW846 6010B (Total) ug/L		,		5	9	9	ž	2	418	000
Aluminum		200	s s	S S	<u>7</u>) 	S Z	2 2	54.5	1.7 IB
Arsenic		0 86	źź	2 2	2 8 9	⊆ 2 % 1	S Z	Z Z	8 2 10	01.17
Barum		3 5	2 2	2 2	2 2	2012	SN	SZ	, elo	×10
Bery Huam		3,	2 2	Z Z	7	3	SX	SZ	3	\$
Cadmum		0005	SZ	SN	2060 JQ	2130 JQ	SN	NS	4420 JQ	4060 JQ
(ak num		9	SN	SN	· 01>	· 01>	SN	SN	QF>	0 ×
Chromatin		8	SN	SN	2.3 JB	0 93 JB	NS	SN	1.5 JB	<30
COOM		01	SZ	SN	8 1 JB	01>	SN	SS	<10 UL	9₹
Copyx		200	SZ	SN	345	326	SN	SZ	280	352
1011 1			SN	SN	2.7 JQ	Q	SN	SZ	ত	φ
Monte		2000	SZ	SN	JS80 JQ	Of 0721	SN	SS	3620 JQ	3250 1Q
Managara state		20	SZ	SN	1 72	76	SN	SS	804	62.7
Manganese		07	SN	NS	0 ₩>	<40	SS	Z	<40	0 * >
Note:		80	SN	SN	<100	۰۹00 دا00	SZ	SN	×100	×100
Delegeling		2000	SZ	SN	2150 JQ	2490 JQ	SN	SZ	Of 080:	Of 0155
Codum		2000	SZ	SN	4620 1Q	2400	SN	SZ	6270	7670
North and		50	SZ	SN	8	ð	SZ	SZ	ଚ	O\$>
Vanistien		20	SZ	SN	31.5	62	SN	S	Dr 151	<20
Man (has less 10 to 0 t										
Thallum - 537840 /841 (Ulsselved 1421). Thallum		23	SN	SN	<2 UL	a	SN	NS	<2 UL	\$

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02

Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Center Richmond

Richmond, Virginia

							- C	Comple	Comple	Sample
	Sample 1D	Reporting Limit (a)	Sample MWFTA-9 Oct 2001	Sample MWFTA-9 Apr 2002	Sample MWFTA-9 7/17/2002	Sample MWFTA-9 10/29/2002	Sample MWFTA-10 Oct 2001	Apr 2002	MWFTA-10 7/17/2002	MWFTA-10 10/29/2002
Polyshlormated Biphenyls (PCBs) - SW846 8082 µg/L. Not Detected			SN	SZ	Y X	¥ Z	SZ SZ	NS	¥ Z	A A
Polygyche Arumatic Hydrocarbons (PAHs) - SW846 8270C ug/l.	C uz/l.			5	;	2	Si A	2	¥ Z	Ý
Acenaphthene		0.2	SZ	ŝ	¥.	ξ :	2 2	2 3	7	Z
Anthracene		0.2	SZ	SZ	Z :	¥ :	2 2	Ş 3	2 2	7
Huorene		0.5	SN	SZ	¥	Ϋ́Z.	S.	S.	5 2	. 2
Naphthalene		0.2	SN	SS	¥ Z	K	S Z	SN	ď Z	Š
Volatile Organic Compounds - SW846 8260B µg/L				,				<u> </u>	7	7
i i L. Tochloroethane		-	S	SN	⊽	⊽	C.	2	<i>,</i> .	; ;
1.1 Dr. blacerbane		_	SN	SN	⊽	⊽	SZ	NS	⊽	⊽ .
		-	SN	SN	7	⊽	SZ	SN	⊽	⊽
		_	SN	SN	⊽	⊽	SZ	SN	⊽	⊽
1.2.4-1 minemyloenzene		-	SZ	SN	⊽	⊽	SX	SN	⊽	⊽
1.2-Un niordicenzene			SZ	SN	~	⊽	SZ	SN	⊽	₹
i, i, o-i innelityleene		-	NS	SX	⊽	⊽	SN	NS	⊽	⊽
1 Dichiopenzene		_	SZ	SX	⊽	⊽	SZ	SN	⊽	⊽
1.4 Dit hlorobenzene		- 2	×	S	<10 UJ	<10 R	SN	NS	<10 UI	<10 R
Actione		? -	SZ	SN	⊽	⊽	SN	SN	⊽	⊽
Benzene		. –	SZ	SN	7	⊽	SN	NS	⊽	⊽
Carbon lettac filotide			SZ	SN	⊽	⊽	SX	NS	⊽	⊽
Chloroform			Z	SZ	<2 UJ	A	SZ	SN	<2 UJ	7
Chloromethane		Š	SZ	SZ	\$	<0.5	SX	SN	& 5	92
crs-1 2-Dichloroethene		· -	2	SZ	⊽	⊽	SN	SN	⊽	⊽
Ropropyibenzene			2 2	ž	₹	⊽	SN	SN	⊽	⊽
Methylene chloride			2 2	: ¥	; =	- FI	SZ	SN	f ∩ !>	∄ ▼
Naphthalene		-	2	ž	. ⊽	∵ ∵	SN	NS	⊽	⊽
Tetrachiorouthene		0.5	ž	SZ	905	805	SN	NS	\$ 65	\$₽
trans 2-12h hioroeth.rhe		; -	S	SN	~	⊽	SZ	SN	⊽	⊽
Trichloroethene			2	2	C	7	SS	SN	7	₹

FABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

			Kichmond, virgitia				
	Sample ID: Sample Date.	Reporting Limit (a)	Sample MWFTA-23 10/9/2001	Sample MWFTA-23 4/5/2002	Sample MWFTA-23 7/31/2002	Sample MWFTA-23 10/15/2002	
FIELD PARAVILTER Dissolved Oxygen - E369 Lmg/L Dissolved Oxygen		- 0	- 8	99	-	9	
Ferraus Iran - A3500D mg/L. Ferraus Iran		0.1	46	34	₹	9.0	
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		;	57	.73	7	-76	
<u>pH : F.150 1 pH Ųnus</u> pH		;	4 67	533	4 96	51	
Specific Conductance - E120 1 mS/cm Specific Conductance		100 0	0 466	0.152	0.211	0.249	
Temperature - E170 deg C Temperature		10	20 1	159	193	8 61	
<u>Turbidity - E180 I NTU</u> Turbidity		-	107	1	171	84	
FIXED BASE LABORATORY ANALYSIS Anons - MCAWW 300 0A mg/L Chloride Nitrate Sulfate		10	801 1 0> 9u 170	33 6 0 02 JQ 2 3	70 6 1 0 8 1 0	36 4 4 6 1 8 1 8 1 8 1 8 1 8 1 1 8 1 1 8 1	
Dissolved Gaves - RSN SOP-175 mg/L Carbon dioxide Ethane Ethene Methane		0.001 0.002 0.003	290 J 0 000048 JQ 0 039 1 9	150 0 00061 JQ 0 028 0 84	260 <0.004 0.0072 0.22	210 0 00089 JQ 0 036 1 4	
Dissolved Hydrogen by Microseeps AM20GAX, nM Hydrogen		0 03	13	6-1	14	61	
Total Alkalınıty - MCAWW 310 1 mg/L Lotal Alkalınıty		s	23	22	23	23	
<u>Total Organic Carbon - SW846 9060 mg/L</u> Total Organic Carbon		-	88	90	23	Ξ	
Total Sulfide - MCAWW 376 Ling/L. Total Sulfide			23	⊽	⊽	⊽	

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
UPPER WA I'ER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7

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			Altimone, Tighina				
	Sample ID	Reporting	Sample MWFTA-23	Sample MWFTA-23	Sample MWFTA-23	Sample MWFTA-23	
	Sample Date	Limit (a)	10/9/2001	4/5/2002	7/31/2002	10/15/2002	
Mercury - SW846 7470A (Dissolved) gg/L. Not Detected			⊽	⊽	⊽	⊽	
Mercury - SW846 7470A (101al) µg/L. Mercury		-	⊽	⊽	⊽	⊽	
Metals - SW846 6010B (Dissolved) ug/L							
Alummun		200	Or 871	64 6 JB	245	J29 JQ	
Arsenic		5	92.8	48 6	917	75 \$	
Вллит		200	582	Or +61	492	251	
Beryllium		01	8F 6 I	<10	16 JB	1.2.10	
Cadmun		2	\$	\$	03 18	\$	
Calcium		2000	5820	2680 JQ	4950 JQ	2520 JQ	
Спротин		9	°10	0l>	0I>	<10	
Cobatt		33	ðr £ 11	4 5 10	10.7 JQ	5 JQ	
Conce		2	<10	01>	<10	<10	
lion		200	91300	23600	36900	21300	
Lead		۴	Ø	ŋ	\$	\$	
Magnesium		2000	8160	3080 JQ	6450	3260 JQ	
Manganese		20	499	151	423	961	
Molybdenum		40	0 / 2	c40	<40	<40	
Nickel		100	OF 501	65 18	Of 101	49 JQ	
Potassium		2000	6270	37.0 JQ	4210 JQ	Of 085.	
Sodium		2000	7740	4440 JQ	0060	Or onst	
Vanadrum		20	16.18) 7 7 C	97.6	- 7¢	
Zinc		70	174	Dr 681	917	167	
Metals - SW846 6010B (Total) ug/L							
Aluminum		200	656	213	297	J74 JQ	
Arsenic		so.	9 96	49 3	E .	77.2	
Ванит		200	209	Or 961	502	256	
Bery llum		<u>o</u> (21 JB	کار /دو چ	97.01	3.	
Cadmium		7 000	77 7	250 10	4910 10	2 5 85 C	
Cakıum		0000	0010	Dr 0607); oth	Dr 0657	
Chromium		2 9		2	2 7 51	OI 93	
Cobalt		₹ 5	27	707	7 22	7 9 9	
Copper		0.55	41000 44000	34300	013	21800	
Fon		90°	7,000	200	2	S. 7	
Lead		2000) 9	Of 080	6510	3280 JO	
Magnesium		202	519	152	428	86	
Maligariese		9	\$ ₹	<40	<40	440	
N. L.		82	104 JQ	3 1 JB	Of 901	68 JQ	
Potassium		2000	6570	3640 JQ	4220 JQ	9510 JQ	
Sodium		2000	7960	4550 JQ	7070	4870 JQ	
Vanadium		95	2.3 JB	14 JQ	16 JB	Öf E I	
Zinc		20	152	24 8	112	55	
rt. Marry . SW946 7841 (Decade ed.) 119(1							
Thallium		2	\$	<2 UL	m ~	Ç	
Thailium - SW846 7841 (Total) 2/L							
Thallium		2	2 I JB	70 C	<2 UJ	\$;
9							Page 12 of 33

TABLE D-1

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02

UPPER WATER-BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

NA NAFTA-23 NAFTA-23 NA NAFTA-23 NA				Samole	Samnle	Sample	Sample
109/2001 109/2001 4/5/2002 7/3/1/200		Comple ID	Reporting	MWFTA.23	MWFTA-23	MWFTA-23	MWFTA-23
NA		Sample Date	Limit (a)	10/9/2001	4/5/2002	7/31/2002	10/15/2002
0.2 NA							
0.2 NA NA NA 0.2 NA NA NA 0.2 NA NA NA 0.2 NA NA NA 1 <5000	Polychiornated Biphenyls (PCBs) - SW846 8082 ug/L. Not Driected			V.	₹ Z	۲Z	₹ Z
0.2 NA							
Part	Polycyclic Aromatic Hydrocarbons (PAHs) - SW846 8270	C <u>v 2/1.</u>	ć	ž	2	42	¥Z
NA	Acenaphthene		7 0	ζ 4	(< Z	ć z	¥z
1 C C C C C 1 C C C 1 C C C C 1 C C C C 1 C C C C 1 C C C C 1 C C C C 1 C C C 1 C C C C 1 C C C C 1 C C C C 1 C C C C 1 C C C C 1 C C C 1 C C C C 1 C C C C 1 C C C C 1 C C C C 1 C C C C 1 C C C 1 C C C C C 1 C C C C C 1 C C C C C 1 C C C C C 1 C C C C C 1 C C C C C 1 C C C C C 1 C C C C C 1 C C C C C 1 C C C C C 1 C C C	Anmacene Thousas		0.2	N N	₹ Z	< z	NA
C-5000 C-2000 C-2000 C-5000 C-5000 C-2000 C-2000 C-5000 C-5000 C-5000 C-2000 C-5000 C-5000 C-5000 C-2000 C-5000 C-5000 C-5000 C-2000 C-5000 C-5000 C-5000 C-2000 C-5000 C-5000 C-2000 C-2000 C-5000 C-5000 C-2000 C-5000 C-5000 C-5000 C-2000 C-5000 C-5000 C-5000 C-2000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000 C-5000	Naphthalene		0.2	NA	٧z	٧X	NA A
\$\circ \circ \ci	Den 90209 219403 - American O control of 1541/4						
\$\i\csigma_0 \text{off} o	1 1 L. L. Shoomban		_	<5000	<1200	<5000	<1200
\$\leqsignature{\coloredge}{\	1. Deblorethus		-	<5000	<1200	<>000	<1200
1	1. D. Morathen		-	<5000 UJ	<1200	· <5000	<1200
130 JQ 270 JQ 5000 1	1.2 4.Tumethylbeazene		-	<5000	<1200	<5000	<1200
1	2-Dichlorobenzene		-	Or 0001	270 JQ	<5000	<1200
1	1.3 5-Tomeshylbenzene		-	~≥000	<1200	<\$000	<1200
1	13-Du hlorobenzene		-	~2000	<1200	<5000	<1200
10 3600 JQ <12000 R <50000 R <12000 R <50000 L <12000 <12000 C <12000 C <12000 C <12000 L <12000	1 4-Du blosobenzene		-	<>0000	<1200	<>000>	<1200
1 \$5000	Action		10	3600 JQ	<12000 R	<50000 R	<12000
1 \$\infty\$ \$\inft	Benzene		-	<5000	<1200	<5000	<1200
1 \$\infty\$ (\$\infty\$ ((urban tetrachloride		-	<5000	<1200	<5000 UI	<1200
2 < (10000 4) 6 190000 34000 (2500 (10000 U)) 6 190000 34000 (140000 1) 6 1	Chloroform		-	<5000	<1200	<5000	<1200
05 190000 34000 140000 140000 140000 1	Chloromethane		7	<10000	<2500	<10000 UJ	<2500
1 \$\sigma \text{5000} \text{<1200} \text{<5000} \text{<5000} \text{<1200} \text{<100 JQ} \text{<1200 JQ} \q	os-12-Dehloroethene		0.5	190000	34000	140000	\$2000
\$\sigma_{500} \text{<1200} 2100 JQ \\ \text{<200} \text{<1200} \text{<100} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \text{<000} \	January Almanas		_	<5000	<1200	<\$000	<1200
\$\leqsign \cdot	Methylene obloude			<\$000	<1200	Of 0012	1300
1	Nachhalen		-	<5000	<1200 UJ	€ 000 UJ	<1200
05 <2500	Tet a blomether		_	<\$000	<1200	<5000	<1200
1 <5000 240 JQ 2500 JQ 2 5400 JQ 2600 4000 JQ	rene. 1.2-Dichlomethene		0.5	<2500	<620	<2500	<620
2 5400 JQ 2600 4000 JQ	1.ch(oroethere		-	<5000	240 JQ	2500 JQ	<1200
	Vini oblonda		7	5400 JQ	2600	4000 JQ	2500

4
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~1

Estimated based on QC data _ =

Estimated possibly bused high or false

positive based on blank contamination

Estimated, possibly brased high based upon QC data Estimated, possibly brased low based upon QC data Estimated, Value is between reporting himt

 $\Xi \dashv \Im$

and detection limit

Not Analyzed

Not Sampled Unusable

Undetected, Reported Detection Limit is imprecise ₹ ¥ ∡ 5

Undetected Data biased low - Reported

Detection Limit is higher than indicated Ħ <u>e</u>

normal operating procedures with the method-required stample volume extracted and analyzed. Sample reporting limits may vary due to sample volume/sumple weight extracted and/or sample Reporting limits presented are the best that can be achieved under

TABLE D-2

	Sample ID: Sample Date:	Reporting (a) Limit	Sample DMW-29B 10/10/2001	Sample DMW-29B 47/2002	Sample DMW-29B Jul 2002	Sample DMW-29B Oct 2002	Sample MWFTA-14 10/9/2001	Sample MWFTA-14 4/8/2002	Sample MWFTA-14 7/17/2002	Sample MWFTA-14 10/29/2002
FIELD PARAMFTER Dissolved Oxygen - F360 1 mg/L Dissolved Oxygen		6	70	13	SN	SN.	Ξ	2 8	16	2 4
Ferrous Iron - A3500D mg/L. Ectrous Iron		9 0	₹	0.2	Š	Š	- 9	9	₹	[0
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		!	155	248	SN	SN	12	115	45	\$61
<u>pH - F150 1 pH Units</u> pH		i	\$ 24	\$68	SN	ž	9 82	10.71	10.03	80 6
Specific Conductance - E120 1 mS/cm Specific Conductance		0 (X)1	0.061	0.093	Š	SN	0.439	0 382	0.312	0.495
<u>Temperature - E170 I deg C</u> Temperatur.		9 1	13.1	17.1	SN	SN	156	12.9	18 4	4
Turbidity - E180 LNTU Turbidity		_	13	9	Š	SN	4	⊽	7	×
FIXED BASE LABORATORY ANALYSIS- Amons - MCAWW 300 0A mg/L Choudd Nitrie as N Sullate			93 401 \$	94 <01 58	NS NS	NS NS NS	16 5 <0 1 29 6	12 \$ <0 1 20 1	153 JH 003 JQ 269	13.9 (a) 14) 20.2
Dissolved Gases - RSK SOP-175 mg/L Carbon dioxide Fithan. I thene My thans.		0 001 0 002 0 001 0 001	45.3 <0.002 <0.001 0.0014.3B	39 <0.002 <0.001 0.0043	S S S S	N N N N N N N N N N N N N N N N N N N	0 11 JB <0 005 <0 001 0 0036	<0.002 <0.002 <0.001 0.0019	0.15.JQ <0.002.R <0.001.R <0.001	0.22 JB <0.002 <0.001 0.000 JB
<u>Ily drogen by Microsceps - AM20GAX nM</u> Hydrogen		003	27	6.7	Š	SN	7.2	8.2	13	œ
<u>pH P.P.A 150 1 units</u> pH (Inquid)			% %	N A	SN	SN	6	¥Z	¥z	ν
Total Alkalını (y MCAWW 310 1 mg/L Total Alkalını (y		ν.	24	22	SN	Š	150	199	061	091
Total Organic Carbon - SW846 9060 mg/L. Total Organic Carbon		_	0.5 JB	7	SN	SN	2 JB	ÒI 60	⊽	Of 80
Total Sulfide - MCAWW 376 1.mg/L. Total Sulfide.			1.5	⊽	SN	SN	⊽	⊽	₹	4

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TABLE D-2

Marker Strate Str		Sample ID. Sample Date:	Reporting (a) Linut	Sample DMW-29B 10/10/2001	Sample DAIW-29B 477/2002	Sample DAIW-29B Jul 2002	Sample DMW-29B Oct 2002	Sample MWFTA-14 10/9/2001	Saruple MWFTA-14 4/8/2002	Sample MWFTA-14 7/17/2002	Sample MWFTA-14 10/29/2002
Street approximate Decision Compared	<u> Ngrcury - SW 846 7470A (Dissolved) ng/L</u>	Not Detected		₹	1∪ ∧	ŠN	ž	⊽	<1 UI	⊽	7
Styles with Description of the case Styles St	Mercury - SW846 7470A (Fotal) µg/L.	אפו לאופי וכם	_	⊽	~ I UI	Š	ž	⊽	N 1>	v	v
No.	Metals - SW846 60108 (Dissolved) ug/L										
1	Alumanum		200	<200	<200	Š	N	<200	<200	DL 217	<200
No. 1995	Antinkiny		•	У	ς,	SN	NS	\$	۵.	\$.	442 J
1	Arsenic		•	\$	ζ.	S.	SN	; ۲	Ş	٠ <u>;</u>	V s
10 2.10 1.	Burum		(%)2	314.30	236 JQ	ž	SN	35.10	Or 1.65	0,470) (40.4) (40.4
No. 1996 24 24 24 24 24 24 24 2	Beryllium		Ξ	×10	ol>	S.	SZ :	01>	0, V	0 ·	07 °
1987 1987	Cadmium		2	Ç	0 35 JB	SS	Z	\$	₹	7	7
Color Colo	Caktum		2000	5390	4300 10	SZ :	Z :	2340	97.	1.8(3)	080
10 10 10 10 10 10 10 10	Chromium		01	- TO	01×	SZ	Z	0 >	D (210)
Column	Cobalt		33	30	<30	Š	SZ	0.5	€ :	0.86 JB	⊋ [!] • •
State Stat	Copper		10	0 V	~10	Š	SZ	0 >	97	<10 UE.	2 4 JB
No.	Iron		200	215	121	Š	SN	\$20K)	00°	258	
State Stat	Magnesium		50XIO	4040 JQ	3190 JQ	Š	SZ	5150	4480 JQ	10800	6470
Not Detacled Not	Manganese		50	72.9	48.5	ž	SN	27 JB	4 50	45.5	Or 6.7
100 5	Moly bdcnam		40	^ 40	<40	ž	SN	7.5 JB)) (75.30	OF 98
No.	NICKE		8	×100	00	SZ.	Ž.	(a)	ON IN	2012	
10	Родуктит		50XX)	2080	4280 JQ	ź	Ž:	26000	000.69	(D)4(Z)	40.00
No. of the control	Sodium		5000	4590 1Q	5070	SZ.	SZ :	\$2700	51000	0060)4	49700
SWAME FOR DEPARTMENT SUPERMENT SUPER	Vinadium		€	%	<\$0	ž	SN	0\$>	() (>	- - -	Ç;
SM846 6010Bt Closable EQL. SM846 6010Bt C	/Inc		20	304 J	<20	ž	SN	-50 -50 -50	<20	65 63	62 7
10 10 10 10 10 10 10 10	How these I's dotted by a set of sets.										
Color Colo	Alemania		UUC	200	<200	SZ	SN	\$66	51.2 JO	75 JO	<200
10 10 11 11 11 11 11 11	Alghinian			۲,	۲	ž	SN	5>	ζ.	ζ.	٧.
10 0 8 1 10 0 8 1 10 10	Alklink		000	36.2 10	23.8.10	SZ	×	01.8.18	31.3.30	01.919	39.7 JO
Second S	D. 2. Hunt		=	0.81.18	01>	SZ	Š	0!>	, 01>	, or	01>
1,000 1,00	Post y mann			V	0.35_JB	SN	Z	\$	7	4	\$
10 \$\leq 10 \$\le	Cak mm		5000	5330	4330 JO	NS	ź	8670	5870	12600	7250
30 \$\circ{10}{10}\$ \$\cir	(hearthing		3	≘ V	010	SN	SX	16 JQ	•10	0 >)
Color Colo	(ob.)		90	0٤>	O\$>	SN	SN	14 JB	O\$>	<30	OL>
um 200 2080 420 NS NS 905 <2100 259 cv. 200 4280 JQ 420 NS NS NS 8480 MS 4800 JQ 102k0 cv. 200 78 f 487 NS NS NS 17 JQ 170 JQ 102k0 count 100 4100 487 NS NS 86 JB 79 JQ 67 JQ m 50k0 4780 JQ 7200 NS 86 JB 79 JQ 67 JQ m 50k0 4780 JQ 7200 NS 87 JQ 4100 26700 J m 50k0 4790 JQ 7200 NS NS 7300 7100 2600 n - 5W846 7841 (Total) ug/L Not Detected 2 <20 <2 <2 <2 <2 <2 n - 5W846 7841 (Total) ug/L Not Detected 2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2<	, 000 J		=	01>	01>	SN	SN	<10	<10	<10 UI	2 JB
tum \$(00) 4280 420 NS 8480 4800 1Q 102k0 cex 20 78 5 487 NS 8480 4800 1Q 102k0 cex 40 240 NS NS 17 1Q 367 cex 10 40 480 NS 17 1Q 367 cox 10 4100 850 NS 12 1Q 1100 4100 cox 10 4350 1Q 8290 NS 12 1B 4500 4500 cox 500 4790 1Q 4290 NS 12 1B 450 450 m-SW8467841(Total) ug/L Not Detected 2 20 L NS NS 23 4 420 420 m-SW8467841(Total) ug/L Not Detected 2 42 UL NS NS 42 UL	Logical Control of the Control of th		200	2080	450	SZ	SN	300	<20X)	259	\$20P
1.5 1.5	E STATE OF THE STA		\$(800)	4280 10	3230 JO	SZ	SX	8480	4800 JO	10200	6350
100 100	Market State		200	78.5	48.7	SN	S.	192 30	17.30	7.9%	33.10
100	Manipulation of		40	. Q	(41)	S. X	S	86.18	79.10	67.10	75.10
10 10 10 10 10 10 10 10	Many Ductions		371		2 7	ž	ž	33.6	Ž S		35.
Sum 4790 1Q 5290 NS NS 12 JB <500 <500 <500 <500 <500 <500 <500 <50	NICKS!		5000	050	01 0517 4150 IO	Ž	SZ	00825	71400	262001	466(K)
Not Detacled 2 <2 <2 UL NS NS <2 <2 UL S NS NS <2 <2 UL C <2 UL	POLASSILIII		- XXXX	4790 IO	\$290	ž	SN.	00655	52000	48400	49.Y(X)
Not Detacted 2 <2 CUL NS NS <2 CUL <2 CUL NS NS <2 CUL <2 CUL NS NS <4 CUL <2 CUL <3 CUL <3 CUL <4 C	VANIBAL 1 - American		3		250	Z	Z	12 18	<50	₹) \
Not Detacted 2 <2 <2 UL NS NS <2 <2 Ul <2 <2 CUL 2 <2 CUL S S <4 CUL S S S S S S CUL S S S S S S S S S S S S S S S S S S S	* dijadiuiii		20,	142 JO	5 0	SZ	×	23.4	~ 20	; ∂;	\$50 \$30
Noi Deitated 2 <2 <2 UL NS NS <2 <2 UI <2	7017		3	, ,)					į	,
2 <2 <2 UL NS NS <2 <2 UL <2 UI	Thallum - SW846 7841 (Dissolved) µg/L	Not Detected	2	4	<2 UL	NS	SN	\$	<2 UI	?	75 UI
2 <2 UL NS NS <2 <2 UL <2 UL											
	Thallium - SW846 7841 (Lotal) ug/L Thallium		2	a	<2 UL	SN	SN	a	<2 UI.	<2 UI	\$

TABLE D-2

	Sample 1D	Reporting (a)	Sample DMW-298	Sample DMW-29B 4772002	Sample DMW-29B Jul 2002	Sample DMW-29B Oct. 2002	Sample MWFTA-14 10/9/2001	Sample MWFTA-14 4/8/2002	Sample MWFTA-14 7/17/2002	Sample MWFTA-14 10/29/2002
	Sallighte Date:									
Volatile Organic, Compounds - SW846 8260B µg/L						!	,		•	7
L.L.I-Treplero, thane		-	⊽	⊽	SZ	Z	▼	⊽	v	₹ .
11-the block thatte			⊽	⊽	SN	SN	₹	⊽	⊽	V
1 Dr. Blores Ib. m		_	m v	⊽	SN	NS	<1 UJ	⊽	7	⊽
1. The blooding		-	⊽	7	Š	SN	⊽	⊽	⊽	⊽
t z-premonencial			: 7	: ▼	ž	NS	7	⊽	⊽	⊽
1 despiration de la company de		· 2	; ₹	<50 R	×	SZ	01>	<10 R	01>	<10 R
2 Butanone		2	3 =	<10 K	×	SN	01>	<10 R	<10	<10 R
Z PLXARNIL		9	: =	2.1 R	SZ	ŠN	<to>+</to>	218	<10 UJ	<10 R
P. C. C.		-	⊽	;	SN	SN	⊽	⊽	⊽	⊽
OCHIVERE		_	; ⊽	⊽	SZ	SN	7	⊽	⊽	⊽
Christian de ma			. 7	2	SX	SN	\$	Ç	♡	3
Chanten		-	. △	⊽	SZ	SN	⊽	⊽	⊽	<u>~</u>
Charachtra		,	; ?	: 0	SZ	NS	\$	7	<2 UJ	8
Chigh this than the an		50	01.57.00	50	SZ	SN	& & &	<0.5	<0.5	€ 05
A chair and bloods		· -	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	₹	×	SN	⊽	⊽	⊽	⊽
Nicht year Caronical Control of Caronical Caronical Control of Caronical Control of Caronical Control of Caronical Caronical Control of Caronical Control of Caronical Caronical Control of Caronical		-	⊽	⊽	SX	SN	024 JQ	⊽	<1 UJ	r N V
of particular in		-	~	~	SN	Š	⊽	⊽	⊽	⊽
p-tacification and Table 1. The control of the cont		_	032.30	⊽	SZ	SN	⊽	⊽	⊽	⊽
Tologo		_	0.34 JO	⊽	SN	SN	0.47 JQ	⊽	⊽	⊽
read 12-Dy History the re		6.0	<0.5	<0.5	NS	SN	€.5	<0.5	<0.5	₹ 0>
Con bloom the me			0.21 JO	Of 610	N.	SN	⊽	⊽	⊽	⊽
Vinyl chloride		2	\$	Ç	SN	SN	7	Ç	~	4
Volatile Organic Compounds · SW846 8260B, UNPRES µg/L	RES pg/L									
1.13r blygg thang		_	ΝA	SZ	Š	Š	Ϋ́	ď Z	Y Y	Z
1.Dr blonx the pt			Y.	SN	SN	SN	٧×	ΥN	V.	NA V
Actor		01	٧X	SN	Š.	SN	Υ Y	NA V	NA	Y.
in 2-12-13. Beauty the m		0.5	ΑN	SN	SN	Š	Š	Y.	NA	VZ.
Methyl pro ploring		-	Ϋ́	SN	Š	SZ	Š	V	Ϋ́	NA
Ter block the		-	ΑX	SN	SN	SN	¥.	NA	۷ ۷	V Z
Ver I plane		2	×	N.	SN	Š	NA	NA	NA	NA

TABLE D-2

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02

LOWER WATER BEARING UNIT

Annual Grundwater Report - October 2002

Operable Unit 7

Defense Supply Creter Richmond

Richmond, Virginia

	Sample ID:	Reporting (a)	Sample MWFTA-16	Sample MWFTA-16	Sample MWF1 A-16	Sample MWFTA-16	Sample MWFTA-17	Sample MWFTA-17 4/5/2012	Sample MWFTA-17 7/31/2002	Sample MWFTA-17 10/15/2002
	Sample Date:	Limit	10/9/2001	7007150	7107/67//					
PIELD PARAMETER Dreided Ovigen - F360 1 mg/L Dreided Origen		0	4.6	2.51	36	65	7	8 2	62	4
Ferrous Iron - A35000 mg/L Lansus from		10	60.	- - -	1	9	₹	NA A	8	₹
Oxidation Reduction Potential - A258tlA mV Oxidation Reduction Potential		!	-165	-120	-121	-149	5 01-	()5-	45	-64
<u>pit - E150 t pit Units</u> pit		l	11 13	12.5	12 33	12 23	66 11	11 94	££ 21	12.33
Specific Conductance - E120.1 mS/cm Specific Conductance		0 (9)	4 93	96 5	473	1 92	1.75	1.73	173	1 44
<u>Temperature - E.170 I deg C.</u> Temperature		0.1	215	154	268	181	9.61	168	316	186
<u>Turbidity - Ł18h,1 NTU</u> Turbidity		-	46	S 1	2	4	æ	61	-	tr.
PIXED BASE LABORATORY ANALYSIS- Annors - MCAWW 300 HA mg/L Chloride Nitate as N Sullate		100	76 <01 74	64 <01 54	8 7 <u 1<br="">5 4</u>	116 401 71	59 <01 72	63 46 – 86	\$ \$ 10 \ 01	5.6 6.1 10.8
Desobred Gases - RSK SOP-175 mg/L Carbon droxide I thane I thene Mcthane		0 001 0 002 0 001 0 001	40 17 UJ0 0015 JQ0 0110 0022	<0.17 0.0074 0.08 0.097	<0.17 0.0029 0.029 0.039	<0.17 0.0055 0.049 0.12	40 17 J 40 002 40 001 0 073	<0.17 <0.002 0.00045 JQ 0.12	<0.17 <0.17 <0.001 <0.001 <0.001 <0.001	<0.17 <0.002 <0.001 <0.001
<u>Hydrogen by Microseeps - AM20GAX nM</u> Hydrogen		600	26	36	83	27	51	9.7	4 9	4 -
<u>p11 FPA 150 1 units</u> plf (tiquid)			± E	¥ Z	Y Y	Y.	11.7	N A	Š	∢ Z
Total Alkalmuy - MCAWW 310 j mg/L Total Alkalmuy		v	480	700	07.1	270	270	061	290	250
Total Organic Carbon - SW846 9660 mg/L. Total Organic Carbon		-	2 JB	_	84	Н.	2	2	7	2
Total Sulfide - MCA WW 376 1 mg/L Total Sulfide		-	61	⊽	⊽	0 49 JB	⊽	⊽	O 12 IQ	0.49 JB

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TABLE D-2

Sample 1D.	Reporting (a)	Sample MWFTA-16 10/9/2001	Sample MWFTA-16 4/5/2002	Sample MWFTA-16 7/29/2002	Sample MWFTA-16 10/15/2002	Sumpte MWFTA-17 10/2/2001	Sangre MWFTA-17 4/5/2002	Sample MWFTA-17 7/31/2002	Sample MWFT 1-17 10/15/2012
Not Detected	-	⊽	⊽	⊽	⊽	⊽	⊽	⊽	7
Not Detected	-	7	OI 10	⊽	⊽	⊽	⊽	~	⊽
	200	<200	<200 UJ	<200	854 JQ	5340	5380	4520	4430
	•	φ	ъ	<5 UJ	۲,	۵,	Ά.	ς,	۰ ۲
	٠	۲ (ን :	١٠	2 5 JQ	۶ ک ^و	9 g	9 <u>5</u>	2 ?
	200	121	061	886	329	2 95) (67)	2 2	01.
	<u> </u>	<u></u>	01× 0	€ ?	€ 5	- - -	Ş	3	7
	7	(A)	182000	150000	55500	()00611	000201	94100	92400
	100	1.5 JB	2.4 JB	15 JO	01>	01×	01>	<10	o1>
	2 6	<30.	05	0.50	30	<30	c 30	o£>	O\$>
	20	<10	01×	o1>	01>	01>	01 >	9	() 1>
	200	<200	<200	<200	<200	<200	<200	<200	<200
	\$000	125 JQ	13 I JB	S7 1Q	326 JQ	0005>	<5000	<5008)	<5000 2000
	20	2 10	0Z ::	~ 50	50	12 18	()	9 9	97 9 7
	9	×40	40	04°	049 2017	24 IB	(4) (5) (7)) E	€ S
	200	< 100	0012	1621800	47500 1	26800	19900	270(X)	21300
	2000	59300	46600	38600	37600 J	0K)\$11	00511	147(X)	12600
	95	16 JB	95	₹	32.10	OY 9	Of 19	72 JQ	7.2 JQ
	20	508	<20	14 1 JQ	<20 UI	<20	<20	Or 691	<20 UI
	;	;	,	3	į	0363	1000	4631	4636
	200	70.4 JQ	62 6 JB	80.4 DL 4.0	6/4 6	US27)8CC	45.20 8.00 8.00 8.00 8.00 8.00 8.00 8.00 8	4620
	000	Ç Ž	0 2	Ç <u>Ş</u>	Ç \$5	145 JO	33.50	01 101	127 JO
	9	2 =	015	01 01∨	10 √10) 01>	7 01V	7 01 >) Elv
	2	7	, 4	\$	a	\$	\$	\$	\$
	5000	00011	201000	165000	111000	119000	110000	93900	101000
	10	<10 <10	17 JB	91>	<10	01>	010	!	<10
	30	<30	<30	₹	<30	30	°30	30	(} ✓
	10	~1 0	۲I0 دان	2 ∨	23.10	e e	01v	0	2
	200	<20X)	<200	82 4 30	581	Q(Z)	<2(X)	<200	<200
	5000	1930 JQ	Of 0281	3220 10	00191	CSCSC	<>0000 1000 1000 1000 1000 1000 1000 100	00×	(MM)
	50	12 4 3Q	216	499	124	97 \$	07 (70	97 (R7 ₹
	OF 55	()	D# 1	₹ ₹) ()	Q-10-10-10-10-10-10-10-10-10-10-10-10-10-) S		
	90.3	0012	NAI>	177000	78000	34400	DOEUZ	267181	737(8)
	0000	CKSIN	SUKIN	41500	247(8) 1	(88)	1400	144(X)	135(X)
	05	S In	Now.) S	082.10	52.10	9	Of 2	0/ 17
	20	24.8.1	₹	15 6 JO	10 02>	<20 <20	<20	(20) (20)	<20 UI
	2		į						
Not Delected	2	22 J	7 n	<2 UI	2 UI	<2	<2 UI	42 UJ	Ų
	2	A	<2 UI	<2 UI.	4	- 5	17 C	2 U	7
	Not Detected Not Detected Not Detected		200 200 200 200 200 200 200 200 200 200	200	200	230	1	1	1

TABLE D-2

			Cornele	Carmelle	Samuele	Samole	Samole	Samole	Sample	Sample
	Sample ID	Reporting (a)	MWFTA-16 10/9/2001	MWFTA-16 4/5/2002	MWFTA-16 7/29/2002	MWFTA-16 10/15/2002	MWFTA-17 10/2/2001	MWFTA-17 4/5/2002	NIWFTA-17 7/31/2002	MWFTA-17 10/15/2002
										ı I
Volatile Organic Compounds - SW846 8260B µg/L									-	-
1 1 E Truchlorumhane		-	<50	G)	\$	\$2	⊽	⊽	₹ '	-
1 t.De blazes thank		_	0€>	<33	\$	Š	⊽	⊽	⊽	-
1 Librahlana ibana		-	<50 UJ	<13	90	9 5 >	⊽	⊽	⊽	⊽
1 2.1hr bhardhana n		_	01.10	<13	<50	<ځو	7	⊽	⊽	⊽
A On Monthly and		_	, 0\$>	¢33	\$\$ \$	~ 56	⊽	⊽	⊽	⊽
2 But man		. 01	<\$000	<330 UJ	<500 UJ	<560 UJ	<10	<10 R	× 10 ×	<io oi<="" td=""></io>
The state of the s		: =	2000	<330 UJ	<500 R	<560 UJ	<10 UI	<10 R	<10 R	<10 UI
A. Monte		9	46 JO	<330 R	<56KD R	<560 UJ	Of 19	26 K	47 K	EL 1.1
B. a control		-	, 1350 1500	<33	₹	9\$>	⊽	⊽	⊽	⊽
C block over		_	-\$0 -\$0	49 JQ	~	\$ \$	7	⊽	⊽	⊽
(block bits		2	×100	. C9>	×10x	<110	8	Q	7	₽
(blocoform		-	0\$>	<33	<\$0 \$	5€	⊽	⊽	⊽	⊽
Chloroganh		2	00I>	19>	<100 UJ	<110 <110	2 NI	Q	<2 UJ	8
A real 2-the blooms have		0.5	1200	201	1100	1500	\$Q2	<0.5	€.	₹
Maintenancement		-	05>	12 JQ	32 JB	<\$e	⊽	~	₹	₹
Number of the		_	<50	<33 UJ	\$	\$ \$	0.82 JQ	0.9 JB	rn I>	⊽
a forecovated in no		1	\$0	33	\$	9\$>	⊽	7	⊽	⊽
To the bloom the m		_	2€	33	95	\$\$	⊽	⊽	⊽	⊽
Tolar		_	9\$	<33	95	~ \$6	03 JQ	OL SE D	⊽	7
remain 3.10c blossesthane		0.5	<25	11	\$	<28	<0.5	<0.5 0.5	₹0>	\$.
For blacewith the		_	95	433	\$\$ \$0\$	< 56	⊽	⊽	⊽	⊽
Vinyl chloride		2	270	310	430	920	\$	\$	Q	\$
Votatile Oceanic Commonate - SW\$46 826(18, 1)NPRES up/L	PRES up/L									
1 The bloom thins		-	ΥZ.	ΥN	<u>8</u>	<62	A'N	V.	Ϋ́	ΑN
1. Dr. blengarth, par		_	N A	ΝΑ	0 0	<62	A'A	×	۲×	Y.
Autom		91	Y.	Ϋ́	61 R	<620 UJ	Y.	Y Y	Š	V Z
received 2. De blosseethern:		6.5	¥Z.	ΝA	0011	1400	Υ _Z	ď Z	۲ Z	NA
M. thek m. Albunka		_	¥Z.	NA	33 JB	<62	Υ Z	ΥN	NA	Y.
Tri bhreath ni		_	Y'N	NA	O\$>	<62	¥ Z	¥ Z	AN	NA
Vinyl chloride		2	NA	NA	440	920	٧X	Y Z	NA	NA

TABLE D-2

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02

LOWER WATER BEARING UNIT

Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Cneter Richmond

Richmond, Virginia

	Sample 1D: Sample Date	Reporting (2)	Sample MWFTA-18 10/2/2001	Sample MWFTA-18 4/4/2002	Sample MW FTA-18 7/29/20012	Sample MWFTA-18 10/16/2002	Sample MWFTA-19 10/2/2001	Sample MWFTA-19 47721012	Sample MWFTA-19 7/30/2002	Sample AIWFTA-19 10/17/2002
FIELD PAKANETER Dssolved Oxygen - F360 Ling/L Dxsolved Oxygen		- 0	0.4	80	13	1.6	63	NA A	7.	,
Ferrous Iron - A3500D mg/L		10	_	90	10>	hr.	₹	ď Z	₹	9
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		1	98	08-	£11•	68-	۳	K Z	92	61-
pH - E150 t pH Units		ł	68 9	989	56.9	7 34	16 01	∢ Z	11 92	10.89
Specific Conductance - 1:120 1 mS/cm Specific Conductance		0.001	0.125	0 172	. 6110	0 156	0.609	Ϋ́	0 528	0 725
Temperature - E170 1 deg C Temperature		0.1	<u>**</u>	17.9	8 61	17	16.5	Υ V	21.9	191
Turbidity - F180 1 NTU Iurbidity			24	34	2	3 \$	<u>æ</u>	K K	4	7
FIXED BASE LABORATORY ANALYSIS- Anions, MCAWW 300 0A mg/L Chlorid, Nitrate as N Sulface			3.8 <0.1 0.94.3Q	4 3 4 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4 <0.1 1.2	47 - <0] 12	6 62 62	66 <01 ×2	64 JB <0 l 6 S	64 100 100
Dissolved Gases - RSN SOP-175 mg/L. Carbon droxid. Frhanc Friber. Methans.		0 002 0 002 0 003 0 003	7.1.1 0.001.1Q 0.005 0.28	19 0.001 JQ 0.003 0.37	13 <0.002 <0.001 0.007	15 <0.002 <0.001 0.043	<0.17 J <0.002 <0.003 <0.0034	0.22 JB <0.002 <0.001 0.0010	<0.17 <0.002 <0.001 <0.0001 JB	<0.17 <0.002 <0.001 0.0028
Hydrogen by Microscyps - AM20GAX nM Hydrogen		603	8 9	30 30	2	26	13	7	4	91
pil EPA 150 l umis pil (hquid)			7.3	ď Z	Š	Z Z	601	Υ Y	NA	V V
Total Alkalınıty - MCAW W 310 1 mg/L Total Alkalınıty		8	99	89	<i>L</i> 9	æ	110	130	0\$1	120
Total Organic <u>Carbon - SW846 9060 mg/L.</u> Total Organic Carbon		-	2	2 JH	-	63	⊽	04 10	⊽	HI 70
Total Sulfide - MCAWW 376.1 mg/L. Total Sulfide		-	⊽	7	⊽	HI 180	⊽	v	⊽	⊽

Page 8 of 15

TABLE D-2

Sample ID.	Reporting (a)	MWFTA-18	MWFTA-18	NIWFTA-18	MWFTA-18	MWFTA-19 10/2/2001	MWFTA-19 47/2002	MWFTA-19 7/30/2002	MWFTA-19 10/17/2002
Not l'Arected	_	1	~	⊽	~		<1 U)	7	⊽
Not Detected	-	⊽	Of 160 0	⊽	⊽	₹	8L 210	⊽	⊽
	200	109 JB	<200 UJ	<200 UJ	<200 UJ	659	716	106	616
	\$	3.10	ď	φ	ŋ	۵.	\$ '	ζ'	\$;
	5	\$	Ф	δ	ን	٠ ا	۱ ک	S S	42.16
	200	<u>0</u> 1 γ6	31 30	28.9.10	308 JQ	552.30	72.5 JQ	2 4 E	7 1 1
	01	×10	۱۶ ۱۹	9I>	or °	01>	9 7 V	₹ 5	? ?
	2	Ç	₽	7	7	96.50	20 5	77 75	50.ZC\$
	SOOS	9530	14800	1300	84(8)	45000	390KV		£ (1)
	2 ;	0; { }	200	0 8 V	Q €	0 %	2 5	₹	£ 5
	e :	⊋ :	₹:	Q 5	3 5	2 5	2 2	2 =	01>
	<u>01</u>	010	975	012	1470	SE S	SIS 5	250 2500 2500	<200
	007	(A)477	ZL &	5240	4920 10	17.5 JD	<50XX)	<5000	<5000
	אטטא.	g (2)	2 × ×	¥ 66	719	<20 20 20	5	420	<20
	2 7 1	€ ₹	<40	<40	<40	<40	<40	2 5 JQ	<40
	100	29 JB	<100	<100	<100	005×	(X)!>	(K) >	<100
	2000	7180	5330	5530	5590	10400	11000	10600	9870
	5000	7670	0717	7640	7740	5640	5370	0855	6170
	05	<50	O\$>	S	5 0	24 18	2.8.JQ) } }	28 10
	20	<20	<20	<20	<20 UI	<20	5 00	Ş	<20
	Š	1	51	11000	111000	673	169	X7X	817
	107 107	ar /c	2 1	70 VOV	5 Y	<u>}</u> '\$	ζ 'ζ	Ý	2.1.13
	י איני	386 (1)	5 (5	24.5 10	34 5 10	545 JO	OF \$ 92	63.4 JO	67.2 JO
	01	70.00	2 5	0.5	\$ 0.1×	012	V 010	OI>	, ol>
	5 (0	3	V	8	42	ß	4	₹
	2000	9620	00951	00911	8800	454DO)	61800	548(X)	\$78(X)
	2		c10	<10	01>	01>	0 >	OI>	<1¢
	35		()£>	() _F >	O£>	Q€>	<30	OŁ>	<30
	0.1		01>	0I>	01×	210	0 ! >	0I v	<u>()</u>
	2003		0261	2430	0691	<20K)	<200	<200	<200
	\$(8)3		1950	\$460	5180	44 8 JB	<50XX	<5006	230 1Q
	92		%	1 05	1.11	\$ \$20 \$	<20	\$ 0	13 18
	40		<40	<4()	<40	<40	() ₹	<40	₩
	93		34 10	€100 VI	32 JQ	(Q) 	(X) <10(k)	(X) V	<u>20</u>
	SOXX		2400	2670	5820	10200	128(30)	10400	10200
	SUCK		7470	7910	810	\$560	0909	718U	\$\$20
	95		Ş	Ş	O\$>	22 JB	33.30	-\$- -\$-	2 5 JQ
	20	<20	DI 861	<20	Dr 561	<30	<20	Ş	<20
Not Detected	7	å	<2 UL	\$	\$	\$	<2 UI	<2 UJ	<2 UI
							;	;	;
	2	4	<2 UI	<2	8	ت ت	<2 UJ	500	5 OI
	Not Decree		200 105 200 2 3 3 3 10	200 169 JB < 5	200 169 JB	200 169 JB	200 109 JB (200 JJ) (200 109 JB <200 UJ	200 169 JB \$\beta \text{cluster}{4}\$ \$\beta \text{cluster}{4}\$

TABLE D.2

	Sample 1D:	Reporting (a)	Sample MWFTA-18	Sample MWF1A-18	Sample MWFTA-18	Sample MWFTA-18	Sample MWFTA-19	Sample MWFTA-19	Sample MWFTA-19	Sample MWFTA-19 10/17/2002
	Sample Date		10077AL	7007/6/6	700716711	70070101				
Volattie Organic Compounds - SW846 82641B µg/L										
I - Trubloroethane		_	⊽	₹	⊽	₹	⊽	⊽	⊽	₹
L.L-Dic blorger flame		_	⊽	⊽	⊽	⊽	⊽	⊽	⊽	7
1 - Da blares them		_	⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽
2-13s blostesh, n.c. n.		_	⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽
4-The bleed by a contract at		_	7	⊽	⊽	⊽	⊽	⊽	⊽	⊽
2 Buttoning		16	0I>	<10 UJ	<10.01>	۰I0	<10	<10 R	<10 UJ	<10.01>
2 He sanone		10	<10.01>	<10 UJ	<10 R	ol>	<10 UI.	<10 R	<10 R	<10 UJ
Actual		01	Of 90	<10 R	<10 R	01>	QL 87.0	24 R	<10 R	<10 M
Buzen		_	⊽	⊽	⊽	⊽	⊽	⊽	⊽	⊽
Chlorobenzene		_	⊽	7	⊽	⊽	⊽	⊽	⊽	⊽
(hleresthan		2	<2	Of 940	7	Q	4	\$	7	7
(hforestorm		-	⊽	⊽	⊽	⊽	7	⊽	⊽	⊽
Chloropethan		2	<2 UI.	8	<2 UJ	\$	<2 UL	7	<2 UJ	7
case 1.2-22, the metabolic		0.5	2.5	23	2.2	2	16	1.5	1.2	=
Mishylan chlorade		-	⊽	7	7	⊽	0 44 JQ	⊽	⊽	⊽
Namhhalane		-	⊽	f Ω I>	⊽	⊽	⊽	7	⊽	⊽
o Isopropyliolune		_	⊽	~	⊽	⊽	~	7	▽	⊽
Teleschipters then.		_	⊽	7	7	⊽	OT 97.0	-	-	1.2
Tolum.		-	Ot 590	7	7	⊽	0.24 JQ	₹	⊽	⊽
tene-12-Di blorgethene		0.5	<0.5	<0.5	\$0\$	<0.5	&0.5	5 0>	<0.5	₹ ()>
Trublese then		_	⊽	⊽	<u>~</u>	7	044 JQ	OF 390	OF 90	0.54 JQ
Vinyl chloride		2	7	<2	Q	7	4	a	\$	8
Volatile Organic Companies - SW846 8260B, UNPRES ug/L	PRES up/L									
11 De hieres than.		-	NA AN	NA NA	V.	٧Z	ž	Y Y	Ϋ́	ΑN
1.1 De planskthene		_	NA NA	NA	Ϋ́	NA V	¥ Z	Ϋ́	NA	٧X
A. ISD.		9	NA	N.	¥	Y.	Ϋ́Z	ď Z	VZ	٧X
an 1.2-Duhlarsathan		405	Y.	Ϋ́	Y.	NA	Y Z	۲	ΥN	٧×
Muhylone chloride		_	٧X	Y.	Š	NA	Ϋ́Z	Ϋ́Z	ΝA	٧X
Try hlorix then		_	A'A	Ϋ́	٧	٧Z	Ϋ́	۷ Z	Y.	۷Z
Vinst chloride		2	Y X	V.	NA	NA	Ŋ	NA	NA	NA

TABLE D-2

	41	Day and the Col	Sample MWETA. 28R	Sample MWFTA.28B	Sample MWFTA-28B	Sample MWFTA-28B	Sample MWFTA-29B	Sample MWFTA-29B	Sample MWFTA-29B	Sample MWFTA-29B
	Sample Date	Limit	10/8/2001	4/8/2002	7/17/2002	10/29/2002	10/1/2001	4/4/20112	7/30/2002	10/17/2002
FIELD PARAMETER <u>Dissolved Oxygen - E360 1 ng/L</u> Envalved Oxygen		0.1	90	3 92	4	1.5	3	2	Ξ	1.1
Ferrous Iron - A3500D mg/L Ferrous Iron		10	- 0 <u>></u>	V	0.5	0.5	\$	10>	-	-
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		;	-124	-121	-140	£6-	-113	٠2.	-176	-82
<u>pit - F150 i pit Units</u> pit		ł	101	78.7	7 49	7 09	13.0	13 88	13 03	12 44
Specific Conductance - E120 1 mS/cm Specific Conductance		0 001	0 543	0 502	0 492	0 697	24	2 47	187	19
Temperature <u>- E170 I dea C</u> Temperature		0.1	146	14 1	22.9	12.4	691	12.7	25	18.7
Turbidity - E180 1 NTU Turbidity		-	51	21	⊽	21	6٤	31		5
FIXED BASE LABORATORY ANALYSIS Anors - MCAWW 340 HA mg/L Chloridt Nitrate as N Sullate		- 6 1	58 6 <0.1 14	28 9 40 1 1 1	55 8 <0 1 2 1B	58.2 <0.1 5.6	1.5 5.1 5.1	14 007 JQ 34	19 JB <0 L 18 2	2 40 1 40 4
Dissalved Gaves - RSK SOP-175 mg/L Carbon dioxide Frhan. I ihene Mcthane		0.001 0.002 0.001 0.001	3.2.J <0.002 <0.001 0.0021	13 0.00045 JQ <0.001 0.99	15 <0.01 R <0.005 R 0.48	18 <0.002 <0.001 0.41	0 (000) 0 (000) 0 (000) 0 (00)	40 1760 0070 0010 0010 0010 00	<0.17 <0.002 0.00057 JQ 0.012	<0.170.00039 JQ0.00130.034
<u>Hydrogen by Microseeps - AM20GAX nM</u> Bydrogen		603	N A	30	14	4 6	\$25	2	3.5	26
p <mark>il FPA 150 1 ynits</mark> pil (ligud)			5\ **	N	Ϋ́	K K	8 =	N A	A A	¥ z
Total Alkalinity - MCAWW 310 J mg/L Folal Alkalinity		\$	091	160	230	160	440 J	190 J	370 JI	340]]
Total Organic Carbon - SW846 9060 mg/L. Total Organic Carbon		-	22	9	2	2		4	۳	۴
Total Suifide - MCAWW 376, 1 mg/L. Total Suifide		-	1.2	⊽	⊽	7	22	⊽	7	0.62 JQ

शिक्ष्य भागा । ५

TABLE D-2

			Sample	Sample	Sample	Sample	Sanple	Sample	Sample	Sample
	Sample ID Sample Date	Reporting (a) Linut	MWFFA-28B 10/8/2001	MWFTA-28B 4/8/2002	MWFTA-28B 7/17/2002	MWFTA-28B 10/29/2002	MWFTA-29B 10/1/2001	AIWFT A-29B 4/4/2002	NIWFTA-29B 7/30/2002	10/17/2002
Mercury - SW846 7470A (Dissolved) ug/L.	Not Detected	-	⊽	IJ. 12	⊽	⊽	₹	0.14.10	⊽	⊽
Mercury - 5W 846 7470.A. (Total) µg/L.	Not Dytected	-	⊽	m 1>	⊽	⊽	⊽	el UJ	⊽	⊽
Metals - SW846 6010B (Dissolved) up/L.		200	<200	<200	DF 911	<200	453 JB	122	£0	266
Aglimin		5	٧.	\$	Ϋ	5 UJ	۶	۵	\$	ζ.
Archi		5	ζ	Ϋ	\$	ζ.	: ۷	٠ : ۲	٠ :	Ş -Ş
Barum		200	75.3 JQ	Or ell	128 JQ	137 JQ	239	215	Of 881	2 2
նւյիստ		01	€-	<10	0.78 JQ	0I v	0.76 JB	, <u>,</u>	010	<u>}</u> ;
Cadmium		2	Q	ଧ	7	7	7	7	90887	27 67
Cakrum		2000	22400	34700	47100	35300	109(88)	101100	748UU	(N)(N)
Chromaum		≘ 1	ol>	01 >	e :	017	91.61	Q ₹	€ ₹	? (
Cobalt		2	<u>0</u> 2 :	⊋ :) •	- C - C - C - C - C - C - C - C - C - C	3 5	? ₹	=======================================
Cupper		2 ;	01 5	010	10 01 >	יוני פולי	4 3 10	01V		900
Iron		7(X)	425	0001	0017	33200	20.1.00	20 5 101	01 55	×2(1)\$>
Magnesium		CKO?	22400	24400	25/00	2030	10 C+	20.00	\$ \$	×200×
Manganese		07	101	770	177	t 9,	0 TE	G 5 6	2 10	OF 8.9
Molybdenum		3 5	G (2)	33 15	957	200	 E	45.10	41.10	Of E
Nickel :		0005	779(X)	20051	13100 1	12500	91200	60509	65000	574(X)
Polassum		2005	47200	29000	24800	23500	72400	468(X)	532(X)	490(%)
Sodium V. d. d. lum.		50	950	95	OL 77.0	9\$>	31.10	OK 98.0	12 JQ	14 JQ
אַדייין		30	47.2	144 30	, 20,	<20	<20	- - - - - - -	4 50	5 00
, inc		ì) :	3			<u>-</u>			
Metals - SW846 6010B (Total) ug/L				;	;	•				â
Aluminum		200	279	317.10	Of 22	200 200	HC 9961	HL 0111	10(X) J11	3.2 (0
Andre		\$	o :	0 :	0 2	0 5	Ç	, ;	53.53	Of 7.7
Barium		200) 5 68 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	2	Of 98.0	7 2	21 55 U	317	2 (1)	2017
Beryllium		01) (0 × 0	2 (? ?		\$ 5	9	7
(יוקעוותעו		CIANS	1059c	347(X)	387(0)	36300	00001	00866	17800 JI	(18(8))
Calcium		GI C		9	62 10	01>	42.1	43.10	01>	33.10
		9.0	€	39	OF 88 0	<30	2.2 JB	(JE >	C3()	<30
i ado)		10		₹	<10 UI	010	12 JB	al>	<10	19 JQ
long (although the contract of		200		2270	2590	2330	HI ()/61	\$08	504 HI	D(9)
Margarith		SOUC		24500	26400	23800	DI SER	321 JQ	390 JQ	599 10
Note: Section of the		20		222	23.7	2019	713	15.3.10	12.4 JQ	JS 7 JQ
Melybdrunns		9		<40	₹	<4()	71.10	49 JQ	Q1 E3	71.30
N. F.		100		201×	<100	001>	97 JQ	78 70	4 JQ	38 30
Universal		SCORT	•	(X)851	13700 J	12800	89300	\$K2(X)	OXKITO	54400
Sodium		5000	41700	28900	25800	24100	(XX/ELL	44700	\$45(X)	4620N)
Vanadium		50	11 18	3	ŞÇ	~)8 JQ), JQ) [14 JQ
/mr		20	392	213	42 6	< 50	30 S	II 6 96	<20	<20
Thallium - SW846 7841 (Dissolved) ug/L	2	r	?	20.00	25 UI	3	5	<2 UI	<2 UI.	77 73
			;	!						
Thailium - SW846 7841 (Total) µg/L		r	7	20 118	17 11	8	-5 NI	<2 UI	10 C>	25 EN
្រង់រារបញ		ı		; ;	: :)	 		;	; !

TABLE D-2

C C C C C C C C C C		Sample ID	Reporting (a)	Sample MWFTA-28B	Sampte MWFTA-28B	Sample MWFTA-28B	Sample MWFTA-28B 10/29/2002	Sample MWFTA-29B 10/1/2001	Sample MWFTA-29B 4/4/2002	Sample MWFTA-29B 7/30/2002	Sample MWFTA-29B 10/17/2002
1		Sample Date	Cimer	10022001	7007835						
	Volatile Organic Compounds - SW846 8260B ug/L						•		7	7	7
Comparison Com	1.1 Te. Mars that		_	⊽	₹	⊽	7	⊽	₹ '	7	;
Compounds - SW846 82641B, UNPRES MAKen Compounds - CW846 82641B, UNPRES MA	1 1-115 markement		_	V	⊽	⊽	⊽	7	⊽	⊽	⊽
Columb	- Jic hloroethans		_	= 1	. 7	₹	V	⊽	⊽	⊽	-
heartern controlled by the state of the stat	1 I-Dichbracethan			5 -	; 7		⊽	7	~	⊽	⊽
benatic benati	1,2 Dichlorobenzene			⊽ -	; ;	7 7	; 7	: 7	7	7	⊽
10	1 4-Dit blorobunzen		- ;	∵ ;	⊽ ;	7 =) S	; <u>*</u>	100	<10.01>	<10.01>
10	2 Butanone		9	2 10	¥ 6/ 6	017	4017	\ = 		<10.8	<10 UJ
Departed: S.W846 8260B, UNPRES LEVIL Departed: S.W846 8260B, UNPRES L	2 Hexamone		<u>o</u>	012	¥ :	015 -	410 K	37.71	; ≃ ≃	7 % K	LU 0.1.>
Departed Say Signification of the control of the co	Acctonc		2	1 1 13	¥ .	T 0.7	4017	27 22	01.45.0	~	v
Depunds - SW846 8260B, UNPRES BULL 1	Brazini		_	⊽	⊽	⊽	⊽ '	27.70	7 -	; 7	; ,
Dounds - SW846 8260B, UNPRES mVL 1 0.88 10	(House as as		_	⊽	7	₹	⊽	⊽	⊽ '	⊽ '	7 5
Departed Say States LUNPRES LIMIT 1 1 0.28 JB	Chichele Live		2	27	4	\$	4	\$	7	7	Ÿ
Depunds - SW846 8260B, UNPRES LIVIL 1 NA	ר שומנות וושחוב		-	0.28 JB	⊽	⊽	~	⊽	⊽	⊽	⊽
Depunds - SW846 8260B, UNPRES prof. 1	Chlorotorm			£2	7	<2 UJ	\$	<2 JI.	0.26 JQ	<2 UJ	4
Dounds - SW846 8260B, UNPRES uv/L 1 052 18	Chloromelhane		• •) (5 5	<0.5	<0.5	\$0	\$ 02	<0.5	ê
Pounds - SW846 826/18, UNPRES BULL 1	cis-1,2-Dichlorocthene		-	. G. CS (1)	7	⊽	⊽	⊽	⊽	⊽	⊽
Politic SW846 82648, UNPRES LIVE 1 NA	Methylene chloride		•	01.92.0	12 IB	mı	043 30	082 10	1.5	7	⊽
Pounds - SW846 826iB, UNPRES put/L NA	Naphthalcne		-) 		₹	, ⊽	. ⊽	⊽	⊽	⊽
Pounds - SW846 826iiB, UNPRES µUL 1 NA	p Isopropyltoluene		_	7 7	; ;	₹ ₹		⊽	7	~	⊽
Pounds - SW846 826/18, UNPRES BULL 1	Ertrachlorocthene		-	7 78 7	01 22	₹	₹	Ot 560	OK 65 0	0.48 JQ	~
1	Tolucar		- 9	7 7	7 5	; {	\$ 05	<0.5	<0.5	<0.5	€
2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2 <2	trans-1 2-Dichloreethene			è .	} ¬	₹⊽	⊽	⊽	7	(0 1 >	⊽
NA	Truchkoreethen			; 5	; ?	: 7	?	4	a	4	7
Dounds - SW846 826itB, UNPRES tutL 1 NA	Vinyl chloride		•	;	;)	!				
A	Volatife Organic Compounds - SW846 8260B, UN	PRES µg/L					;	;	:	3	2
0 NA	1 to blooming to the			Ϋ́Z	ž	Ν	4 2	2	<u> </u>	Š	
01 NA	1 1-Dunance			ď	AN	Ϋ́	NA	Υ X	Y Y	Ϋ́	Ϋ́
AN A	L,I-Dichloracthene		• =	4 Z	X.	ž	٧X	Ϋ́	Y X	٧X	Ϋ́Z
AN A	Actione		2 0		NA.	Z	V.	¥	Ϋ́	< <u>v</u>	۷ Z
AN AN AN I	cis-1,2-Dichloroethene		, -		¥ Z	Z	Y.	AZ.	Ϋ́	N A	₹ Z
	Methylene chkwide			. 2	¥.	Ž	Ϋ́	AZ.	ž	VA	Ν
	Jackhorecthene		- `	<u> </u>		2	Y Z	Y.	V.	Y N	Ϋ́N

TABLE D-2

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02

Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Greter Rechmond

Rechmond, Virginia

	Sample 10	Reporting (a)	Sample PWFTA-2	Sample PWFTA-2	Duplicate PWFTA-2 4/4/2002	Sample PWFTA-2 Jul 2002	Sample PWFTA-2 Oct 2002
FIELD PARAMETER Discolved Oxygen - E360 1 mg/L Discolved Oxygen			7.0	*	so.	SX	ž
Ferrous Iron - A35001) mg/L Lerous Iron		0	100	510	\$1.0	X S	S S
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		ì	94.	-82	-82	ŠX	Š
<u>p11 - E150 1 p11 Units</u> pil		l	1011	11 82	11 82	Š	SN
Specific Conductance - £120.1 nS/cm Specific Conductance		100 0	66 ()	0.763	0 763	SN	ž
Temperature - E170 I deg C Tx np.rature		10	15.2	146	146	Š	Š
Furbidits - E180 NTU Turbidity		-	2	⊽	⊽	N	ž
FIVED BASE LABORATORY ANALYSIS Amons - M <u>LAW W 300 0A mp/L</u> Chlonds Natule as N Sultane			86 0.0 88	8 9 002 JQ 5 9	87 002 JQ 58	XXX	ž ž ž
Dissolved Gases - RSK SQP-175 mg/L. Carbon doxide Fithan. Fithan. Methan.		6 001 6 002 0 001 6 001	<0.17 UJ <0.002 0.002 0.16	<0.17 <0.002 0.0024 0.23	<0.17 <0.002 <0.0002 0.00027 0.25	X X X X X X X X X X X X X X X X X X X	źźźź
Usdrogen by Microseeps - AM20GAX nM Hydrogen		003	46	t 051	f 011	N	N
pH EPA <u>150 1 units</u> pH (liquid)			11 3	Ϋ́	V V	ž	SN
Total Alkalınıty - MCAIVIV 310 1 mg/L. Total Alkalınıty		v.	140	54 J	46	Š	Š
Total Organic Carbon - SW846 9060 mg/L Total Organic Carbon		-	⊽	Ħ -	H 1	ź	Š
Total Sulfide - MCAWW 376 1 mg/L. Total Sulfide			12	⊽	7	N S	ž

TABLE D-2

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02

LOWER WATER BEARING UNIT

Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Cneter Richmond

Richmond, Virginia

	Sample 1D.	Reporting (a)	Sample PWFTA-2	Sample PWFTA-2	Duplicate PWF1 A-2	Sample PWFTA-2	Sample PWFTA-2
	Sample Date:	Limit	10/1/2001	4/4/2002	4/4/Z(X)Z	Jul 2(A)2	OCI 2007
Mercury - 5W846 7470A (Dissolved) ugl.	Not Detected	-	⊽	0 14 10	⊽	SN	ž
Mercury - SW846 7470A (Total) µg/L	Not Detected	-	⊽	0 13 10	QL 71.0	Š	ž
Metals - SW846 6010B (Dissolved) <u>pg/</u> L							!
Alumnum		200	1200	1020	1620	SN	ź:
Antimany		~	٧	\$	φ.	SZ :	ž.
Arknic		•	\$	\$	φ.	SZ :	ž
Вилит		200	Of 65+	44.9 JQ	454 10	SN	ž
Beryllium		2	۱۶ داه	<10	0 I>	Ϋ́Z	ź
Cadmium		2	4	4	\$	SN	SN
Cakium		S(XX)	SRIXXI	\$2800	52900	SX	ž
t bromuns		92	01>	<10	0 1 0	NS	SN
Cobali		Q.	€30	₹30	<30	NS	SN.
1 (41)		9 🖺	=	- 10	ol>	ž	ž
Colpte		300	E 9	2000	<200	· Z	Š
iron.		CONT	(07)	00037	(AXIS /	Z	Z
Magnesium		1972 1972	2000	2007	300	Ž	2
Mungalick		07	07 S	, ç	3	ŽŽ	2 2
Malybdenum		D# 1	F :	0.50	0.00	2 2	2 2
Nic Ke		RII	001>	2012	ONL'S	5 5	£ 32
Potassium		2000	90166	00172	10660	S. S.	Ž
Svalium		OUNC S	0.12	0000	DAMAI.	<u> </u>	2 2
Vsnadlem		₹.	2 718	Of 1.7	۲ (۱۰ ۲۰۰۰) ۱۳ (۱۰ ۲۰۰۰)	2	£ 3
Zinc		20	<20	2 5	07>	Z	É
Been district to the Allegan State of the Allegan S							
Michaels - Stroom do lots Lotal High		(4))	1000	1630	47.5	SX	SN
Aluminum		207	7 904	2,5	1 1/1	. 2	32
Arknie		c ;	Ç ;	Ç.,	Ç	Ç i	()
Barium		200	43 2 30	D(7 94	JC 814	Z :	S Z
Berylhum		2	<u> </u>	<10	212	ź	É
Садтит		2	7	Of to	Ø	SZ.	ź
Cakıum		50X0C	546(80	548(X)	513(0)	ž	Š.
Сргогишп		2	0 >	01>	01>	۶. Z	ź
lfrqu)		25	0€>	c30	<3() <	SZ	S
Conper		2	4.2 JB	01>	<10	××	SN
in in		200	<200	<200	<200	ž	SZ
M. um. sum		(KXI)	57.9 JB	<5000	<\$UXX	Š	ž
M. Strain Strain		υc	14 13	<20	ê	Š	N
to the first of th		2 5	900	: F	₹	2	32
Molybachain		₽ <u>9</u>	£ ,	£ 5	£ 5	Ž	S.N.
Nickel		0003	97.5	0012	DALLA C		5 2
Potassum		SON	37300	70,707	COOC 7	5	S
Sedium		2000	12900	10700	00101	Z	12
Vanadium		SO	2 3 JD	Of 8-1	14.10	S.Z.	Š
/inc		20	<20	49.7 J	<20 UJ	×	ŠZ
Thallium - SW846 7841 (Dissolved) µ2/L	Not Detected	~	\$	42 UI.	42 UI	ž	Š
Thallium - SW846 7841 (Total) µp/L		,	ς		7	ž	ž
Thallium		2	7	<2 ni.	IO 25	ź	Ź.

TABLE D-2

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02

LOWER WATER BEARING UNIT

Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Cneter Richmond

Richmond, Virginia

	Sample 1D Sample Date	Reporting (a) Limit	Sample PWFTA-2 10/1/2001	Sample PWFTA-2 4/4/2002	Duplicate PWFTA-2 4/4/2002	Sample PWFTA-2 Jul 2002	PWFTA-2 Oct. 2002
Volutile Oreane Communds - SW846 826HB ug/L	Tr						
1 Trublery than	ı	-	⊽	⊽	⊽	SZ	Ž
1 D. Marco de mo		-	: 🖘	43	36	SZ	SN
1-17th HAM OCHINANO		-	2.1	23	40	SZ	SN
1 - Oktober Christ			1.5	0.89	Of 160	SZ	SZ
4 De bleedbon e n			07170	0.17	Of 810	Ϋ́Z	SZ
1,44-19EIIIOOOCICIOOOCI		· <u>=</u>	01>	<10.01	<10.01>	SN	ž
2-Ditalinate		: =	<10 U.J.	<10 UJ	<10 UI	SZ	Š
Actions		9	2.7 JO	23 R	16 R	SX	SZ
מניים		! -		. 🔻	⊽	SZ	SZ
beliefik Elseken an		-	: ▼	⊽	⊽	Ϋ́Z	Z
Call de La			: 7	\$	4	NS	SZ
intercentalise		-	! ⊽	7	7	SZ	ŠŽ
Chikatoria di ma		. 2	Z OI	\$	8	NS	SN
Contraction of the physical by the		50	5.3	46	44	SZ	SN
Market n. Absente		; 	₹	⊽	⊽	SN	SZ
North Jone		-	0.82	141	⊽	SS	SN
inguisment.		_	02 10	Of 98 0	Of 98 0	NS	ŠZ
Take block than		-	04 10	0.25 JO	0.25 JQ	٧ <u>٧</u>	5 Z
Tetracino (America)		_	031 10	0.24 JQ	02.10	×	Š
respective to the black the se		50	01 91 0	\$ 95	Of 61.0	NS	SN
Tree black the ne		-	5.4	63	99	NS	ž
Vinyl chloride		7	041 JQ	0 44 JQ	041 JQ	SN	N.
Volatije Organic Compounds - SW846 8260 <u>B, UNPRFS</u>	NPRFS µWL.					;	;
f-Dr. blococibane		_	٧×	NA	ΥZ.	YZ.	Ź
1 - Du hlorix thene		-	Ϋ́Z	٧X	٧X	S.Z.	ž
Archine		01	NA	NA VA	ζ.	SZ	ź
15-1 2-1)tablems there		0.5	NA	Ϋ́	Ϋ́	SZ	Ϋ́
Mothet, in thiorage		-	Ŋ	٧X	۷Z	×Z	Ž.
Techharach no		_	NA	ΝA	Ϋ́	N.	N.
Vend history		2	Ϋ́	٧Z	ΥZ	SN	SN

PREPARED/DATE JAH 5/28/03
CHECKED/DATE JAY 5/28/03

TABLE D-2

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02 LOWER WATER BEARING UNIT Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Cneter Richmond Richmond, Virginia

			Sample	Sample PWETA.2	Duplicate PWFTA-2	Sample PWFTA-2	Sample PWFTA-2
A.	Sample III Sample Date	Keporting (a) Limit	10/1/2003	4/4/2002	4/4/2002	Jul 2002	Oct 2002
F arrest regime							
Volatile Organic Compounds - NW846 8200B HOLD		-	7	₹	7	SZ	SX
1, Techherestiane			7 -	. 4	×	S. Z.	SN
1 Dichlorox thans			, ,		2.6	SZ	ź
I-Dichloreethen.			- :		5. 100	2	SN
2-Dichlorobenzene		-	_	680)		ž
4 Dichlorobenzene		-	021 10	/10); «I p	2 2	2
2-Butanone		9	0IV	(1) (1) (1) (1)	(10 C).	£ 2	Z Z
2-lt xanone		01	<10.01	<10 UJ	507	2 2	32
Alline		91	کار / 5 م	¥ 5 7	¥ _	2 2	Ž
Bנחת חני			⊽ -	⊽ ¬	₹ ₹	SN	SZ
Chlorobenzene			⊽ '	J (7	ž	2
(hlorexubane		~1	3 .	7 7	7	2	SZ.
(hlorotorm		- '	⊽ ;	, ר	7 ?	. v	SZ
Chloremathane		2	<2 UI.	7:	7:	5 2	2
cts 1.2 Dichlorox thene		\$0	5.	÷.	# - ·		ž
Methylene chloride			7	⊽]	,	2	Z
Naphthalene			787	() 70 C	CF 98.0	Z	SX
ր-Լուրքությերնում		-	Of 70	Or own	200	2	32
ן רוניזי ploise then		_	04 10	025 10	95 v.	£ 2	Ž
Toluene		_	03. JQ	0.24.50	Or 70	* 5	S N
reme 1.2 Deblors, thene		5.0	0 16 JQ	<0>	0(6)0	ź	S
Ter. bloom the co.			5.4	63	99	ź	£!
Vinyl chloride		CI	041 JQ	0 44 10	041 JQ	ž	S Z
Volatife Organic Compounds - SW846 826/lB, UNPRES µu/I	RES ug/L		;	į	ž	ž	ž
1 f-Dychlorocthanc		-	ς Ζ	₹Z.	Y.		9
1. Dr. block then:		-	V.	NA	Y.	ź	ź
A. Isan		10	N A	Š	V.	SN	ž
Attitude 19 De Monte Ch. m.		50	VV	ĄZ.	٧X	Š	Š
Maintenance historia		-	VN	٧Z	٧×	NS	Š
To bloombin		-	Ϋ́	NA	Ϋ́Α	NS	SN
		C	ΝΑ	NA	VV	S.V.	ž

_ =

Furnated based on QC data
Furnated, posselly based high or tales
positive based on blank contamination
Furnated posselly hased high based upon QC data
Furnated posselly hased high based upon QC data
Furnated, value is between reporting from
and detection from 폭독 꽃

Not Analyzed Not Sampled

Unusable

X 8 ≥ 3 5

Reporting limits prevented are the best that can be achieved under Undereach, Reported Delection Limit is impresse Undereach, Dala brased fow Reported Dereation Limit is higher than indicated

normal operation procedure, with the method-required sample volume extracted and analyzed. Sample reporting hints may vary due to sample volume/sample weight extracted and/or sample dilutions

TABLE D-3

SUMMARY OF CONSTITUENTS DEFECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
FRACT URED BEDROCK
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

			Sample	Sample	Sample	Duplicate	Sample	Duplicate
	Sample ID	Reporting	MWF1A-20	MWFTA-20	MWFTA-20	MWFTA-20	MWFTA-20	MWFTA-20
	Sample Date	I mat	10/2/2001	4/1/2002	7/30/2002	7130120812	10/1 //24/02	100100
FIFLD PARANIF FER <u>Drsabyd Ovygen - E360 I ng/L</u> Drsabyd Oxygen		0	Ça Err	11	% **	₩ 90	3.5	3.6
<u>Ferrous Iron - A35001) ng/L</u> Lerous Irut		ā	-	- 65	- 8	40 J	7	भ
Oxidation Reduction Po <u>tential - A2580A mV</u> Oxidation Reduction Potential	A m.V	1	*	491	%t-	×	71	<u>\$1</u>
pH . F150 1 pH Units pH		ı	104	10.64	8.77	8.77	941	941
Specifi <u>c Conductance - F120 1 ms/cm</u> Specific Conductance		0 (0)	0 157	0 147	9510	0.156	0.215	0.215
Temperature - E. 170 I, deg. C. Temperature		0	7.71	951	23.2	23.2	<u>æ</u>	<u>%</u>
furbidity - E180 1 NTU		-	শ	⊽	æ	ý	9	10
FINED BASE LABORATORY ANALYSIS Anors - MCAWW 300 HA mg/L C blends Sulfate	SIS		к. д. Av эх	6. 4 2. 2	4 JEI 4 S	37 JB 45	3.7	ж д ж м
Dresided Gares - RSA SOP-175 mg/L c arbon doxide 1 thane 1 thane Nethane		0 (83) 0 (82) 0 (83) 0 (83)	0.089 JB <0.002 0.0054 0.013	0.32 JB 0.00032 JQ 0.0093 0.023	<0.17 <0.002 0.003 0.0088	<0.17 <0.002 0.0032 0.0098	0.12 JB <0.002 0.03 0.027	0.13.1B <0.002 0.011 0.031
<u>Hydrogen by Microsceps - AVI20GAN nM</u> Hydrogen	집	0.03	19	×	ч	22	2.7	2 8
<u>pH FPA 150 1 սունs</u> pH (եզսով)			96	₹ 7.	K Z	V.	N A	Υ Z
Total Alkalimity - MCAWW 310 1 mg/L Fotal Alkalimity	- 1	ď	27	89	- ×	6L	74	74
Total Organic Carbon - SW846 9060 mg/L Fotal Organic Carbon	m/L	-	⊽	QL 7.0	⊽	⊽	⊽	⊽
Total Sulfide - MCAWW 376 1 mg/L. Total Sulfide		-	⊽	⊽	Ot 760	⊽		Of Fo

TABLE D-3

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWA FER - OCT 01, APR 02, JUL 02, AND OCT 02
FRACTURED BEDROCK
Armual Groundwater Report - October 2002
Operable Unut 7
Defense Supply Center Richmond

KKCI	66
enter	N.
uppi) C	phonda
ense S	ž
=	

Mircury - SW846 7470A (Dissolved) pg/L. Not Delicted Mercury - SW846 7470A (Total) pg/L.	Sample Date Linut 121	MWFTA-20 10/2/2001	MWFTA-20 4772002	MWFFA-20 7/30/2002	MWFTA-20 7/30/2002	NIWFTA-20 10/17/2002	MWFTA-20 10/17/2002
Not Defected Mercury - SW 846 7470A (Total) µp/L		7	;	7	7	~	⊽
Mercury - 5W846 7470A (Total) pg/L		v	5	,	;	;	:
איז ואנורונים		~	Ω t>	⊽	⊽	⊽	⊽
Metals · SW846 ontols (Dissolved) ng/L	•		3,7	110067	908	<280 113	<200 UJ
Aluminum	7		, (S	5	\$ '\	\$	\$
Anlunony	•	Of 22 Of 2	749 30	0f 1 99	Of 8 29	OF 2 89	OL F 7-30
Daliumii Lubarena	•		0 35 JB		\$	\$	\$
	×		14600	00101	12400	149(X)	14300
na.			Or 951	285 J	DI ES1	Of 861	OT 1 76
Mancham	<i>y</i>	•	ዕ ሃ 08L 1	()569	2690	4780 1Q	4640 10
Nungalack			564	L 271	132 J	9.7 ¢	L 16
Palasaum	¥.		8210	6410	0989	7040	0289
Scalum) ,		11700	0066	10200	00501	10100
nunbuny			o\$>	\$\$ \$	O\$>	Or 69 0	0 ; >
Metals - SW846 601008 (Total) ug/L							
Alimenin		301 JB	<200	JY 9 JQ	<20X) UI	<200 UI	<20K) UJ
747			\$	\$	\$	2.2 JB	\$
Street Street			OL 67	Of 89	77 S JQ	OF 859	68.2 JQ
min jr.)	₹	, NO 1710X	15100	1 00911	17900-1	14200	15100
live			Of 061	299 J	144 JQ	281	259
Margarina	7		4520 JQ	£ 0019	2900 JQ	4540 JQ	4400 JQ
o di sai N			7.1.7	152 J	658 J	- 96 - 96	816
Distriction of the control of the co	7		8370	0299	8060	0£89	7180
Collina	¥		11700	10200	11500	10200	10400
V. o. dom			0\$>	(\frac{1}{2})	<50	₹	05>
/ 111.		20 <20	02>	<20	20.8	<20	<20
Thallium - SM 846 7841 (Bissalved) pg/L. Net Delected		2	<2 UI	<2 UJ	<2 UJ	<2 UI	<2 UJ
Thallium - SW 846 7841 (Fotal) µg/L Thallium		73	<2 UI	<2 UJ	c2 UJ	<2 UJ	<2 UJ

TABLE D-3

SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER - OCT 01, APR 02, JUL 02, AND OCT 02
FRACTURED BFPROCK
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

(II stancy	P. Brooring		Sample MW FTA-20	Sample MWFTA-20	Sanple MWF1A-20	Duplicate MWFTA-20	Sample MWFTA-20	MWFTA-20
Sample Date:			10/2/2001	4772002	7/30/20112	7/30/2002	10/17/2002	10/17/24/02
Volume Organic Compounds - SW 846 8260B ug/L	,							
1.1 Te. blyce thing		_	\$	OL 170	ζ.	٤٤>	₹	*
I bush said in		_	30	5	61	61	~	91
I DE MONTO MARIE		_	66	19	=	٠6	7.5	9.2
i Dichaka arene		. –	0.76 JB	<33	\$	<13	₹	\$
nastatalli 1		. 5	130	<u>- 0</u>	150	130	92	90
CIN 1 Zepzichiamickinche Marchalana a blassak			۷.	<33	3.3 JB	ðr ::	\$.	\$
Metally least called the		-	OF FI	433	\$	۲۴>	₹	\$
scalable		· <u>~</u>	<25	r*	<25	<17	\$	7
allysis 2-17th individuent		-	1.	20	7.4	×5	× 7	
incinoration Viavi chlorade		ری -	84 10	- 2	S6 JQ	9.2	12	13
Non 3-10d VII doxed storms) on 3 100							
Matthe Organic Companios - 3 n 640 64000, Civ	A DE LA PERE	-	Ą	V.	20	N.	13	Ϋ́
I-Dichasse, and a			2	Ϋ́ X	=	NA	99	NA
1 1-DJC MARK TROM			e Z	¥.	091	Ϋ́	87	Y.
ensel zel Mentourk memer Mensel London bilanda		_	Z	V.	3.2 JB	NA	4>	Y.
To the contract		_	NA.	Ϋ́	7.1	NA	42	Y.
TOTALITY OF THE STATE OF THE ST		- 6	Y.	N A	S 6 JQ	NA VA	11	NA

	Fsiimated,	f sumated
Note	_	<u>=</u>

Fsimaled, based on QC data Fsimaled possibly brased high or labse positive based on blank contamination

Fairmated, possibly based high based upon QC data Fairmated, possibly based high based upon QC data Fairmated Value is between reporting limit and detection limit. Not Analysed. Univable

≒ ≕ ≌

≨∡35

Undelected, Reported Delection Limit is impractise Undefected Data biased low - Reported December multis higher than indicated

Reporting timus presented are the best that can be achieved under normal operating procedures with the inclined required sample volume extenced and analyzed. Sample reporting timus may vary due to sample volume/sample weight extracted and/or sample ditherens.

PREPARED/DATE JAH 5-28-03
CHECKED/DATE JAV 5/28/03

TAB

Appendix E

APPENDIX E
SUMMARY OF QUALIFIED DATA FOR THE
OCTOBER 2001 THROUGH OCTOBER 2002 SAMPLING EVENTS

TABLE E-1
SUMMARY OF QUALIFIED DATA
UPPFR WATER BEARING UNIT
September(Ot tober 2001
Annual Groundwater Report - October 2002
Operable (hit 7
Defense Supply Center Returnend
Returnend, Vergleia

			,	}.	1	1	-q3	Commo	Theolicofo	Samule	Samule
	Sample 1D Sample Date	Reporting Limit (a)	AEH 10	AEHADG 10 10/5/2001	AEHADG-30 10/5/2001	DVIW-13A 10/5/2001	DVIW 22A 10/5/2001	DMW-25A 10/5/2001	DNIW-25A 10/5/2001	DMW-26A 10/4/2001	DMW-27A 10/5/2001
FIETD PARAMETER Divoled Objects - Fed J nm/J Divoled Colorer					6	. 0	≙ -	9	1	- -	9
Prinsulve vez gen Perrons Iron - A \$500D, mg/L Lurvas, from			10	9.	36	23	1.7	- 9 	- e	3.8	2 2
Oxidation Reduction Potential - A2580A mA Oxidation Reduction Patential				82	*	SHIF	гL	169	160	<u> </u>	æ
<u>pH-⊁ 150 i pil Units</u> pil				5.57	5.57	3.9	505	٠ 5	\$ 16	195	4.15
Specific Conductures - E120 1 mS/cm Specific Conductures		0	100.0	0 278	0.278	0 162	0.43	0.103	£01 0	0.822	0.089
Temperature - E170 I deg C Fempetatur			<u>.</u>	20 4	20.4	219	164	<u>∞</u>	×	23.5	22 5
Turbulity - F180 1 \ 11U			-	26	56	-	₹	∞	×	⊽	2
FIVED BASE LABORATORY ANALYSIS America - MC VW.W. 300 As mg/L. Chloride Nitrae Sull ac				75.2 <0.1 20.1	73 8 <0 3 20 4	20.8	86.9 1.5.1	11.7 <0.1 74	12.9 <0.1 7.1	258 <0.1	17.1 2.2 - 2.2
Divolyed Gases - RSA, SOP , 175 mg/l (arban davida I than I the in		****	0.001	94 J <0.002 0.005 0.023	100 J <0.002 0.1049 0.023	110 J <0.002 <0.001 0.0013 JB	73. J <0.002 <0.001 0.22	130 J <0.002 <0.001 0.013	140-3 <0.002 <0.002 0.012	170 J <0.002 <0.001 5.4	240 J 0.00038 0.0031 3.7
Dysolved Hydrogen by Microsceps AM20GA nML Pydrogen		_	0.03	× 3	Ξ	91	5 ∕8	\$ 6	× 7	_ xc	11
Jotal Alkalinity - MC AWM 310 J mg/L Jotal Alkalinity			٠.	91	71	٧.	\$	13	22	ä	3 JB
Total Organic Carbon - SM846 9060 mg/L. Lotal Organic Carbon			-	# -	8f -	0 6 JB	۳	08.50	86 38	71	압
Jotal Sulfide - MCAWW 376 J mg/L Lotal Sulfide			_	191	7	⊽	12.1	₹	7	Ξ	

TABLE E.1
SUMMARY OF QUALIFIED DATA
UPPF R WATER BFARING UNIT
September/Grober 2001
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

		!	Sample		1	Sample	Sample	Duplicate	Sample	Sample
	Sample II) Sample Date	Reporting Lamii (a)	AEHADG-10 10/5/2001	-10 AEHADG-10 31 10/5/2001		DMW-22A 10/5/2001	DMW-25A 10/5/2001	DVIW-25A 10/5/2001	DMW-26A 10/4/2001	DNIW-27A 10/5/2001
Mercury SM 846 7470A (Dissolved) 112/L. Marury			~	v	⊽	۲	⊽	⊽	⊽	⊽
<u>Μεταιιτ · 5/N 846 7470 Α (Total) με/L.</u> Μεταιη			-	⊽	⊽	⊽	⊽	7	⊽	⊽
Metals - SW846 6010B (Dissolved) ug/l				į	-	17/6	Ş	582	01 221	131
Munimum			366	(2 <u>2</u> 0)	<u>}</u> v	\$200 \$2) v	Š	, .C	; ₹
Antimony			;	63.7	. ₹	19.7	\$	* >	٧	٧.
APATIK			201 112 1Q	-	Or soli	93.8 JQ	71 9 JQ	55.1 JQ	66.2 JQ	112 JQ
B. r. Hun					97 11	01>	<10 <	0 .	# P	96 JB
(Admiss				=	0.88 JB	\$	7	0.15 JB	8f 77 0	27 17
(skium		•			Of 0112	14700	Of 0162	24.61.00) (1) (2) (3))
Հ հւտուստ			20 <10	0T>	975	9 5	2,10	01V	? ?	? ?
Cobuit) 17.	2 =	210	===	2 2	===
(oblac			200 27200		3680	5130	210	J. 27.1	13600	3110
lron .					9	· 5	7	۶	۵	5
l cad		•	,-	7500	Of 0152	11900	2330 JQ	Of 0181	2190 JQ	JS70 JQ
Mulgin Stum					195	185	490	9	91	16.7 JQ
March Person					<40	<40	<40	<40	O + >	<40
Zi. L.			7	_	29 JQ	<100	38 10	12 10	× 100	× 100
Polassium		r	5000 6410		ÒF 096₹	8910	4440 JQ	Of Ober	3, 1,	3440 JQ
Enical					ъ	٠ ٥٠	: ت	φ:	^د ۲	0 =
Silver					9	91×	01>	91>	OIV	4640 10
Sudium		vr.	5000 15000		0.59 197	12/00	184	900	2 1 18	2 18
Vanadium			£ 5	₹ ₹	5 P	200×	25.0	12 8 JB	<202 <20	- AS
/184					.	27)		į	ļ
Metals - SW 846 6010B (Total) µ2/L					ć	Š	01.512	900	3	325
Alumman			٧		(5 1	907	₹ ₹	ž v	<u> </u>	3 %
Anthrony			5 ×5	Çā	۲ ٥	Ç	; ;) t	7 70	7 %
Arknik			-		9 51	. <u>:</u>	3 - 85	55.7 JO	62.2 JO	00 801
Hurn.			*	2 = -	2 =	2017	200	OI V	017	al 69 0
Benyllium				_	er	4	7	₹	0 1 JB	4
יייייי (ייייייי		•	OFTS IND		2290 1Q	15300	2560 JQ	2460 JQ	440Xi JQ	614 JQ
(humina)					ē	<10	<10	(F)	0	25
Coball					57 JQ	.∶	Or 21	OT 6 11) (}	37 E
Lupper			9 × 9	3 √2			77.) cit	010	2000
livin			100 mm		136U	5,7	Į 7	: 5	- Fan-	; 5
רים					2200 10	12300	Or OSSI	Of 0181	2050 JO	Of 0151
Magnesium			20 1080	0101	7 2002	192	467	455	107	. Of 1-91
Mark mit were			F> 9		II+>	0 1 >	O+>	<40	₹	<40
New York			, at	4	28 JQ	O(1)	ÇL F	28 10	< EX)	<100
Selection		•			Of oton	9(KA)	4130 3Q	4040 JQ	\$210	Of oitt
Schalam			۸ ۸		ζ.	۵,	Ÿ	\$	∵ √	\$
Silver					0Iv	₽,	=	⊕ ;	al V	al .
Hadium					6620	13400	(V)(V)	16210	(4×100)	Of 0.14
Vandrum			95	B - 16 JB	₹:	18 18	Q -	000	er - 7	SF 77
/inc					1	<20	N7>	117>	07 V	(F)
Thullium : \$W846 7841 (Dissolved) ug/L					,	9	ς	ς	31 3	
Thalliam			2 21 113	7 >	24 JB	מו גו	7	;	900	H 7 7
Thathum - 5W846 7841 (Total) ug/L			-	?	6	7 I II	?	\$	2.18	٧
Challium					,	:	;	:	!	!

TABILE F-1
SUMMARY OF QUALIFIED DATA
UPPER WATER BEARING UNIT
September(Actober 2001
Annual Groundwater Report October 2002
Operable Unit 7
Defence Supply Center Richmond
Ruthmond, Virginia

			Sample	Duph, ate	Sample	Sample	Sample	Duplicate	Sample DAYN 264	Sample
	Sample ID Sample Date	Keporting Limit (a)	AEHADG-10 10/5/2001	10/5/2001	10/5/2001	10/5/2001	10/5/2001	10/5/2001	10/4/2001	10/5/2001
Volatile Organic Compounds - SW846 8260B ug/l			- CT ,	7	7	7	7	7	٧	7
1 1 2-10 Una Brasia, Brand				1301	7 ⊽	; ₹	7	₹	\$	- ▼
1 1 2 Turning Culture			1 <420 UJ	<42u UJ	. I		(I) I>	m •>	{u }>	41 UJ
1.1.2. Tachletox than			1 <420	<420	⊽	~	⊽	⊽	۵,	⊽
1 1-Dichback than			Or vs	کر د ھ	⊽	Ot 7.0	⊽	⊽	ζ	₹
1 1 Սերեհորդ միլու			1100	1100	⊽	066 30	₹	⊽	∵ '	⊽.
1.1 Dachloroprop. nc			1 < 120	<420	⊽	⊽	⊽	₹	ζ.	⊽ .
123 Techloropenan			<430	47A	⊽	₹	⊽	⊽ :	ς:	. :
123 Inchluspropur			I <420 UJ	<420 UJ	- n	r ∩	3 ▼	•	Ω\$>	n .
124 Theblorokanan			- <430	<420	₹	⊽	⊽ .	⊽ '	ζ,	⊽ ′
154 Franchylkazane			(77)	<470	⊽ '	⊽ '	₹,	⊽ '	Ç f	⊽ গ
1.2 Diboano 3 chloroprop an			2 <810	⊕ ;	7 -	♥ 7	7 7	77	2 4	J 7
1.2 Dibrome, than			0 7 50	0245	⊽ -	-	⊽ 7	₹ ₹	۲۵	₹ ₹
2 Dichlorobenzene			Or ne	2 :	⊽ 7	Or 79 0	7	₹ ₹	٥ ۲	, †
1.2 Dichlero, than			F 55	3 S	⊽ 7	₹ ₹	7	, ,	۲ ر	; 7
2-19chloroprop.nc			25.	045	⊽ √	V 7	7	7 7) t	7 7
ייי ביי ייי ייי ייי ייי ייי ייי ייי ייי			130	7750	7 7	; 7	; 7	; 7	∵ "	: 5
4-12)chloruthanzahan			135	7	7 7	7	; 7	⊽	7	₹
1 S Dreateropropant			7450	270	, T	7 7	; ⊽	7 7	9 9	⊽
1 4-12 Calculation of the			<420	<420	; 7	; ⊽	; ⊽	⊽	ď	v
2 Z-124 month opport			10 <4200	<4200) V	~10	01>	ol>	O\$>	61 ×
2 Characala ta			1 <420	C#30	7	⊽	⊽	⊽	۵	⊽
2 Fx x 487.0-			10 <4200 U.L.	<4200 UI	-10 UI	<10 U.L.	<10 UI	10 01×	<50 UI	<10 UI
4 Chlomoduck			1 <420	<4 20	7	⊽	⊽	<u>_</u>	٥	7
4 Methyl 2 pentanone			10 <4200	<4200	9F>	<10	91>	610	Q\$\ \	~1 0
Actome			10 <4200	<4200	۷I0	<10 	0 >	0I v	O\$>	0.85 JB
Влист			1 <420	<420	⊽	⊽	⊽	⊽ '	ς.	⊽ '
Bromolythene			1 <420	<420	⊽ '	⊽ '	⊽ '	▼ .	۲, ۰	⊽ `
Bromer, Novome than			<420	C420	⊽ .	⊽ `	⊽ .	▼ .	0 '	₹ 7
Bromodichloromethane			27.7	1242	₹ ₹	V 1	7 7	₹ ₹	5 4	⊽ 7
Bromolorm			0745	0745	₹ 5	ا د	۶ ټ	7	5 =	۶ ۲
Bromonk than			7 430	() (Q)	∵ ₹	7	7	; t	} '	; 7
יייייייייייייייייייייייייייייייייייייי				Of Ori	7 ⊽	7 ⊽	7	7	. •0	, .
Cally as the fellowands			- F	1642	₹	V	⊽	∵	۵.	⊽
Characteria.			2 <830	(K30	7	\$	7	\$	01×	\$
(blocatom			at 0.61	14t) JB	0 36 JB	7	⊽	⊽	\$	⊽
(they was that			2 <830	€83	7	\$	42	? >	e!>	۲۶
cts 1.2 Drellbare, then			088 50	078	<0>	6.2	≫ ∞	∞ ∞	<25	5 (5)
civ 3-Dichlarappropers			1 <420	<420	⊽	⊽	⊽	⊽	٥	₹
Dibrosno, blorom than			1 <420	<420	٧	⊽	⊽	⊽	ζ,	₹
Dibramonethane			I <420	<420	Ÿ	⊽	7	⊽	٥	⊽
յր, հեշուժի <u>մ</u> յացությերու			2 <830	058>	7	~	<2	\$	91	Ç
וואון אינויון וויין ווייין וויין ווייין וויין וויין וויין וויין ווייין ווייין ווייין וויין ווייין ווייין ווייין ווייין ווייין ווייין ווייין ווייין וויייין וויייין ווייייייין וויייייייי			1 <420	<420	⊽	~	⊽	~	ς.	⊽
Huxa hlorobetadu m			1 <420	<420	7	⊽	7	⊽	۶	⊽
happapy the near			1 <420	<420	⊽	₹	⊽	⊽	ζ.	⊽
m-Aylene & p Aylene			1 <420	• <430	⊽	⊽	₹	⊽	٥	⊽
Methylcine chlonde			1 <420	<430	⊽	⊽	₹	v	* >	₹

TABLE E-1
SUMMARY OF QUAI INTED BATA
UPPER WATER BEARING UNIT
Septembar/Oktober 2001
Annual Groundwater Report - Oktober 2002
Operable Unit 7
Defense Supply Crater Richmond
Richmond, Virginaa

	Sumple ID	Reporting	Sample AEHADG-10	Duphente AEMADG-10	Sample DAIW-13A	Sample DAIN-22A	Sample DMM-25A	Duplicate DAIW-25A	Sample DMW-26A	Sample DNIW-27A
	Sample Date	Limit (a)	10/5/2001	10/5/2001	10/5/2001	10/5/2001	10/5/2001	10/5/2001	10/4/2001	10/5/2001
				100	7	7	7	7	۲	V
n Bury Dense De			<470	<420	Ū	,	;	,	;	; -
n Power In a series			C750	<420	⊽	₹	⊽	⊽	ζ.	<u>_</u>
n Happacanon			2	07.79	V	⊽	⊽	~	Ş	⊽
A iprinately.		_	E 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	<210	. 6	Ş }	\$ 05	₹	225	\$ ₹
1 ANG R.		•		<4.30	⊽	⊽	⊽	⊽	ъ	<u>~</u>
p evolutopy nemuse ne			(17)	<+121>	⊽	⊽	7	⊽	Ş	⊽
AL-BRISHDA DALIA			O.CT->	67F>	: ⊽	V	⊽	⊽	ς,	~
Nyn ii.				<420	; ,	⊽	₽	~	ζ.	₹
בים ואוואוואישרים			TRUEZ I	3308)	: 7	प	6	<u></u>	ς,	7
וווער שנטע אין ער ער				5	. ₩	. 🔽	~	~	۵,	V
tuletife.			11167	Ş	505	5 0>	\$ 1 5	\$ 05	<2.5	< 11.5
Hans-1 2 Oxenions arene				<420	⊽	₹	7	⊽	<u>۲</u>	⊽
Entry 1 y Demondration			(HX)(F)	KXITI	~	2	36	\$ 4	\$	⊽
The more than the			2830	0830	. ₹	7	?>	≎	<10	\$
Fire microsoft described in the			2 (830)	0K %>	7	0.32 JO	06 JQ	OF 90	<10	17
Ayk new (total)			4211	<420	⊽	⊽	₹	₹	٧.	₹
Surrogate					!	;	1	ŧ	9	š
1.2 Dichlary than 43.			35 1	£	64	Š	80	9.6	<i>f</i> 6	5
Description of the second of t			83	20	96	% %	\$8	98	æ	ş
4 Distillations of the Control of th			 16	56	5	ነ የ	74	\$	な	3
Particular designation of the control of the contro			n	35	501	<u>=</u>	101	101	102	105

TABLE E.1
SUMMARY OF QUALIFIED DATA
UPPER WATER BEARING UNIT
September 2001
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

	Sample ID	Reporting	Sample DMW-33A	Sample DMW-35A 10/5/2001	Sample MW FOS-1 10/9/2001	Sample MWFTA-1 10/4/2901	Sample NIW FTA-3 19/4/2001	Sample VIW FTA-5 10/8/2001	Sample MWFTA-7 10/1/2001	Sample MWFTA-23 10/9/2001
- Comment of the Comm	Sample Date						į			
FIFLD PARAVIETF R Dissolved Oxygen - EMO LingA. Dissolved Oxygen		10	4 4	₹	0	 ♥	9	₹	80	1 \$
<u>Perrons Iron - A 1500D mg/L.</u> I cnous Ion		0	3.5	-	٠٥	3.6	**	90	= ₹	97
Oudation Reduction Potential - A2580A mV Oxidation Reduction Potential			- 74	21	15	23	49	69	486	75
<u>p11 - £,150, 1 n41 Units</u> p1			506	5 22	119	659	H 9	5 48	4 08	467
Specific Conductance - F129 1 mS/cm Specific Conductance		E00 ()	11 (1235	0.073	0.145	1290	0 121	0 085	0.16	0 466
Temperature - E.170 1 deg C Temperature		5	11.0	61	21 5	961	19.4	651	18.7	20.1
Turbidity - F 180 1 NT? Lurbidity			71 1	51	⊽	-	6 4	12	=	107
FIAED BASE I ABORATORY ANALYSIS Amons - HCAN W 300 3A mg/L Chlonde Ngrae Vellae		5	1 453 01 <01 1 216	4 0 0 4 1 0 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	تا 60 1 وي	30.4 40.1 1.2	17.8 <0.1 5.3	4 5 6 6	10.2 0.71 29.2	801 1 0> QL 17 0
Dreathed Gases - RSA SOP-175 mg/L Carbon diverds i than I the ne Vi thans		19049 0 9091 1001 P	01 110 J F2 <0.002 01 <0.001 01 0.024	78. J <0.002 <0.001 0.0012 JB	22 J <0.002 <0.003 0.0038	510 J <0402 <0401 44	93.3 <0.002 <0.001 0.061	40. J <0.002 <0.001 0.0018	97 J <0.002 <0.001 0.00085 JB	290 J 0 00048 JQ 0 039 1 9
Desolved Hydrogen by Microscop, AM20GA nWL. Hydrogen		÷	1603 9.1	* 2,	30 30	9	7.4	7.8	×	<u>~</u>
Total Alkahmis - MCAWW Mg I mg/L Total Alk dinity			5 15	at or	51	284	21	77	16 JB	۲۲
Iotal Organic Carbon - SW846 9968 mg/L Total Organic Carbon			1 2 JB	⊽	06 JB	36	r	8L 7.0	-	48
Eural Sulfide - MC A W W 376 1 mg/L. Lot il Sulfack			1 28	=	⊽	⊽	⊽	63	~	2.3

TABLE E-1
SUMMARN OF QUALIFIED DATA
UPPP R WATER BEARING UNIT
September(October 2001
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

		į		Lounde	dames	Samme	Sample	Samole	Sample	Sample	Sample
	Sample 1D Sample Date:	Reporting Limit (a)	٠.	DVIW-33A 10/8/2001	DVIW-35A 10/5/2001	MW FOS-1 10/9/2001	MWFTA-1 10/4/2001	MW FTA-3 10/4/2001	MWF1A-5 10/8/2001	NIWETA-7 10/1/2001	MW FTA-23 10/9/2001
Mergury - 5,W 846 7470A (Dissolved) 112/L.			-	⊽	⊽	⊽	<1 UL	~	⊽	⊽	⊽
Menuts - SW 846 7470A (Total) ug/L			-	⊽	⊽	⊽	2	⊽	⊽	⊽	⊽
McKaly											
Metals - 5 W & 46 6011013 (Developed) µ2/L. Alaminam			200	<21()	<200	<200	ðr १९।	2 3	<2005	1340	OL XCI
Antimony			v	ç	ζ,	٠ ٧	ۍ د	, c	†O †	۶ ۲	ÇŞ
Areanc		•	vn ş	S S	٠ ا	3.0	784	⊋ ⊆ × ₹	305.10	62.7.30	582
Barum			3 =	57.76	2 2	2 2	O 87 JB	01.	0 57 JB	2.5.113	81.61
Br.p.llium C.almin			- 7	Q	\$	Ÿ	0.42 JB	٧	8	Q	د ک
C alcama		Ň	5000	125(X)	2800 JQ	1860X)	352(X)	252u JQ	3460 JQ	TK6s	58 20
Chromam			Ξ	<10	\$1×	۰۱۵ دار	012	9 ?	<u>=</u> ;	01>	0 V
Cubalt			⊋	-3I)	4}0	₽,	2.2 JB	₹ :	⊋ 3) ()	7 (1
Copper			2	₽ ;	9F> :	9F \$	012		01×	2018) NE 19
lrun			200	200	1310	î î	10501	<u> </u>	Š	7	~
			, (K)	9490	2240 30	0,000	52700	Of 0561	QT 0772	JZ 072F	8360
Magnestam		-	Ę	111	; 4	\$6.8	822	39.8	40	1 17	499
Manganek.			; ⊋	: ₹	: ₹ >	17.18	<40 <40	<40	<40	×40	<4I)
No. b. f.			E	×100	~100	<1001>	<100	<100	(X)	4 5 JB	Df 201
Principal		5	000	6200	4240 JQ	8220	10400	5120	7020 TO	21%1.70	6270
X lcmum			v	Ş	\$	٠	٠	÷ ۵	°≎ -	o f	c f
Silver			2	01>	10	Ð ;	012	010	91V	1430 101	OIV T
within		*	3 S	0102	718017	F 2 V	16 18	(X)	150) (S)	81. 91
Vanadrum			2 2	15.7 15	3 8	386.1	308	420	927	<20 <20	121
/inc			ŝ	X 7 (1	<u>;</u>	,	1 1 1				
Metals - 53836 6010B (Lotal) pe/L			5	300	ONIC/	2002	424 BH	478	<200	1360 J	959
Alumanusn			207	250	3 (,		Š	, v		\$
Antimony			n •) t	7 10) ' 0	42.5	18	Ÿ	\$	996
Arkine			200	82.4 IO	30.7.30	13.7.30	281	OL 8 65	25 9 JQ	DI 19	FUR
Butter			<u> </u>) E	0 >	000	212	, 01>	, 	2 5 JB	2 l JB
BCD/IBum (texum			rı	3	q	Ÿ	0.17 JB	\$	<2	\$	<2
marrier)		r	5(MM)	12900	3180 JQ	19800	34200	278U JQ	3650 JQ	5930	D(99
(homen			Ξ	-II	٩I٠	€.	1 17	2 ;	<u>0</u> ;	ə	01×
(opali			⊋.	₽ -	-9E>	₽ :	2 113	⊋ ? •	Ş -	ر د .) 171 170
Cupper			2 }	= £	057	202	4470	1840	100	2 Z	50.5
Ikan			717	160		· V	5	₽	*	\$	۶
וניקו		•	SIKO	0196	2490 JO	1170	51900	2190 JQ	QL 11782	OL UNSF	8564)
National Control of the Control of t			50	<u>8</u>	18.4 18.4	8 (9	5117	43.7	468	40.5	615
Mohkkann			7	-	<40	3.9 JB	₩	Q 0	O#>	₩ ₩	0+0
Nickel			36	<100	27 JQ	(IO)	901>	<100	V \ (K)	44 18	104 JQ
Potassium		41	5000	6250	OF 065+	8830	90 v	5720	Of olse	22.0 JQ	6570
չ և ուսա			•	~ :	ý i	v :	Ç î	ς ₹	Ç Ş	c 	ÇĘ
Marc			2	01.5	012 25 111 25	9575	010	2400	4310 4310	2500 10	(1) (N)
Sedium Sedium		,	SUC	65.) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1	0/0/	13,000	15 10	360	¥ 5	1 L
Vindium			2 2	37 5	7		1 1 1 C	<20	01 91	₹	152
/mr			3	7	3	20)	Y	Ì	!
Thailium - SN 846 7841 (Dissolved) ug/L. Thailium			7	4	\$	₽	2 JB	8 I 8	\$	\$	7
I have the second and the second seco											
Thallum - 533 646 7641 (1012) 201.			2	8	\$	۵	21 113	2 4 JB	8	\$	2 113

TABLE E-1
SUMMARY OF QUALIFIED DATA
UPPER W ATER BEARING UNIT
September/October 2001
Annual Grundwater Report - October 2002
Operable Unit 7
Uxferse Supply Center Richmond
Richmond, Virginia

Company Comp		Sample 1D	Reporting	DVIW-33A	Sumple DMW-35A	MW FOS-1	MWFTA-1	MWFTA-3	VIN FTA-5	MWFTA-7	MWFTA-21
1,3m		Sample Date	Limit (a)	16/8/2001	10/2/2001	1007/6/01	10/4/2001	1007/201	1007/0/01	10041101	
1,000 C C C C C C C C C	The title Chemicals Consequences - CW X46 X350H net										
150 150	1 1 t 2.T. ten bloom than			<100	⊽	⊽	٧	⊽	⊽	7	<5000
1	1 1 Tan blore, then			1 1200	⊽	⊽	ζ.	⊽	⊽	⊽	<5010
### 4	1 1 2 2 Tetrahlore, then			1 <1(X)	rn >	₹	^, ⊼	دا UJ	⊽ '	⊽ '	<50XX
450 1	1.1.2.1 m.fblome.thans			1 <100	⊽	⊽	⊽	⊽	<u>~</u>	⊽ '	- ARS
480	1.) Dichlore than			1 170	₹	⊽	٧	027 JQ	⊽	⊽.	()(X)(>
Company Comp	I,I Dechorachen			1 450 J	⊽ '	65 V	ζ'	ΟΥ × *	5. ⊽	⊽ 7	to force
Company	1.1 Deficerproper			- 490	▼ .	⊽ .	ζ,	ਹ -	▼ -	⊽ ₹	CAMA
Company	123 Trucklarobenzene			(<u>8)</u>	⊽ :	₹ .	۰ ۵	- <u>-</u>	₹ ₹	₹ ₹	CARACA CARACA
	1 2 3 T nchloropropan.			(8) V	B . ▼	⊽ '	ζ'		v	⊽ 7	(MAIL)
1	1.2.4-1 nchlorabingan			<u>10</u>	▼ .	₹ .	ζ,	₹	<u>.</u>	⊽ ₹	INNIC>
1	i 2 4-Trimuthy lbanance			1 4100	⊽ ¹	ত গ	0 =	⊽ গ	7 ⊽	; ç	VIIXHXII
	2 Ռոնոտոտ Դ-փկմութըություն			(A)(7)	v ·	7 7) v	7	; ₹	,	SOUND
1	1.2 Dibromsethan			2 S	₹ ₹	⊽ ₹	۶ ۲	₹ ₹	7 7	7 7	CH IK)E1
Company Comp	1.2 Dichladok nacha			2 g	₹ 7	J 7	7 5	7 7	; ;	7 7	-51Kil
Compared	1.2-Dichtsroothans			2017	₹ 7	₹ 7	۲ ۲	7	7 7	7	1005>
Company Comp	1,2-E) c hkyropropanc			0012	7	J 7	7 4	; 7	7 7	, ,	(KE)
Company Comp	1 3 5 Truncthylk n.c.n.			2012	⊽ ₹	₹ ₹	0 4	; 7	7 7	7 7	CKINIC
Compared	1 3 Dichlorobentene			(A)	⊽ 7	, T	Ç 4	; 7	7 7	7 7	(VIN)
10 Ching	1.3 Dichlumpropant			1812 ·	⊽ 7	J 7	۲ (; 7	7 7	7 7	-SOHO
10 C	1.4 Dichlordenen				⊽ 7	7	7 (7 7	7 ⊽	, .	<5000
1	2.2.Dachlotupfropatic			1000 v	; <u>q</u>	; =	₹	; 2	; =	01>	<50000
1	2-10 00 00 00 00 00 00 00 00 00 00 00 00 0				; ₩		۵:	⊽	⊽	7	<51KH1
1	t (Bratalollaciae				61012	: =	1005>	(In n)	0 >	< RU UI	<51000
	2-fft Aufholia.			2015	. ▼		٧	⊽	⊽	~	< SUXII
10	A Marine 19 and records			0001>	010	- FE	o\$>	01×	<u>≈</u> ∨	<10 UI	(X)(K)\$>
\(\langle \text{(100} \) \(\text{c} \) \(\)	4 Mentaga angkatananan Angkatanan			10 <1000	e oj v	ols.	10.05>	01×	01>	01×	Of cross
Club	20 m			001>	⊽	⊽	\$	⊽	~	~	<50HG
Colon Colo	Beanathorem			1 <100	⊽	⊽	۵	7	⊽	~	<\$0HO
Close	Brann, Blaven Ihan.			(K)]> 1	⊽	7	Ą	⊽	⊽	⊽	<50KK)
Compared to the control of the con	Bromodu bloromethan			JOI>	~	7	\$	⊽	⊽	⊽	<500X)
Compared by the compared by	Biomolorm			101>	⊽	₹	\$	₹	⊽	⊽	<5UX)
1	Вкупууты Сама			2 <2(N)	\$	0	<u>0</u> v	۵.	7	3	<11KH)()
C C	(ահոռ վոսքից,			1 < 100 R	⊽ .	æ . ∀	φ.	⊽.	¥ .	⊽ :	< 5000 K
Clint Clin	Curbes tutas blonde			i i	v	⊽ '	δ,	⊽ -	₹ .	⊽ -	DOI:
1 2,000	Chlarokinzak				⊽ '	⊽ :	Ç Ş	۶ ټ	₹ ₹	₹ ₹	SIXIO
1	(historic thank			יוובא י	7	7	2 (; ;	7	7	/Stein
16.5 29/30 17 44 42 42 12 44 43 44 44 44 44 44 44 44 44 44 44 44	(phorologia			30 C / C	77	7 5	- - -	; Ç	7	- 7	CIONA
	(Blockwith thath.		•		; :) ¥	· (; :	; =	; ; ;	(HXHXH)
	רנא ד ב ואורות ואני אינות וויי				: 7	, ,		! √	; ⊽	⊽	(XI)
	CAST 6 Dichlorophope at			317	7 7	7 ⊽	5 ℃	7 ⊽	; ⊽	, √	<50HO
	DISTRIBUTE DISTRIBUTE THE THE THE THE THE THE THE THE THE T			907	; 7	; 7	ξ,	; ,	. ₩		<500X)
	DENORMAN INSTANTANTANTANTANTANTANTANTANTANTANTANTANT			202	; %	7 😯	; ₹	; 7	; €	; ₹	<10000
	THE THE SECOND CONTRACTOR OF THE SECOND CONTRA			(8)	; ⊽	! ⊽	\$. ≏	! ⊽	. △	<54KK)
V V V V V V V V V V	I thyre, marine.			001>	∵⊽	₹	٧	⊽	⊽	7	<51KXI
	In Authoritation and in			801>	~	⊽	\$	7	v	⊽	<50XX
The second of th	twiped put in the second secon			5	⊽	⊽	∵\$	⊽	⊽	⊽	<50XH)
	al Ayrın & P-Ayrın			3 5	; √	; ⊽	34.18	⊽	⊽	· ~	<50KH)

SUMMARY OF QUALIFIED DATA
UPPER WATER BEARING UNIT
September/October 2001
Annual Groundwater Report - October 2002
Defense Supply Center Richmond
Rectumond, Virginia

	Sample ID	Keporting	Sample DASW-33A	Sumple DMM-35A	Sample NIWFOS-1	Sample NIWFTA-1	MW FTA-3	MWFTA-5	NWFTA-7	MWFTA-23
	Sample Date	Limit (a)	10/8/2001	10/2/5001	10/9/2001	10/4/2001	10/4/7001	10/9/2001	1007/1/01	200
			0.001	۲	⊽	¥.	V	⊽	⊽	<54000
n Butthenen				; 7	: 7	\$	⊽	⊽	⊽	<51XJG
ո Ռուրչ Մե ոչ, ու				; 7	: ¬	46	⊽	~	⊽	OKO\$>
Նորինի մէ ու		-	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	; `	÷ =	<2.5	<0.5	50>	طا ۶	<2500
o λንkm		2			ī	· V	V	⊽	7	<\$000
ր Խօրույի վախառ			35	7 7	7	₩.	⊽	⊽	⊽	<5(K)()
we Butylbenzer				7 7	; 7	. ₹	⊽	7	⊽	()(K)\$>
Nyan.			257	7 7	; 7	: '5	⊽	⊽	⊽	<5000
եր-Butylbeneau			7137	7 3	; ⊽	7	. ~-	⊽	~	<5000
Tetrachlankthene			101	: 7	; ↓		⊽	⊽	⊽	< S(X)()
Fostur IR.		,	(10)	- S	505	<2.5	0 22 JO	₹ 9	\$ D>	<25(K)
than 1.2 Dublors, the ne		•	2 2	,	÷ -	. ζ	7	⊽	⊽	(XXXX)
trans-13 Dichkaropropene			3500	; ~	, ,	٧.	34 34	⊽	⊽	<51K)()
frichlister, them.			(a)(2)	, (3	9	7	₹5	<2 UJ	<1(XXX)
<u> ը</u> գրիջույլայությունու			33.10	V	7	01×	OY 95 0	₹	Ç	\$400 JQ
Vinyl chlaride Ayk nes (tot il)			201>	- ▼	⊽	۲,	~	⊽	⊽	<\$!XX!
Surrogale			¥	ş	86	3	\$	35	гń	<u>.</u>
2-Dichkora (hanc-d4			2	· 56	98	98	98	87	88	87
4 Βευποίλυντολ, πλ. π.			2 %	3	6	94	3	42	76	۴ų
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i sumated based on QC data Lsumated, possibly brased high or labs, positive based on blank contamination Noice _ =

I stim tied possibly based high besed upon (K data I stim tied possibly based low based upon (K data Latin tied Value is between reporting limit and detection limit.

Not Amalyed.

Unusable.

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2×35 ₃

Undereited Reported Delection Firm is impressed Undereited, Dala blaced how Reported Delection Firms in the act

Reporting limits presented are the best that car be achieved under normal opstating procedures with the method required sample evoluting context and analyzed. Sample reporting limits may way due to sumple evolutic/weight extracted and analyzed. Sample reporting limits may way due to sumple solutions.

PRI PARI D/DATI KMB 6/14/1/3

1ABLE 1-2

SUMMARY OF QUALIFIED DATA - SFPTFMBFROCTOBER 2001
1 OWER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit
Befeixe Supply (conter Relimond
Richmond, Virginia

	Kict	Kichmond, Virginia					
	Sumple 1D	Reporting	Sample DAIW-29B	Sample VIWFTA-14	Sample MW FTA-16 10A/2081	Sample MW FTA-17 10/2/2001	Sample MWFTA-18 10/2/2001
	Sample Date	The same	10000				
FIFTD PARANETER <u>Divented Oaden - F. 860 1 mg/L.</u> Divented Oagen		0	7	Ξ	3.4	٢	70
Perrous from - A 3500D me/fi Ismous from		10	-	₹	ę	₹	-
Oxidation Reduction Potential A2580A m.). Oxidation Reduction Potential		ı	ž	압	-165	50	-%6
<u>pii - F 150 1 pii Umis</u> pii		1	5.24	9 82	11 13	<u>د</u> ا	68 9
Specific Candyclance - F120.1 mS/m Specific Candactines		1000	900	0.439	16.7	1.75	0.125
<u>[emperatore - F.170 deg.C.</u> Lemperaton		10	151	15.6	21.5	961	<u>×</u>
Turbidits - F.180 1 NTU luthidity		-	13	4	46	e	ō
FINED BANE I ABORATORY ANALYSIS Amores MCANYW 1993A fire/I Caboral Natar		- 10 -	و 1 م	16 S 40 I 29 6	76 <01 74	59 401 72	18 co 1 094 1Q
Dysoulved Gases - RSK SOP-175 mm/L. Carbon dunnel. I than: I the ne. Methans		0 000	45 J <0.002 <0.001 0.0014 JB	01110 2000> 20000 00009	40 17 UJ 9 0015 JQ 0 011 0 022	40.171 40.002 41.001 0.073	71.J 0001.JQ 0005 0.28
Orsain ed Hydrugen by Marrogens AM20GA nM/A. Hydrogen		600	2.7	7.2	26	5	% %
pH F PA <u>150 i unis</u> pH (lquul)			89	16	æ =	11.7	1.1
Total Alkalonty - MCAW W 310 Lmg/L, Lotal Alkalonty		v n	24	150	480	270	99
Total Organic Carbon - NW846 9960 mg/L Local Organic C. arbon		_	8f \$0	2 JB	2 JB	2	2
Total Sulfide - MCAWW 376 I mg/L Iotal Sulfide		-	1.5	⊽	5-	⊽	⊽

TABIF F-2

SUMMARY OF QUAITERD DATA - SFPTEMBFROCTOBER 2001
1 OWER WATER BEARING UNIT
ABBID GROUND ARE REPORT - Oxfober 2002
Operable Unit 7
Defense Supply Center Rethorned
Richmord, Arguna

	RRE	Richmood, Virginia			ļ		
	Sample 10	Reporting Limit (a)	Sumple DNIW-29B IU/10/2001	Sample MW FTA-14 10/9/2003	Sample MWFTA-16 10/9/2001	Sample NIW FTA-17 19/2/2001	Sample MW FTA-18 10/2/2001
Mercury - SW 846 7470A (Dissolved) and		_	₹	⊽	. ₹	⊽	⊽
Mergury - SM 846 7470A (Todal) 42/L Mergury		-	⊽	7	⊽	⊽	7
Metals - 538 \$46 60 [UB] (Descolved) pg/l						:	9
Alummum		200	c300	~300 ,	<200	95	E 62
Anamony		v	৩ খ	८९	०५	۷ ک	} %
Arken. Present		500	314.10	35 JQ) [2	Of 951	Of 160
D. A. T. Marin		21	PI V	<10	915	01>	<10
C idmusti		C 4	ç	\$	₹	Ç	V
(ak man		5000	5190	5390	IOSXXX)	00061	()); }(i
(brequium		2 ;	07:	2,	15 38	₽ ₹	2 5
Cobalt		<u> </u>	9 9	€ 5	₹	9 9	9.5
Copper		2002	215	S 200	2007) (20 (20 (20 (20 (20 (20 (20 (20 (20 (20	2012
ן וואן רייין			7	\$	7	٧	۲,
Material		5000	70H0 10	5150	125 JQ	<5000	0559
Manganes		R	72.9	2.7 JB	2 JB	1.2 JB	£01
Molybdenum		O T	0 1 0	7 5 JB	0.5	(†)	050
NKKI		20.0	88	(X) V	0012	26900	50 V
Portsonem		ow.	<u>}</u> '(SAMEAU SAMEAU	S S	S S	\$
A.C. Gibin		0) 0	01>	VIO	c10	0I>
(Adjusts		2000	4500 10	52200	59300	11500	0.0297
Vanaduum		\$0	•	0\$) 	16 18	O(9	0\$°
/mr		0.	J 70.	Ð	_ × 0.	.	Ş
Vi(tak - 5W846 6010B (Total) µ2/1.							
Abusumun		300	<200	566	70.4 JQ	5250	257 JB
Απίπωη		\$	' የ	φ.	ζ,	۲,	۲,
Arkink		\$	\$	۲ کو	į ۶	٠ <u> </u>	٥ ١
Вышп		200	36.2 JQ) 8 1¢	8 7 Y)) (a p.
Be is thum		2,	מר זיים	300	? ?	3	₹ 7
Cadmann		2005	51.0	x670	900111	11900	0796
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liva		200	2080	506	<200	900 900 900	2910
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Mangura		8, 9	(F	St 261	9.00	} ₹	: ?
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Silver		91		01×	0 >	9	~I0
Sodum		8000		25900	58500	0.01	7490
Vanadium		90		12 13	16 JB	5.2 JQ	<50
/mr		20		23.4	3487	ð	<20
Thailium - SW846 7841 (Dissolved) uv. (Ladlum)		2	2	4	2.2 J	Э	₽
Thallium - SW846 7841 (Total) us/l		2	å	4	8	8	\$
i nallillari		,	!	!			

TABIFF-2

SUMMARY OF QUALIFIED DATA - SEPTEMBEROCTOBER 2001
1 OWER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit
Before Supply Center Rehmond
Rechmond, Virgina

			Homes	Sample	Samole	Sample	Sample
	Sample ID	Reporting Limit (a)	DAIW-29B	MWFTA-14 10/9/2001	MWFTA-16 10/9/2001	MWFTA-17 10/2/2601	N1WFTA-18 10/2/2001
Volate Oreans Compands - SW846 8260B and							
1112 lenachberchark		_ ,	⊽.	⊽≒	95° 5	⊽ ₹	⊽ √
1.1Irachanathana			⊽₹	⊽₹	3 5	7 ⊽	7 ₹
1] 2 2 Petraghian (han) 1 3 12 Established		• =	; ₹	; ⊽	8	. △	⊽
Z J.K. HIGOLOGICA		_	⊽	⊽	SS <	v	⊽
Da bloweth or		_	n ⊳	in 1>	<\$0 U	⊽ '	⊽ ′
1 1-13 k histoprope re		-	⊽	⊽ '	9	⊽.	⊽ -
123 Inchlorobensum		_	⊽ `	⊽.	₹ 8	⊽⁻	⊽ ¬
1.2.3. Erchloropropana,		-	⊽ 7	ত দ	₹ ₹	⊽ 7	⊽₹
1.2.4-Likhiorahanan		_	₹ 7	7	3 8	7 7	7 7
1.2.4. Immethylbonions			7 ∵	ς γ	3 8	7	7
1.2 Dibrumo-1-chkmpropuse		•	7 5	7	₹	! ⊽	, ≏
1.2 Dibromethane		-	; ⊽	7	Or 69	- ⊽	⊽
1. Z-EVGBOOTBEN DZ DR.		. –	⊽	⊽	, 8	⊽	⊽
1.2 De histopropin		_	7	⊽	Q.Q.	⊽	₹
1 3.5. Imparibility notes.		_	⊽	7	\$	⊽	⊽
1 3 Dy Horotk actal		_	⊽	⊽	Ş9	⊽	⊽ '
] 3-Dulhoropropur		_	⊽	⊽	3	▼ .	⊽ .
4-Մյլենտի ոչեր		_	⊽	⊽ '	0\$) ;	⊽ .	⊽ -
2 2-10u bloreprepun.		- ;		⊽ 9	€ 8	⊽ ₹	⊽ ₹
2 Butanone		0.		Q -	9	2 ₹	€ 7
2-Chkristolyucus		7.		7 5	3 5	1 01	
2-8 kxamon.) -		9-	3 8		Ş -
4 (hkrokilik &		- 02) OV	2005	10 OF>	10.01>
4 NUMBER OF THE STREET		01		01>	OF 95	OF 29	Of 90
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Bronne, like our than			⊽	⊽	Ş	⊽	▼ .
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Віцпююття			⊽ '	⊽'	0 V	⊽'	⊽ 5
Bromonethane			7:	₹ 5	001>	7	7 7
Carbon disuffick			^ .	¥ 7	¥ 500	7	7 ₹
Curbon tetrachlande			⊽ ₹	7	} {	7 ⊽	, √
(Noroby nythe		- •	7 %	7	20.5	: 3	: ♥
C Blorak inam.			; ⊽	! ⊽	95	' ₹	7
(blocombine			\$	a	<100	∪ <>	2 UI
CIN 2 DK hlusto, Dk. B.		0.5		ş	1200	÷	2.5
cas-13 Dahloroproprin			⊽	⊽ .	Ç √	▼ .	<u>.</u>
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1 thythence			7 7	7 7	, ?	7 ₹	; 7
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n Propyibenzenc			⊽ .	, c	9	⊽ (₹ ₹
Naphthalanc		- *		~ *) (7 7 7	₹
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P-Isophop totals in			7	7	-\$5 -\$5	⊽	⊽
Number of the second se			∵	₹	9€	₹	⊽
t.tBut lb.n.cnc			⊽	₹	<\$0 \$	⊽	⊽

SUMMARN OF QUAI HHED DATA - SFPTEMBER/OCTOBER 2001 1 OWER WATER BEARING UNIT Annual Groundwater Report - October 2002 Operable Unit 7 Beferse Supply Cinter Relimond

	KICH	Kichmond, virgina					
	Sample 1D Sample Date	Reporting Limit (a)	Sample DN1W-29B 10/10/2001	Sample MWFTA-14 10/9/2061	Sample MWFTA-16 10/9/2001	Sample MWFTA-17 10/2/2001	Sample MWFTA-18 10/2/2001
l str. Lise suff.		- !	012.10	⊽	0 0 0 0	⊽	⊽
Lett & Hotteethene		_	034 JO	047 JQ	95	01.10	O 63 JQ
remain 1.3 De blueselle se		0.5	\$9	<0.5	25	\$	\$ (P
their 1 to the filter control in		_	₹	⊽	O\$>	⊽	⊽
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Ayknes (total)		-	~	⊽	\$	v	⊽
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1 2-13s blynnathing d4		1	3	68	₹	3	ž
4 Propelliansk as n		•	\$8	××	87	8 8	68
District district the party of		:	3	ጜ	2	3.	ላን
Total at the		:	Ľά	95	75	8	9

TABLE F-2

SUMMARY OF QUALIFIED DATA - SEPTEMBEROCTOBER 2001
1 OWER WATER BEARING UNIT
Annual Grundwater Report - Oktober 2002
Operable Unit
Defense Supply Center Rehmond
Rechmend, Virginia

	Rich	Richmond, Virginia					
	Sample ID	Reporting	Sample MWFTA-19	Sample MW FTA-28B	Z	Sample PWFTA-2	Duphaste PWFTA-2
	Sample Date	l mrt (4)	10/2/2001	10/8/2001	10/1/2001	10/1/2001	10/1/2001
FIFED PARAVIETER Discorbed Oxigen F 560 Ling/L Discolved Oxygen		0 1	63	90	0.4	7.2	2.7
Ferrous Iron - A 3500D mg/L Lerrate Iron		0.10	ŧ	9	-	₹	-
Oxidation Reduction Potential - <u>\(\frac{1280\text{S}}{1}\) in the Reduction Potential</u>			ń	121	<u></u>	9⊱-	æ
211 - F150 1 2H 21 2015		1	16 01	10.1	011	:6 :-	10 11
Specific Conductance - P 120 1 mS/cm Specific Conductance		10 (X) (1	6(9) 0	0 43	دا ب	66 ()	66 0
Tenigerature - F17 <u>0 1 deg C.</u> Lanparatur		0.1	16.5	94	169	15.2	15.2
Turbidis - F180 1 NTU Luthaliy		-	8	51	39	7	7
FIAED RAYE I ABORATORY ANALYSIS Amons - MCAWW 300 3A mg/l Chórnk Natae Sulfae		- 0 - 1	6 40 1 6 2	58 6 40 1 14	<u>2</u> & <u>2</u>	86 58 58	86 -(5) -26
Dryadyed Gases - RNA SOP-175 mg/L. Curbon doxyle I than. I than. Methan.		0.002 0.002 0.003 0.003	40 17 J 40 002 45 001 0 0034	12 J <0.002 <0.003 0.0021	0 11 0≥ 0 000000 0 000000000000000000000	40 17 UJ 40 002 0 002 0 16	014 JB <0.002 0.0022 0.17
Droubed Bydrigen by Mariocepy AM206A nVII Hydrogen		0.03	Ξ	ž	52	9	
<u>pii PPA 150,1 unds</u> pii (hqual)			601	6.8	<u>=</u>	113	Š
Total Alkalinty - MCAWW 310 1 mg/l. Fotal Alkalinty		v	01	99	440 J	94	120
Trial Organi, Carbon - 538846 9980 mg/f. Lotal Organs, Carbon		_	⊽	22	v-	⊽	⊽
Total Suffide - MCAMW 376 1 mg/L Load Suffide		-	⊽	-	61 61	1.2	~

TABLE F-2

SUMMARY OF QUAITIFED DATA - SEPTEMBEROCTOBER 2001

1 OWER WATER BEARING UNIT

Annual Groundwater Report - Oxfoder 2002

Operable Unit

Peferse Supply Center Retimond

Retimonal - Retimonal

	Ruh	Ru, hmond, Virgina				i	
	Sample 10	Reporting Limit (a)	Sample MW FTA-19 10/2/2001	Sample NIWFTA-28B 16/8/2001	Sample Sample MWFTA-28B MWFTA-29B 108/2001 10/1/2001	Sample PW FTA-2 10/1/2001	Duplicate PWFTA-2 10/1/2001
Mercury - 538 Blo 7470A (Dissolved) Barnary Mercury		_	₹	⊽	⊽	7	⊽
<u> Merury - 5M 846 7470A (Total) 112/1.</u> Merusy		-	⊽	⊽	~	⊽	⊽
Metab - 5M 846 6010B (Dresdyed) 49/L.		í		Ş	9	0000	0661
Aluminum		O()7	629	ŝ (<u> </u>	3 4	į v
Antanony		r, vr	ንህ	9 10	, v) *C	\$
Arkak Barun		300	55.2 30	DL F 27	682	OF 654	457 JQ
Beryllaun		01	0I >	9,	01.6 JB	610 5	€ ९
(Altumin		2	0.1.10	22400		2,00°	57.50
רוומואף)		3		9 01	8f 6	01×	01>
Chroneum C.b.ia		2 29		<30	0£>	99	Ot.>
Copper		10		o1>	4 3 JB	¢10	95
fron		300		425	5 00	SS 7	857
וארץ!		3		Ş.	19 S	9 S	500
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Minguis		Ş		0 + >	81 16	o 4 0	×40
DELI T		100		<100 <100	5.8 JB	00I>	23.10
Polavium		2000		27900	91200	\$100 \$	365(0
Schnam		n S	0 ₹	० ह	⊽₹	9	7 🕏
Salven		COOS		42300	72400	12300	12600
Sodium		20		80), IF	2 JB	23 JB
Vinadiaisi		25		47.2	<20	9	62 0
Metals - SW846 6010B (Total) pg/		200		279	HC 0961	f 0061	1280 J
Aluminum		•	٧	Ø	۵	۵	ΰ
Anathony		\$		Ø	Ø	ŋ	\$
Burum		200	545 JQ	Of 1 68	250	71.5 JQ	Of 8 54
Աւդհատ		01		≘ ·	ar 660	ξ,	€ γ
Cadminin		7 500		36500	1000	24600	, 2
Caltum		9		910	- G	OF>	95
C brommin		90		8	2.2 JB	OL>) [\$
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		200		3130	H 0791	<200	<200
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Mang utc.x		5 7	9	: ₹	01.67	2 1 →) ,
Melybdenum		90		100	97.10	6. 18	26 JB
Parsons		5000		25800	00168	37.400	47000
V. british		•		Ŋ	\$	۵,	۵,
Ziher		5		<10	<10	c10	0 V
Sodum		9009		41700	007.57	12400	129(X)
Varudum		₽ ?	2.2.18	9f 11	54. K.	00°	23 JB
/mr		2		7.	2	}	Ì
Thallum - 5 W 346 7841 (Dissofted) u.g/l		2	Ø	7	<2 UI.	٢	♡
Box (level) 1535 313 813							
Thalbun		<u>(, , , , , , , , , , , , , , , , , , , </u>	\$	ឋ	ID &	∜	7

TABIL 1-2

SUMMARY OF QUALIFIED DATA - SFFTEMBER/OCTOBER 2001

Annual Grounds ster Report - October 2002

Operable Unit 7

Defense Supply Center Returned

Richmood, Virgina

Sample ID	Keporting	Sample MW FTA-19 M	Sample	Sample Sample MIWFTA-28B MWFTA-29B	Sample PWFIA-2	PWFTA-2
	(a) I'm'l	1002/2/01	10/8/2001	1 10/1/2001 1	10/1/2001	10/1/2001

Volatile Organu, Compounds - NW 8-46 8260B gg/l	-	⊽	~	⊽	⊽	⊽
THE CALL CONTROL OF THE CALL CALL CALL CALL CALL CALL CALL CAL	-	~	⊽	⊽	⊽	⊽
[] [- Jrg high, fluth, 1 - Jrg high, shows that high high high high high high high hig	-	: 7	⊽	₹	⊽	₹
1 2 Cylisk Bottle Lister	_	⊽	٧	⊽	⊽	7
The highest think	-	⊽	⊽	⊽	7	-
[]-[]- Khanash ku	-	7	√1 CI	₹		CI -
i I Duftkorajrop.uz	-	₹		⊽ .	⊽ ₹	⊽ 7
12.3 Inchiable with	-	₹ .	⊽ -	5 7	⊽ 7	7
2 3-freahtaropiopane		7 7	7	⊽ ₹	7 7	7 7
24 Transkingkingera		7 7	; T	, T	, .	₹
1.2.4-Trunk thy the not ne	- ‹	, c	7 0	; ∜	: 🗸	4
1.2 Dibronio 3 chlaropapase	·4 -	; 7) T	; √	; ⊽	• ⊽
1.2 Dehrenmertham		7 7	7 7	, T	· <u>~</u>	5
2 Dehasok ne n		7 7	7 7	⊽	: ⊽	⊽
1 2-Duchlorestham		7 7	; √	; 🔻	: ⊽	⊽
1.2 Duchlurepropadu		, T	; 7	⊽	₹	⊽
1.35-Unmuthytheazeak		7 7	; च	₹	⊽	⊽
3 Dg hkgrub, nzen.		7	₹	∵⊽	⊽	⊽
L, 3. Dx hickoping and the control of the control o	-	; 7	: 7	~	021 JO	02 JQ
1 4-1 3k Historiak district		; 7	; ⊽	₹	, ⊽	▼
2 2-13k hloropi upank	- =	; 0	2 JO	Of 81	۷I0	<t0< td=""></t0<>
1 Butthow.	? -	: ⊽	[⊽	, ⊽	⊽	⊽
2 Compression Recognition	91	<10 UI	۷I۰	17.31	<10 UL	<10 UI
A Marie Land Company of the Company	-	⊽	⊽	~	⊽	⊽
4 Mathyl-2 is in and a	10	10 OI>	01>	<10 UI	<10 UI	<10 UI
Action	2	O1810	73 JB	<u>~</u>	27 JQ	28. E
BANCIR	-	₹	⊽ '	OF 220	⊽ `	⊽ :
Brumah מזכוה	_	⊽.	⊽ .	⊽⁻	₹ ₹	⊽ 7
Bromer Blorente thate	-	⊽.	⊽ `	₹ .	⊽ 7	₹ ₹
Branada hlorona than		⊽ ?	₹ 7	⊽ ₹	₹ 7	⊽ ₹
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Brownmethans	7 -	7	÷ ¢) T	, .	/ ⊽
Curken disullid.		7 7	; ⊽	₹	₹	₹
ל עלטט נילובא הוסלאו. מינו - 12		₹	⊽	⊽	⊽	⊽
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CHICK-CHAIN.	-	⊽	0 28 JB	⊽	⊽	⊽
(thatwhich in	7		Ą	1 5 JI	<2 UI	o ur.
(3-12 Dichlorathm	0.5	9	\$	Ş.	۲.	٠.
cn-1.1 Diction project.		⊽ ¹	⊽ '	₹ 5	⊽ ₹	⊽ 7
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1 Meronion I bark		7 7	۶ ۍ	; °	7 🕏	7 7
Dr. Horodaftuoromethame	, –	, 1) -	; ⊽	; ⊽	' ⊽
LIBYTON BACING	_	⊽	⊽	~	⊽	⊽
FILE CACHIOLOGO CACACACACACACACACACACACACACACACACACACA	-	7	⊽	⊽	⊽	⊽
11-12-12-12-12-12-12-12-12-12-12-12-12-1	-	₹	₹	⊽	₹	⊽
Nichykus a jezykus Nichykus akersk	-	044 10	0 52 JB	⊽	⊽	₹
n Bulyharan	~	⊽	⊽	⊽ '	⊽ '	⊽ .
ם-ואטשאואימיניה	-	7	₹ ;	⊽ ;	⊽ ;	7 9
Naphishikete	- ;	₩	07.4 0.7	ر 2×0 0×2	7 ; ₹ 6 7 ; ₹	7 7 7
o-A)km	s -	Ç -	ê 7	Ş 7	0.50	021.50
p-Isopropy Roluenc		7 7	7 ⊽	; ⊽	; -	7 ⊽
פאר-נותו) ושיווער הא		; ⊽	⊽	₹₩	₹	⊽
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ונת ושוויות המוכנים הפ		;	:			

TABLE F-2

SUMMARY OF QUALIFIED DATA - SEPTEMBEROCTOBER 2001
1 OWER WATER BEARING UNIT
Amual Groundwater Report - October 2002
Operable Unit
Perfect Supply Center Rehmond
Rehmond, Vergetta

	Sample ID	Reporting	Sample MWFTA-19	Sample AIMFTA-28B	_	Sample PWFTA-2	Duplicate PWFTA-2
	Sample Date	(F) Jimir	10/2/2001	10/2/2001	1007/1001	1007//01	100177101
		_	01 92 0	⊽	⊽	04 10	Of 10
I CHIAN HPP OF GARINE		-	07 10	0.84 JQ	Of 560	O31 JQ	0.28 JQ
TOTAL TO The Manual to the		10	÷	\$02°	ş	O 16 JQ	OLXIO
Harry I a 17 March 18618		-	⊽	⊽	~	⊽	⊽
that we have the state of the s		_	01 #10	⊽	⊽	7.	5.5
THE DIGHT OF THE RE		. (1	7 m	V	E C	<2 UI	<2 UJ
THE HEAD INCIDENT AND A SECOND ASSESSMENT OF THE SECOND ASSESSMENT		2	Ų	γ	\$	041 10	Of 1Q
Xjkre (hkal)		-	₹	⊽	⊽	⊽	⊽
Surrogate				;	;	3	Ş
1.7 De februaritate all		1	5	5		÷	,
d Brondhington at		•	87	×	5	68	⁸ 7
District of the second of the		•	ç	7.6	3	76	Š
J ZIRJUHAN KIDI KAKA INGAK.		:	96	š	7.6	<u> </u>	ş

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possite, bead on blank containmation of
sumated, possibly bused high based upon QC data
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Unocket and Reported Detection I min is imprecise
Unocket the Jata based low - Re ported
I Nacetion I min is higher than individed 1 대

≒=2 2≥55

Reporting limits presented are the best that can be achieved under normal operating precedures with the neclinel-required sample volume extracted and analysed. Sample reporting limits may vary doe to sample solume Assergible extracted and/are sample, obtainous.

PREPARED/DATE RMB 6/04/03

SUMMARY OF QUALIFIED DATA - SEPTEMBER/OCTOBER 2001 FRACTURED BEDROCK Annual Groundwater Report - October 2002 Operable Unit 7

Defense Supply Center Richmond Richmond, Virginia

Richmo	nd, Virginia		
	Sample ID Sample Date	Reporting Linut (a)	Sample MWFTA-20 10/2/2001
FIELD PARAMETER			•
Dissolved Oxygen - E360,1 mg/L Dissolved Oxygen		0 1	3 2
Ferrous Iron - A.3500D mg/L Ferrous Iron		01	<01
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		•	-48
pti - E150.1 pH Units pti			10 4
Specific Conductance - E120,1 mS/cm			
Specuic Conductance Temperature - E170,1 deg C		0 001	0 157
Temperature Furbidity - E180.1 NTU		0 1	17 7
Furnidity - Elevis 1910 Furnidity		1	4
FIXED BASE LABORATORY ANALYSIS Anions - MCAWW 300,3A mc/L			
Phloride		1	3.5
Itrate ulfate		0 1 1	<0 l 4 8
Dissolved Gases - RSK SOP-175 mg/L			
Carbon dioxide		0 001	0 089 JB
thane		0 002	<0 002
thene fethane		0 001	0.0054
		0 001	0 013
issolved Hydrogen by Microseeps AM20GA nM/L ydrogen		0 03	6 1
<u>II FPA 150.1 units</u> H (liquid)			96
otal Alkalinity - MCAWW 319.1 mg/L otal Alkalinity		5	72
otal Organic Carbon - SW846 9060 mg/L		1	<1
otal Sulfide - MCAWW 376.1 mg/L		•	``
otal Sulfide		1	<1
tercury - SW846 7470A (Dissolved) HE/L			
fercury (T. a.)		1	<1
lercury - SW846 7470A (Total).ug/L tercury		1	<1
tetals - SW846 6010B (Dissolved) ug/L.		200	<200
питопу		5	2.8 JQ
rsenic		5	<5
arium eryllium		200 10	72 JQ
nywani ndmium		2	<10 <2
aksum		5000	16800
oromium		10	<10
opak Opak		30 10	<30 <10
oli Adher		200	<200
ad		3	<3
agnesium		5000	2210 JQ
anganese olybdenum		20 10	25.9 <40
ickel		100	<100
d Issum		Sono	10360
kanum ver		5 10	<5 <10
		5000	11600
schum un alium na		5000 50 20	11600 1.2. JB ~20

SUMMARY OF QUALIFIED DATA - SEPTEMBER/OCTOBER 2001 FRACTURED BEDROCK Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

	Sample ID Sample Date	Reporting Limit (a)	Sample MWFTA-20 10/2/2001
Metals - SW846 6010B (Total) ug/L			
Aluminum		200	301 JB
Апштолу		5	<5
Arsenic		5	<5
Barium		200	79 5 JQ
Beryllium		10	<10
Cadmium		2	<2
Calcium		5000	17100
Chromium		10	<10
Cobali		30	<30
Copper		10	<10
Iron		200	520
Lead		3	હ
Magnesium		5000	4950 JQ
Manganese		20	139
Molybdenum		40	<40
Nickel		100	<100
Potassium		5000	9980
Selenium		5	্ত
Silver		10	<10
Sodium		5000	11400
Vanadium		50	1 2 JB
vanadium Zinc		20	<20
auto		20	~20
Thallium - SW846 7841 (Dissolved) ug/L			
Challium		2	<2
<u> Ihallium - SW846 7841 (Total) ue/L</u>			
Thalkum		2	<2
Volatile Organic Compounds - SW846 8260B ug/L			_
1,1,1,2-Tetrachloroethane		1	<5
1 1 1-Trichloroethane		1	<5
1,1 2,2-Tetrachloroethane		1	<5
1.2-Trichloroethane		1	ধ
1-Dichloroethane		1	20
1,1-Dichloroethene		1	93
1-Dichloropropene		1	<5
1,2,3-Trichlorobenzene		1	<5
2 3-Trichloropropane		1	<5
2 4-Trichlorobenzene		1	ರ
1,2,4 Trimethylbenzene		1	<5
1,2 Dibromo 3 chloropropane		2	<10
,2 Dibromoethanc		1	<5
2 Dichlorobenzene		1	<5
1 2-Dx hloroethane		1	<5
1 2-10chloropropane		1	<5
1,3,5-Trumethylbenzene		ι	<5
1,3-Dichlorobenzene		l	<5
3 Dichloropropane		l	< 5
4-Dichlorobenzene		I	<5
2-Dichloropropane		1	<5
2 Butanone		10	<50
2 Chlorotoluene		l	<5
Hexanone		10	<50 UL
Chlorotoluene		1	<1
1-Methyl 2-pentanone		10	<50 UI
		10	<50
Aceione		1	<5
		1	<5
Benzene		i	<5
Benzene Bromobenzene			•
Accione Benzene Bromochloromethane Bromochloromethane Bromochl bloromethane		· i	<5
Benzene Bromobenzene Bromochloromethane Bromodichloromethane		1	<5 <5
Benzene Bromothorzene Bromothoromethane Bromotorm Bromotorm		1 1	<5
Benzene Bromobenzene Bromode, hloromethane Bromode, hloromethane Bromorn-thane		1 1 2	<5 <10
Benzene Bromo benzene Bromo de hloromethane Bromo do m Bromo mundane Bromo methane Cathon disultide		1 1 2	<5 <10 <5
Benzene Bromobenzene Bromodichloromethane Bromodolm Bromomethane Carbon disulfide Carbon tetrachloride		1 1 2 1	<5 <10 <5 <5
Benzene Bromo benzene Bromo de hloromethane Bromo do m Bromo mundane Bromo methane Cathon disultide		1 1 2	<5 <10 <5

SUMMARY OF QUALIFIED DATA - SEPTEMBER/OCTOBER 2001 FRACTURED BEDROCK

Annual Groundwater Report - October 2002 Operable Unit 7 **Defense Supply Center Richmond** Richmond, Virginia

	Sample ID Sample Date	Reporting Limit (a)	Sample MWFTA-20 10/2/2001
Chloromethane		2	<10 UL
cis-1,2-Dichloroethene		0.5	150
cis-1,3-Dichloropropene]	্ব
Dibromochloromethane		1	<5
Dibromomethane		1	<5
Dichlorodifluoromethane		2	<10
Ethylbenzene		1	ব
Hexachlorobutadiene		1	<5
Isopropylbenzene		1	<5
m Xylene & p-Xylene		1	<5
Methylene chloride		1	ব
n Butylbenzene		l	ර
n-Propylbenzene		l l	∢
Naphthalene		1	<5
o-Xylene		0.5	<2 5
p Isopropyltoluene		1	<5
sec-Butylbenzene		1	<5
Styrene		1	<5
tert-Butylbenzene		ì	⋖
Tetrachloroethene		1	<5
Toluene		1	I 1 JQ
trans-1 2-Dichloroethene		0.5	<2.5
trans-1,3-Dichloropropene		1	ৰ
Trichloroethene		1	7.4
Trichlorofluoromethane		2	<10 UJ
Vinyl chloride		2	8 4 JQ
Xylenes (total)		1	<5
Surrogate.			
1,2-Dichloroethane-d4			93
4-Bromofluorobenzene		-	89
Dibromofluoromethane			94
Toluene-d8			98

Notes.

- Estimated, based on QC data
- лв Estumated, possibly biased high or false positive based on blank contamination
- Estimated, possibly biased high based upon QC data Ж
- Estimated possibly biased low based upon QC data Estimated, Value is between reporting limit and detection limit
- JQ
- NΑ Not Analyzed
- Unusable R UJ Undetected, Reported Detection Limit is imprecise.
- Undetected, Data biased low Reported
 - Detection Limit is higher than indicated
- Reporting limits presented are the best that can be achieved under normal operating procedures with the method-required sample volume extracted and analyzed. Sample reporting limits may vary due to sample volume/weight extracted and/or sample dilutions.

PREPARLD/DATE RMB 6/04/03 CHECKED/DATI. IAH 6/05/03

TABLE E-4

SUMMARY OF QUALIFIED DATA - APRIL 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Rehmond
Rethmond, Virginia

	Sample ID Sample Date	Reporting Limit (a)	Sample AE11ADG-10 4/5/2002	Duplicate AEHADG-10 4/5/2002	Sample DNIW-13A 4772802	Sumple DMW-22A 4712002	Sample DMW-25A 4/5/2002	Sample DMW-26A 4/5/2002	Sample DNIW-27A 4/4/2002	Sample DMW-33A 4/8/2002
FIF LD PARAVIETER Drooked Ovigen - EMO 1 mg/L Drooked Ovigen		ŭ	-	13	2	2.2	۴	6	<u>*</u>	Ξ
Ferrons Iron - A 1500D mg/L Lerrons Iron		J	01 62	6.2	26	0.4	9.	32	2	-
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential				4	•135	98	172	691	186	74
pH - F150 1 pH Units pH			95 -	56	4 02	\$4	5.6	471	4 26	5.2
Sixefit (andixlayee - F120 ! mS/cm Specific (andixlayee		100.0	01 0 1 11	U 144	0 144	0 267	0 185	0.827	0.088	0116
Temps rat <u>ure - F170 1 de<u>u C.</u> Lemps ratura</u>			01 127	12.7	162	104	651	991	16.2	8 61
1 urhidin - E180 1.N.1U Lurhidity			en -	ĸ	⊽	⊽	91	11	Ð.	٤
FIVED BASE LABORATORY ANALYSIS Vilons - MCAWW 300 34 mgl., Chlanda. Natada.			0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(20 <0.1 18 6	213 1-1 23-5	63 1 0 54 14 6	9 9 9	210 0 29 53 3	20.4 <0.1 2.5	5 0 0 0 4 E 0 4 E 0 0 0 0 0 0 0 0 0 0 0 0
Drygh of Garss - RNK SOP-175 mg/l (urban diovad. 1 th ar. 1 th, ac. Meth ar.		3 5 5 5	0.001 92 0.002 <0.002 0.401 (1.9063 0.001 0.035	86 <0.002 0.0354 0.03	40.002 <0.002 <0.001 0.002	39 <0.002 <0.001 0.01	68 <0.002 <0.003 0.0059 JQ	120 <0.002 <0.001 1.8	90 <0 (02 <0 (0) 3 6	71 <0.002 <0.001 0.15
Decoled Helmer by Merusers AM20GAX nM		0	003 14	- 1	13	96 ()	~	_	2	77.0
Ford Alkalinty - MC AWW 3101 mg/L Total Alkalinty			H El 3	H ::	\$	31	÷	\$	2.1.13	81 01
Total Organic Carbon - SW846 9960 mg/L Lotal Organic Carbon			Ot 80 1	-	Õr 90	м	4	7	æ	ы
Total Sulfide - MCAWW 376.1 mg/L. Total Sulfide			7	⊽	⊽	⊽	⊽	⊽	₹	⊽

SUMMARY OF QUALIFIED DATA - APRIL 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Rethmond

				Opera Defense Suppl Richmo	Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia	P					
	Sample ID-	Reporting	\ *	Sample AEHADG-10	Duplicate AEHADG-10	Sample DMM-13A	Sample DMW-22A	Sample DVIW-25A 4/5/2002	Sample DNIW-26A 4/5/2002	Sample DMW-27A 4/4/2002	Sample DN1W-33A 4/8/2002
Mercary - 5W 846 7479.4 (Dissolved) <u>up/1.</u>	Sample Date			7007164				,	, ,	7	Ell
McRuty			-	⊽	⊽	<u>5</u>	3 V	₹	,	7	}
Mercury SW 846 7470A (Total).ug/I			_	~	⊽	ra 1>	. I UJ	0.094.1Q	7	⊽	<1 UJ
Metals - SW846 6010B (Dissolved) ug/L		•	i	01.15	<u>u</u>	1361	<2(8)	<200 UJ	81 6 68	X62	(KDC)
Aluminum		•	907	27 - 12 77 - 12	ar (%	5	Ş	\$	\$	٧.	ς,
Antimony			. پ	2 62	30.2	\$	\$	۲.	\$	\$	\$
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lan			E G	33,00	33500	3090	፰ ፕ	9027	7890		۳.
1 cad		ū	£ (2007)	7 €	÷ =	2460 TO	8740	3010 10	3800 JC	Or osoz	Of 056£
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Nekt			3	S5.3 JQ	Of 135	×100	49 10	901>	68 JB	24.10	(1)
[hatanam		ν.	OK)	4610 JQ	462U KQ	Of 0861	- K) (4)	5 (A	}	\$ \$
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Alkan			ç	27.8	27.9	Ş .	4 8 JQ	S :	Ç	Ç 3	17.7
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Burlium			≘ ^	, Ç	<u>.</u>	6F 6F 0	0.37 JB	V	Q	4 2	ç
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/IR			2	49.7 3	915	474	DY 641	14 y JQ	256	0Z>	77 tı
Thallium 5W846 7841 (Dissolved) ug/L Thallium			7	<2 Ui	<2 UI.	<2 UI	<2 UI.	<2 UI	IU \$>	<2 UI	<2 UI
Thatlann - SM 846 7841 (Total) ug/L.								,		:	;
Thulium			7	U C	2.01	<2 UI	√2 UI	√2 UI	<2 UL,	<2 UI	43 NI

TABI E E-4

SUNYMARY OF QUALIFITD DATA - APRIL 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit T
Defines Supply Center Rulmond
Richmond, Virguila

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Sample ID	Reporting	AF	-	Duplicate AEHADG-10	Sample DMW-13A	DAIW-22A	Sample DMW-25A	DMW-26A	DMW-27A	DMW-33A
Sample Date	Lunst (a)		4/5/2002	4/5/2002	47/2002	477/2002	4/5/2002	7007/5/4	7007/4/4	
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TABIEE-4

SUMMARY OF QUALIFIED DATA - APRIL 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Returnond, Virgina

Annaly Date Limit 1		Sample [1)	Reporting	Sample AFHADG-10	7	DMW-13A	DMW-22A	DMW-25A	DVIW-26A	DAIW-27A	DM1W-13A 4/8/2002
Color Colo		Sample Date	Limit (a)	4/5/2002	4/5/2002	477,2002	4/1/2007	7007/6/14	40071614		
Style Styl				081>	4130	⊽	⊽	⊽	⊽	⊽	<20
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1	1.1. Transcongression			Of 12	(330)	ī,	⊽	⊽	7	⊽	70
CATO	1.3 De blocommon			1 <330	<330	⊽	⊽	⊽	~	⊽	620
Carting Action Cart	1 3 December of the party of th			0ft>	-330 -330	⊽	⊽	<u>~</u>	₹	⊽	42.10
CATO	1 + Digital Color inc			(% t>	<330	⊽	⊽	₹	⊽	⊽	<20
Comparison Com	2.2-Ordensorapropara			U 00055 01	<3300 R	<10 R	< t0 R	<10 UJ	<10.01	<10 UI	<200 UI
1 CANDIN	2 Bullanone			130	330	⊽	~	⊽	⊽	-	5 0
Color Color	2 M. v. march			10 ×3300 UJ	<3300 K	<10 R	<10.1	<10 UI	<10 UJ	TO OF	<200 UJ
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SUNIMARY OF QUALIFIED DATA - APRIL 2002 UPPER WATER BEARING UNIT Annual Groundwater Report - October 2002 Operable Unit?

Defense Supply Center Rechmond

			Defense Supp Richm	efense Supply Center Richmond Richmond, Virginia	2					
	Sample 1D Sample Date	Reporting Limit (a)	Sample AEHADG-10 4/5/2002	Duple ate AEHADG-10 4/5/2002	Sample DNIW-13A 4/7/2802	Sample DMN-22A 47/2002	Sample DMN-25A 4/5/2002	Sample DVIW-26A 4/5/2002	Sample DNIW-27A 4/4/2002	Sample DNIW-33A 4/8/2002
Nurrogate - 7 1.2 Dichloroxti in, 44 4. Biomaldiaroby, a.v., Dicharoquesi dian, Foliu, d.X.	į		75 76 76 120 99	98 88 HII	99 94 100	97 94 101 100	125 76 117 92	126 76 116 91	103 74 100 93	127 87 118

SUMMARY OF QUALLHED DATA - APRIL 2002
UPPER WATER BEARING UNIT
Annual Grundwater Report - October 2002
Operable Unit 7
Defense Supply Center Refunond
Richmond, Virginia TABLE E-4

	Sample ID Sample Date	Reporting Limit (a)	Sample DVIW-35A 4/5/2002	Sample NIW FOS-1 4/5/2002	Sample MW FTA-1 4/4/2002	Sample VIW FTA-3 4/4/2002	Duplicate MW FTA-3 4/4/2002	Sample MW FTA-5 478/2002	Sample MWFTA-7 4/7/2002	Sample MWFT A-23 4/5/2002
FILLO PARAMFTER Dissolved Oxygen <u>F.560 I mg/I</u> Dissolved Oxygen		5	6 1	7	-2	6.7	4.7	\$ 0	3.7	>
Ferrous from A A Squit mg/l. Letters from		-	- -	0.4	26	9	=	4	₹	T.
Oxidation Reduction Potential - A2580A m3 Oxidation Reduction Potential			298	<u>.</u>	Ŕ	96-	ş	<u> </u>	×1.7	1.1
pH - F15t1 , pH Umts pH			. 51	81.9	5.81	95	9.5	٤١٤	* "	۴۲۶
Specific Conductance - F120 1 mS/cm		0000	1 0.074	0 147	1) 686	194	t68 0	0 1165	160 !!	0.152
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<u>Turbidus - F180 1 N7 ti</u> Turbiduy			▽	V	30	<u> </u>	Z	J.	⊽	Γ.
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Dissolved Hydrogen by Microsceps AM20GAX nM		100	\$1	13	=	11	7	860	95	5 -
Total Madmus - MCAWW 310 1 mg/L Total Madmuy			16 8	111 61	0.25	H 51	Hf 91	H 05	3 6 JB	23
Futal Organic Carbon - SW846 9060 mg/L Total Organic Carbon			▽	ðr 9a	11	9	2	04 10	~	æ
Total Suffide - <u>AICAWW 376 I mg/t.</u> Tutal Sulfide			⊽	⊽	⊽	⊽	v	⊽	⊽	₹

TABLE E-4

SUMMARY OF QUALIFIED DATA - APRIL 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Rehmond
Richmond, Virginia

Sample ID. Reporting	Sample DVIW-35A 4/5/2002	Sample MW FOS-1 4/5/2002	Sample MW FTA-1 4/4/2002	Sample MW FTA-3 4/4/2002	Duplicate MWFTA-3 4/4/2002	Sample MWFTA-5 4/8/2002	Sample MW FTA-7 4/7/2002	Sample MW FTA-23 4/5/2002
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1ABLE F-4

SUMMARY OF QUALIFIED DATA - APRIL 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

	9	2000	-	Sample DATA 35.3	Sample	Sample MWFTA-1	Sample MWFTA-3	Duplicate MWFTA-3	Sample MWFTA-5	Sample MWFTA-7	Sample MWFTA-23
Sample Date	Date	Limit (a)	,	4/5/2002	4/5/2002	4/4/2002	4/4/2002	4/4/2002	4/8/2002	471/2002	4/5/2002
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TABLE E-4

SUMM MRY OF QUALIFITD DATA - APRIL 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Relutiond
Richmond, Virgina

### 1990 #### 1990 ##### 1990 ##################################		Sample 1D	Reporting	Sample DMW-35A	Sample MW FOS-1	Sample MW FTA-1	Sample MWFTA-3	Duplicate NIWFTA-3	Sample MWFTA-5	Sample MWFTA-7	Sample MWFTA-23 4/6/2002
		Sample Date	Limit (B)	4/5/2002	4/5/2002	4/4/2002	7007/11	7007/1/1	***************************************		
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	2 But man.			(I) < (I) (I)	<io oi<="" td=""><td>- ID 01-</td><td><33 R</td><td><43 K</td><td>AH.</td><td>Y IN</td><td>ואוכניי</td></io>	- ID 01-	<33 R	<43 K	AH.	Y IN	ואוכניי
	2 Chlorodeluc no			⊽ -	⊽	₹	5	,	⊽ :	V .	I Samuel A
	2 Ilexanone			10 <10 EJ	<10 UJ	n alv	าง เกาะ เกาะ	4110	X (10)	YOY.	ואוצוי/
	4 Chloratolucine			▽	⊽	⊽	(1)	<u>.</u>	₹ ⁵	⊽ ₹	CALLIA CAMPELLA
Color Colo	4 Akthyl-2 pentanon.			01>	SI.	‡	(3)	25.5	(H)	E -	H CHUCLY
1 2 0 1 1 0 0 1 1 0 0 1 1	Action			II) <10 K	<10 K	< IU K	,	<15 K	× -	z - 1	18221
	Влия			⊽ -	⊽	Of %I o	ć33		₹ ₹	⊽ ₹	90017
	Branch, nzen.			⊽ -	⊽	⊽ .	٠,	÷ ;	₹ ₹	7	(3)(1)
	Bromo, blorom, than			⊽ -	▽ .	⊽.		, ,	₹ ₹	; ;	(F)
	Bromedichloromethan			▼ -	⊽ `	⊽ -	55.	* * * *	₹ ₹	7 7	98217
	Вгатоботи			⊽ :	⊽ :	₹ ;	647	41.00	7	; ;	/2500111
	Bromman than			m .>	m .	10.7×	Λο / K	4 5	; t	; ¬	<120X)
	Carbon disulfide			⊽ .	⊽.	5 7	Ş	; ;	; 7	; 7	C1213
	Carbon tetrachloride			v .	⊽ 1	₹	5 7	5 C	7 7	; ¬	<1200
The control of the co	Chloroft, n/c nc		•	⊽′	⊽ ?	7 5	5 5		; ?	; 0	<2500
	Chinachun			7 7	7 7	7 5	9 5	95	; ⊽	• ⊽	<1200
	(hkaskam			⊽ ? 	7 7	7	<67111	<67.03	; ₹	7 7	<2500
	(hkamethan				7 =	7 7	3 3	7	Ş	\$ 0>	CHOCK
	cis 1.2 Dichloraethen.				C 1	5 7	- F	63	. ⊽	⊽	<1200
March Marc	cis 13 Dichloropeup.ne			;	; 7	; ¬	33	٠ د	₹	~	<1200
Marchael	Dibromochloromelhane			; -	: ⊽	⊽	33	<13	⊽	⊽	<1200
C C C C C C C C C C	President Italia			2 <2	Ç	Ç	<67	<67	Ç	ç	<25(8)
Secondary	TACINOTOMINATION CONTRACTOR			▼	~	⊽	<3.1	۲,	7	₹	<1200
	the a blombar of the			~	⊽	⊽	433	<13	⊽	⊽	<1200
	Looping Ib no n			- -	⊽	=	41	۲٤>	⊽	⊽ .	<1200
\$\circ{1}{\cinc{1}{\cinc{1}{	n-Victor & n-Xvicor			⊽ -	7	⊽	533	<33	⊽ .	⊽ -	<1200
	Methylen, chloride			-	⊽	⊽	633	<3.3	⊽ .	⊽ .	(4) (1)
	n Butylbenku			⊽ -	₹	⊽ .	£5.		₹ 7	⊽ 7	(K)71>
	ը Բորչի խոշատ			⊽ –	⊽ .	⊽ ;	÷ ;	;;	7	J 7	11248717
1 1 1 1 1 1 1 1 1 1	N դրիլի, մե ու				60 V	e ;	· ·		₹ ₹	ŧ	26211
	o When				(p) ¬	- 7	÷ =	7	÷ ¬	⊽	CH 200
	p kopropyltulacne			· ·	⊽ √	; ;	7	55	; ⊽	⊽	<1200
	ac Buttharam			· ·	7 7	7 7	5	93	∵	⊽	<1200)
	Styrene			7 7	7 7	; 7	733	5	⊽	⊽	0071>
	ורון שמל ואישירית			; =	; ¬	∵	£13	۲۶>	⊽	7	<1200
05	Terrublementhen.				; 7	₹	<13	533	⊽	⊽	<1200
	Toluch			_	\$ 00	\$ 0 ≥	4	4 2	√ (1)	<0>	<620
1	tiats 2 Dichlore, the fire				⊽	⊽	<33	۲٤>	7	v	<1200
Unicham, 2 <2 <2 <67 <67 <2 <2 online and a second	tions i senientoproprie				⊽	⊽	ζγ 9 I	<u> </u>	⊽	⊽	240 JQ
CHIRCHART 2 42 42 14 13 42 42 1	JIR BARTA UR OL			2 <2	₽	<2	C 9>	C 9>	Ç	₽	<2500
	Higherorinordicans			\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	\$	Q	ĭ	٤.	ζ>	<2	26410
	Vidyl Chronoloc			⊽	⊽	⊽	١١>	۲٤>	⊽	⊽	<1210

TABLEE

SUMMARN OF QUALIFIED DATA - APRIL 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Crater Rehmond
Richmond, Virginia

	Sample 1D Sample Date	Reporting Limit (a)	Sample DMW-35A 4/5/2002	Sample MW F OS-1 4/5/2002	Sample MW FTA-1 4/4/2002	Sample MWFTA-3 4/4/2002	Duplicate MW FTA-3 4/4/2002	Sample MW FTA-5 478/2002	Sample NIWFTA-7 4772002	Sample NIW FTA-23 4/5/2002
Surrogate - Se 12 Dichorathan 44 4 Brandlaordy nyan Dibronollaordy nyan			76 76 119	\$5 E B	00 C & X	11 47 11 69 17 18 18 18 18 18 18 18 18 18 18 18 18 18	114 77 113 72	26 86 801 809	102 96 105 101	126 82 120 97

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SUMMARY OF QUALTHED DATA - APRIL 2002
LOWER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Ukerse Supply Center Rehmend
Rechmend, Virginia

	Sample ID Sample Date	Reporting Linut (a)		Sample DMW-29B 47/2002	Sample MW-FTA-14 4/8/2002	Sample MW FTA-16 4/5/2002	Sample MW FTA-17 4/5/2002	Sample MW FTA-18 4/4/2002
HEI D PARAMETER Disolved Oxigen - FWO 1 me/L Dissolved Oxygen			0.1	13	% 64	2.5	8.2	×
Ferrous Iron - A3500D ng/L. Ivitaus Iron			0.1	0.2	-	₹	Š.	90
Oxidation Reduction Potential - A2580A 1013. Oxidation Reduction Potential			;	24%	11\$	120	05-	-80
<u>թյ - F150 1 թյ1 Մոկչ</u> Թ1			1	\$ D8.	10.11	12.5	3	6 86
Specific Conductance - U120 <u>1 nestem</u> Specific Conductance			0.001	1600	0 382	\$ 96	£. 1	0 172
Temperature . El 70 1 deg C Temperatur			- 0	17.7	12.9	154	8 91	6.21
<u>Luchiday - Etwa 1 NTU</u> Turbiday			-	9	⊽	15	7	큤
FIVED BASE LABORATORY ANALYSIS Aniory - MCAWW 340 3A mvl. Charac. Nitrie			- -	22 1 ⇒ 8 × 8	12 \$ <6.1 20 1	64 44 44	63 86.1 86.1	£ 4 ⊕ -
Dissalt of Gases - RSN SOP-175 mgg. Carbon disrade I than: I then. Wethan.			0.001 0.002 0.001	39 <0.002 <0.001 0.0043	<0.17 <0.002 <0.001 <0.001 <0.0019	40 1740 0740 080 097	<0.17 <0.002 0.00045 JQ 0.12	60 000 0 000 000 0000 0000 0000 0000 0
Dissolved Hydrogen by Microweps ANI20GAX nM Hydrogen			0.03	6.7	8 2	¥	64	86
Total Alkalinity - MCAW W 310 1 mg/l. Fotal Alkalinity			≈ 1	22	<u>35</u>	700	180	89
Fotal Organic Carbon - SW846 9060 mg/L Lotal Organic Carbon				⊽	Ør 60	-	64	2 JH
Total Sulfide - MCAWW 376 1 mg/L. Total Sulfide			-	⊽	⊽	v	⊽	⊽

FABLE E S

SUMMARY OF QUALIFIED DATA - APRIL 2002
LOWER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond

		Defense Supply Center Richmond Richmond, Virginia	Center R d, Vingo	chmond				
	Sample ID Sample Date	Reporting Linut (a)	-	Sample DVIW-29B 4/7/2002	Sample MW FTA-14 48/2002	Sample MWFTA-16 4/5/2002	Sample MW FTA-17 4/5/2002	Sample A18 FTA-18 4/4/2002
Meculy - SW 846, 7470A (Dwolved) ug/L Merusty			-	4 BJ	U	⊽	⊽	⊽
Mercury - SW846 7470A (Total) ug/l. Mercury			-	<1 UJ	U I≥	Of 10	⊽	OF 160 0
Metals - SW846 6010B (Dissolved) ug/l			900	<200	00Z>	<200 U	5380	<200 UJ
Антилия Амтили)			· ~ ·	·0 ·	۵,	7) 4	* *	٧,
עניינוא			ج <u>ج</u>	36.50	347 JO	Ç ₹	Of 62) E
13 mum Bersthim			Ξ	els els	<10	o10	9,	≣, •
Cadmum			۲۱ (0.35.38	₽ 53 State	O 39 JQ	52 100002	77 C
Cak iiin			2 3	2 a 5	01v	2.4 JB	01>	01>
Chromium			?	€,	₹>	[# >	€,	0,>
Cupper			10	=======================================	OI>	01v	0 š	<u> </u>
Iren			200	<u>5</u> 7	\$200 \$7	(XXX)) T	‡ °
Land			, 96 , 96	3 <u>8</u> 5) 180 180 180 180 180 180 180 180 180 180	73 I JB	<5000	5800
Manghesten			20,7	48.5	<20	Ş	<30	78.8
Motybelenen			₽ ;	⊕	71 JQ	() (i) (i) (i) (i) (i) (i) (i) (i) (i) (₹ [₹]	Q ₹
NRKL			9 5	(KIIV CA CACA	001>	00098	19861 19861	413.10
Potavanin			·	, v	۲,	۶	\$	\$
Salar			Ξ	01>	ol>	910	0 .	e .
Sadaum			5000	9,030	\$1000	46600	00511	7170
Variation			9 8	9 3	₽ ₹	₹ ₹) J	Q 27
/mx			3	3)	i)	į	
Metals - SW846 6010B (Total) ut/1			01/6	GIA.	01.5.15	62.6.118	5580	Of 201
Alumanum			3 ~	\$ 5	T T	\$	۵.	۵,
Anthony			5	۵.	٧	₹	د ۶	ζ.
Burum			200	23 % 1Q	אני זו	1320) (1)	507 3Q
Թ. ւչ մոսու			2 -	 	ê ?	€ ς	e 	€ 7
Cadmum			7 01835	97 125	5870	201000	111000	156(8)
Cak turn Chroming			9	- E	₹	U 7 1B	0!>	<u>≑</u> ∨
Cobil			30	c30	0£>	€,	O£ >	2
Cupper			2 8	= €	95.5	01. V	01V	1970
Iron			·	} V	} ⊽	₹	⊽	∵ 5
Mace sum			5(3)(7210 JQ	Of 0084	Or 0281	<5(XX)	11565
Mangare			20	7 7	7 10	216	n2 =	7
Molybdenum			9	₹ :	Of 67		÷ 5	74 D
NEXCI			2 9	4350 ID	20 F32	205000	20300	Z INT
Potassum			8	? ≥ '⊽	٧	\$	\$	\$
Schilling State of St			2	Ş	<10	ete	<10	c t 0
mirpos			2000	\$290	52(X)0	50600	1400	7470
Vandum			9 2	& &	₹ ₹	₹ ₹	Ž 6.25	Dr 7 61
/ mc			ł	;				
Thallium - SW 846 7841 (Dissolved) uz/L. Thallium			7	<2 UL	c2 UL	2 UI	L2 UI	-2 UI

SUMMARN OF QUALIFIED DATA - APRIL 2002
I OWER WATER BEARING UNIT
Annual Grounds afer Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

2u,		Sample ID	Reporting		Sample DMW-29B	Sample MW FTA-14	Sample MWFTA-16 4/5/2002	Sample MW FTA-17 4/5/2002	Sample MWFTA-18 442002
2 Cull Cull Cull Cull Cull Cull Cull Cul		Sample Laie							
	Thailium - SN 846 7841 (Total) ug/L Thailium			2	2 UI	<2 UL	ī t	<2 UI	<2 UI
	Volatile Organic Compounds - SW846 8260B ug/I			•	•	•	Ę	7	٦
	1.1, 2-Tetrachlorise thank				⊽ √	₹₹	5 €	7 ▼	₹
	1 1,1-Tik hiorex thank				; 7	7 ⊽	3	7	⊽
######################################	1.1.2.2-Tetrachlorouthan.				7 ⊽	⊽	5	₹	⊽
The control of the co	1.12 legisland			-	; ⊽	⊽	ઈ	⊽	⊽
######################################	1 - On blorgerand.			-	⊽	⊽	લ્ય	7	⊽
99.00 Per control of the control of	1-10kminitatik.ik			-	⊽	₹	<33	~	⊽ .
99.00	1 1-100 motors by a property of the property o				⊽	⊽	છ	⊽	₹.
1	1.2.3 Truthsrupopane			-	₹	⊽	£5 ;	⊽ -	₹ 7
1	1 2,4 Tryblorok, n.c.			_	⊽ '	⊽ -	3;	⊽ ₹	₹ ₹
Properties: 1	1.2.4 Trimethylly.no.en.			_ ,	⊽ ^	⊽ ৭	; ;	⊽ ∵	7 7
Re	1 2-15thromo-3 chloropropane			٦.	J 7	7	9 5	; ⊽	, △
C C C C C	1.2-Dibromer, thane				7 7	7 ▼	;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	⊽	⊽
C	1.2 Dunkstobenaun				; ⊽	; ₹	45	⊽	₹
## ## ## ## ## ## ## ## ## ## ## ## ##	1 2-Da hisrox thane			-	; ₹	⊽	ęş	⊽	⊽
C C C C	2-Dachioropropalac			-	7	⊽	€3	⊽ '	⊽ '
C	1.3 The bloods on the			-	⊽	⊽	ć,	⊽ .	⊽ ′
	1.3 Du blocupcopup			-	⊽	7	£	⊽ .	⊽ .
	1 4-1)a hkaruh nam			-	v	⊽	(⊽ -	⊽₹
	2 2-Dx hioropropan.			- :	√ :	⊽ \$	(43) (43)	201/	7 5
Internal Linear Control Contro	2 Butabon.			≘ .	<10 R	¥ 0.10	C130 C2	7	5 7
thank th	2 С Иотопонк ж			- 5	⊽ =	7 Z	4330UF	< 10 K	ci ol>
10	2 Hexanoix			≥ -	407	; -	<13	⊽	⊽
2 P. Maltonia, 10 2 P. R. 2 R 439 2 R 4	4 Chlorotoluca.			- =	; 🕏	, 0 <u>1</u> >	330	٥I٧	ol>
	t Mainyl 2 partanone			: =	2 I R	2 I R	<330 K	26 K	<10.18
	ALCIDIK B. Dane			_	7	7	<u>د</u>	⊽	⊽ '
	Brownsh par B.			_	⊽	⊽	<33	₹.	⊽.
	Droman Historia than			-	⊽	⊽ .	£ ;	⊽ :	⊽ ₹
2	Bromodic bloroms shan.				⊽ :	<u>v</u> -	\$ [⊽ 7	7
2	Bramotorm				⊽ ∜	۶ ۲	= = = = = = = = = = = = = = = = = = =	7 73	; 72 (2)
49 AQ	Bromath.than.			٧ -	7 ₹	J ⊽	<33	; ⊽	⊽
## ## ## ## ## ## ## ## ## ## ## ## ##	Carbon disuited.				; ₩	: ⊽	633	⊽	⊽
2	(Arbon It Tac Norma				⊽	⊽	49 10	⊽	⊽
2	Chlorolatizatik			7	42	\$	<i>L</i> 9>	₹	0.46 JQ
2	- Mondain			-	7	⊽	433	⊽	~
# # # # # # # # # # # # # # # # # # #	Character	`		ÇI	å	\$	19>	\$	♥:
	crs-12 Dichlorouthere			£ ()	<0>	₹	100	∵ .	53
	LIN-1 3 Da hloroprop. n.				⊽	▼ '	F 1	⊽ -	⊽ ₹
	Dibrama Blarons, than			-	⊽ '	⊽.	£ .	√ 7	⊽ ₹
	Dibrogomethan			_	⊽ '	⊽'	S,	⊽ 5	, ¿
	Dk hloradillioremethane			(1 ·	۵.	7	٠ ۲	7 7	77
	1 thylbrane to				⊽ ?	⊽ ₹	\$ 5	₹ ₹	7 7
	Hexac blorobutadu n.				⊽ ₹	7	: ₹	7	. △
1 C C 12 IQ C 1	Isoprapylb-uzen.				⊽ √	7 7	£13	⊽	⊽
	m-X)km & p-Vykme				7 7	; ⊽	12 JO	⊽	⊽
	Methylen, charact				7	7	(÷	⊽	⊽

SUMMARY OF QUALIFIED DATA - APRIL 2002
LOWER WATER BEARING UNIT
Annual Grunds siter Report - October 2002
Operald Unit 7
Defense Supply Center Richmond
Richmond, Virginia

	Sanple ID Sample Date	Reporting Limit (a)	Sample DMW-29B 4772002	Sample NIW F1A-14 4/8/2002	Sample MWFTA-16 4/5/2002	Sample MW FTA-17 4/5/2002	Sample MW FTA-18 4/4/2002
Propy ils pants			▽	⊽	ē	⊽	⊽
Janah D.			▽	⊽	<33 UJ	8F 60	ını∨
A Vibra		90		\$ \$	<17	Š	~ ₹
o species			₹	⊽	433	v	7
Franklich der De			~	⊽	{{\cdot \}	v	V
	•		~	⊽	<13	7	⊽
regions.			▽	⊽	(1)	~	~
Control placement			∀	7	Ę	⊽	⊽
Tollar re			⊽	⊽	<33	Of 85.0	7
rents 1.2 The blessow them.		0	285	\$ (\$)	<1 7	₹	Ş
teans 1 3-1 he blooming in			~ -	⊽	€\$	⊽	7
to those the or			Of 610	⊽	{ ! }	7	v
To blood horoning them.			2	♡	<i>1</i> 9>	V	7
Vandi filorak			2 42	\$	310	4	ଧ
Xyknes (total)			⊽ _	⊽	S 3	⊽	⊽
Surrogate - C							
1 2-42k-hiorrx-thanc d4			97	<u>3</u>	125	103	125
4 Bromvollmorub, no. p.			- 92	t6	75	%	28
Debromofluorone Haro			101	5	611	105	611
A)			5	Ē	Š	103	Ç.

	SUNA	SUMMARY OF QUALIFIED BATA - APRIL 2002 LOWER WATER BEARING UNIT Annual Groundwater Report - October 2002	HD DATA - AF BEARING UN Report - Octobe	'R1L 2002 IT r 2002			
		Operable Unit 7 Use Supply Center Richmond Richmond, Virginia	Operable Unit 7 Supply Center Richmon Richmond, Virginia	_			
	Sample ID Sample Date	Reporting Linut (a)	Sample AIM FTA-19 4772002	Sample 19 MWFTA-28B 2 4/8/20012	Sample NIW FTA-29B 4/4/2002	Sample PW FTA-2 4/4/2002	Duplicate PW FTA-2 4/4/2002
FIFLD PARANIFTER Docohed Oxigin - Will mg/L Discohed Oxigin - Will mg/L		-	0.1 NA	9.6	61	~	•
berrogs, <u>Iron - A3500D mg/L.</u> Latous Bon		-	NA 10	V.	8	0.2	6.2
Oxidation Reduction <u>Polyntial - A2581A mV</u> Oxidation Reduction Potential			N	-121	.23	-82	82
<u> 1911 - 1918 (1911)</u> pki			, v	71.1	13 88	11 82	11 82
Specifi Conductance E1201 mSkm Specific Conductance		10	0.00 NA	0.502	247	697.0	11763
Temperature - F170 1 deg C			VN I I	7	12.7	146	9 71
<u>Turbidin - E.189,1 N.1U</u> Turbidisy			VN	91	31	⊽	⊽
FIVED BASE LABORATORY ANALASIS Amons, Alcaww, Ann 14, mpl. Chlarak, Nutak, Suliak,			1 66 01 <01	\$\$ 0 \ 1	14 007 JQ 34	89 002 JQ 59	87 1102 JQ 58
Dissolved Gases - RNK SOP-175 mg/L Carbon distold: I than: I there: Waifank		0000	0.001 0.22 JB 0.002 <0.002 0.001 <0.0019 0.001 0.0019	13 13 14 10 10 10 10 10 10 10 10 10 10 10 10 10	<0.17 0.1007 0.10017 0.0033	40-17 40-012 11-0024 0-23	<0.17 <0.002 0.0027 0.25
Dissolved Hydrogen by Microseeps AM20GAN nM Hydrogen	- 1	8	7 500	×	2	170 J	1 011
Total Akalimty - MCAWW 310 Lug/L Total Akalimty			\$ 130	161	1 0%1	54 J	ş
Total Organic Carbon - SW 846 9960 mg/L Total Organic Carbon			I 04 JQ	9	7	<u> </u>	H -
Total Sulfide - MCAWW 376 J mg/l Tetal Sulfide			▽	⊽	⊽	⊽	⊽

TABLE E-S

SUMMARY OF QUALIFIED DATA - APRIL 2002
LOW ER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defines Supply Center Richmond
Exchanged Vicinitia

		Richmond, Virginia	۱inginia				
	Sample 1D Sample Date	Reporting Linut (a)	Sample NIWFTA-19 4/7/2002	Sample NIW FTA-28B 4/8/2002	Sample MW FTA-298 4/4/2002	Sample PW FTA-2 4/4/2002	Duplicate PW FTA-2 4/4/2002
Mrcun - SW846 7470A (Dissolved) up/f			u u	m ₽	0 14 10	Of \$1.0	⊽
<u> Mercury - SW846 7470A (Total) 197/1.</u> Menuty			BL 510 1	(U)	۱۵۰ م	Of El 0	Of 110
Metals - SW846 6010B (Dissolved) ug/L		ē	715	900	322	1020	1020
Alumanum		ā	5 5	ÿ v	8	۵.	ζ'
Ars. file.		•	·	<u>د</u> :	ሪ ጀ	25 o£ 50 o£	<\$ 45.4 TO
Barnum		F•		2f 0ll	C 97	7 61 ×	010
Bery barm Cachmum				å	2	3	7
Cakum		35	5000 59600	4706 317	10100	\$2800) <10	\$290H < 10
Chromam				€ ₹	8) P	. ₹
Consti				01>	ot>	94>	410
lion		71		1850	200	<200	200 7
l cad		13		2440)¢	ğ ğ, Ç	SIKK)	() (0)
Magnesium		2		220	\$ 55 \$ 50 \$ 50 \$ 50 \$ 50 \$ 50 \$ 50 \$ 50	8	02
Mungunose Montrel our				O F ∨	Or 6.2	O *>	<40
VKKI				3.2 JQ	4 5 JQ	× 100	101 2 co
Potassium		3 6		5900	50×03	7/1(x)	S/4(N)
N. k. nuan				0 ₹	≎ ₹	7 🖣	; ₽
Silver		35		290001	40800	10701	00901
V.m.dhim		!		() () ()	Or 98 ⊕	21.10) -
/mc				144 JQ	<20	0Z>	<20
Metals - SW 846 6010B (Total) ug/L.		'		Š		0.574	Ę
Aluminum			200	2	#r 0111	i v	; \$
Antunsiny				3 1	7	ζ.	Ŋ
Barum				δ(III	212	46.2 JQ	43 8 JQ
Deryflum				<10	0 '	0 V	€ ?
питрт)		ì		0.28 JB	7 (7)	O. 50	77
Cuk num		ĸ		6) 0 0	43 JO	¢10	CI 0
Caremban Cobal				<30	° 0₹>	O£>	OF>
Copper			- CID	ol>	01>	01v	<u>0 </u>
וניום				0/77	۽ ڙ	<2(A)	§ 5
ייייי ייייי		<i>∓</i>		24500	OY IZ	<\$UKU\$>	<\$(HX)
Mangages				222	Of 1.51	<20	<20
Mohadon				<4I}>	49 JQ	=	Q * >
Nu kel				001	78 JQ	0112	(2015)
Potassum		*		1 St. 1	(M)201 2.5	20 PA	2 Mate)
Vels mum				7 ₹	; ₹	; 2	=
interest of the second		•		2890x)	44700	10700	10100
Varadium			33.10	\$ 2 2 2 2 3 3 4	13 JQ	- 18 JC	14 JQ
/nx				1		•	}
Thallium - SW 846 7841 (Dissolved) ug/L Thallum			2 <2 UI	<2 UI	<2 UI.	<2 UI,	<2 UI

SUMMARN OF QUALIFIED DATA - APRIL 2002
LOWFR WATER BEARING UNIT
Annual Groundwater Report - Octuber 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

				Comple	Samoi	Samole	Sample	Duplicate
	Sample 1D	Керолия	-	11WFTA-19	MWFTA-28B	MWFTA-29B	PWFTA-2	PWF1A-2
	Sample Date	(init (a)		471/20112	4/8/2(N)2	4/4/2002	4/4/2002	447002
Phallum - SN 846 7841 (Fotal) ug/1.						;	į	
Ումեսո			2	<2 UJ	52 UE	<2 UI.	5 7	72
Volatile Organic Compounds - 5 W 846 8260B ug/l.			-	7	7	7	⊽	⊽
1.1.2 Ferrachhoroethan.				, ,	7 7	, √	∵⊽	⊽
Trublora thate			-	; ₹	; ⊽	⊽	~	⊽
1 J. ZLeffac Riotick India:			-	⊽	⊽	⊽	⊽	⊽
1.1.2. The Marie Consult.			_	⊽	~	⊽	4.3	æ
1 - 1 M. Charles (Market)			-	v	⊽	⊽	2.3	2.4
1 1 Du blotting of the			-	7	⊽	⊽	⊽	⊽ '
1.2 3 Technology			-	⊽	⊽	⊽	⊽	⊽ '
1.2.3. Treblorupapals.			-	⊽	⊽	⊽	⊽	⊽ .
1.2.4-Trublerob.n.v.n.			-	⊽	⊽	⊽	⊽ '	.
1.2.4 Trime the bearing				⊽ '	⊽ '	⊽९	⊽ 7	⊽ ₹
1.2 Dibromo 3 chloropropane			٠, .	₽.	3 7	7 7	7	7 5
1 2-Dibromex thank.				⊽ ′	⊽ -	⊽ ¬	- P	2 50
12-Dichlarobenanic				₹ ₹	⊽ 7	₹ ₹	ê	7
2-15ahlorocthane				7	7 7	7 7	7	⊽
1.2 Duhloropropure				7 7	7	₹	₹	⊽
3 STrunciny (No. n. z. n.			. –	₹	⊽	⊽	7	⊽
1.4 Dig Morett, marche				; 7	⊽	⊽	⊽	⊽
1 1 Dichlorophopalic			-	⊽	⊽	⊽	0.17	Of 810
2.2. Observations			-	~	⊽	⊽	₹	⊽
2 2 Datamorphic Park			2	<10 R	0.79 R	161	10 DI	<10 UL
2 Chlorotolu ne			-	₹	⊽	⊽	⊽ :	→ ;
2 Heanufe			2	<10 R	^I≎ K	<10 UI	10 U	10 0. 10
4 Chlorotolacia			_	⊽	⊽ :	⊽ :	∵ :	⊽ ₹
4-Methyl-2-pantanom			≥ .	€ ;	al :	010) .	01>
Action			≘ -	24 K	× 7	18 K	¥ 7	-
שרוויה				₹ 7	⊽ √	27.7	7 7	7 7
Bromokanar				7	7 7	7 ⊽	₹ ₹	⊽
Bromechkronethan				7 7	√ √	; ⊽	7	⊽
Bromosk hurone Ham			-	₹	⊽	⊽	⊽	⊽
Bromotorth December (Note)			٠,	\$	4	\$	m ≎	<2 UJ
promotivation of a state of the			-	⊽	⊽	⊽	~	⊽
Carbon to frachimely			_	⊽	⊽	⊽	⊽	⊽
(plotty hytes			_	⊽	⊽	⊽	⊽ '	⊽ '
Citysocthan			7	3	\$	\$	₽.	۵.
Chiorotorm			1	⊽ '	⊽ '	Ţ `	۶ ک	۶ ۵
Chluronxthank			٦ :	7 :	₹ ₹	₹ %	7 5	7 7
cts-1 2 Dichloroethere.			co.	2 -	() T	ê T	÷ -	; 7
cus 1.3 Dichioropropent				⊽ ₹	⊽ ₹	⊽ ₹	, ,	77
Dibroms blorom than				⊽ 7	7	7 7	; 7	7 7
Dibrumom, than				۶ ۲	7	78	; ব	; \$
Dublarodillucromethane			4 -	77	; ₹	, √	' ⊽	' ⊽
i uhylbenzene				7 7	, ₽	; ⊽	∵⊽	. 4
Hexachlerobutadking				7	; ⊽	∵⊽	⊽	⊽
Esupropyllungue			-	7 7	₹	⊽	₽	⊽
m-Aykov, & p Aykov M. dali e. i bloods			-	⊽	⊽	⊽	₹	⊽
Modify Energia				⊽	⊽	~	~	⊽
II BUISTALIZATE								

TABLE E-5

SUMMARY OF QUALIFIED DATA - APRIL 2002
LOWER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

	Sample 1D	Keporting	Sample MW FTA-19		Sample MWF1A-28B M		Sample PWFFA-2	Duplicate PW FTA-2
	Sample Date	Limit (a)	4/7/2002		478/21102	4/4/2002	4/4/2002	4/4/2002
t seed of			_	_	₹	⊽	~	⊽
n-riopy activate.			-	_	1.2 JB	<u>~</u>	7	<u>~</u>
Adjuliations			0.5	•	₹	\$	£	(0.5
On A.) R. B.				⊽	~	⊽	ON 98 0	OF 98 0
principle of the			-	_	⊽	⊽	⊽	⊽
See Bullytan House			_	_	⊽	⊽	₹	7
apting and the same				_	⊽	⊽	⊽	₹
The pullation			_		⊽	⊽	OL 250	OL 25 0
Test aciliente incine.				_	01.52.0	Of 65 0	0.24 JQ	0.2 JQ
LOTILLER.			5.5	×	, S	₹	\$ 65	O(61 0
come 1.2 De blooming as			_	_	7	⊽	⊽	₹
Con Month the sec			590 1	5	⊽	⊽	ن ؛	66
The left medium come district			7	٠,	Ą	7	7	Ų
Vest Chine			۷	F4	\$	7	Of the	Of It #
Yskines (total)			_	_	⊽	⊽	⊽	⊽
Surrogate - %							į	i
1.2 Da blosca than 444			<u>~</u>	÷	102	105	7.	tal
A Bremofensch as no				7	76	7.1	ŝ	7.7
1 Sheed of the state of the sta			=	103	<u>=</u>	ξ,	<u>~</u>	103
TAIN CHANGE TO THE COURT OF THE			=	90	101	묤	96	5

Notes

ΙΒ

Limited Pased on QC data
Estimated possibly based high or false
positive based on blank contamination
Limited possibly based high based upon QC data
Limited possibly based low based upon QC data
Limited Value, to kriween reporting from
and detection limit

≡ = ≥

Unusuhk

2≃35

Underected Reported Described I must be impreselved. Underected Total based low - Reported Described Lamin is higher than independing the proceeding times presented are the Pest that can be additived in independent to the Pest that can be additived under normal operating princedures with the interhoof required sample volume, extracted and/or sample apporting limits may vary due to sample volume/weight extracted and/or sample distributions.

PRI PARI D/DATI RMB 6/04/03

SUMMARY OF QUALIFIED DATA - APRIL 2002 FRACTURED BEDROCK

Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Center Richmond Richmond, Virginia

	Sample ID: Sample Date:	Reporting Lunit (a)	Sample MWFTA-20 4/7/2002
FIELD PARAMETER:			
Dissolved Oxygen - E360.1 mg/L			
Dissolved Oxygen		0 1	3 7
Ferrous Iron - A3500D mg/L			
Ferrous Iron		0 1	<0 1
Oxidation Reduction Potential - A2580A mV			101
Oxidation Reduction Potential			104
pH - E150.1 pH Units			10.64
рН			10 64
Specific Conductance - E120,1 mS/cm		0 001	0 147
Specific Conductance		0.001	0 147
Temperature - E170.1 deg C Temperature		0 1	15 6
Temperature		01	130
Turbidity - E180.1 NTU Turbidity		1	<l< td=""></l<>
Turbidity		1	<i< td=""></i<>
FIXED BASE LABORATORY ANALYSIS: Anions - MCAWW 300.3A mg/L			
Chloride		i	3 4
Nitrate		01	<01
Sulfate		1	4 9
Dissolved Gases - RSK SOP-175 mg/L			
Carbon dioxide		0 001	0 32 JB
Ethane		0 002	0 00032 JQ
Ethene		0 001	0 0091
Methane		0 001	0 023
Dissolved Hydrogen by Microseeps AM20GAX nM			
Hydrogen		0 03	8 1
Total Alkalinity - MCAWW 310.1 mg/L		_	
Total Alkalınıty		5	68
Total Organic Carbon - SW846 9060 mg/L			
Total Organic Carbon		ı	0.5 JQ
Total Sulfide - MCAWW 376 1 mg/L			
Total Sulfide		I	<1

SUMMARY OF QUALIFIED DATA - APRIL 2002 FRACTURED BEDROCK

Annual Groundwater Report - October 2002 Operable Unit 7

Defense Supply Center Richmond Richmond, Virginia

	Sample ID: Sample Date:	Reporting Limit (a)	Sample MWFTA-20 4/7/2002
SINOA/ BAROA /SI	<u>-</u>		
<u>Mercury - SW846 7470A (Dissolved) μg/L</u> Mercury		•	-1 575
•		1	<1 UJ
Mercury - SW846 7470A (Total) µg/L			
Mercury		1	<1 UJ
Metals - SW846 6010B (Dissolved) µg/L			
Aluminum		200	<200
Antimony		5	<5
Arsenic		5	<5
Barrum		200	74 9 JQ
Beryllium		10	<10
Cadmum		2	0 35 JB
Calcium		5000	14600
Chromium		10	<10
Cobalt		30	<30
Copper		10	<10
ron		200	156 JQ
ead		3	<3
fagnesium		5000	4380 JQ
fanganese		20	56 4
folybdenum		40	<40
ickel		100	<100
otassium		5000	8210
elenium		5	<5
llver		10	<10
odium		5000	11700
anadium		50	<50
inc		20	<20
letals - SW846 6010B (Total) ug/L			
luminum		200	<200
ntimony		5	<5
rsenic		5	<5
arum		200	79 JQ
eryllium		10	<10
admium		2	<2
alcium		5000	15100
hromium		10	<10
obalt		30	<30
opper		10	<10
on .		200	190 JQ
ad		3	<3
agnesium		5000	4520 JQ
anganese		20	71 3
olybdenum		40	<40
ckel		100	<100
Massium		5000	8370
lenium		5	<5
lver		10	<10
dium		5000	11700
nadrum		50	<50
nc		20	<20
iallium - SW846 7841 (Dissolved) µg/L			
allium		2	<2 UE.
		2	<2 UL
allium <u>allium - SW846 7841 (Total) µg/L</u> allium		2	<2 UL <2 UL

SUMMARY OF QUALIFIED DATA - APRIL 2002 FRACTURED BEDROCK

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

	Sample ID:	Reporting Limit (a)	Sample MWFTA-20
	Sample Date:	Limit (a)	4/7/2002
Volatile Organic Compounds - SW846 8260B µg/L 1,1,1,2-Tetrachloroethane		1	<33
1,1,1-Trichloroethane		1	0 53 JQ
1,1,2,2-Tetrachloroethane		1	<3 3
1,1,2-Trichloroethane		1	<3 3
1,1-Dichloroethane		1	22
1,1-Dichloroethene		1	61
1,1-Dichloropropene		J	<3 3
1,2,3-Trichlorobenzene		1	<3 3
1,2,3-Trichloropropane		1	<3 3
1,2,4-Trichlorobenzene		1	<3 3
1,2,4-Trimethylbenzene		1	<33
1,2-Dibromo-3-chloropropane		2	<67
1,2-Dibromoethane		1	<33
1,2-Dichlorobenzene		1	<3 3
1,2-Dichloroethane		ì	<33
1,2-Dichloropropane		1	<33
1,3,5-Trimethylbenzene		1	<33
,3-Dichlorobenzene		1	<33
,3-Dichloropropane		1	<33
.4-Dichlorobenzene		1	<33
2,2-Dichloropropane		1	<33
2-Butanone		10	<33 UJ
2-Chlorotoluene		1	<33
2-Hexanone		10	<33 UJ
I-Chlorotoluene		1	<3 3
l-Methyl-2-pentanone		10	<33
Acetone		10	<33 R
Benzene		ı	<33
Bromobenzene		l	<33
Bromochloromethane		1	<33
Bromodichloromethane		1	<3 3
Bromoform		1	<33
Bromomethane		2	<67 UJ
Carbon disulfide		1	<33
Carbon tetrachloride		1	<33
Chlorobenzene		1	<33
Chloroethane		2	<67
Chloroform		1	<33
Chloromethane		2	<67
is-1,2-Dichloroethene		0.5	130
is-1,3-Dichloropropene		1	<33
Dibromochloromethane		ì	<33
Dibromomethane		1	<33
Oromomethane Orohlorodifluoromethane		2	<3 3 <6 7
thylbenzene		1	<33
lexachlorobutadiene		1	<33
sopropylbenzene		1	<3 3
n-Xylene & p-Xylene		1	<3 3
Methylene chloride		1	<3 3
-Butylbenzene		!	< 3.3
-Propylbenzene		1	<3 3
aphthalene		i	<3 3 UJ
Xylene		0.5	<17
Isopropyltoluene		1	<33

SUMMARY OF QUALIFIED DATA - APRIL 2002 FRACTURED BEDROCK

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond

Richmond, Virginia

	Sample ID: Sample Date:	Reporting Limit (a)	Sample MWFTA-20 4/7/2002
sec-Butylbenzene		1	<33
Styrene		1	<3 3
tert-Butylbenzene		1	<33
Tetrachloroethene		1	<3 3
Toluene		1	<3 3
trans-1,2-Dichloroethene		0.5	3
trans-1,3-Dichloropropene		1	<3 3
Trichloroethene		1	78
Trichlorofluoromethane		2	<67
Vinyl chloride		2	12
Xylenes (total)		1	<3 3
Surrogate - %			
1,2-Dichloroethane-d4			125
4-Bromofluorobenzene			77
Dibromofluoromethane			122
Toluene-d8			95

Notes:	
J	Estimated, based on QC data
JB	Estimated, possibly biased high or false
	positive based on blank contamination
JH	Estimated, possibly biased high based upon QC data
JL	Estimated, possibly biased low based upon QC data
JQ	Estimated, Value is between reporting limit
	and detection limit
NA	Not Analyzed
R	Unusable
UJ	Undetected, Reported Detection Limit is imprecise
UL	Undetected, Data biased low - Reported
	Detection Limit is higher than indicated
(a)	Reporting limits presented are the best that can be achieved under

er normal operating procedures with the method-required sample volume extracted and analyzed. Sample reporting limits may vary due to sample volume/weight extracted and/or sample dilutions

> PREPARED/DATE RMB 6/04/03 CHECKED/DATE JAH 6/05/03

SUMMARY OF QUALIFIED DATA - JULY 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Rehmond
Rechmond, Virguita

			Richmond, Vinginia	21.E						
	Sample ID Sample Date	Reporting Linut (a)	Sr AEH 7/3	Sample AEHADG-10 7/30/2002	Duplicate AEHADG-10 7/30/2002	Sample DMW-13A 7/17/2002	Sample DMW-20A 7/30/2002	Sample DVIW-22A 7/30/2002	Sample DMW-25A 7/29/2002	Sample DMW-26A 7/31/2002
FIFI D PARAMETER Dosobred Oxygen - E360 Lmg/L Dosobred Oxygen			0 1	71 1	117	% 9	0.92	<u>=</u>	90	١ ٦٦
Perrous Iron ; A3500D mg/L Letrous Iron			0.1	>	Đ	~	V.	c	Ð	0
Oxidation Reduction Potential : A2580A ml. (Audation Reduction Potential			1	2 v	2.	319	749	±.	310	×
pH F150 1 pH Units pH				5.17	537	361	3.95	6 82	4 92	2 86
Specific Conductance - F120 LinSem Specific Conductance		Ó	6601	0 221	0 221	0 138	0.085	0 23	0 125	97.0
Temparature - E179.1 dag C Lumpyrature			-0	21 29	21 29	23 99	22 48	194	2112	93.9
Furbidity - F 180 1 N 1 U			-	60	60	2.7	13.5	7.9	3.9	\$9
FIXED BASE I ABORATORY ANALYSIS Amoure - MCANAY 3M 3A mg/L Chlorade Nitar				65 8 <0 1 20 8	65 5 46 1 26 2	254 JH 0 51 197 JH	166 0.12 10.9	± 5 ≡ ∞	124 0.17 18.7	224 <0.1 2.7
Dissibled Cases, RSB SOP-175 mg/l. Carbon doxide. 1 than. I than. Multan.		9 0 0 0	0.001 0.002 0.001 0.001	100 <0.005 0.01 0.045	110 <0.002 0.011 0.05	130 <0.002 R <0.001 R 0.0011	120 <0.002 <0.001 0.0013	70 <0.002 <0.001 0.021	100 <0.002 <0.001 0.0022	150 <0.004 <0.002 0.29
Hydrogan by Microsce py - AM2005AX mM Hydrogan			0.03	8	6	24	2.2	27	2	36
Lotal Alkalunts - MCAM W 310 L 002L.			\$	٣	<u>~</u>	2	2 1 18	4	27	Ş
Total Organic Carbon, SW 840, 9060 mg/l. Josel Organic Carbon			-	_	-	⊽	⊽	7	CI	~
Foral Sulfide - MCAWW 376 1 mg/L. Foral Sulfide			_	⊽	Of 59 0	⊽	0 th 0	Or \$9.0	⊽	Of 760

SUMMARY OF QUALIFIED DATA - JULY 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

			Maid, Tiginia						
	Sample 1D	Керопив	Sample AERADG-10	Duplicate AEHADG-10	Sample DMW-13A	Sample DMW 20A	Sample DMW-22A	Sample DMW-25A	Sample DNIW-26A 7/1/2002
	Sanple Date	Limit (a)	71.507.2002	11.50/2.0012	7111/7007	1) SUNTAINOT	TOWN TOWN	***************************************	
Merury - SW 846 7470A (Dysolved) 1921. Merury			⊽	⊽	⊽	⊽	₹	⊽	⊽
Nexury - SWN46 7470A (Fotal) mult. Menury			⊽	⊽	⊽	⊽	⊽	⊽	⊽
Man Man Land Control of the Control									
Alementa		2	200 69 JQ	745 JQ	1550	121 10	<200 UJ	<200 UJ	292
Anthrony				٠	۲,	φ,	ড় :	9 4	0 T
AIKIN				44.2	٥	S i	5 to 5	Ş	60 600
Barium		61	<u></u> .	2 £ ∶	07 KZ	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	7 (4	2 2 1	010
Berylhum)) () 	>r 50 n	9	3	4
C adminin		7	0.025 11A.05) <u>(</u>	2820 10	Of 9591	7998)	4520 10	3940 IQ
(Jakium		ž		010	01>	01>	()1>	÷.	37 10
(Bromum				31.5	S 9 JU	5.8 JQ	Ot>	2.1 JQ	13.18
Coball			10 <10	n n	3.2 113	01>	<10	e.	28 JQ
Copper		7		23100	4190	75.	0,44	<2(X)	174(x)
				Ð	9 8	₽	ç	ŋ	⊽
LAJO M. um. uma		7	S(X)O 7370	1915	2650 JQ	2860 JQ	4730	1530 JQ	2050 JQ
M Constitution				696	221	304	117	157	98 6
Makak			40 <40	04>	9 ₹	<40	()T>	Q *	₹
Ne had		_	4	40.2 JQ	<100	S1 JQ	<100	\$0L>	<100 100 100 100 100 100 100 100 100 100
l'ataxium		×	•	5170	2020 10	280x0 JC)	7% YO	Of mile	4 (B) 10
Schmun				\$	ζ:	φ:	Ç	Q f	Ç ₹
Silve				91	01V	0 V	01>	010	900
Sodium		.	_	16000	7270	\$5 € €	78741	0.50	1290AU)
Vanadam			P 22	Of son	0 5	14 10	2.5	14.7 10	- F
/mr						7	}		j
Netals - 5// 846 6010B (Total) <u>µ2/L</u>						į		į	9
Aluminum		.,	200 97 1 1Q	Of 701	06+1	2.89) (2)	7 × 7	8,4
Antumony			٠ <u>.</u>	v į	0 4	٥ ٣	Ç <u>₹</u>	٠ ۲	ŷ ₹
Arem		•	•	e / - 1	2 2	C o xx	, (H	515	73.4 JO
Barum		•	56.51) S	? =	2 2 2	? ;	000) 12 2
Աւդքատ				7	Of 160	\$	å	Q	8
maimin)		35	0095 0005	5790	2440 JQ	JS50 JQ	8060	4740 JQ	4050 JQ
(AKINIII				or>	9	Q1>	÷.	⊕ •	2 JQ
cht.				711	57 30	\$7 JQ	₽,	24 10	a .
			10 <10	() - -	34 JB	9I>	917	01>	0 v
fron			23100	23400	9690	2960 J.C	1910	4	18800
1.c.ud		ī		ع د	C1 0326	3,000) [88	5 059	2120 10
Magne งเมพ		F		(187) 779	228	203	122	181	101
Mangares			Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q	₹	97	C40	() *	- 1	()
Mody Bachan			•	426 JQ	OHI>	47 JQ	(FO4)	45 JQ	<100
Day actual		~		5360	Of 00.61	QL 08.12	4850 JQ	3250 JQ	4430 JQ
- Carrotter				ø	\$: ن	: ۵	٠	٠
			10 <10	<u>=</u>	<u> </u>	0[>	910	010	07.5
Notion (Ň	_	16200	6730	0179	0.767	199(K)	(KE)CS
Unitherny			S & &	Ĉ 5	e ç	00 8 01	2 = 5	5 5) ; ;
/unk				į	2	2	Ì	į	Ì
Thefluen - SW 846 7841 (Dissolved) µ2/L. Thefluen			2 <2 W	42 UJ	O OI	4	₩ \$	۵	2 UI
Thallium - SW 846 7841 (Total) pg/L				:	;	,	,	,	-
Thallum			2 <2 UI	2 UI	<2 UE.	8	200	ğ	<2 01

FABLE E-7

SUMMARY OF QUALIFIED DATA - JULY 2002
UPPER WATER BEARING UNIT
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Defense Supply Center Rehmond
Richmond, Virginia

	ar di	Danceton	Sample	Duplicate AFIIADG-10	Sample DMW-13A	Sample DMM-20A	Sample DMW-22A	Sample DWW-25A	Sample DMW-26A
	Sample Date	I urut (a)	7/30/2002	7/30/2002	2002/17/7	7/30/2002	7/30/20012	7/29/20012	7/31/2002
Polychlorinated Biphenyls (PCBs) - SW 846 8082 ug/l			2	ž	< Z	V	ν.	۷ Z	<u>ک</u>
14 B 1016				ź	×Z	۷×	ν. V.	٧N	۷ ۷
[ACB] 2221			× ×	××	< ×	< Z	۷×	<z< td=""><td>Z.</td></z<>	Z.
MCB 12.0			VZ.	N.A.	۷ Z	۲ ۲	₹ Z	S :	S :
2777 G X			VN I	V.V.	< 2	< Z	< Z	< :	2 :
97C = 30			VN 1	< Z	۲ ک	۷X ا	S :	X X	< <
KE 126			VN -	< z	S	< Z	ć Ž	Š.	V
								;	į
Surrogate of			- NA	<z< td=""><td>۲×</td><td>< Z</td><td>< :</td><td>ζ;</td><td>Š ž</td></z<>	۲×	< Z	< :	ζ;	Š ž
ta cacinetonjunaja Teirachioto m ayk m			X.	V.N	ζ _N	Š	SZ.	Š.	Š
Sem Valade Oreanic Commounds - 5W846 8278C pg/L					:	į	2	7	Ž
Accaphthan				Z:	< :	ζ ²	2 2	C Z	ź
Accarphiliter				ζ <u>2</u>	< < Z Z	X	źź	ź	×z
Anthraca ia.				ŠŽ	V.	V.	۷	Š	٧X
Buno(a)anthracere				ζ.	<z< td=""><td>Y.</td><td>۷ ۷</td><td>Š</td><td><z< td=""></z<></td></z<>	Y.	۷ ۷	Š	<z< td=""></z<>
Betracial pyr. 18. B. exactations of the				Y	۲ ۲	×:	Ϋ́Z :	< :	≲ *
By payof children in the De				ζ.	ź:	< ;	< 2 Z 2	< < 2 2	£ 2
D. nzo (k) Huorantinan				S :	< 2	2 2	<u> </u>	<u> </u>	×.
Curticok				< < 2	< <	ž Ž	Š	ź	ž
Chrysen				C Z	Ş	ź	Š	ν.	Š
Unkazis hisathacm			0.2 NA	K Z	Š	₹ Z	ź	ν V	۷ ۷
I just an facility				S.	< Z	۷ Z	S Z	VZ:	Š:
Titural II				₹.	۷ : 2 :	ž i	Ž ž	< < Z Z	< < z
Nuphthal n.				Y :	< < 2	< <	< <	ž	ź
Phenanthum				< <	źź	ž	Ş	Š	ž
Pyr.n.				V.	<u> </u>	<u>.</u>			
£ .									
Surrogate - Se 2 + 4 Tubromonly not				ž	۷ ۷	ž	VN :	Ϋ́Z	ζ×.
2 4 to 1 minosity occurs				ν.	YZ:	ž ž	ζ.	<u> </u>	< <
2 Haveoph mil				Z Z	< × ×	2 2	ž	ž	ź
Niturk norm, ds				źź	: < : z	Š	Š	Š	N/N
Phanol dS			VN.	< Z	Ϋ́χ	V.	ν.	ν.	٧٧
ic rpla, b) i u i +									
Volatik Organic Compounds - SW846 8260B ug/l				Ě	7	~	7	7	V
1 1 1 2 Tetrachhoroctham			2,404	OK)	7 ₹	-	; ⊽	⊽	~
1 1 frk blouck thank			071>	<170	7	۵3	⊽	⊽	⊽
2,2-1c frachitotre, mane			1 <170	<120	7	۲,	⊽	⊽	⊽
1 (2) FIGURATOR GLISTA			ا ا ا	Or 89	⊽	د اء ع	O 5 0	Ÿ	⊽ '
1 DM House Boards			1 270	270	⊽	<u>-</u> 3	074 JQ	⊽	⊽ .
J. D. HANDLINE III.			1 <170	<1 7 ()	⊽	۵,	⊽	▽ '	⊽ '
1 Distriction of the property			1 <170	0.71>	₹ '	~ :		₹.	⊽ :
1.2.3.Tru, hkiropropun.			0/1>	2 2 1	⊽ -	~ ;	₹ 7	⊽ ₹	₹₹
1 2 4 Tru More bank no.			5.5	5170 170	⊽ 7	5 7	7 7	7 7	7 7
1.2.4. Frank thy the needs			7 4170	25	; S	27	; Ç	: 0	: 4
2 Dibrumo 3 chloropropane				3512	; -	· 🕏	; -	† ⊽	! ₹
1.2 Debramoc thane			Of 071	or osi	₹	£ 7	⊽	⊽	⊽
յ 2 Լիդինոնու ոշեր									
									Par

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Richmond, Virginia

			Comple	Dunffcute	Samule	Samule	Sample	Sample	Sample
	Sample 1D	Reporting	AEHADG-10	AEBADG-10	DMW-13A	DMW-20A	DMW-22A	DMW-25A	DMW-26A
	Sample Date	Lindt (a)	7/30/2002	7/30/2002	7/17/2002	77.5072102	1130/2007	700716711	400711011
			(1) 0/13	<170 U3	⊽	2	r 01 ≥	U 1≥	⊽
1.2 Dichlorocthank			2017	<170	∵		⊽	⊽	⊽
1.2.12k.likoropropara.			1 20	0/1>	⊽	<13	⊽	⊽	⊽
1 5 Jrmkihylkov, ne			0212	<170	⊽	£ 7	7	⊽	⊽
1 STANIOTON MATER			1 <170	<170	⊽	<u>-</u>	⊽	⊽	⊽
1 \$ Juli Divisioproplank			1 <170	<170	7	۲۱>	⊽	⊽	⊽ '
1 4 JA BUNTUR ALAR			1 <170	<170	⊽	٦.	~	⊽	⊽
2. 2. DACHRISPHEPAIN.			U 41700 UJ	<1700 UJ	c 10	<13 R	<10 01>	<10 UJ	<15 ×
Z-Bulgasoli,			1 <170	<170	⊽	د ا	⊽	7	⊽
2-C Diesentallich.			10 <1700 R	<1700 R	۱0 دا0	<13.R	<10 K	<10 R	<10 K
2-it v inots			1 <170	<170	⊽	<u>-</u>	7	7	⊽
4 CHOLOUCHAL III.			0.071> 0.1	<1700	₽	۲۱>	€	et e	₹ :
4 breight Kanadak			10 <1700 R	<1700 R	<10 UJ	× ∞	<10 K	<10 K	¥ .
William II.			1171	OZ1>	⊽	٦	₹	⊽ .	⊽ -
Delivery Revenuelle no ne			UZ1>	<170	⊽	٦	⊽ '	₹.	⊽ -
December 11 to 11 to 12			1 <170	<170	₹	<13	⊽	⊽ '	▼ .
Divinic and Office and Company Recognite blocoms of the			021>	<170	⊽	c 13	⊽ '	⊽ .	▼ -
DECEMBER OF THE PARTY.			1 <130	OZI>	⊽	<u>-</u>	⊽	⊽ '	⊽'
datumenta dan			2 <130	c330	7	7	4	۵.	3.
Conference count.			U <170	<170	⊽	~	⊽ :	⊽ :	₹ 5
Call Anticonstants			I <170 UI	<170 UJ	⊽	<13UJ	5.	⊡ . ⊽	G ,
(thursburg pt			1 <170	<170	⊽	<u></u>	∵ '	⊽'	⊽ ¹
Calabrate in the control of the cont			2 <330	3 €	a	<27	\$	۵.	7
Chleroform			UZI> 1	65 JQ	⊽	(I>	⊽ ;	- ;	₹
C blooms that			2 <330 UJ	<330 UJ	<2 UJ	<2.7 UJ	Z OZ	رن کې ر	42 UJ
Control control in the control in th			0.5 780	780	Ą	2	35	.	€ ·
cas 13 Da blacoproper			1 <170	5.	⊽ '	Ę,		⊽ 1	⊽ ₹
Pahramac Morons, thank			1 <170	c130	⊽ '	<u>.</u>	₹ .	⊽ 7	
Dibramankthuk			1 <170	6170	⊽ '		7 7	₹ ₹	₹ ₹
Dehloralituoromethane			2 <330 UJ	<330 UJ	3 -	77 O	5 ,	5 ,	5 -
i thythe rocuse			- <170	0.T⊃	⊽ -	· ·	⊽ ¬	₹ ₹	₹ ₹
He xare blossibutade in			0/17	2/17	₹ ₹	5 7	; 7	, √	; ⊽
Espirops the rivers.			277	E 7	7 ⊽	; ,	7	⊽	: ▼
חי) ארחיל לין אין ארחי				110 18	∵⊽	· -	⊽	7	⊽
As thykin chloride			0215	2/15	⊽	< t 3	⊽	⊽	⊽
n Butylk nare			170	<170	⊽	۲۱>	⊽	⊽	⊽
n Propile alan			1 <170	<170	S IV	<1 3 UJ	7	⊽	<1 UJ
Naphibaka R			U.5 <83	%	<0 ≥	\$	<0.5	₹	€.
() Nyk Dk. H. Lameston Bodin tok			0.21>	<170	⊽	<u>-</u>	⊽	⊽	⊽
p-tschripting			1 <170	<170	7	~	⊽	⊽	⊽
K. Duljukira.			1 <170	<170	⊽	۲)	⊽	⊽	⊽
Statistics of the state of the			1 <170	OZ1>	⊽	₹	⊽	⊽	⊽
K. (I-Bull) in M. (K. K. K			1 2800	2700	₹	<13	3.2	<u>~</u>	⊽
Leffactions are a			1 <170	o/1>	⊽	<13	⊽	₹	⊽
John IX.			0.5 < < \begin{align*} 3.1	£4>	₹ ₹	99 09	\$ \$	₹	₹
CLAID 1 TO THE CONTROL OF THE CONTRO			1 <170	<170	⊽	÷:	⊽ :	⊽,	▼ -
Tra hlorne like in			3100	\$20KI	⊽ '		71	4 4	⊽ ₹
Try thereflueromethan			2 <330 UJ	330 UZ	9 4	227.03	∃ ?	, 2	5 5
Vmylchkoruk			2 <430	9.5	7 7	7 7	7 7	; ₹	7 7
XyXnc (total)			0/1>	N 17	v	- 7	7	,	7

SUMMARY OF QUALIFIED DATA - JULA 2002
UPPER WATER BEARING UNIT
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Defense Supply Center Richmond
Ruhmond, Virginia

	Sample ID Sample Date	Reporting Linut (a)	Sample AEHADG-10 7/30/2002	Duplicate AE/IADG-10 7/30/2/02	DAW-13A DAW-13A 7/17/2002	34mpe DMW-20A 7/30/2002	DMW-22A 7/30/2002	DMW-25A 7/29/2002	DMW-26A 7/31/2002
Surrogate 55 12 Dicherchias 44 4-Bronelliuscob noer Differencollascom, than			108 108 107 107	H 98 5	106 102 103	801 18 501	166 83 102 92	95 50 80 80 80	81 81 701

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									- Janes
	Sample ID Sample Date	Reporting Linut (a)	Sample DAIM-27A 7/30/2002	Sample DMW-33A 7/17/2002	Sample DMW-35A 7/17/2002	Sample MW 112-2 7/31/2002	NW FOS-1 7/29/2002	NWFOS-3 7/31/2002	7/3//2002
FILL D PARAMFTER Divalved Overon - E360 Ling/L Divalved Overon		5	0.84	77	0.83	254	1 26	NZ 1	10.47
Ferrgus Iran - A.5500D mg/l Letters lean		0	0 10	50	70	=	=	ž	э
Oxidation Reduction Potential - A2580A niv			-31	101	, <u>%</u>	228	161	280	-147
<u>p.11 - p.150 i p.11 Umus</u> p.H			4 4 5	\$ 2	۳.۶	95 +	\$ 87	472	5.67
Specific Conductaince Specific Conductaince		160 0	860 0 10	0.202	90.0	#11 0	171 0	7£0 ti	0.444
Lemperature - F17 <u>01, deg C.</u> Lemperature		=	0.1 27	161	20 22	24 83	20.8	25.26	226
Turbidas E.180/1/0/14/ Turbidas			=	6	28 1	7.9	10.9	16.7	5 6 2
FINED BUSE LABORATORY ANALYSIS Amores MCAMM 300 3A molls C blonal. Nutar.		Đ	- 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0	\$0.4 <0.1 16.3 JH	11.2 JH 0.028 JQ 4.8 JH	139 U 15 9 L	7. ≙ 2. 2. ± 5.	4 5 1 2 1 2 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5	1 8 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Divadived Gases - RNK MOP-175 mg/l. Carbon dovide. I thans. I the ts. Methors.		0 1001 0 1002 0 043 0 003	200 200 32 <0.00H 33 <0.002 31 0.26	81 <0.0003 R 0.00038 R 0.093	72 <0.002 R <0.001 <0.001	69 <0.002 <0.000 0.0003y	46 1902 44 1901 44 1901	190 <0.002 0.003 11.29	440 <0.03 <0.03 0.51
Highogan by Mignoveps - ANI 20GAA nM		ä	0.03 2.2	7	2 8	99	23	5 6	26
Total Alkahmty - MCAWW 310 1 mg/L Fotal Alkahnty			S 18 JB	13 JH	=======================================	EII E 7	=	7.2 JH	<u>6</u>
Total Organic Carbon - SM846 9060 mg/l. Lotal Organic Carbon			1 13	-	⊽	⊽	⊽	E.	27
FOLA SUBAR TOTAL SUBAR			Or 28 0 1	⊽	⊽	OF 59 (I	⊽	⊽	0 12 JQ

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SUMMARY OF QUALIFIED DATA - JULY 2002 UPPER WA FER BEARING UNIT Annual Groundvater Report - October 2002 Operable Unit 7 Dafense Supply Center Richmond Richmond, Virginia

								1	Counts
	Sample ID	Reporting	Sample DMW-27A	Sample DMW-33A 7/17/2012	Sample DVIW-35A 7/17/2002	Sample N1W112-2 7/31/2002	Sample NIW FOS-1 7729/2002	Sample MWFOS-3 7/31/2002	58thp4c MWFTA-1 7/30/2002
	Sample 17ate	Callut (B)							
<u>Mercun - SW&46,7470 A (Dissofred) 100/L.</u> Manury			⊽	⊽	7	⊽	⊽	⊽	N 1>
MKRUIT - SW 846 7470A (TOUR) HE'L. MKRUIT			⊽ -	⊽	7	⊽	⊽	⊽	- I OI
Metals - Swyde Gillub (Dissolved) 112/L		i		C C C C C	2	9	9	Ot 871	346
Alummam		17	200 200 200 200 200 200 200 200 200 200	} ````````````````````````````````````	2	\$ 5	۵	ัง	ኄ
Antimony				\$	В	Ŋ	∵	24.4	æ ;
AFKIDK		7		93.5 JQ	30.7 JQ	Of 90€	154 JQ	?` ₹	242
Barrum R. relinim			•	14 JQ	~10 -10	er *-	o °	€,	€ 5
Cadmum				ઝ	Ø :	7	2 3	130 12	INISO2
(alk not)		86		14300	3400 JQ	3460 10	9)C8/	2 07	91
Chromom			32 JG 97 07	012	- T	- T	, ₂	2 JB) to JQ
Cobalt				GI 600	17.18	012	₹	24 JQ	ol>
Cepper		Č	0881	5770	1210	879	579	3920	0.299
Iron		•		v	0	Ф	₽	\$ \$	ς
Evad		50		10700	2460 JQ	2830 JQ	8320	Or 0961	28500
Magna storm		•	20 10 8 JQ	[63	512	59.2	49.5	1 59	SI0
Mungura se				<40	<40	O+>	15 4 JQ	₹ :	.
Nation (National National Nati		-	Of 15 001	<100 <100	<100	59 JQ	9017	<100 × 100 ×	
Part security		9		OF 084	3300 JQ	2890	6840	Of 0102	<u> </u>
				ზ [:]	Ŋ :		o ₹	ο ₹	τ ₹
Silver		i		010	il>	010	01 2	9 (B)	(XI)
wydun.		35	5000 4740 JQ	8170	26 JG		£ 95	§ \$	<u> </u>
Unitation			00 00	270 2	, ₂	₹ ₹	21.9	121	, <20,
/IR				}	į				
Metals SW846 6010B (Total) up/L		•		3	5	318	Of 1 69	155 JO	366
Aluminum		7	610 007	3 4	· '	7	, ,	ζ.	₹
Алічану			7 7	\$ 50	8	70	*	26.7	15.1
Arkink		r,	Of 011 002	Of 6.98	Of 106	Of 610	OL 871	Or 411	21.2
Baltum			5	13.30	01>	1 & JB	₩.	₽,	€,
DAT) HAMIN				♥.	₽ :	0.29 18	8	2 mar.	7 5
(Lakion)		×		00[1]	Of elect	2 € ₹	0000	7 17	010
Chronitum			7 8 7 04	610 11.77 IR	E *	43 18	; €	19.10	15.30
Cohall				- Feb.	2.2 JB	100	(I)	25.2	==
Copper		,,		53(4)	1220	0181	077	3880	6780
lron .				۳	۲	\$	∵	7	٥
		7	(X) 1460 JQ	9540	2410 JQ	2900 10	8240	Or oth	28.4(8)
N Consult of			20 109 JQ	153	56	. [9	49.1	4.5	= =
Moh Mak num				OF.	9 ;	a₹ 7)r s.	₩ ₹	- S
Nukel Nukel		_ ;		(E)[>	21 15 21 2	2009	0875	STEASURE STE	25011
umission		7	7 no/7 no/8	کار اولارا ا	2r 0175		\$, 'S	\$
), Linum			7 =	; ₹	; =	; €	# N	=	0. 10.
Silver		ÿ	Ť	26.46	2400 JO	Of Ober	1615	6240	14500
Systim System		7		Of 20	3	ê	0\$>	<\$0	12.10
Vanadram			20 <20	<20	²² 0	05 05	Ę	9812	<20
/IR									
[hallum - 5 W 846 7841 (Dissolved) 112/L Tradium			2 <2 UJ	IJ ⇔	7	<2 UJ	4	<2 UJ	Ç
Man Man T and the state of the									
Thallum - 5W 840 /841 (10/21) D.L.			2 4 WJ	≥ UI	42 UI	<2 UJ	4	<2 UJ	<2
I Pallicus									P.11gt. 7

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			Sample	Sample	Sample	Sample	Sample	Sample	Sample
	Cl ample (1)	Reporting	DAIW-27A	DNSW-33A	DMW-35A	AIW [12-2 7/31/2012	MW FOS-1	MWF0S-3 7/31/2002	N1W FTA-1 7/30/2002
	Sample Date		-						
E Salle Me (S.) Cabber 1									
Polychlornated Riphenyls (PC 185) 533 546 5452 1121.			2	Š	٧X	VN	۷ ۷	×	⊽
FLB 1016			Ž	ž	×z	٧X	٧×	×	₹
K.B. 1221			× ×	ź	Ϋ́Z	Ž	ž	۷×	⊽
17 B-12 S			Ϋ́Z	VZ	Š	۲ ۲	VZ	٧X	~
250 277			NA 1	VZ.	< Z	V.	×z	×N	⊽ '
15C S M			VN -	٧X	ς Ν	٧×	< Z	< Z	⊽ .
14.B 1260			₹ -	ζ Z	< Z	< Z	Š	S Z	₹
Surrogate 2				Z	Š	VZ	VN	۷ ۲	₹.
Decade the composition of the co			VZ 1	VZ.	۷ ۲	VN	٧×	×	112
Transmitted III-55 bear									
Som Volatile Organic Compounds - SW846 8270C µ2/L				2	2	2	Š	ž	0.066 R
Accuaphthen				Y Z	<u> </u>	: ×	ž	ž	<0.2 R
Actuaphthykin				5 Z	Z Z	×	ź	×	0.057 R
Anthraceixe				Z.	×	٧X	Ϋ́χ.	VN	<02 R
Ben/o(a)				V.	٧ ٧	×	ζ.	Ÿ.	<0.2 K
Bunotalpyrene				٧X	۷ ۷	ž	Š	< Z	412 K
B. resolutional milk riv				٧X	٧×	Š	ζ Z	Ϋ́	€ 2 R
Denote the second allowers and the				VN	۲ ۲	۲ ک	V V	Ϋ́Z	₫.2.k
Carbusal				VV	۷ X	۷ N	YZ :	V.	<0.2 R
				Ϋ́	۷ ۷	V.	Ź:	ž :	<0.7 ×
District (h)unthracum				< Z	V.	¥.	Š:	Š.	<0.2 K
Thorantha			O 2	X :	X z	< <u>*</u>	< ×	Š Ž	3 7 CO
I lyon as				۲ :	۲ د	< 2 2	5 2	. ·	200
indiant 2 tedipyr in				< < z, 2	< × ×	ζ Z	< <	č Z	2 C S
Naphthak n				< z	ξ χ	<u> </u>	Š	ž	\$ 5 K
Phraziutrcik				ŠŽ	: < : Z	×	Š.	Ž	<0.2 R
Pjra				<u>:</u>		•			
Surroguer - 7			VN :	VV	Ϋ́N	Ϋ́Z	< Z	V.	≘ :
2 The subject of				VZ	۷ ۲	Š:	ź:	ž :	÷ ;
2-Fluorophand				Š.	Š:	<u> </u>	V 2	Z 2	¢ 5
Numbers and a				Z 2	V 2	\$ 2 2	2	Z	× ×
Phani d5			< × ×	< <u> </u>	S S	Ź	Š	ź	æ
Feighem 3-d14									
Volatile Organic Compounds : 53/846 8260B µP/L				;		•	,	2330	,
1 1 1 2 Terrachbrowthans			- ·	585 5	⊽ ¬	₹ ₹	⊽ ₹	Q (₹ ₹
1.1.1 Try. hkirto, than			⊽ ¬	(XX)	7 7	7 7	; 7		, T
1 1 2 2- Letrachlores thank			,	£ 5	; T	, ¬	∵⊽	<330	; ⊽
i i g- Frethorwithans			7 7	Ē	; 7	. △	⊽	<330	-
1 Ducthern thank			7 7	25	; ₹	⊽	⊽	<330	. ₩
1 Decibroctions			; ¬	£30	₹	. △	⊽	513€	⊽
1 (-1)th histopropert			; v	£8	⊽	~	⊽	€£\$>	⊽
1 2 3 Truchioropeanus				£	⊽	⊽	⊽	6730	⊽
2 to the manufacture			7	£\$	⊽	₹	⊽	<330	~
1.24 FIXING COLUMNIC			⊽ -	€93	⊽	⊽	⊽	<330	⊽
1 2 Theorem 3-thoughton			2 <2	<170 UJ	<2 UJ	3	2	0/9>	\$
1.2 Dibromos than			⊽ -	683	⊽	⊽	⊽ .	<330	₹ .
1.2 Dy historia na ra			▽	<83	⊽	⊽	⊽	€13	⊽

SUMMARN OF QUALIFIED DATA - JULN 2002
UPPER WATER BEARING UNIT
Annual Grounds safer Report - October 2002
Operable Unit 7
Defense Supply Center Rechmond
Recinsond Virgina

			Sample	Sample	Sanple	Sample	Sample	Sample	Sample
	Sample ID	Reporting Limit (a)	DMM-27A 7/30/2002	DVIW-33A 7/17/2002	DMW-35A 7/17/2002	MW 112-2 7/31/2002	MW FOS-1 7/29/2002	MWF0S-3 7/31/2/02	MWF1A-1 7/30/2002
			= 7	180	÷	⊽	E	38	7
1.2-Dr. lilotor, thank			5 -	3	; 7	₹	⊽	<330	⊽
1.2-Dichloropropane			; T	8	∵⊽	⊽	⊽	<330	⊽
1 % Transally its mark			7 V	<83	₹	⊽	⊽	<330	⊽
1 - 1 DA DROGORA CAZETA 1 - 3 Tue blossocieta con			-	£8>	⊽	⊽	₹	<330	⊽.
1 4 D. Blymak nozake			- -	()	⊽	⊽ '	⊽.	9	⊽ ¬
2.2 Dachburopropain			¬ :	6	∀ ₹	·	- F	UK. >	7 O
2-Butamon,			10 01	(8.10	7	2 7	S = V	0.12	∵⊽
2 Chlorotolaca.			- E	. S. S.	7 =	≅ 8	; = \ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \	<33H) R	<10 R
2 Hevanon,			101	\$: ¬	₹	⊽	0£1>	⊽
4 Chlorototis n.			07>	C830	9	91>	<10	<3300	OH,
4 ALIB) (2 Pantanora Antono			10 13 R	<830 UJ	141	<10 K	<10 R	<33km R	۲ ۲
Basis			1	<\$3	⊽	⊽	⊽	C330	⊽ .
Bringoh da de			⊽ -	<83 83	⊽	₹ '	⊽ ′	⊋ ;€ ?3	₹ ₹
Browner Huse			⊽ -	<83	⊽	⊽	⊽ .	₹ ?	⊽ •
Bromode blerom than			⊽ -	£83	⊽.	⊽.	⊽ 7	₹	⊽ 7
Вготовы			~ ·	E# (#	⊽ '	⊽ 5	⊽ ং	9 F	7 (
Bromoth thatk			c; -	<u> </u>	7	7 0) 7	3.65	; ⊽
Carbon drullade			⊽ = -	£ %	7	7 =	; 5	C) 0.05>	i P
Curryon is trachborned			3 7	2 2	; ⊽	-	⊽	<130	⊽
Chlorekatark			. 7	0/1>	7	77	Q	(1/2)	ಶ
(Thoron thank			· ¬	183	⊽	⊽	⊽	<330	⊽
C INVESTIGATION OF THE PROPERTY OF THE PROPERT			2 <2 UJ	<170 UJ	42 UJ	⇔ 01	<2 UJ	(0 0/9>	<2 UI
CHROTOTHE Library.			0.5 <0.5	1808)	950	φ.	\$ \$	11000	043 JQ
CN 12 Oxford Scriment			~	<83	⊽	⊽	⊽	<330	⊽ .
The way the fact that			⊽ -	83	⊽	⊽	⊽	330	⊽ .
Distriction of the control of the co			⊽ -	<83 83	⊽	⊽	⊽ :	æ: •	⊽ :
On the redulation in the contract of the contr			2 <2 UJ	×170	\$	m .	G 2	Ω #¥	m -
וויאואישיישי			⊽ -	£ :	⊽.	⊽ ?	⊽ ¬	066	⊽ ₹
He var interchatada na			v -	£ 5	7 7	₹ ₹	√ √	257	; 7
hapiupalkanala			⊽ ¬	G 5	⊽ ₹	, 7	7 7	77	7 7
m-tykm & p-tykm			, t	- E	; ₹	; ⊽	⊽	Of IIS	⊽
Methykin chiarde			. T	**************************************	⊽	⊽	⊽	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	⊽
p Butytk.na.na.			~ 	(%)	⊽	₹	⊽	OF 1>	~
n stropuna secure			~	LU F%>	rn I>	II >	⊽	ረህ ወደ ነ>	3.2 J
A VALUE OF THE STATE OF THE STA			0.5 <0.5	<42	\$ 0	\$	ê.	2. 17. 12.	₹
n-1-ymmpy liptur it.			√ -	<*3	⊽	⊽ .	⊽ ′	⊋ ;	₹ .
Act Burylk nzene			⊽ -	\$ ·	⊽ .	⊽ -	√ .	₹	⊽ 7
7.17C PC			- -	£ :	⊽ .	⊽ -	⊽ 7	915	⊽ 7
ter Buylknan.			⊽ .	÷ ;	⊽ ;	⊽ ¬	⊽ 7	965	⊽ ¬
Terrethornethens			⊽ :	<u> </u>	× 7	⊽ 7	⊽ 7	2 S	₹ ₹
Tolac as			7 7	(F)	7 5	; =	7 ₩	01 89	₹ ₹
train 1.2-Da blaroastucie					; V	⊽	⊽	€3.30	⊽
trans 3-Da Moroprupane			7 🔽	2000	3.1	⊽	⊽	8400	⊽
The files with the			2 <2 UJ	0.21>	7	<2 UJ	<2 UJ	(U 11F9>	<2 UJ
Francisco de la contraction de			2 43	<170	\$	A	\$	380 JQ	\$
Vinish Citizen and			▽	(8)	~	⊽	⊽	O£\$>	⊽
Ayk R. S (101ab)									

SUMMARY OF QUALIFIED DATA - JULY 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Reinmond
Richmond, Virginia

	Sample ID Sample Date	Reporting Linut (a)	Sample Dv1W-27A 7/39/2002	Sample DNSW-33A 7/17/2002	Sample DMW-35A 7/17/2002	Sample MW112-2 7/31/2002	Sample NTW FOS-1 7/29/2002	NIWFOS-3 7/31/2002	Sample MW FTA-1 7/30/2002
Surrogate - 54 1 2-13x bions, it ins-d4 4-Bromaillauck, ix, ix, Dibromelluerons, ilans,				100) 82 101 92	102 81 101 89	109 82 105	109 80 105 92	10t 82 100 93	80 70 70 80

TABLE E-7

SUMMARN OF QUALIFIED DATA - JULY 2002
UPPI R WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defines Supply Center Richmond

		Operaci Defense Supply (Richmond	Defense Supply Center Richmond Richmond, Virginia	77					
	Sample ID Sample Date	Reporting Linut (a)	Sample VIWFTA-3 7/30/2002	Duplicate NIW FTA-3 7/30/2002	Sample MW FTA-5 7/17/2002	Sample MW FTA-7 7/29/2002	Sample MWFTA 9 7/17/2002	Sample MWFTA-10 7/17/2002	Sample MW FFA-23 7/31/2002
FIELD PARAMETER Dwolled Oxigen - F360 J.mg/L Dwolled (typen		9	_	-	0 86	2 68	8£ 0	265	16.97
Ectrous Iron - A350010 mg/L Ectrous Iron		10	2	o	\$0	-	=	=	÷
Oxidation Reduction Potential - A <u>2580A mV</u> Oxidation Reduction Folential		:	;	54	52	=	189	tit.	7
<u>րվ - 6 150 1 ը() Մոստ</u> րժ		ŧ	3	2.	90 9	24	\$ 26	5.7	4 46
Specific Carductan <u>ce - F 120 1 mS/cm</u> Specific Conductance		190 0	S1 0	0.15	0.074	- 0	0 068	0 094	0.211
<u>Jenderalure - E170 I deg C.</u> Temperalur.		10	61	<u>6</u>	169	21.1	182	1815	19 26
Furbidity FIND (ATU		-	2.9	2.9	ъ	911	8 9	34	121
PINED BASE LABORA TORY ANALYSIS Anions - MCANYM 300 3A mg/L. C blonds. Nitale			7.17 6.1 7.9	HL 988 1 0> 01	46 JB 44 I 63 JH	7.2 0.02.3Q 19.9	63 JB 40 J 8 JH	43 JB <01 62 JH	78.6 60.1 70.18.10
Dissajted Gases - RSts \$01-175 mg/L. Carbon dioxak 1 thats. I the rs. Mathans.		0 001 0 002 0 001 0 001 0 001	100 <0.002 <0.001 0.036 J	40 002 40 001 40 001 0 026 J	40 <0.002 R <0.0001 R 0.00071 JQ	56 40 002 40 003 40 003	54 <0.002 R <0.001 R <0.001	34 <0.002 R <0.001 R 0.00064 JQ	260 <0.004 0.0072 0.22
Bydrogen by Microscept - AM20GAA nM Hydrogen		600	23	22	1 2	2.1	13	51	<u> 4</u>
Total Machinity MCAWW 310 I mg/L Total Alk danty		•	28	æ	24	\$	11 11	7.	23
Total Organic Carbon - 538 846, 9060 mg/L. Total Organic Carbon		_	7	7	⊽	_	-	~	23
Fotal Suffide - MCAWW 376 Ling/L. Fotal Suffice.		-	क्ष क	Or at 0	⊽	⊽	⊽	v	⊽

FABLE E-7

SUMMARY OF QUALHEID DATA - JULY 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Pefers Supply Center Richmond
Richmond, Virginia

	(I) aldines	Reporting	Sample MWFTA-3	Duplicate MWFTA-3	Sample NIWFTA-5	Sample MWFTA-7	Sample MWFTA-9 7/17/2012	Sample MWFTA-10 7/17/2002	Sample MW FTA-23 7/31/2002
	Samph Date	Linux (a)	1130070071	TOWN FRANCE					
Mergin - SW846 7470A (Dissolved) pg/L		-	7	⊽	⊽	⊽	⊽	7	⊽
Meteury		-	;	i					
Mrrun - SW846 7470A (Todd), pg/L. Mrrun		-	⊽	⊽	⊽	~	⊽	⊽	⊽
Morella SW 816 S00011 (Discolated) and									
Aluminum		200	Of 15.1	1117	Of 96	765	5. ₹	78.1 JQ	' '
Antonony		v ~ (٥;	v :	۲ ⊽	۲ ۲	۲ ۲	5 3	. 16
VINDA		•	2 5	1 1 1 2 2 2	305 (5)	01 299	3 97	07 (9	, 64 C64
Вытип		007) (2)	DI 681	2 2 2	7 6	? = ?	(-)	16.18
Bertham		E () (÷ (3	7 7	V	V	O.3 JB
minute)		STAN	Š	or ove	Of arts	OL UPES) III II	OF 0757	OF 0561
Cakrum		3	-	01>	<10		<10	0l>	o1>
(Incinium		. e		₽,	0.96 JB	Of 95	18 38	8F 1 i	DI 7 II
(oball		2		91>	2 JB	0I>	5.2 JB	<10 OL>	ÇŢ.
Culpper		200	07-9	1660	859	<200	114 JQ	21149	36900
lion .		•		∵ ~	۶	۶	۶	45	۲
		(KX)5	ನ	QL 0802	2670 JQ	Of 0998	JS60 JQ	3420 JQ	(57)
Multiple States		20		46.5	48 x	8 94 8 8	26.1	20.5	123
A full bit anno		07) } >	×40	()	040	6 ₹2	0 † √
New Transfer of the Party of th		300		001×	×100	42 10	01V	×100	DI 700
Par Isan		SIKK	₹	4540 JQ	33 J	Of 0191	2120 10	3 €	Of 017
i kanaa		φ.		' 0	ζ.	φ:	φ:	° 3	Ç ÷
13/17		=		<u>0</u>	9 ₹	×10	1	0 0	010
Sodium		S(XX)	20600	22000	2840	2200 30	Of a sp	DCO20	1060 T
Vandum		.		§ ₹	95 F	₹	Ž ?	Ĉ	91.61
Zink		20		(7)	07>	Ō	7 (7	3	9
Metals 538846 6010B (Total) ng/L							•	į	ţ
Ahanimin		200	268	20%	66.5 JQ	(X6Z	125 JQ	\$76	167
Ablunon		ς.		Ş	Ø	۰ ۲	ζ,	v ;	٥:
当けて		5		5.2.1	٠	; ۲	\$ \$ \$) : : :	÷ ;
Вытип		002 ·	- j) 100 100 100 100 100 100 100 100 100 10) (1) (2)	2 :	Of sar) (7 c	701 10 9 1
Berllum		= *		<u> </u>	<u></u> 7	2, 5	?	Ş	Ç
C.idmum		7	3 E	311711 12	OF OUR	22181 10	2060 10	4420 30	Of ores
(akatan		and the state of t) = N	2017	2 = 2		, E	×10
С Вголиция		2 2		07.68.0	8f 8 f	54 30	2 3 JB	115 113	Of 901
C obalt		<u> </u>	-	\$ 0!>	<\$0.0U.	<10	81.10	< IO UI	○I>
Copper		200		1760	732	<200	£	580	HKILL
lion.				₽	5	٧	2.7 JQ	₽	٣
יין נייום		(KXX)		2120 JQ	20(N) JQ	Of 0895	DF 0851	Of 0298	6510
Mark dura		20		47.7	48.7	67.8	1 72	%0 4	428
Market in the contract of the		8		(*	<40 <	₹	9	₹	(
National Control of the Control of t		001		NI>	<10X)	3.5 E	(X)[>	(6) ×	OF 901
Halvelog		SURK	47	4530 JQ	740Ki JO	Of 4851	2150 JQ	ense Jo	Of 0225
Solum		~		٥	Ç	Ç :	Ç [‡]	Q ¹	Ç
		2		د ا ه	Ç	<u>0</u>	Î,		
E REAL PROPERTY		SCKKL		22900	477u	2120 10	4620 JQ	6270	7070
Enland		05	05>	Ŷ	05°	₽;	0 V	₹ ;	E 4
/IR		20		<20	(5	7	.	Dr v Cr	711
The therm - SW846 7841 (Dissolved) ug/L								,	,
Thillium		2	. 2 W	2 2	7	8	5 %	5 0 1	52 M
Challian - SW846 7841 (Total) ug/L								;	
Thellum		2	2 UI	<2 UI	<2 UI	7	\$	<2 bi	<2 UJ

SUMMARY OF QUALIFIED DATA - JULY 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

								1	Sample
	Sample ID:	Reporting Limit(s)	Sample MWFTA-3	Duplicate MWFFA-3 7/30/2002	Sample MWFTA-5 7/17/2002	Sample NIW FTA-7 7/29/2002	Sample MWFTA-9 7/17/2002	Samps: NIWFTA-10 7/17/2002	7/31/2002
	Satisfic Date	(0)							
Mary Children and District of Children (1907).									
TOLKING DISTRIBUTED IN THE PARTY OF THE PART			⊽ -	~	VZ.	ž	< Z	٧X	< :
1000-1000 1410-151			~ -	⊽	VV	Y X	< Z	Ž:	V :
K.B (3)?			>	⊽	< Z	×z:	K :	Z :	× ×
16.0 13.5 16.0 13.5				7	×	< Z	X :	Z :	ζ γ
81 CT 81 XT				⊽	ź	×:	ž:	<u> </u>	× × ×
			⊽ -	⊽	< Z	< Z	ź:	VZ :	< *2
PCB 1260				⊽	< Z	< Z	Š	Š	
								:	:
Surrogass 78				42	٧X	×	Š	Š.	×:
Telestropikary Tetrachierom-syken			- 78	<i>\$</i>	V.	V.	۷ ۷	₹ Z	Š.
Sem-Valute Organs, Compareds - \$11846 8270C ug/L						;	;	į	ž
Accomplished				40.2 R	۷ ۷	۲ ۲	ź:	Š:	ς : Σ
An englished to				₽ 5 5 8	×Z	< Z	ζ:	Š.	S :
Anthracia				¥ ;	¥:	ź:	Š.	<u> </u>	< <
Benzo(Janifirace Pe				40 2 K	Z :	Z :	S 2	< ×	Š Ž
Веплицирують				¥ ;	Z Z	< <	ć ź	ξ <u>2</u>	Z Z
Веплеф)//шоглафеве				402K	< 2	< <u><</u> 2	< - 2	S Z	ž
Benza(ghi)perykin				7 (0)	Ç Z	: < 2	ź	×	×
Benzu(killuoraniben.				7 5	<u> </u>	ž	ž	×z	×z
Curbazok				2 2 7	ž	V.	×z	Ϋ́N	V.V.
Chlysia				€ 5 %	×z	VZ.	NA NA	۷ ۷	Ϋ́
Ethen (a h)anthracene				<0.2 R	۲ ک	ζ.	۷ ۷	< Z	×
I DUCKLISTING IN				<0.2 K	×z	Š	< Z	Š	٧ ٧
Figure 10.				<0.2 K	Y.	٧	۷ Z	VZ :	Z:
Nachthalia				4.2k	×Z	Š:	X :	Z :	ž ž
[4] ranshir re			02 <0.2R	428	ž:	ζź	Σ 2	Ç Ş	<
Para				<0.2 K	< Z	Š	Š.	Y.	×.
Surrogate - %			7.1	99	٧X	ž	ς Ζ	٧N	×Z
2.4 fs Enthiomophicason				8.8	V.	Š	V.V.	V.	VΝ
2. I moreovate med				6.7	VV	Ϋ́Ν,	VN	<z< td=""><td>Š</td></z<>	Š
Newspace P. 15				6.6	Υ Z	Š.	×:	Š.	ž:
Ph. 101-45			; **	8 9	Z:	S:	Š i	Š i	X :
եւրև ոյ վե				*	Š	V.	É	Š	Š.
Volatile Organic Compounds - 5W846 8260B µg/L					•		•	•	NAME OF THE PERSON OF THE PERS
1112 fetrachloroctham			⊽ .	. .	⊽ 7	⊽₹	⊽ √	, 7	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
1.1.1 Inchere than			⊽ ₹	- -	⊽ ₹	₹ ₹	7 7	<i>7</i> 7	C5(00)
1 1 2 2-1 crachlorae than			⊽ ¬	7 7	J 7	7 7	7 ⊽	, √	5000
1 1 2 Inchlored thank			01 690	. 7	, ,	; ⊽	. ₹	; ₩	<5000
t I Dichlorocthanc			- 202	01.67.0	₹	: ▼	⊽	₹	<\$0HH)
1 I-Dichloroethem				¥ 	∵	∵	⊽	⊽	<500H)
1 Dachkoropfup.m.				7	⊽	⊽	⊽	~	<5()Y()
1.2.4. FREDOMENTALIN.			▽	† >	⊽	⊽	⊽	⊽	<5000)
2			7	7	⊽	⊽	⊽	-	<5000
1.2.4.1 Killing the state the			~	₹	⊽	⊽	⊽	₹	<5000)
1 2 A THOROGON 3 Chloropane			2 <2	429	42 UI	Ç	5 M	5 CI	< loans
1 2 Difference than			- -	*	⊽ '	⊽.	₹.	⊽ -	SINIO
1.2 Dr. Horobanasas			∵ -	7	⊽	⊽	⊽	⊽	< N(XX)

SUMMARY OF QUALIFIED DATA - JULY 2002
UPPER WATER BEARING UNIT
Annual Grounds site Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virgina

			9						
	4	1	Sample	Duplicate	Sample	Sample MW FTA.7	Sample MW-TA-9	Sample MWFTA 10	Sample MWFTA-23
	Sample Date	Reporting Linut (a)	7/30/2002	7/30/2002	7/17/2002	7/29/2002	7/17/2002	7/17/2002	7/31/2/102
			:			:	,	7	(0),005
1.2 Dichlorise thans			(A)	Ω÷. ▼	⊽ -	3 -	J 7		CACA V
1.2 Dachtoropropuna			∵ .	₹ :	⊽ 7	⊽ ₹	⊽ ₹	7 7	(0.05)
1.3.5.1 rimethylbenzen			⊽ •	7 7	5 7	7	; 7	; 7	
1 3 Okhlorok na ik			⊽ ¬	* 7	₹ 7	7	; 7	; ⊽	O(KI)\$
1 3 De hloropropan			⊽ ¬	* ¬	7 7	; T	; 7	; ⊽	<50NO
1 d Dichlordhanch.			7 T	, ,	; ₹	; ₹	; ⊽	7	<500X)
2.2-4 Ar. Blotspropunc			7 15 15	1417	; 2	<10 UJ	Ę	01>	<51XXXI R
2-Bullings.					⊽	⊽	⊽	⊽	<\$800
2-4 Moratolarik			- 10 K	. ~ 7	; 0	<10 K	Oi>	<10	SINNN R
Z-Ftc Kallsoft			* \(\tau \)	7	⊽	⊽	⊽	⊽	<5(NK)
4-Crocoscolucia.			0 >	V 14	9	<10	<10)l>	<50000
4 brenyt z pentanon. Azana			10 <10 %	3 y R	<10 U)	<10.8	<10 UJ	<10 UJ	<50XXQ R
B. D. D.			⊽	<u>^</u>	⊽	⊽	⊽	⊽	OKKI\$>
Brenasta			7	~ 7 √	⊽	⊽	⊽	~	<51XIQ
Briggs history			 	7	~	⊽	~	⊽	<50()05>
Brunodk florum thate			⊽ -	7 ▽	7	7	⊽	⊽	<<0(X)
Визипатоги			▽ -	7	⊽	⊽	⊽	⊽ '	(X)(X)
Brymon, than			2 <2	<2.9	۵	Q	₽.	a .	<1000)
Curbon disultate			▽	4 1	⊽	₹	₹ '	₹ '	CACK)
Carbon Istrachloride			1015	<14 UJ	⊽	rn .	₹ '	⊽ .	<0000 CE
Chlurobyna r.			⊽	<1 A	₹	⊽ '	⊽ '	⊽ '	2000
Chbroullane			2 2	42 9	\$	7	۵.	۵.	<1(K)(K)
Chierotorm			▽	▼ :	⊽	⊽ :	⊽ :	⊽ ;	CX(RX)
(hloromethan)			2 <2 UJ	79 UI	₹ 00	70 CZ	<2 UJ	2 CO	CTIMARI O
(15-12-Duhlorauthum		•	0.5 38.1	78 1	Š	S (\$	6	\$.	14(KM)0
cus-13 Dachloropropen			⊽ -	7	⊽.	⊽.		⊽ -	-FORK)
Dibronne, blorottethane			⊽ .	<u>~</u> .	⊽ ′	⊽ -	⊽ 7	⊽ 7	CSINNI SERVIN
Dibronom than.			⊽ .	+	⊽′	₹ .	⊽ ?	⊽ ৢ	TIANKS III
Dichlorschiltworoms thans			7.07	IO 6.7>	7 -	65 -\ 75 -\	7 7	7	CO (NUMBER OF A STANK)
l thyth nam			⊽ ¬	* 7	₹ ₹	7 7	7 7	7 7	CEOS.
He and bloombutted and			7 7	7 7	7 7	; ⊽	; ₹	; ⊽	<5000
Expropy Indix (R			; -	. ⊅	⊽	⊽	⊽	⊽	<\$000
III A) M. R. C. A. C. A. M. R. A. A. L. C. A. C.			~	0.87 JB	⊽	⊽	~	⊽	2100 JQ
Artificial Comments			▽	^ 4	⊽	⊽	⊽	⊽	<school< td=""></school<>
n Prominent in			¬	7	⊽	⊽	⊽	⊽	<\$000
Naphthak m			~	7	T3 ₹	⊽ :	(n >	fn ⊽	<5(K)O UJ
0 (1) km		-	US <0,5	<0.72	40.5	₹.	\$0	505	<2500
ր Իսրոսիչևսխութ			₹ -	<u>^</u>	⊽.	⊽ -	⊽ 7	⊽ -	(S)(S)
sex-Buly the fix the			∵	<u>^</u>	⊽ 7	∵ 7	⊽ 7	₹ ₹	(MX)C
Mynn			⊽ ·	V 7	⊽ 7	⊽ ¬	⊽ ₹	⊽ ₹	A CANA
tert-Butylkenzere			⊽ : - :	7 7		₹ -	7 7	7	C TOTAL
First block the re			4.	⊒ :	₹ ⁻	⊽ 7	⊽ 7	⊽ ₹	ano.
1 olum.				÷ .	⊽ :	⊽ ;	⊽ ₹	⊽ ;	Olive
tran 1.2 Dichlorouth, ac		_		9/0	Ç ₹	ê	ςη, (1)	()	(X)CZ>
trans 1.3 Ox hloropropene				† :	5 7	⊽ 7	₹ ₹	⊽ 7	OFCO ICS
Truchlores them.			77 - 7	81.00	۶ ټ	₹ ₹	ς γ	₹ γ	DI (2007)
Trichlareomethalic			ק ה קייניייייייייייייייייייייייייייייייייי	3 5	7 (, ,	; ;	; ;	400 10
Vinyl chilentic			7 7 7	7 7 7 7	7 5	7 7	7	7 7	Or Own
Xykmen (total)			; -	;	;	;	•	•	

TABLE C-7

SUNIVARY OF QUALIFIED DATA - JULY 2002
UPPER WA 1 FR BEARING UNIT
Annual Groundwater Riport - October 2002
Operabit Unit 7
Befense Supply Center Rehmond
Richmond, Virginia

	Sample ID Sample Date:	Reporting Limit (a)	Sample MW FTA-3 7/30/2002	Duplicate MW FTA-3 7/30/2002	Sample MWFTA-5 7/17/2002	NWFTA-7 7/29/2002	Sample MW FTA-9 7/1//2002	NW FTA-10 7/17/2002	7/31/2002
Surrogate . 9				!			ì	101	3
- 3 18 phone - 4 con 2 c			991	<u>=</u>	105	=	<u> </u>	1	67)
ב-וכעיוווע וויקונו כן			ř	8	£	98	ź	2	32
4 Bromofluorop name			:	210	:	1	1 3	3	-
Distractional Investment of the contraction of the			: =	<u>=</u>	3	<u> </u>	<u>=</u>	701	į
Color of the			<u>-</u>	16	닭	47	20	06	b

PRI PARI D/DATI RMB 6/14/03 CHI CKI D/DATI JAH 6/05/03

procedures with the rice thanking mends sample volume extracted and analyzed. Sample repering timits may vary due to sample software/weight extracted and/or sample dibrious. Reporting limits presented are the best that can be achieved under normal operating

I similated possibly based high or fals, positive based on blank contamination.

I similated possibly based high based upon QC data. I similated possibly based how based upon QC data. I similated bases between reporting limit and de tection limit.

Not Analyzed University.

Ξ = ₹

i stimated based on QC data

Z E

Underlied Reported Delection Limit is improvise Underlied, Dala based fow Reported Detection I aim to higher than make aled

2×25 a

TABLE E-8

SUMMARY OF QUALIFIED DATA - JULY 2002
LOWER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Befense Supply Center Richmond
Richmond, Virgina

	Sample 1D Sample Date	Reporting Limit (a)	Sample MW FTA-14 7/17/2002	Sample MW FTA-16 7/29/2002	Sample NIWFTA-17 7/31/2002	Sample MW FTA-18 7/29/2002
FIELD PARANELER Dissolved Oxygon - F360 1 mg/l Drowlyed Oxygon		-0	91	36	62	13
Ferrous Iron - A3500D mg/L. Lerous Iron		2		₹	- -	<u>\$</u>
Oxidation <u>Reduction Potential - A2580A mV</u> Oxidation Reduction Potential	Vm AV	1	\$	-121	₹	-117
<u>pH - E150 1 pH Units</u> pH		1	1003	12 33	1233	\$6.9
Specific Conductance E120 I mS/cm Specific Conductance		0 001	0 312	473	173	6110
<u>Temperature - E 170 I deg C</u> Temperatur		16	8 <u>1</u>	268	316	8 61
<u>Turbidky - E189 I NTU</u> Turbidky		-	⊽	2	-	7
FIXED BASE LABORATORY ANALYSIS Aniors - MCAWW 300,34 mg/L	YSIS					
Chlonde		-	15.3 JH	8.7	×	4
Nitrate		10	0.03 3Q	₹	₹	- - -
Sullat		-	26 9	\$ 4	01	1.2
Dissolved Gases - RSA SOP-175 mg/L.		0.00	Ot \$1.0	0. 71.0∧	<0.17	:
I thuse		0.002	<0.002 R	0.4029	<0.002	<0.002
- Three		100.0	<0.001 R	0.029	<0.001	400 d>
Methan		EQU D	<0.001	0.039	6100	0 0X)77
<u>Hydrogen by Miczoseps - AM2005A V nM</u> Bydrogen	N.	ម្តាប	13	28	э́л	7
Total Alkalinit <u>y - MCAWW 310 1 mg/L.</u> Total Alkalinity	-1	•	061	770	290	63
Total Organ <u>ic Carbon - SW846 9060 mg/L.</u> Total Oganic Carbon	<u> 1777 </u>	-	⊽	7	2	-
Total Sulfide - MCAWW 376 Lingl. Total Sulfide		_	7	⊽	0.32.JQ	⊽

TABLE E-8

SUNVARY OF QUALIFIED DATA - JULY 2002
LOWER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defence Supply Center Richmond
Richmond - Virginia

Sample ID Sample Date	ID Reporting	Sample MW FTA-14 7/17/2002	Sample MW FTA-16 7/29/2002	Sample MW FTA-17 7/31/2002	Sample MW FTA-18 7/29/2002
Mercury - 5W 846 7470A (Dissolved) ug/l		,	,	7	,
Minury		⊽	V	⊽	7
Mercury - SW846 7470A (Eglaf) well. Neicury		⊽	⊽	⊽	⊽
Metals - 5W 846 (4010B (Dissolved) ug/L					
Alaminum	200	77	<200	4520	LU 005>
Авитопу			S UJ	ζ,	ζ,
Arabic			γ (Ş F	\$ \$ \$2 \$ \$ \$2
Burum	2(0)	0 6/4 10	788 7	¥ = 1) (v)
Bury Hum	51 6		₹ 5	7 7	7
C alcount	5 ONUS	-	150000	94100	11300
C alcium C becoming	_		Of \$ 1	<10	<10
Carlotte Carlotte			· 0ε>	O£>	O£>
Capter	_	10 <10 UL	()(>	0I×	9 V
Iron	200		<200	<200	2080
العدا			۱ ۵	V	v į
Magnesium	2000	00800	₹	Sila	067L
Mangabase	7 *	07 50 07	070	9	000
Moistalenum		267	\$ T	90.7	2017
Portschill	5000		162000	27000	5530
Y-lenne			۵	ζ.	\$
Silver	-		√10	0 v	⊋ {
Sodium	0005	w.	38600	14700	D#9/
Mucham V	ν.	3 3 3 3 3 3	0 5 - 1	Q 7/	9 5
/m/	7		₹	Or 6.01	77
Metals - SW 846 60100 (Total) ug/L			;		
Aluminum	200	7	O + 0%	4520	(2000 C)
Antemony			0 4	۶ ۷	۶ ۲
עזאר מור	ā	200	0 🖺	133 153	135 10
Busines.	DY.7		9 5	2 = 1	=
Brojina Visi		2 6	Ç	7	₹ 7
	T (MM)S	-	165000	93900	11600
	-		۰t٥	e1>	01>
th qui			<30	O£>	() ₹ >
Copper	_		0 P	- 10) V
Jran	×		824 JQ	(500 (500)	2430
l.ad	20		3 052	S S	(S)
Magnesium	שאור		75.022	300	¥0
Many or A	• •	07 07 07	्रे इ	₹ ₹	9
Nica) rachim	· <u>=</u>		<u> </u>	(X)(×	Not?
Politicum	2000	XO 26700 J	1770XX)	26700	\$670
The munity			۵	Ş	\$
Silver		01> 01	01 >	01×	01>
Yorkium.	SUM	4	41500	14400	1910
Vandrum	-	50 <50	₹	α,	<\$0 -
/Inc			156 JQ	<20	<20
Thailium - SW 846 7841 (Dissolved) µ2/L. Thailium		2 <2	<2 UL	25 EU	\$
Thallium - 5W849 7841 (1012) #2/L		2 <2 UI	<2 UI	<2 UJ	\$

TABLE E-8

SUMMARY OF QUALIFIED DATA - JULY 2002 I OWER WATER BEARING UNIT

Sample Sample Sample MWFTA-17 7/17/2002 7/29/2002 7/19/2002

Sample 1D Sample Date

17.17 17.18 18.4		_	⊽	90	;	
1	1.1 S. Pachlana de an	_	~	<50	7	⊽
History than the control than than than than than than than than	1 2 January Photos II at	_	7	05>	⊽	⊽
Control Barry Control Barr	I DE PLACE TO THE	-	₹	€	⊽	7
C C C C	[1-Duhlem than	_	⊽	() ()	~	⊽
Section Sect	1 E-Dichforcethen.	_	⊽	₹	~	7
Islambic at a many latest at a many la	13-Dichlaropropere	-	⊽	∂\$\	₹	⊽
Manker Care	123 Trchlorbena r.	-	<u>~</u>	ŝ	⊽	⊽
history of an interpretation of the component of the comp	1.2.3 Trichlompropunc	_	⊽	65	⊽	⊽
Column	12,4 Truchkmykaza	-	⊽	€2	<u>~</u>	7
1	i.2.4 Trim, thyth, no. no.	_	⊽) - -	⊽	⊽
	1.2 Dibromo 3 chloropropare	C 4	<1 UJ	<100 0	Ų	Ç
Comparison of the control of the c	1.2-Dibrome than	-	⊽	() ()	₹	⊽
Controlled by the controlled	1.2-Dachlorotanzene	-	7	o\$>	⊽	⊽
Comparison of the comparison	1.2-Dichloricathan	-	7	<50 UJ	⊽	<u>n</u>
1 1 1 1 1 1 1 1 1 1	1.2 10 երիտորոթան	-	⊽	₹	⊽	⊽
Comparison	1 3 5 Trimethylly noun	-	⊽	€	⊽	⊽
Component	1,3 Dichkrokan	-	₹	0€>	⊽	⊽
Color of the col	1 Dichtorupropan	-	7	5€	⊽	7
Component	3.4 Dichlorobing in	-	v	-50	⊽	₹
1	2.2. Die blanzpropan.	-	7), >	⊽	⊽
C C C C C	2-Bulanen	92	<10	<500 UJ	<10 K	L) III >
10	2 Chlempolum	-	⊽	-50	~	⊽
c c c c c c c c c c c c c	2 Hexanon.	10	0I.>	<5011 K	<10 K	<10 R
2-yentamone	1 Chlorotoluene	_	٦	Ŝ	⊽	⊽
10	4 Methyl 2-pentanone	2	«It	<5(X)	Œ,	SIS
	Action	=	CH M	<588 K	47 ∺	× = .
C C C C C C C C C C	Berzer	-	⊽	₹ '	⊽	⊽ .
C C C C C C C C C C C	Մեսյուսե _ւ ու ու	-	⊽ '	()	⊽ .	⊽.
C C C C C C C C C C C	Bromor hivronachan		v	Ç :	⊽ 1	₹ 1
C C C C	Bromodichtorom, than,		⊽ .	₹ 4	⊽ 7	⊽ ₹
C C C C C C C C C C	Bromotorn		⊽ ′		∵ 5	7 5
C C C C C	Bromonethan	7 -	7> -	7 (B)	7	7 5
Color Colo	Lurbon divuliida		⊽ 7	0. V	7 -	7 =
1	(יתלאינו ורוניזר וואינוקי		⊽ 7	10.00	5 7	5 -
1 1 4 400 4 4 4 4 4 4 4	ר הוטרטאר הער הער	- ^	7	2 3	7 %	7 0
Active Color Active Color Active Color Active Color Active Color Active Col	L HORALINAIN El colores	. –	; 7	5.5	; ¬	÷ 7
100 100	Chlorogen than	. ~	11.62	(1011)	<2.03	(1) (2)
	on 12 Defibring the n.	20	5	1100	\$ 0.5	2.5
1	Dy-1.3 Dichloroptop.n.	_	v	C / C	⊽	~
thank	Dibrupachlorymethan	-	7	05>	₹	⊽
1	Սերաթապեսո	-	⊽	₹	⊽	₹
C C C C C	Dichloradiffeoromethane	7	7	<100 UJ	<2 UJ	<2 UJ
C C C C	l hyth, na ne	-	⊽	05>	⊽	⊽
	Ու դա ինոսիկավուր	-	⊽	€	⊽	~
	Lapropy the neeme	-	⊽	05×		₹ .
	m-Xylae & p Xylae	_	7)\$>	<u>~</u>	⊽ .
	Multylane chlonds		⊽ :	72 JB	⊽ -	
	ո-Butylb.nzcn.	_	V	Ŝ	₹ .	⊽ .
03	n Propylbenzene	_	⊽	₹ :	⊽ :	∵ .
CD C	Naphthalene	- ;	m :	€ ;	i :	⊽₹
7 000	o-Xykn.	6	ş.	9 :	.	(·
	թ-Լ չարտիչ (toluc nc	-	⊽ '	₹ 7	⊽ -	⊽ .

TABLE E-8

SUMMARY OF QUALIFIED DATA - JULY 2002
LOWER WATER BEARING UNIT
Annual Grounds ster Report - October 2002
Operable Unit 7
Defense Supply Center Rechmond
Richmond, Virguia

	Sample ID Sample Date.	Reporting		Sample MWFTA-14 7/17/2002	Sample MW FTA-16 7/29/2002	Sample MWFTA-17 7/31/2002	Sample MW FTA-18 7/29/2002
			-				•
Styn m.				⊽ 1	05°	⊽ ₹	⊽ ₹
ten Butyfornen				7	3 5	7 ₹	7 ₹
Tetrachlorwith ne				7 7	, ₹	;	⊽
Total I follow the me				<0.5	<25	<0.5	₹
Italy 1.3 Du blansprop.ne			-	⊽	<50	⊽	⊽
Tochloructhen			-	⊽	°50	V	⊽
Trichtorottuorong thing			7	7	<100 UJ	<2 UJ	f∩ ₹>
Vinyl chlondo			7	\$	440	<2	Q =
Xyknes (total)			-	▽	()\$\ ()\$	⊽	₹
Surrogate : %							
1.2 Dichloredhane-d4			ì	501	801	Ξ	L 03
4-Bromstluoreh, ու ու			1	%	£ ;	i :	£ 5
Distribution than Taken 18			1 1	<u> </u>	± 5	z	92
Volutile Organic Compounds - SW846 \$260B, UNPRES 112/L	6 \$266B, UNPRÉS	7/31					
1,1,1,2-Tetrachloroethanc			-	ΥN	<50	X.	¥:
f,1 1 Tachlora,thara.			_	Š.	₹ :	ž ž	× -
1 1 2 2- Fetrachloraethane				ž:	₹	Š ž	ξ ς
1 2 Truchlotecthan.				žž	3	ž	ź
ון ו-ווירון וויירון וו				žž	3 ₹	ź	ź
1 - Out of the Control of the Contro				ź	950	\Z	۲×
(,1-1) in bloods no no			-	Š.	0 \$ >	×	٧×
1.2 3-To-thanoman			-	ž	50	Y Z	۷N
124-Tachlorobenen			-	ž	0 \$ >	< Z	Y
124 Trimuthyllking in			-	٧X	₹	₹ Z	S:
1 2-Entromo 3-chloroprop.nc			~	< Z	901>	Ž :	Ž;
յ 2-քնեւտագրի տ.				ž	9 ₹	ζź	<
2-Dichloroby nyong				. <u>.</u>	1150	Ç Z	ź
1.2-Dichoraginate				ž	185	Z.	ζχ.
1.2. December of the second se			-	ž	() \$>	Ϋ́Z	٧X
f 3 Dichlorobances			-	Y.	-\$-	< 7	Ϋ́N
1 3-Dichloropropan.			-	ž	115>	× Z	S.
1,4-Dichlorobenzene			-	V.	95>	Ź:	<u> </u>
2 2-Dichloropropane			- ;	Š.	950	ž ž	< <
2 Bulanone			≘ -	ž ž	CO(C)	Š Ž	\$ \$2
24 hloratolaum			- 5	ŽŽ	2 GEV	ž	ź
2 Hexabolic				ź	÷	Š	×z
4-Charles and a subsection of the subsection of			2	ź	<501	Š	ζ Z
Artine Artine			2	٧X	61 R	ž	۲ ک
Βιπισ			-	Z	o\$>	V Z	< Z
Bromotenen			-	٧	()\$ >	ζ.	₹ Z
Bromochloromethane			-	VZ.	9 V	Š:	<u> </u>
Bromodachlorom, than				ź.	€ §	ž ž	× ×
Bromotorm				ž ;	OC .	< 2	× ×
Dromomethan				ž ž	9 is \	ž ž	S 2
Carbon divalled.				2) 5	2	Ž
Curbon telrachionide				ć ź	9	ź	ź
Chlory than			- 7	ź	001>	ź	٧×
Chlerotum			-	Š	φŞ	VZ.	VV
Chloromethane			C+	×	4100 UJ	۷ ۷	۷ Z

SUMMARY OF QUALIFIED DATA - JULY 2002
LOWER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defence Supply Center Rechmond
Rukmond, Virginaa

					S. C. Carlotte	Compati
	Samule 1D	Reporting	MWFTA-14	MWFTA-16	NWFTA-17	MWFTA-18
	Sample Date	I mut (a)	7/17/2002	7/29/2002	7/31/2002	7/29/2002
October Base		90	ν Σ	001	×z	Ϋ́N
creek 3 Deliferonson			š		Š	ζ×χ.
Dihromochlorom shan			V.	05>	Š	٧×
Subcamam than			YZ -) { >	SZ.	<z< td=""></z<>
De bloogiffyorome than			NA S	<100.01>	٧X	< Z
Libylbenzen			ž	Ç\$>	٧X	۷X
He explorated ne			۷Z	(₹)	×	Ϋ́Z
Somonthenen			Ϋ́Z) } >	V.	۲×
m Xvlen. & p Xvlen.			ν. Γ) 5>	YZ.	<z< td=""></z<>
Machine Change			×2	al FF	<z< td=""><td>ź</td></z<>	ź
n Butylly n A ev			××	O\$>	Š	< Z
n Propylly nyers			ν. V.	O\$>	×	<z< td=""></z<>
Naphthakac			×z	ŝ	< Z	< Z
D-X3h Dr		5.0	VZ S	25	×Z.	Š
n Isonian-Bolacar			٧٧	\$	Š	×Z.
sy-Buylbena ne			VZ -	o\$>	×z	۲ ۲
SINGE			×2	-\$0 -\$0	۷Z	×z
tert-Butylby no. De			VN I	₹	۲ ۲	٧Z
Tetrachlores, the m			ν N	0€>	< Z	Y
Tolucie			×Z	₽Ç>	V Z	ź
trans-1.2 Duchlors, thene		50	VN VN	<25	×Z.	٧X
trans 1 3 Dachloropropene			٧Z	<50	Š	ź
Tochlorethene			×N	-50 -	×Z	Š
[nchlorofluorome.lhane			VN 7	<100 UJ	×	ž
Vinyl chloride			2 NA	430	Š	<z< td=""></z<>
Xyknes (total)			ž	<\$0	₹	۲ ۲
Surrogate - %						
1 2-Dichlory, than -d4			NA	107	×z	V.
4 Bromofluorob, n., n.			VN :	79	√ Z	۲ ۲
Dibranofluorom, than,			Š	=	Y.	۲×
Tolucne-d8			- NA	16	Š	V.

TABLE E-8

SUMMARY OF QUALIFIED DATA - JULY 2002
LOWER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defence Supply Center Reclamond
Rechmond, Virginaa

			Comple	Produceto	Sample	Sumb
Sample ID Sample Pats	Reporting Linut (a)	54mpte NSW F1 A-19 7/30/2002	MW FTA-20 7/10/2002	MWFTA-20 7/30/2002	7/17/2002	MW FTA-29B 7/30/2002
FIFT D PARANIETER Disglard Oxigen - E360 Ling/L Dissolved Oxygen	=	52 10	93 (*	æ	£ 1	Ξ
Ferrus Iron - A3500D mg/L 1 erous Iron	S	102	- ₹	1 45	- 9	10>
Oxidation Reduction Potential A2580A 01V		<u>\$</u>	81.	8t-	-140	9.21
<u>pH - E.150 ł pH Units</u> pH		11 92	877	8 77	44.7	1303
Specific Conductance - FL20 LinStens Specific Conductance	1000	н 0 528	0.156	951.0	0.492	187
Temperature - E.170 deg (. Tempe chure	0	0.1 21.9	23.2	23.2	22.9	25
Turbidity - E180 i NTII		4	ڼ	خ	⊽	-
FIVED BASE LABORATORY ANALYSIS Amours - MCAMM, 300 IA mg/L (bland, Nitale	-	1 64 JB 01 <01 1 65	HL 4 1 (4) 2 4 5	37 JB <01 45	558 <01 2 JB	19 JB <0 1 18 2
Dissolved Gares - RSB 50P-175 mg/L. Carbon dissud: I than: I the ne. Methane.	0.001 0.002 0.001 0.001	11 <0.17 12 <0.0012 31 <0.001 31 0.00051 JB	<0.17 <0.012 <0.012 0.003	<0.17 <0.002 0.0042 0.0043	15 <0.01 R <0.005 R 0.48	<0.17 <0.002 0.00057 JQ 0.0112
<u>Hydrogen by Microsepps - AM20GAX nM</u> Hydrogen	003	7	7	2.2	±	3.5
Total Alkalimty - MCAWW 410 J mg/L Lotal Alkalimty		6 150	38	47	230	370 Л
Tatai Organik Carbon - 519846 99641 mel 1. Fotal Chganic Carbon		⊽ -	⊽	⊽	7	•
<u>Total Suffide - MCAWW 376 1 mg/l.</u> Total Suffide		⊽	Of 760	⊽	⊽	⊽

TABLE E-8

SUMMARY OF QUALIFIED DATA - JULY 2002
LOWER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

	ļ	Commis	alume	Denlicate	Sample	Sample
Sample 1D Sample Date	Reporting Limit (a)	MWF1 A-19 7/30/2002	MWFTA-20 7/30/2002	NIWETA-20 7/30/2002	MWFTA-28B 7/17/2002	MWFTA-29B 7/30/2002
Mercury - SW\$46 7470A (Desodved) pp/l. Meany	_	7	⊽	⊽	⊽	⊽
<u>Mercura : SW&46 7470A (Total) µ0/1.</u> Marany	-	7	⊽	⊽	⊽	⊽
Metab. 538.846 6010B (Dissolved) 112/L	25	Ş	200111	01 5 06	Of 911	¥
Antimony	8	₹ %	٧	ν	ď	۲,
Arkin	\$		\$, , ,	٠ ا	₹
Burum	200	ੇ ਹੋ ਹੋ) 193) (% / o	OF 82.0	01>
Breythum (Imma	2 71		7	₹ ₹	\$	0.41.30
Cakum	5000	•	10100	12400	371(10)	74800
C browniam	= ;	9 8	<10 25	a, ₹	₽ ₹	€₹
Cobalt) S	3 0	<10 UL	9 0
t apper Jeon	300		285 J	Or FRI	2360	<21.0
No.	3		۲	\$	۶	\$
Magnesium	5000	<5000	6950	2690	257(K)	رد 5 کا
Manganes	2		L 271	1 ZFI	227	₹,
Molybdenum	⊋ 3	25 JO	97	40 7 (40	÷ 5	Or - ₹
Nickel S. J. S.	100 S		3 7 7	988	13100	(90)59
L'ALLES AND	3		γ	70	\$	*
Silver	01		<10	012	9	(H)
Stadium	2000		0066	10200	24800	53200
Vanadiem	05		0 ; >	95 V	Of 11.0	Σ ξ
/ınc	20	02V	07>	07>	07>	027
Metals - 578 846 60 1018 (Total) ug/l.	i		1	111111111111111111111111111111111111111	<u> </u>	14100 111
Alemmum	90, S	*2*	OF \$ 62	70 007 ×	<u> </u>	111 (A)(2)
Antimony	~ ~		0 4	5 5	7 (5 %
Archi	280	69) (89	Ot 2 77	Of 91.1	DI 191
B. Allum	01		£ \$, 01>	OK 58.0	<10
C. Admiran	2	V	4	7	♡	\$
C alcium	5000	•	11600 J	1,5900	38700	77800 11
(hromum	≘ ;	9 2	01,7	5 (Ç ⊆	2 7
Coball	¥ <u>=</u>		₹ ₹	2 2	10 OI>	; =
Lin	200	<200	799]	14 JO	2590	604 JH
וריון			٧	٧	۶	۳
Magnesium	SCHM	•	6100 J	2900 JQ	26400	390 JQ
Manganese	50		152 J	658 J	712	7 7 Y
Mulybok num	¥		4 0	() (O †	O()
Nicki	001		1012	201 > 5	1 0072 E	4 JQ
Pot issum	SIRX)	(F)	S/90	300	500	(V) V
Scle mum	~ ~		7 ₹) =	; =	; 🖣
VIIV.T	1005		00701	00511	258(K)	\$4500
Vindim	~		O\$>	<\$0	0\$>	<u>0</u>
/ın.	50	02>	0 2 >	20.8	42 6	<20
Thallium - SW 846 7841 (Dessolved) 1197). Fhallium	C1	<2 UJ	<2 UJ	<2 UJ	<2 UI	<2 UI
Lithium - Strott forth old by L	.,	<2 UI	<2 UJ	<2 UI	11 7.1	<2 UI

TABLE E-8

SUMMARY OF QUALIFIED DATA - JULY 2002
LOWER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense yupply Center Richmond
Richmond, Virgina

Yelatte Organic Compounds - SN 846 826011 ppd1 1 1 - 2 - 1 circ. block than: 1 1 - 2 - 3 - 1 circ. block than: 1 1 - 2 - 3 - 1 circ. block chan; 1 1 - 2 - 3 - 1 circ. block chan; 1 1 - 2 - 3 - 1 circ. block chan; 1 1 - 2 - 3 - 1 circ. block chan; 1 1 - 2 - 1 circ. block chan; 1 2 - 3 - 1 circ. block chan; 1 2 - 3 - 1 circ. block chan; 1 2 - 4 - 1 circ. block chan; 1 2 - 3 - 1 circ. block chan; 2 2 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 -	775th 1150VZ8 5						
Volatile Organic Compounds - 5M 846 1 1-3-terra-blacon thane 1 1-7-terra-blacon thane 1 2-3 terra-blacon thane 1 2-3 terra-blacon thane 1 2-3 terra-blacon thane 1 3-4 ter	5 8260B ±2/L						
1 1 2 1 1 2 1 1 2 1 1							
1 1-Fruthorathan. 11.2.3 Tatas hiorathan. 13.2 Intablorathan. 13.1 Dushorathan. 11.1 Dushorathan. 11.1 Dushorathan. 11.2 Intablorathan. 12.3 Intablorathan. 12.3 Intablorathan. 12.4-Fruthorathan. 12.4-Fruthorathan. 12.4-Fruthorathan. 12.1-Intablorathan. 12.1-Intablorathan. 12.1-Intablorathan. 12.1-Intablorathan. 12.1-Intablorathan. 12.1-Intablorathan. 12.1-Intablorathan. 12.1-Intablorathan. 12.1-Intablorathan.			- ×t	\$	ج3ع	⊽ '	₹.
1 2 2 3 ctrachlorochbar, 1 8 2 forthorochbar, 1 Dichlorochbar, 1 Dichlorochbar, 1 Dichlorochbar, 1 2 3 forthorochbar, 2 3 forthorochbar, 2 4 forthorochbar, 2 4 forthorochbar, 2 1 forthorochbar, 2 1 forthorochbar, 2 1 Dichlorochbar, 2 Dichlorochbar, 2 Dichlorochbar,				ζ,	£ 5	₹ 7	Ţ.
1.1 B 2 I rathlorus thane 1.1 Dichlorus than 1.1 Dichlorus than 1.1 Dichlorus than 1.2 I rathlorus parat 1.2 I rathlorus nan 1.2 I rathlorus nan 1.2 I -I'malmah nan 1.2 I -I'malmah nan 1.2 I -I'malmah nan 1.3 I Dichlorus dhare 1.2 Dichlorus dhare 1.2 Dichlorus thare 1.2 Dichlorus thare			⊽ ⁻	5 Y	; ;	₹ ₹	- -
1.1 Dichlorecthan 1.1 Dichlorecthan 1.1 Dichlorepsop.ne 1.2 3 Tachloropopan 1.2 3 Tachloropopan 1.2 4-Trichloropopan 1.2 4-Trichloropopan 1.2 4-Droma-Cahl 1.2 Dichlorocchan 1.2 Dichlorocchan 1.2 Dichlorocchan 1.2 Dichlorocchan 1.2 Dichlorocchan 1.2 Dichlorocchan 1.3 Dichlorocchan 1				; <u>=</u>	; <u>2</u>	7 ₹	. △
1 110 thouse the transfer of the foreign system of 1 2 1 to thoropopam. 12 3 to thoropopam. 12 4 Tru thoropopam. 12 4 Tru thoropopam. 12 4 Dromos Alan, and 12 10 to thoropopam. 12 10 thouse Alan, and 12 10 to thoropopam.			7 V	: =	. 6	₹	7
1.2.1 Trushbropopane 12.3 Trushbropopane 12.4-Trushbropopane 12.4-Trushbrok nz. ix 12.4-Irnachlylk nz. ix 12.1-Ibhroma-Callorenopane 12.1-Ibhroma-Chane 12.1-Ibhroma-Chane 12.1-Ibhroma-Chane 12.1-Ibhroma-Chane			; -	: ">	43	⊽	⊽
12.3 Transhorspropan 12.4-Frichlorsk nyt is 12.4-Frichlorsk nyt is 12.15-bromo-3 valencpropan 12.10-bromo-3 valencpropan 12.10-broms dans 12.10-broms dans				\$	٤١٧	⊽	⊽
12 - Frinchisch north 12 - Frinchisch north 12 - Dinmin-3 - Allempropais 12 - Dinmin-3 - Allempropais 12 - Dichlorec (hare 12 - Dichlorec (hare				<u>۸</u>	<33	⊽	7
1.2.4-1 rms.th)lb. nz. m 1.2-15hnmo-3 delonquos 1.4.2 Divensac. (d.m. 1.2. Div. Bionds. nc. nc. 1.2. Div. Bionds. nc. nc.			~ -	ţ	<3.1	⊽	⊽
1-2-Dahmano-3 chlorapropan 1-2 Dahmanachan 1-2 Duchlorak-nach 1-2 Duchlorachana			~	Ş	۲۶>	⊽∶	⊽'
1.2 Dibromachan 1.2 Dichlorakanen 1.2 Dichlorachan			2 <2	0	<6.7 26.7	m.	IJ :
12 Dichbankina 12 Dichbarthin			√ -	ζ,	۲. ' نا	₹ 1	⊽ 7
1.2 Dichlorecthan			⊽ -	٠	£ ;	₹ 7	v =
			m .	fo .		⊽ ₹	5 -
1,2-Dichloropropanc			⊽ ¬	۲ ر	77	7 7	; ⊽
135 Franchylbeneen			, T	7 7	Ś	: 7	⊽
LA DICHIORARCBA RU			, ¬	φ.	5	~	⊽
1 1 Demonstrates				\$	<13	⊽	⊽
1 4 Oktober State			1 ~1	\$	<33	7	⊽
2 Bulansia.			10 <10 UJ	<50 UJ	<33 R	91>	M 01>
2-C theroteluene				٧.	6	₩.	⊽ :
2 Hexanon			10 <10 R	<50 R	63.K	Ş 7	¥ 5,7
4 Chlorotolucne				≎ ₹	į	7 =	; =
4 Methyl 2-pentabone			9017) e) ((26.1	, ec
Acciding				5 5	, ç	; ⊽	⊽
BLAZUR			· -	ð	<3.3	⊽	v
Digitality from the transfer of the transfer o			~ -	•	۲٤>	⊽	v
Brondthhoromethane			▽	۵.	<33	⊽	⊽ '
Вготобит			- -	φ:	√3	⊽'	⊽ 1
Bromomethane			2 -	9	9 9	7 7	7 7
Carbon disulfide			⊽ ,	Ç = \	111	; v	7 7
Carbon tura Bonde			3 - ·	Ş \	<33	⊽	V
Chloropen de de			. 7	17	C 4>	<2	\$
C measurement			· -	\$	٤٤>	⊽	⊽
t histomethan			2 <2.01	CHI CI	(U L 9>	n ∵	<2 UI
cis-1 2-13chlorathen		_	05 12	051	06.1	₹	\$ (\$ •
сту 1 3 Эктионаргарсяе			⊽ :	ζ,	ري د د د	⊽ ₹	⊽ ₹
Dibromechloronethan			⊽ .	0 5	· ·	7 7	⊽ 7
Dibromantthan			- ;	0 =	11129	, c	110
Dicklondifluoromethane			557	3 (,	; ¬	-
LAhyiba nyene			7 7	V	333	₹	⊽
TLEAGE HISTORIANISMS			; -	٧.	ę,	₹	⊽
m-Nylone & D-Xylone			~	Ф	<33	⊽	⊽
Methylene chloride			; -	33 JB) (1)	⊽ '	⊽ .
n Buiy ประการกะ			▽	ζ.	<33	⊽ .	⊽ .
л Propylbenzen.			⊽ -	\$	633	⊽ :	V -
Naphthalene				ን ና	5 5	5 7	⊽ ₹
o-Xյkn.			(n) (n)	C 7 >	7 7	<u>}</u> 7	; ,
p-Isopropyholuene			⊽ ¬	7	; ;	; ¬	; ₹

TABLE E-8

SUMMARY OF QUALIFIED DATA - JULY 2002

1 OM ER WATER BEARING UMIT
Anneal Groundwater Report - October 2002

Operable Unit 7

Defense Supply Center Richmond

	Sample 1D Sample Date	Reporting 1 mut (3)	Sample MW FTA-19 7/30/2002	Sample MW FTA-20 7/40/2002	Duplicate MW FTA-20 7/38/2002	Sample MWFTA-28B 7/17/2002	Sample MW FTA-29B 7/30/2002
No po			⊽ -	\$	63	₹	7
ter-Bulylkazar			▽	\$	<13	⊽	⊽
1 ւրա հետու հետ			= -	ቴ ነ	,	∵ ₹	<u>0</u>
Toluch.		,		0 5	 	₹ ₹)
truty 1.2 October Antelle.				V	£ 5	⊽	⊽
Inchese, there			00.00	7.4	\$ 5	7	<10.15
1 ncklorolluaromethan			2 <2 WJ	<io td="" uj<=""><td><6.7 UJ</td><td><2</td><td><2 UJ</td></io>	<6.7 UJ	<2	<2 UJ
Vinyl chlonde Aylenes (total)			2 <2	86 JQ <5	42 <41	⊽⊽	≎ ⊅
Surrogate - %							
1.2 Dr. blong than - 44				107	108	108	901
4 Ուդուսիստուծութու				덫	20	≅ :	S
Differential between than Tolucin-48			96	\$ 5	ر بر در	5 5	£ 55
Volatile Organs, Cumpounds - 5W846 8260B, UNPRES 112/	50B, UNPRES	1/3					
1.1.1.2 Fetrachlusechane			VN I	ζ.	Ϋ́	ž	Š
1.1.1-Trublerecthanc			l NA	\$	ž	ž:	ž:
1 1 2 2 Fetrachlons, thus.			< 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	٥,	< *	žž	źź
1 1 2 discolora, mark			≦ <u>≤</u>	; ≈	ž Ž	ž	ź
I Dichlary then			×Z	=	< Z	٧ ٧	٧×
1.1 Dichloreproper			VN -	٧	Š	V	< Z
† 2 3 Truchlombensens			×z	۲,	Š:	Ž.	S ;
1.2.3 Luchloropropanc			<u> </u>	ζ,	Š	<u> </u>	<u> </u>
124 Inchloroty, ac. ne			< ×	5 4	ζź	< <	Z Z
1.24 Trimethythythythy 1.2 Dishamo 34 blammana.p			< × ×	; =	ξ Z	ž	ź
1 2-Dibromes, than.				8	×Z	ž	N.
1,2 Dichkardkankan			CN I	\$	Š	Z	Ž.
1 2-Dichloric thine			VZ -	<\$ UJ	Š.	Ź:	X :
1 2-Dichleiopropure			< < 2	۲ ۲	< <	<	< ×
1 (5-) interthylbrazene			< ×2	7 (Ž	ź	< ×
1 3 Ducklunghenden.			ž	ζ.	ž	ž	×
1 4 Duhlorokayan			νχ. -	\$	×Z	×z	×
2.2.10ubloropropane				Ď	Ž.	ž	ź
2 Вишкопс			0 ·	(1) (1) (1)	ź:	Ź:	Z z
2-C hlorotoluenc			Y	Ç Ę	< 2 2	< 2 2	< ×2
Z Hekanolik 4 4 Historiako es			V V	4 (Ž	ž ž	ž
A Chichentene				950	ž Ž	×	ź
Actions				<50 K	Ž	××	ź
Bruvene				\$	×	×z	×z
Винокала			VN -	۶	٧	V	Š
Bromor blorom: thank			νν -	۶	Š	Š.	×.
Bromodychloronichan			ζ.	ζ,	ž i	ź;	ź:
Вготоботп			× ×	c 1	< ×	<	< < 2
Bromomethane				€ <	ž ž	£ 2	£ 2
Cartesia to tex historic			VX	, in \$	Z Z	ź	VZ.
Chlorobenene			٧ <u>٧</u>	70	××	<z< td=""><td>×Z</td></z<>	×Z
Chlorocthane			2 NA	~10	< <u>z</u>	×z.	Ϋ́
Симичен			VN I	\$	٧X	×	×Z
Chloromethane			N N V	<10.01>	N.	N.	۲ ک

TABLE E-8

SUMMARY OF QUALIFIED DATA - JULY 2002

LOWER WATER BEARING UNIT

Annual Groundwater Report - October 2002

Operable Unit 7

Defense Supply Center Richmond

Richmond, Virginia

			Sample	Sample	Duplicate	Sample	Sample
•	Sample 1D Sample Date	Reporting Limit (a)	MW FTA-19 7/30/2002	MW FTA-20 7/30/2002	MW FTA-20 7/30/2002	MWFTA-28B 7/17/2002	MWFTA-29B 7/30/2002
1 2 Dathloss the n		50	V.	991	×	Ϋ́Υ	VZ.
cost (3.10) blommorphy				٧.	Š	٧×	Ϋ́Х
Dibermes Linux Iban			VZ.	ۍ.	V.	××	ž
Dibromom, than			۷Z	٧	ΝΑ	VZ	×z
Dichlorechthumanethane			2 NA	<10 UJ	ź	×Z	۷ Z
Lihvibiakan			N N N	\$	V.V.	×z	Ϋ́
H. v.a. blorobetachen			N.V	\$	Š	×z	×
Bapmovillenzene			VN -	\$	۷z	ž	٧X
m Xak n. & n Xak ne			NA I	*♡	Z.	ž	×
Methylen chloride			VN	12 JB	×z.	ž	×
n-Butylly nyely			۷×	ζ.	×z	Š	Š
a Pany III as a			۲ <u>۷</u>	۵	۷×	×	Ϋ́Z
Zubhalen			VN -	\$	ž	×z	V
a-Xylen.		50		<2.5	٧Z	×	٧X
n Isangan/ta/uene			٧ <u>٧</u>	۵	×	ž	ν.
Sec-Bulylty DA De			VZ	Ş	×	ž	٧X
SINDE			VN -	٥	ž	×	Š
ורע פאואן שיים שיי			ν -	₽	×	Y.	٧ ٧
Terranlorsethen			- VA	Δ.	×	×	V.
Loberts			VV	₹	Š	ž	×
trans-1 2 Dichloroethen.		0	0.5 NA	<2.5	ž	×	×z
trans 13 Dichleropropent			ν «	٤.	Š	V	Š
Enchlorouthere			×.	11	۲ ۷	VV	ž
Tre bloroftnoromethane			2 NA	<10.01>	V	¥	V
Vinyl chloride			2 NA	OF 98	Š	V.	V.
Aylence (total)			N N	۲,	Š	ν. V	V.
Į.							
Surrogate : 34			V.	92	ž	ž	Ž
1 Bromodhasch as a			× ×	#	ž	ž	ž
Determination of their			VN.	105	ž	ž	×z
Tolum d8			VN :	Łń	×	Š	VX

. 라

Istimated based on QC data Faunated, possibly based high or tide possibly based high or tide possibly based high based into (X data Istimated possibly based high based inpin (X data Istimated possibly based low based upon (X data Istimated, Value is between reporting limit and detection limit.

포트로

ž z 3 3

Unasable Underested Reported Detection Finis is impresta-Underested Data brased fow Reported

Detection I was to higher than indicated

Reporting himts presented are the best that can be achieved under normal operating procedures with the method required sample columner and analyzed. Sample reporting himte may vary due to sample volume/weight extracted and/or sample dilutions.

PRI PARI D/DATE RMB (404/0) CHI CKI D/DATE JAH 6/05/03

SUMMARY OF QUALIFIED DATA - JULY 2002 FRACTURED BEDROCK Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

_	Richmond, Virg	inia		
	Sample ID Sample Date	Reporting Limit (a)	Sample MWFTA-28 7/30/2002	Duplicate MWFTA-20 7/30/2002
FIELD PARAMETER. Dissolved Oxygen - E360.1 mg/L Dissolved Oxygen		0 1	38	38
Ferrous Iron - A3500D mg/L		· · ·	30	30
Ferrous Iron		0 1	<01	<0 ℓ
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential			-38	-38
<u>pH - E.150.1 pH Units</u> pH		••	8 77	8 77
Specific Conductance - E120.1 mS/cm Specific Conductance		0 001	0 156	0 156
<u>Temperature - E179.1 des C</u> Temperature		0 1	23 2	23 2
Turbidity - E180.1 NTU Turbidity		1	6	6
FIXED BASE LABORATORY ANALYSIS: Anions - MCAWW 300 3A mg/L				
Chloride		1	4 ЛН	37 JB
Nitrate Sulfate		0 1 1	<0 1 4 5	<0 i 4 5
Dissolved Gases - RSk SOP-175 mg/L				
Carbon dioxide		0 001	<0 17	<0.17
Ethane Ethene		0 002 0 001	<0 002 0 003	<0 002 0 0032
Methane		100 0	0 0088	0 0032
Hydrogen by Microsceps - AM20GAX nM Hydrogen		0 03	2	22
Total Alkalinity - MCAWW 310.1 mg/L Total Alkalinity		5	81	79
Total Organic Carbon - SW846 9060 mg/L Total Organic Carbon		ı	<1	<1
Total Sulfide - MCAWW 376.1 mg/L				
Total Sulfide		l	0 97 JQ	<1
Mercury - SW846 7470A (Dissolved) ug/L Mercury		1	<1	<1
Mercury - SW846 7470A (Total) ug/L Mercury		1	<1	<l< td=""></l<>
Metals - SW846 6010B (Dissolved) ug/L				
Alummum Antimony		200 5	<200 UJ <5	90 5 JQ <5
Arsenic		5	<5	<5
Barrum		200	66 I JQ	67 8 JQ
Beryllium Cadmium		10 2	<10 <2	<10 <2
Calcium		5000	10100	12400
Chromium		10	<10	<10
Cobalt		30 10	<30 <10	<30
Copper Tion		200	<10 285 J	<10 153 JQ
ead		3	<3	<3
Magnesium		5000	6950	5690
Manganese Molybdenum		20 40	172 J <40	132 J <40
Nickel		100	<100	<100
nimsetio.		5000	6410	6860
Selemum		5	<5	<5
Silver Sodjum		10 5000	<10 9900	<10 10200
Vanadions		5()	<50	<50
/mc		20	<20	<20

SUMMARY OF QUALIFIED DATA - JULY 2002 FRACTURED BEDROCK Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

			Sample	Duplicate
	Sample ID	Reporting	MWFTA-20	MWFTA-2
	Sample Date	Limit (a)	7/30/2002	7/30/2002
Metals - SW846 6010B (Total) ug/L		200	77 9 JO	<200 UJ
Aluminum		5	<i>ল</i> ব	<5
Antimony Arsenic		5	٠ ح	<5
Barium		200	68 JQ	77 5 JQ
Beryllum		10	<10	<10
Cadmium		2	a	<2
Calcium		5000	1 00011	17900 J
Chromum		10	<10	<10
Cobalt		30	<30	<30
Copper		10	<10	<10
Iron		200	299 J	144 JQ
Lead		3	<3	<3
Magnesium		5000	6100 J	2900 JQ
Manganese		20	152 J	65 8 J
Molybdenum		40	<40	<40
Nickel		100	<100	<100
Potassium		5000	6670	8060
Selenum		5	<5 30	ح 5 ۱۸
Suver		10 5000	<10 10200	<10 11500
Sodium		5000 50	10200 <50	<50
Vanadium Zinc		20	<20	20 8
		20	420	20 0
<u>Thallium - SW846 7841 (Dissolved) ug/L</u> Thallium		2	<2 UJ	<2 UJ
Thallium - SW846 7841 (Total) ug/L Thallium		2	<2 UJ	UJ</td
Volatile Organic Compounds - SW846 8260B ug/L		1	.e	<33
1 1 1,2-Tetrachloroethane		1 1	ಳ ಳ	<33
1 1,1-Trichloroethane		1	<5	<33
1,1 2 2-Tetrachloroethane		1	<5	<33
1,1,2-Trichloroethane 1,1 Dichloroethane		1	19	19
1,1 Dichloroethene		1	ii	93
1,1 Dichloropropene		ī	<5	<33
1,2 3-Trichlorobenzene		i	ح.	<33
1 2,3-Trichloropropane		1	<5	<33
1,2,4-Trichlorobenzene		1	<5	<3.3
1,2,4-Trumethylbenzene		1	<5	<33
2-Dibromo 3-chioropropane		2	<10	<67
1 2-Dibromoethane		1	ح5	<33
1 2-Dichlorobenzene		1	<	<33
1.2 Dichloroethane		1	<5 UJ	<33
1 2-Dichloropropane		1	ব	<33
1 3 5-Trimethylbunzene		1	ತ	<3 3
1,3 Dichlorobenzene		ı	<	<3 3
1,3 Dichloropropane		I.	< ্	<33
4 Dichlorobenzene		1	<5	<33
2,2 Dichloropropane		1	<5	<3.3
2 Butanone		10	<50 UJ	<33 R
2 Chiorotoluene		1	<5	<13
2 Hexanone		10	<50 R	<33 R
4-Chlorotoluene		1	<5	<33
4-Methyl-2 pentanone		10	<50	<33
Acetone		10	<50 R	<33 R <3 3
Benzene		1	<5 <5	<13
Bromobenzene		;]	<5	<33
Bromouhloromethand		, ,	<5 <5	<33
Bromodichloromethane		, 1	<5	<13
Bromotorm Bromomethane		2	<10	<67
Bromometnane Carbon disultide		ì	<5	<33
Larbon tistrachloride Carbon tetrachloride		i	<5 UJ	<3.3 UJ
Chlorobenzone		i	<5	<13
Chloroethane		2	<10	<6.7
Chlorotorm		ī	<5	<3.3
Chloromethane		2	<10 UJ	<0.7 UJ
is 1.2 Dichlorouthenc		0.5	150	130
is-13 Dichloropropenu		1	<5	<13
Dibromochlorometh in-		i	<5	< 3 3
Dibromometh inc		1	<5	<3.3
Dichlorodithoromethane		2	~10 (1)	<67 UJ
thylbenzene		1	<5	< } 3
le vacidorobitadicae		1	<5	<, 1
ic de namentalisación			<5	< 3.3

SUMMARY OF QUALIFIED DATA - JULY 2002 FRACTURED BEDROCK Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

	Richmond, Virg	11114			
	Sample ID Sample Date	Reporting Limit (a)	N	Sample /IWFTA-20 7/30/2002	Duplicate MWFTA-2 7/30/2002
			ı	<5	<33
m-Xylene & p-Xylene Methylene chloride			i	3 3 JB	11 JQ
Metnylene chioride n Butylbenzene			1	<5	<33
n-Propylbenzene			1	<5	<33
Naphthalene			1	<5	<3 3 UJ
o-Xylene		0	5	<2.5	<17
p-Isopropyltoluene			1	<5	<3 3
sec-Butythenzene			1	<5	<33
Styrene			1	⋖	<33
tert-Butylbenzene			1	< ব	<33
Tetrachloroethene			1	4	<33
Toluene			1	حځ مح	<33
trans-1,2-Dichloroethene		0		<2.5 <5	<17 <33
trans 1,3-Dichloropropene			t i	7.4	58
Trichloroethene			2	<10 UJ	<67UJ
Trichlorofluoromethane			2	8 6 JQ	92
Vinyl chloride Xylenes (total)			i	ર્વ	<33
Programme #7					
Surrogate - % 1.2-Dichloroethane-04				107	108
4-Bromofluorobenzene				82	82
Dibromofluoromethane				99	105
Foluene-d8		-	-	91	93
Volatile Organic Compounds - SW846 8260B.	UNPRES ug/L				
1,1,1,2-Teirachloroethane			ι	<5	NA
1,1,1-Trichloroethane			l	<5	NA
1,1 2 2-Tetrachloroethane			1	< ্	NΛ
1,1,2-Trichloroethane			I	<5	NA
,1-Dichloroethane			1	20	NA NA
1,1-Dichloroethene			1	11	NA NA
1.1-Dichloropropene			l	<5	NA NA
2 3-Trichlorobenzene			i 1	ර ර	NA NA
1 2,3-Trichloropropane			ì	ব	NA.
1,2 4-Trichlorobenzene			j	ও ব	NA
1 2 4-Trimethylbenzene 1,2-Dibromo-3 chloropropane			2	<10	NA
1.2-Dibromoethane			1	<5	NA
1 2-Dichlorobenzene			1	<5	NA
2-Dichloroethane			1	<5 UJ	NA
1,2 Dichloropropane			1	حة.	NA
1,3,5-Trumethylbenzene			1	<5	NA
1 3 Dichlorobenzene			1	<5	NA
1,3 Dichloropropane			1	ৰ	NA
1,4 Dichlorobenzene			1	<5	NA
2 2-Dichloropropane			1	<5	NA
2 Butanone			0	<50 UJ	NA
? Chlorotoluene			1	<.5	NA
2 Hexanone			0	<50 R	NA
Chlorotoluene			1	<5	NΛ
4-Methyl-2-pentanone		_	0	<50	NA
Acetone			0	<50 R	NA
Benzene			1	<5 	NA NA
Bromobenzene			1	ಳ ಳ	NA NA
Bromochloromethane			1	<5	NA NA
Bi omodichioromethane			1	<5 <5	NA NA
Bromotorm			2	<10	NA NA
Bromomethane			i	<5	NA
Carbon disulfide			i	<5 UJ	NA.
Carbon tetrachloride Chlorohenzene			i	<1	NA
Unioronenzene Chloroethane			2	<10	NA
Uniorgetname Chlorotorm			i	<1	NΑ
Chloromethane			2	<10 UJ	NA
us-1 2 Dichlorouthenu			5	160	NA
In-1 3 Dichloropropene			1	<5	NΛ
Dibromochloromethane			1	<5	NA
Dibiomomethane			ı	<5	NA
Dichlorodifluoromethane			2	<10 UJ	NA
Ethylbenzene			ī	<5	NΛ
Entynenzene Hexachlorobutadiene			j	<5	NA
Sopropylbenzene			i	<5	NΛ
n Xviene & p-Xviene			1	<5	NA
Methylene chloride			l	3.2 IB	NΛ
					AT 1
			ł	<5	NΛ
n Butythenzene n-Propythenzene			1	<1 <1	NA NA

SUMMARY OF QUALIFIED DATA - JULY 2002 FRACTURED BEDROCK Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Center Richmond Richmond, Virginia

	Sample ID [.] Sample Date:	Reporting Limit (a)	Sample MWFTA-20 7/30/2002	Duplicate MWFTA-20 7/30/2002
o-Xylene		0.5	<2.5	NA
p-Isopropyltoluene		1	ح ح	NA
sec-Butylbenzene		i	હ	NA
Styrene		1	<5	NA
tert-Butylbenzene		1	ব্	NA
Tetrachioroethene		1	<5	NA
Toluene		ı	<5	NA
trans-1 2-Dichloroethene		0.5	<2.5	NA
trans-1 3-Dichloropropene		1	<5	NA
Trichloroethene		1	71	NA
Trichlorofluoromethane		2	<10 UJ	NA
Vinyl chloride		2	Q1 98	NA
Xylenes (total)		1	ತ	NA
Surrogate - %				
1,2 Dichloroethane d4			106	NA
4-Bromofluorobenzene			84	NA
Dibromofluoromethane		••	105	NA
Toluene d8			93	NA

Notes.

Estimated, based on QC data

Estimated, possibly biased high or false
positive based on blank contamination

Estimated, possibly biased high based upon QC data.

Estimated, possibly biased low based upon QC data.

Estimated, Value is between reporting limit JΒ

Л

Л

JQ

and detection limit

NA Not Analyzed

Unusable

Undetected, Reported Detection Limit is imprecise Undetected, Data biased low - Reported UJ

UL Detection Limit is higher than indicated

Reporting limits presented are the best that can be achieved under normal operating procedures with the method-required sample volume extracted and analyzed. Sample reporting limits may vary due to sample volume/weight extracted and/or sample dilutions.

PREPARED/DATL RMB 6/04/03 CHECKED/DATF JAH 6/05/03

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
UPPER WATER BEARING UNIT
Annual Grounds after Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond Virginia

	Sample ID Sample Date	Reporting Linut (a)	Sample AEIIADG-19 10/16/2002	Duplicate AEHADG-10 10/16/2002	Sample DMW-13A 10/16/2002	Sample DVIW-20A 10/16/2002	Sanple DNIW-22A 10/30/2002	Sample DMW-25A 10/16/2002	Sample DMW-26A 10/15/2002
FIFLD PARAVIETER Disorbert Overa, E360 Lmg/L Droubed Ovygen		T g	8 5	8 (1	∞ ≎	_	0.4	2.5	10
Ferrous Iron - A.35001) mg/L. Lerrous Iron		0 1	₹	÷	3.5	-	r	₹	<u></u>
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential		·	.	æ	599	40.5	80	151	89
<u>211 - F150 1 pH Units</u> PH		·	316	5 16	17.1	3 85	5 8 7	663	671
Specific Conductance - E120.1 mS/cm		0 101	1 0318	918	0.137	0 124	0.274	0 291	6716
Jenperat <u>ure - F170 I de<u>r C</u> Kenperature</u>		0	1 20.5	20.5	216	194	8 51	187	21
<u>Turbidity - F180 I NTU</u> Turbidity			<u>~</u>	53	⊽	47	⊽	2	=
FINED BASE LABORALORY ANALYSIS Amons, MCAMM, 300 pa mpl. Chártale Nitale as N		3	01 45 1 40 1 1 197	44 9 < 0 1 18 6	15.2 14.JB 20:8	16.5 0.17 19	45 <0.1 33.6	6 3 1 39 4	118 0.62 JQ 13.9
Divaried Gaves - RNA SOP-175 mg/l Carbon dioxak University of the re- l the re- Mathane		0.001 0.002 0.001 0.401	11 120 12 <0.002 11 0.014 11 0.18	120 <0 002 0 013 0 19	110 <0.002 <0.001 0.0123 JB	160 <0.002 <0.001 0.001 JB	85 <0.002 <0.007 0.075	24 <0.002 <0.001 0.0016 JB	180 <0.002 <0.001 2.4
Hydrogen by Microsceps - AM20GAX nM Bydrogen		600	3 22	26	2.4	2.7	12	~	2.9
Potal Alkalinity - MCAWW 310 1 mg/L. Total Alkalinity			5 13.JH	Hr El	۵	1.4 JB	31	56	14
Total Organic Carbon - 533 846 9060 mg/L. Total Organs Carbon			H - 1	Η -	-	at 1	2	=	91
Total Suffide - MCAWW 376 1 mg/L. Total Suffide			~	0 33 JB	0.49 JB	¥ -	Or 21 0	H 180	69

SUNIMARY OF QUALIFIED DATA - OCTOBER 2002
UPPFR WATER BEARING UNIF
Annual Graundwater Report - October 2002
Operable Unit 7
Define Supply Center Richmond
Richmond, virginia

Colored Colo	No. of the Color No. of the				٥	Samuele	Dunkate	Sample	Sample	Sample	Sample	Sample
1	1		Sample 113	Reporting Linut (a)	AEH 16V	ADG-10 16/2002	AFIIADC-10 10/16/2002	DVIW-13A 10/16/2002	DM W-20A 10/16/2002	DNIW-22A 10/30/2002	DAIN-25A 10/16/2002	DMW-26A 10/15/2002
		Merun - 5W846 7470A (Dissolved) µg/L,	į		-	⊽	⊽	⊽	⊽	⊽	~	⊽
	Name of the control	Mrr. ury - SW846 7470A (Total) ug/l		•	-	,	7	7	⊽	⊽	⊽	⊽
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	100 100	Murury			-	;	;	7	ţ	ł		
1	1	Metals - SW846 6010B (Dissolved) µg/L			•	11100	<200 UJ	162	Of 601	Of 948	623	2(4)
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	Aumon		•		\$ \	٧	70	\$	m s>	ς	ζ.
10 10 10 10 10 10 10 10	No. 1988 1999 1	Artica				17.9	386	\$	\$	51	٧	Q();
10 19 19 19 19 19 19 19	19 19 19 19 19 19 19 19	S. rrup		•		or %	Or 601	98.2 JQ	JU 107	S67 JQ	S19 JQ	OT \$ 25
	State of the color of the col	B. r. llum				70	3 JQ	∂r +1	Õf 160	<10	=	97
Sign	Stop 4770 77	relinean				₹	4	0.43 JQ	Ç	₽	a	9
1	1	Cakam		σ·	-	750 JQ	4710 1Q	Of 11571	Of 09F1	97118	18500	430 10
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	10 218 177 179 171	L. bromann				al>	<10	<10	<10	<10	22 JQ	9
10 10 10 10 10 10 10 10	10 17	Cuball				5.8.JQ	25.7 JQ	7 2	s JB	OK>	2 JC	⊋ :
10 1740 17	1,000,000,000,000,000,000,000,000,000,0	Connect				O</td <td>0I></td> <td><10</td> <td>or></td> <td>۲I0 ×</td> <td>85 JQ</td> <td>⊒</td>	0I>	<10	or>	۲I0 ×	85 JQ	⊒
1	1					17300	17400	2130	43.7 JB	4140	479	12400
10 10 10 10 10 10 10 10	NAME FIRE Light of 1921 12 750 17	A. A				⊽	۶		Э	ซ	₩,	v i
No.	NASSEG MAN NAS	Magnesium		~		5370	5420	2130 JQ	2670 JQ	7380	2690 JQ	380 10
10 10 10 10 10 10 10 10	1.00 1.50	Manganer				050	1 59	162	295	6	8.2 JQ	9,69
100	1	Molyted num				(†	~		070	9 S	(F)	Q+ 50 €
1	1	NEKLI				7, 15	376 JQ	2 :	49.10	97	44 10	(S) (S)
10	10	Роздунт		~		≆, ≆,	4600 JQ	Of 11222	Of 0867	17 Y	- Y	S 4
No. Color	NAME AND	se ke mum			٠ :	Ç F	C =	Ş) {	; =	7 =	; =
1,10, 1,10	1,000,000,000,000,000,000,000,000,000,0	Silver		J		012	00214	97.9	0,000	29900	42000	(KOYOK
1	1	minpos		•		1 10	0.75 10	05>	Ş	7	Of +1	38 JQ
1.5 1.5	1.00 1.00	אייותראד איין איין איין איין איין איין איין אי				7 × 7	27.4	20.4	ID 05>	<20	<20 UI	<20 UI
1.00 1.00	1,000,000,000,000,000,000,000,000,000,0											
1	19	Metals - 5/1/846 6010B (10tal) µ2/1			_	01 11	01 222	831	145 JO	Ot 7.87	925	Ħ
1,000, 1,000,	1	Aluminum				? <	, v	4	ζ ν	10 \$>	ζ.	٧
10 19 10 10 10 10 10 10	19	Anthrony				9 52	368	0	\$	77	28 10	26 JQ
10 19 JQ 12 JQ 22 22 22 22 22 22 22	19 10 19 1	A STATE OF THE STA				Of 70	Of OIT	Or zut	70 5 10	Of 619	QL 1 22	OL 282
10 10 10 10 10 10 10 10	10 10 10 10 10 10 10 10	C. r. llein				. 9 JC	00 61	12 JQ	Of 160	Ę	≘ >	0I>
SQNN 4670 JQ 4500 JQ 1710 JQ 1410 JQ 94510 183010 183010 1930	SWR 4670 JQ 4501 JQ 1710 JQ 1430 JQ 94510	mquinu m				≎	V	0.49 JQ	<2	a	\$	a
10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10 <10	10	Cakrum		•	•	OY 029	4800 JQ	J710 JQ	O(=====	945 <u>1</u>	≘ ×) 10 10 10 10 11 11 11 11 11 11 11 11 11 1
10 247 1Q 256 1Q 41 Q 52 1B 549 245 1Q 10 210 17200 17700 278 679 4070 731 11 210 17200 17700 278 679 4070 731 12 210 210 17700 278 679 475 679 731 13 3 43 43 28 73 43 43 14 28 28 28 29 297 170 2880 1Q 15 210 210 210 270 1Q 270 1Q 15 210 210 270 1Q 15 210 210 270 1Q 15 210 210 270 1Q 15 210 270 1Q 270 1Q 15 270 270 270 15 270 270 270 15 270 270 270 15 270 270 270 15 270 270 270 15 270 270 270 15 270 270 270 17 270 270 18 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 270 27	10	Chronium				≘	≘	01×	01> ¹	0 <u>7</u>	26.10	€ ;
10	10	Cohalt				47 10	% %	<u>→</u>	\$ 2 JB	⊋ [£] V 3	Of ::	⊋ :
17.00	1,240 1,740 2,240 0,59 4010	Cupper			2 ;	01	01V	01×	900	41. V.	7 -	062
State Stat	State Stat	Iron			917	-/ SM	Q (7	101.57 101.51	66	701	۲.	2 T
100 72 100 34 100 37 100 37 100	100 17 17 17 17 17 17 17	Pr TI			٦ ۾	5 5	93) (A)EC	OF Unive	31.3	01 OS92	GE DIVI
100 172 101 184 102 104 107	Comparison Com	Magnanum			e e	930	7	2 2	7 50	117	7 7 7	7 12
100 37 2 1Q 38 4 1Q 34 1Q 42 1Q < (100 37 1Q 3	100 172 JQ 34 JQ 34 JQ 42 JQ < 100 100 172 JQ 384 JQ 34 JQ 42 JQ < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100	Manganese			3 #		£ ₹	₹ ₹	; ₹	97	37 10	₹
SYNAI SYNA	Street S	Mot Nechali				02.60	38 4 JO	34.30	42 10	×100	37 JO	(K)
1	10 20 24 24 24 24 24 24 2	Nit Acti		•		200	Of 065†	2230 JU	2970 JQ	\$670	14160	9400
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12 JQ	State 12 JQ <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50 <50	Sodium			000	11300	11800	6200	6710	29200	41 300	ONLL
20 241 242 477 <20 Ul 21 <20 Ul 21 Ul 23 Ul 23 Ul 24 Ul 25 U	20 241 242 477 <20 Ul 21 Itamus SW 846 7841 (LiNgsheed) ug/L.	Vanadum			9	or is	12.10	0€>	05°	₹:	Of 5	42 10
2 <2 U <2 U <2 <2 U <2	2 2 U 2 U 2 2 U 2	/mx			30	24.1	24.2	47.7	<20 UI	23	<20 UI	<20 UI
2 < 2 U < 2 U < 2 < 4 C	2 <2 U <2 U <2 <2 U <2	Thailium - SW846, 7841 (Dissolved) 112/L.								,	,	į
	Thailiom - 538 846 72441 (Total) 112/L	1 hallium				IJ.	2 U	IJ	2 UI	V	7	2 G

SUMMARY OF QUALIFED DATA - OCTOBER 2002
UPFER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Rechnond, Virginia

			Sample	Duplicate	Sample	Sample	Sample	Sample	Sample
Sample ID	Reporting Linit (a)	AE.	AEHADG 10 10/16/2002	AEHADG-10 10/16/2002	DMW-13A 10/16/2002	DVIW-20A 10/16/2002	DMW-22A 10/30/2002	DMW-25A 10/16/2002	DMW-26A 10/15/2002
Thallum		¢1	<2 UI	1 Z	å	<2 UI	7	å	<2 UI.
Polychornated Biphensis (PCBs) - 53/8346 8082 ag/l			:	;	;	į	i	į	2
PCB 1016			<u> </u>	ž:	< :	Ç ;	< ?	< < 2	< <
JCD-1221			<	\$ \$	< <	S S	Z X	× z	V Z
17.5 E.7.2			ź	×	× ×	Š	×	٧.	۷×
24.5. S. X.		. –	۲ ک	Z Z	< <u>z</u>	<z< td=""><td>٧×</td><td>×</td><td>V.</td></z<>	٧×	×	V.
F. C. L. S. F. F. L. S. F. F. L. S. F. F. L. S. F. F. L. S. F.		_	ζ×.	٧×	٧×	ζ.	٧×	< Z	۲ X
ICB-1260		_	٧٧	٧٧	ς. V	۷N	Ϋ́	< Z	Ϋ́Z
Surrogate - 72							;	;	;
1 xx xx hive high x ny l		:	< Z	~	< Z	< Z	< Z	< Z	ž:
Felgachtaro-m-a) km		;	٧ ٧	Š	× Z	۷ ۷	< Z	ζ Z	× Z
Senn-Volatile Organic Compounds - 53/846/8270C 51M µg/L									
Accounting		0.2	۷×	<z< td=""><td>Š</td><td>Υ<mark>.</mark></td><td>۷×</td><td>Š</td><td>۲ ۲</td></z<>	Š	Υ <mark>.</mark>	۷×	Š	۲ ۲
Accomplished		0.2	<×	٧×	< Z	٧X	< Z	Υ <u>ν</u>	×.
Anthractive		0.2	Š	۷ N	۷ ۷	×Z	۲ ک	VZ:	V.
Benzo(a)anthracene		0.5	Š	٧Z	۷.	S :	Š:	ž	Š:
Berzadalpyrank		C) (Ž:	<u> </u>	Z Z	< < Z	< < Z	< <	< 2
Benzo(b)thussanthene.		7 1	< 2 2 2	X X	< × ×	5 < 2	ŠŽ	Ž	2
Bunzo(ghi)puryken: Bunzo(ghi)puryken:		7 0	źź	ć ź	ć s	Ź	ź	ź	Š
Desired Karling and Article Control of the Control		- 22	ź	Z	<u> </u>	< Z	< z	×z.	۷×
Signature (Signature)		0.2	۲ ک	< X	Š	۲ ۲	×	×Z	×z.
Discussion in the part of the contract of the		2.0	۷ Z	٧×	< Z	Y,	×z	۲X	V.
Tuoranthera		0.2	VV	Š	Y.	Ϋ́	Υ Z	×Z:	Š.
1 laurenc		0.2	۷Z :	< :	ž:	Š:	Ž:	₹:	< :
Indensit 2 3-edipyrae		0.5	۷ ;	<u> </u>	S :	ď ż	Z Z	ž ž	Z Z
Naphttak oc		2 0	< < 2	< 2 2	< <	< <	< <	S S	2 2
The manthre ne		7 0 0	< ×	<u> </u>	< ×	: <	ž	ź	ž
l'yn'n.		•	•						
Surrogate - %				į	:	į	:	i	;
2 4 6-1 դեսուսարու ոժ		;	<u> </u>	Š,	۷ :	S :	ζ;	<u> </u>	V 2
2-d luorobiphunyl		,	<u> </u>	< 2 2	S 2	< ×2	< <	žŽ	X X
2-d Horophysios		: .	< <	ξ <u>ζ</u>	ž z	ź	Z Z	ž	ž
רט אמנאוארא			. ×	. X	ξ ×	ž	×	ž	ž
րտուս ա Ուրթայմ մ 1 ժ			ν. V.	V.	Ϋ́Z	Z Z	N.	ν Z	Š
Volate Organic Companies - 53/846-82608 ne/L									
t 1 1 2-1 ctrachlore, than		_	<120	. <120	⊽	⊽	⊽	⊽	⊽
1 1.1-Tru blocon than		_	1100	1200	⊽	⊽	⊽	⊽	⊽
1 1 2 2 Tetrachlorus than		_	<120	<120	⊽	⊽	⊽	⊽	⊽
1.1.2. Try bloray than:		-	<120	<120	7	⊽	⊽	₹	⊽
1 1-10x hloroethare		_	<120	€130 <130	⊽	⊽	0 48 JQ	⊽	⊽
1 Dahbarahar			Or 86	140 1	⊽	⊽ ') (130	⊽ .	⊽ .
1 I-Dichloropropent		_	<120	<120	₹ '	⊽ '	⊽ :	▼ .	⊽ .
1.2.3 fruhkrubunans		_	- I 50 - I 50	<120	⊽ `	⊽ .	3.	⊽ 1	⊽ -
1.2.3 Fruhlvropropane			<u>8</u>	97 F	⊽ 7	⊽ ₹	⊽ ,	⊽ ₹	⊽ ¬
2 4-Trublerobenzero			271>	7 17	7 7	, ,	; ;	7	; 7
1.2.4-Trinkthylbengan		- ر	1717	35	7 5	7 7	7 ?	7 5	7 5
1.2-Lumomo 1-cakatopropane		•	į	}	;	;	;	;	;

SUMMARN OF QUALIFIED DATA - OCTOBER 2002
LIPPER WATER BEARING UNIF
Annual Grundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Argina

			olumes	Paralleate	Sample	Samole	Sample	Sample	Sample
	Sample ID Sample Date	Reporting Linut (a)	AEHADG-10 10/16/2002	AEHADC-10 10/16/2002	DMW-13A 10/16/2002	DMW-20A 10/16/2002	DMM-22A 10/89/2002	DMW-25A 10/16/2002	DMM-26A 10/15/2002
			130	133	7	₹	₹	⊽	⊽
I 2-Dibromwellane			37 =	9	7 ⊽	; ⊽	Of #0	∵	⊽
1 2-1 7k miorain, mz.in.			0.21>	121>	: ⊽	⊽	√	⊽	⊽
1 Z-4 ALIBORIANI METANIK 1 J. Du Internationalism			1 <120	<120	; ⊽	⊽	7	⊽	⊽
1 3 5 frun thish nam.			1 <130	<120	⊽	⊽	⊽	⊽	⊽
1.3 Deblochings			021>	<120	⊽	⊽	⊽ '	⊽ '	⊽ .
լ Դ-Մև հետրորդու			, ,	02 V	⊽.	⊽ .	⊽.	⊽ 1	⊽ 7
1,4-Dahlorob, az m				<120	⊽.	⊽ :	⊽ ₹	⊽ 7	⊽ ₹
2.2-Dechkeipeopare			25.5	<120 200 200 200 200 200 200 200 200 200	⊽₹	⊽ ₹	- E	Ţ ₹	- E
2 Butanishe			01717 130	(1.24K)	₹ 7	- ₹	5	<u> </u>	§ } V
2 Chkratolaen			1700	15.1×	₹	, .	7 🗟	;	: :
2-Hrvanon			0,70	0217	} ⊽		; ⊽	₹	⊽
4-Chloristother.			10 <128	1027	7 🗸	, <u>01</u>	; 2	0[7	2
4 MULTIN Z-PURABUSIN			10 × (200 U)	<1200 U	S V	0.7>	<10 R	25 JQ	16 JB
Or of the			1 <120	<120	7	⊽	⊽	7	⊽
Britain by De			1 <130	<120	▽	⊽	⊽	⊽	⊽
Bearing history than			1 <120	<120	۲	⊽	⊽	⊽	⊽
Bromeds, historia, thank			1 <120	<120	⊽	⊽	⊽	₹	⊽
Brenittim			1 <120	<120	⊽	⊽	⊽	⊽	5 ▼
Bromonethane			2 <250	<250	د 2	8	\$	Ç	Q
Carbon doulfide			<120 UJ	<120 UJ	⊽	⊽	⊽	⊽	⊽
Carbon tetrachloride			1 <120	۱ <u>۵</u>	⊽	⊽	⊽ '	⊽ '	⊽ '
Chkroth, nz. n.			<120	< 20 	~	⊽ '	⊽'	⊽ '	⊽'
Chlorocthane			2 <250	<250	4	4	Δ.	₽.	Δ.
Chkorotorm			<120	<120	⊽ '	⊽	⊽ '	⊽ '	⊽ '
Chhirunk than				250	Q	0 52 JQ	7	9	7
cp. 12-Dubbrouthm		_	0.59 5.0	OK :	€.	21	2 .	Ç ·	Σ Υ
crs-1 3-Du bloropropera			1 <120	021>	⊽ .	⊽ -	⊽ :	⊽ 7	⊽ 7
Dibroma, floromethane			- ×120	07 IV	⊽ 7	⊽ ₹	⊽ 7	⊽ ₹	⊽ √
Dahromom, thare			07170	02120	۶ ټ	⊽ ১	7 5	7	7 5
Dr. liferordiffuerone than			10 0C7> 7	00.00	7 5	7 \$	5 7	; 1	3 7
i inylikazkik			27 7	27.7	7 7	7 ⊽	; = =	; ⊽	; 7
FILXAL RIOTOTULIAGE INC.			257	<120	; ⊽	; ⊽	. ⊽	⊽	⊽
tropropy octobers.			1 <120	<120 <120	⊽	⊽	⊽	~	∵⊽
of Ayone with Ayene			<120	€I30	⊽	7	⊽	⊽	⊽
o Bulylbacan			1 <120	<120	~	⊽	<1 UJ	⊽	⊽
n Propylly Byth			1 < 120	<120	⊽	⊽	⊽	₹	⊽
Naphihaka			1 54 JQ	ÐΓ 85	7	7	ín I>	⊽	⊽
o Askme			0.5 <6.2	<62	€.	\$€	₽	\$ 0\$	₹
p-Isopropyltoluenc			1 <120	0 .	∵	⊽ ′	₹ -	⊽ -	⊽ -
sec Butytheran			02.T>	021>	₹ :	⊽ ?	⊽ ₹	⊽ 7	⊽ 7
Syne			021>	(7)		⊽ .	₹.	⊽ .	₹ .
ויע-פמו) לא וואינה			1 <120	<120 1111	⊽≒	⊽ ₹	⊽ :	⊽ :	₹ 7
Tetrachlorash re			00/1	006	7 7	⊽ ₹	<u>^</u> 7	<u>†</u> 7	⊽ ₹
Foliance			0,515	3 C.	₹	ī,	; č	÷ 🕏	₹
Irans 2 Dr. highweth, ne				(S)	- } \	<u>,</u>	; ⊽	; ⊽) T
trans 1.5 Oktobra upropere			1 2500	2800	₹	2.5	0	. △	Of 180
The block discount is as			2 250	<250	7	7	4	8	25 CD
Vinyl, blonds			2 <250	<250	77	\$	\$	\$	\$
Ayknes (total)			1 <120	<120	⊽	⊽	⊽	⊽	⊽

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
UPPFR WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit?
Pefans Supply Centur Richmond
Rechnismed, virginia

	Sample 1D Sample Date	Reporting Linut (a)	\annple AFHADG-10 10/16/2002	Duplicate AF14ADG-10 10/16/2002	Sample DMW-13A 10/16/2002	Sample DMW-20A 10/16/2002	Sample DMW-22A 10/30/2002	Sample DNIW-25A 10/16/2002	Sumple DYIN - 26A 10/15/2002
urrogate - %						:		ì	\$
2 On bloom share, d4			· **	**	83	×2	₹	st.	7,6
Bromoffeen S. D.			92	3 5	5 %	Ιń	£.	<u>6</u>	茅
Debries dingration (b.m.			₹ *	£4	16	56	3.	56	ħĥ
- T- T-			5	ŝ	5	35	**	16	#

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
UPPER WA FER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Virginia

			Sample		Sample	Sample	Sample	Sample	Sample	Sample
	Sample ID. Sample Date:	Reporting Limit (a)	DMW-27A 10/15/2002	Ì	DN1W-33A 10/29/2002	DMW-35A 10/16/2002	MW 112-2 10/16/2002	MWF0S-1 10/15/2002	MWFOS-3 10/15/2002	10/16/2002
FIELD PARAMETER Dissolved Ongen - EMOI melt. Dissolved Oxygen		9	=	_	90	60	_	911	36 D	22
Ferrous Iron - A3500D mg/L lverous Iron		0.1	1 05	~	2.4	₹	۳	9	<u>\$</u>	2
Oxidation Reduction Potential - A2881A mV (Nabation Reduction Potential			; ;	63	Ę	147	224	101	230	851-
21 - E150 LpH Vinits pH			3 .	\$	\$115	5 29	4 92	5 56	ж Т	5.67
Specific Conductance - F120 I mS/cm Specific Conductance		1000-0	11 0 123	23	0314	0.073	6110	0.240	0 107	0.557
<u>Fenperature - El 70 1 deg C</u> Tenpa taton		0	0 1 23	£ 2 2 3	981	19.7	661	20	20.4	20.5
Turbality - F 180 1 N FU			⊽ -		Ç	⊽	26	3 £	=	218
FIXED BANE LARORATORY ANALYSIS Amodes - MCAMM, 300 0 mg/l. Chanda da N Sullar		Đ	01 001 1 1 1	20.1 000 JQ 1.4	53.7 0.02.1Q 19.5	11.7 4.2 4.2	164 006 JB 138	12 40 I 62 9	92 60 1 18 1	348.J 40.1 053.JQ
Dissulved Gases - R5A SOP-175 mg/l Carbon doxed 1 tions 1 the rs Methans		0.001 0.002 0.001 0.001		226 <0.001 <0.001 2.9	99 <0.002 0.0017 0.015	61 <0.002 <0.001 0.002 JB	70 <0.002 <0.001 <0.001	42 <0.402 <0.401 0.012	200 <0.002 0.01 1.2	450 <0.002 <0.001 4.8
Hydrogen by Mkrosepy. AM20GAY nM Hydrogen		Đ	001 2	2.4	<u>5</u>	2.5	£°	6.5	9 \$	23
Total Alkalinity - MCAWW 340 1 mg/L Total Alkalinity			91 5	16 JB	HL 26	11 314	4 y JH	13 JH	6.2 JII	060
fotal Organic Carbon - 51/846 9060 mg/L Total Organa Carbon			_	22	1 114	⊽	⊽	118	4 31	95
Fotal Sulfide - MCAWW 376.1 mg/l. Fotal Sulfide.			-	⊽	0 48 10	⊽	⊽	⊽	2.7 JII	4 H

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
UPPER WATER BEARING UNIT
Annual Grundwater Report - October 2002
Operable Unit 7
Defines Auppl Center Ruhmond
Richmand, Virgina

	Sample ID	Reporting	Sample DVIW-27A	pk -27A	Sample DNIW-33A	Sample DVIW-35A	Sample MW112-2	Sample MW-FOS-1	Sample MWFOS-3 18/15/2012	Sample NIWFTA-1 10/16/2002
	Saniph Date	Limit (a)	7007/CIAN	7007	10/27/2007	TIME TO THE	TO THE PARTY OF TH			
Mercury - 5W 846,7470A (Dissolved) µ2/1							,	7	7	= 7
Man			⊽ -		⊽	7	⊽	₹	7	5
Mercury - SW846 7470A (Total) LCL			-	_	7	7	V	⊽	in IV	ij
Mrtury			-	_	7	7	;	;	;	
Metals - 5W846 6010B (Dissolved) H2/L		ŕ		=	(A) 0 03	111 0002/	2 **	2000	OF # 16	250
Aluminaum		7		÷ •	>	10 MAX) 5 5	5	, 'V	ζ '0
Antunony			. v	. •) V	7 (\$ \$	8	29.2	35.9
AFERE		2		Of 851	S8 1 JO	29 5 JQ	JI 8 JQ	Or 911	OY 61.1	217
the contraction of the contracti				Of 60	U 87 JQ	DE 290	2 5 JQ	01×	E,	O/ 1/0
Delyman Calonina				å		2	4	\$	7	8
		05		Ot 756	13100	3160 JQ	OF 00#5	15600), (M)	22200
(Permital				· 01>	٠ <u>١</u> ٥	01>	01>	ŞI.	9(>	0 0 1
Cabal			=	76 JQ	0£>	O£>	36 JB	€	1.7 JB	- 2 JQ
1 ddo)				01 >	410	OI>	9 1>	(]	14 JQ	95
lum		2		0562	5180	1360	166	445	3780	7540
pr T				~	v	\$	♡	₽	₹.	Φ.
Nagnesam		95		17SO JQ	0110	2350 JQ	2870 JQ	0777	Of 0561	3000
Manage				21.7	145	47.9	619	43.5	Æ	∄ :
Moly hde num				< 4 ()	₹	Q₹ •	Q* .	J87 JQ	0 4	(4) (4)
NKALI		_		<100	6 V	44 30	74 JQ	1017	(M) >	OCIO OCIO
Polassium		.S.		2850 JQ	5540	3620 JQ	216	04/0	Or nonz	e v
Seknium				n i	o 1	ÇĘ	0 =	> ₹	7 🗧	; =
Silver		,	7 9 min	017	2 3 3	2020 103	2300 EG	07.40	0865	14200
		Ā		2 5	# J\$ \	050	200	5	Ş	or s l
Vanadum			? ?	2 : 5	5 5	20 CI	20 NI	420 UI	<20 UI	70 CZ>
/100				3	;		,	į		
Metals - 5W846 6010B (Total) ug/l.		,		:		11.000		711 myV	100	310
Alunsmum		7	200 4	415	91.2.JQ	<200 03	Of 5.20	10 007>	? *	<u> </u>
Animony			ν·	ç	3 ₄	0 4) Y) ए	4 22	, č
Arknik		•	v 9.	S 5	S 6 5	2 2 o S) (c) (E	(42.10	215
Brium		•		2 98 6	301	07.17.0	25.10	2 T T T	, 01>	- JC
Sery Unum				, ; 7	7	4	,	, &	8	3
(Administration		5		972 JQ	12900	Of Hitt	Of OIE	156(3)	1220 JQ	21900
Chomin				<10	<10	<10	01>	01>	√10 √10	÷10
Cohall			=	81 JQ	<30	€,	3 5 JB	S	13.18	O 38 10
Copper				~10	24 JB	₽ :	₽	9 ;	15.10	017
Iron				4020	\$240	1 , 60	1030	££ 5	(188)	950
נייון				: ټ	Φ.	٠ ا	\$ \{ \	\$ £	, i	į į
Magnesum		X		C 082	0925	24 50 JQ	Dr 0787	410) (K*)	A16.01
Marganese			15. T	281 \$	9 9	(A	1 70	5 × 3	- 17	= =
Mulyhdenum				077	07 T	46 15	95	2 5	15 10) [
NEEC		_ 2	•	CI USA	5530	37.07.02	χΞ	6740	2180 10	0962
Potassium		×	•	? ?	3 (? ? ?	÷ 5	ξ '∇	*	٧.
Sek mum			, s	, S)) ≎) 0	- 97	9 >	01>
Silki		5		2640	8850	2910 JQ	3360 JQ	0676	6040	14200
Variation		i		2	\$	96	ŝ	O\$>	0\$>	- TO
/ discount			20 <20	<20 UL	18.2 JQ	<20 UI	<20 UI	10 th/2>	<20 UI	<20 UI
Thatting, SW 846 7841 (Dissolved) ug/L										
Thallum			2	4 2	a	8	\$	4	7	5 CI

Thallium - SW846 7841 (Total) ug/L

TABLE E-10

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
UPPFR WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Rethrond
Richmond, Virginia

			4	, const	dom't	Samuele	Samuel	Sample	Sample	Sample
Sample ID	e ID	Reporting	DMW-27A	V17-	DMM-33A	DMW-35A	MW112-2	MWF0S-1	MWF05-3	MWFTA-1
Sample Date	Date	Lindt (a)	10/15	10/15/2002	10/29/2002	10/16/2002	10/16/2002	10/15/2002	10/15/2007	700700101
Thalbum			2	v	IJ	4 2	\$	\$	\$	<2 UI
Polychtonnated Biphenyis (PCBs) - SW846 8082 µg/L										
PCB 1016			z -	٧٧	Š	× Z	۷×	Z :	ž:	
W'B 1221			z. _	≤	< Z	₹:	ź:	ź:	< :	⊽ 7
I/CB-1232			_	<u> </u>	Z :	Z:	Z :	ζ.	< <	₹ 7
IX B-1242			z :	< :	V.	S :	Z Z	۷ ۲	< < 2	7
IX B-1248			z :	≤ :	ζ:	S :	< :	< :	< : 2 2	J 7
PCB 1254			z 	<	<z< td=""><td>۲.</td><td>Š.</td><td>VZ :</td><td><u> </u></td><td>; T</td></z<>	۲.	Š.	VZ :	<u> </u>	; T
PC B 1260			z -	<u>.</u>	۷ ۷	Z Z	ζ Z	< Z	ć Z	⊽
g - grazing										i
Learn thompson in 1				٧V	۷×	٧,	< 2	Š	< Z	49
Tetrachloro m x3kme			Z.	<	ς _ν	× N	Š	< Z	< z	5
S. m., A olotte Orennie Communds. SW&46 8270C SIM us/L										
Ac. naphthan		9		\$	٧×	×	٧X	۷ ۷	<z< td=""><td>OF 1800</td></z<>	OF 1800
Act mathylates		9		\$	٧N	×	۲×	<z< td=""><td>۷ Z</td><td>4 2</td></z<>	۷ Z	4 2
Anthrace Inc		9		\$	٧×	<n V</n 	٧	< z	۲ ک	0.046 JQ
וארנים אין אוון או ארי ואר ואר		.		Ç	٧×	×	۲×	< ×	< Z	<0.2
Benzo(a)pytene		•		~	۲ ۲	ź	Ž:	V.	X :	7 F
Be neach Huarantheme		_		≤ :	×:	ž:	Š ž	< :	< * Z	707
Bunzaghipes) km				> :	Ϋ́Z :	ź;	۲ : د ک	< ×	ž ž	7 C
Benzotkillustanden		- `		\$:	< ?	< ×	< ×	< < 2	2 2	200
Curbazok.				< 1	< <u> </u>	£ 2	<u> </u>	2 2	2 2	÷ 6
(hr) k.n.				5 5	< <	č z	S S	2 2	Z Z	7
Diben/(a h)anthracenc		-		.	ć ć	Ç X	Ž	×	×	7 €
Librariant Mark		, ,		: <	Š	ž	۷ Z	VN.	×Z.	Of 640.0
forther.				>	٧N	٧X	< Z	٧X	< Z	₫ 5
Nachthalan		•		Ş	٧X	Ϋ́Z	< Z	۷ N	Š	23
Phenanthern		_		Ş	< X	٧X	< Z	۷ Z	< Z	40.2
Pyrene		_		Ş	< Z	< N	۷ ۲	< Z	< Z	602
			_	< 2	VN.	Š	×	×	Υ <u>ν</u>	105
2 4 G 1480 Oliverion			, 2	· 5	V.	ζ. Z	< Z	×	ž	Z
2. a montaquicity of				~	\ Z	<z< td=""><td>< Z</td><td>V.</td><td>< Z</td><td>78</td></z<>	< Z	V.	< Z	78
Narobence, d5			,	<u>۲</u>	<××	٧Z	\ Z	۷×	۲ ۲	89
176_00=45			1	Ş	V.V	V.V.	٧X	٧X	Υ _N	70
Terphenyl 414				Ş	Z.	٧X	₹	< Z	< Z	48
Vol. 14th Occame of amounted a SW \$46 \$76418 nect.										
2-1 crachlotte than			_	₹	-67	⊽	⊽	⊽	O£1>	⊽
1 1 I Irahlora than			_	₹	089	⊽	⊽	⊽	c330	⊽
1 2 2-Tetrachloroethane			_		<i>19</i> >	⊽	⊽	⊽	(¹ 10)	⊽
1 1 2- Erschlosov, than			_	7	< (1)	~	⊽	⊽	(1 ₁ 1)	~
1 1-10x hiorouthan			_	~	110	~	⊽	₹	(33f)	0.79 JQ
1 I-Da hiorex the re.			_	⊽	280	⊽	⊽	⊽	₹ \$	⊽
1 I-Du hloropropere			_	Ţ	19>	₹	⊽	⊽ '	<330	⊽
1.2.3 Trichlorob, nz. r.			_	Ţ	<67 UJ	⊽	⊽ .	⊽ .	-330 -330	⊽ '
2 3 Truchloropropare			_	-	<i>1</i> 9>	⊽	⊽ .	⊽ .	<330	⊽ '
1.2.4 Trichloroby nyen.			_	⊽	(O 19)	⊽ '	⊽ .	⊽ -	9 ?	⊽ .
l 2 4 Trunchh lk-nz-n.			_	⊽ .	C#S	⊽'	⊽ '	⊽ ¹	₩ •	⊽'
l 2-Dibromo 3 chlorupropane			2	Ç	~13 0	\$	₹	Ų	GP/II	₹

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Pefense Supply Center Richmond
Richmond Virgins

			Sample	Sample	Sample	Sample	Sample	Sample	Sample
	Sample ID Sampte Date	Reporting Linut (a)	DVIW-27A 10/15/2002	10/29/2002	10/16/2002	10/16/2002	10/15/2002	MW FUS-3 10/15/2002	10/16/2002
1.2 Debrytas, than			<u>v</u>	£45	⊽	⊽	₹	<330	⊽
12 Debrodenen			⊽	<i>L</i> 9>	⊽	⊽	⊽	<330	⊽
1.2 Dehbreethan			⊽	£9>	⊽	⊽	⊽	25€>	⊽ '
1,2 Dchknepropan.	•		⊽.		⊽ -	⊽ -	⊽ ፣	999 979	⊽ 7
1 3 5-Trimethylbenzene			⊽ -	₹ ₹	⊽ ₹	7 7	0 7	÷ ÷	⊽ 7
1 5 Dichlarge Dengelber			⊽ ⊽	9 5	7 च	7 🔻	7 ⊽	330	7 ⊽
1.4-Du Hoselb name			7	[•] [•]	; ⊽	. ₽	⊽	<330	⊽
2 2-Du Moropropan.			. □	L9>	7	7	⊽	O15>	⊽
2 Butainte.		=	J <10 UJ	<670 R	0)	GI>	<10 UJ	<3 400	(10
2 Chlorotoluc n.			⊽	<i>1</i> 9>	~	⊽	⊽	<330	⊽
2-He sanon.		=) <10 UJ	<670 R	</td <td>0</td> <td><10 UJ</td> <td><3300</td> <td><10</td>	0	<10 UJ	<3300	<10
4-Chlorotulucuc			⊽	C 92	⊽	⊽	⊽∶	0EF>	⊽ :
4 Nk thyl-2 pentanon		=	01×	<0.00 CO	0 -	×10	012	(B) (S)	012
Action			mal.	<670 R	ĝ. □	0[>	- NO C	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	Σr - *-
Benefit			₹ ₹	ē ¥	⊽ 7	J 7	₹ ₹	200	₹ ₹
Bronnon, n.y. n.			, t	Ş Ş	7 7	7 7	; v	? ? ?	, T
Dength And Other III.			7 7	<i>1</i> 9	; ⊽	; ⊽	₹	<330	; ₩
Beandise			: in -	19>	⊽	⊽	E P	<330	~
Broment than			7	0.1>	Ą	4	7	029>	\$
Carbon desafrade			⊽	C 9>	⊽	⊽	⊽	<330	~
Curbon Ictrachbrik			⊽	C9>	⊽	7	⊽	0£\$>	⊽
Chlorohena n.			⊽	<i>L</i> 9>	⊽	⊽	₹	<330	₹
Chbrichine			5	×130	۵.	Q	ζ.	<670	₽ ·
Chloruform			⊽ '	2 92	⊽ '	⊽'	⊽'	012°	⊽'
Chlyron, than,		•		0.1>	Q ;	٥ ۽	Q ;	0.670	7
(1) 2-Dehlemethere		<u> </u>		98.5	Ç →	€,	€ ₹	0000 T	1 00
CB 1 FDrhidopropen.			⊽ ₹	è 4	⊽ √	⊽ √	7 7	255	₹ ₹
Darright nascine man.			7 7	9 9	7 7	, ,	7 7	- F	7 7
Date Managed Transcome them.			30	413011	; 0	2	7 77	029>	; 0
1 the library of the			; ¬	£9>	! ⊽	• ⊽	; ⊽	<330	; ⊽
Hearthornburgene			1 <1 0.3	(U 2	⊽	⊽	f0 I>	<330	⊽
Isopropy thank in			▽	c 9>	⊽	⊽	⊽	<330	₹
m Ashir & p Sykin			⊽	<i>L</i> 9>	⊽	⊽	₹	<330	⊽
Methylche chloride			⊽ -	29 10	⊽ '	⊽ '	⊽ '	or of	⊽ '
n Butylbenzere			⊽ .	467 UJ	⊽ :	⊽ •	⊽ -	06F2	₩.
n-Propy lbenzeue			⊽ ¬	(a)	⊽ 7	⊽ 7	. .) () ()	7
Naphthaten.					₹	₹	ΣĘ		n 7
U-A)Kirk.				. <i>(4)</i>	; •) ¬	; ¬	£ 5	, T
e isolaclismones.			; ¬	<67 UI	; ⊽	; ⊽	₹	o.130	; ⊽
A STATE OF THE PARTY OF THE PAR			⊽ -	<i>L</i> 9>	₹	~	⊽	<330	⊽
tru Butylk nzene			⊽ -	C 9>	⊽	7	⊽	<330	⊽
Tetrachiorocibera			~ _	()S+	<u>[9</u>	~	⊽	<330	⊽
Toluene				c67	7	⊽	⊽	<330	⊽
trans-1.2 Dublotecthen.		0.5		€ ₹	€ 5	₹	₹.	140 JQ	\$ ()\$
tras-13-Dubloroprop.a.			▼ `	19	⊽'		₹ -	33.	⊽ '
Trablemethene			- ::	2500	7 '	⊽ '	₹ ÷	76(0)	⊽ '
Frehloroflaoromathana			5 C	⊋ #	9 9	\$ 5	7 C	(1/9×	Q 1
Vmyl chloride			* ·	(E) V	7	77	7 5) (100) (100) (100) (100) (100)	7 7
Ayk Bey (101.41)			-	ĝ	7	7	7	01.7	7

TABLE F-10

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Retiniond

			3 Since	q					
	Sample 1D Sample Date	Reporting Lumit (a)	Sample DVIW-27A 10/15/2002	Sample DVIW-33A 10/29/2002	Sample DNIW-35A 10/16/2002	Sample MW112-2 10/16/2002	Sample MW FOS-1 10/15/2002	Sample MW FOS-3 10/15/2002	Sample MWFTA-1 10/16/2002
Surrogate - %			193	ă	×	×3	\$6	78	78
Duhkara pan da			ţ .	• !	: 4		100	ā	5
and a state of a state			5	×	3	ķ	2	7	ŧ
I (FIRET MACHINE) IN THE STREET OF THE STREE			101	101	çĸ	2	JIK)	93	5
romoniusionik mank			; ;	3	16	5	¥	16	5

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Opcrable Unit 7
Exfense Supply Center Rethinoud
Richmond, Virginia

	Sample ID Sample Date	Reporting Unit (a)	-	Sample MWFT V-3 10/17/2002	Duplicate MW FTA-3 10/17/2002	Sample MWFTA-5 10/29/2002	Sample MW FTA-7 10/17/2002	Sample MW FTA-9 10/29/2002	Sample MW FTA-10 10/29/2002	Sample MWFTA-23 10/15/2002
HILD PARAMI'I ER: Droghed Ovigen - E-360 I mg/L Droghed Ovigen		J	-	» :	3 0	_	90	_	8 -	6 7
Ferrous from A 35(M)D mg/L lyrrous from		_	Ξ	ы	ы,	7.	ч	3.2	~	\$ 0
Oxidation Reduction Potential - A2580A ntV Oxidation Reduction Potential			1	-28	28	ā	\$0 1	161	63	3/6
211 - E 150 1 2011 limis pti				\$ 26	\$ 26	6 37	143	5.31	46.5	<u>-</u>
Specific Conductance - E.120 I mS/cm Specific Conductance		10	0 001	0.432	11-432	0115	U 114	0 (164	0.116	0.249
<u> Tenparature - F1701 deg C</u> Trinparatur			10	20 25	30 30 21	6.5	8 61	163	ž	8 61
Turbidity - F180 1 NTU Turbidity			_	٠	٠,	91	⊽	ر	2	25 20
FIAED BASE LABORATORY ANALYSIS Anions - MAAWW 300 (A, mpg/l C'hlorade Nutate as N Sullate.			~ :	747 <01 278	25 25 25	7.4 <0.1 13.7	7.2 00% JQ 29.8	8	4 6 5 1 4	36 4 - 1 - 8
Dreadred Gases RNA SOP-175 mg/L Carbon doxad. I than. I the rs. As thans:		5 6 6 5	0 001	96 <0.002 <0.001 0.14	93 <0.002 <0.001 0.14	39 <0.002 <0.001 0.001 JB	68 <0.002 <0.001 \$40.001	49 <0.002 <0.001 0.0021	%F 500 0> 100 0> \$00 0	210 0.00089 JQ 0.036 1.4
Hydrogai by Microsetty - AM20GAX pM Hydroga		0	003	<u>-</u>	2.7	v	2.5	1.7	4.	61
Total Akalimty - MCAWW 310 1 mg/L (total Akalimty			~	20	22	51	\$	74 #1	56	23
Fotal Organic Carbon - 5 W 846 9060 mg/L Total Organs, Carbon			_	9 0	50	⊽	2	~	⊽	=
Total Sulfide - MCAWW, 376 1 mg/L, Forth Sulfide			-	QL 87.0	O1 82 O	0 48 JQ	v	Or 96 0	Òf %a	⊽

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
UPPER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Creiter Rethmond
Richmond, Virginia

			Richmonk	Richmond, Virginia					
	Sanple ID	Reporting	Sample MWFTA-3	Duplicate MWFTA-3	Sample AIWFTA-5 10/29/2002	Sample MWFTA-7	Sample MWFTA-9 10/29/2002	Sample MW FTA-10 10/29/2002	Sample MW FTA-23 10/15/2002
	Sanple Date	Trum (a)	7007						
Mercury - 5W846 7470 \ (Dissolved) u2/1		-	⊽	⊽	⊽	⊽	⊽	~	⊽
Mercary - SW846 7470A (Fotal) ug/L. Mercary			⊽	⊽	⊽	⊽	⊽	~	⊽
Aletaly SW846 6010B (Dysolved) ug/L				į	3	į	3	100	130 EO
Aluminum		300	<u>«</u>	228	2 5	⊋ 4	₹ 1) 	Σ' \$7 \$7
Алиния		v v	€ 5	0 ±	, 2 ∠	, ,	3 6	, v	75.5
Arkink		2007	ž	O(1 29	25.5 10	St 208	Of 681	63 10	251
Darbuth C. o floor] =		07. I.C	2 >	Of 61	×10	÷.	12 10
(Admin)		C		· 7>	\$	3	\$	8	۶
Cakaum		OWN	7	Of 0£87	3350 JQ	3680 JQ	2180 JQ	Of 090 1	2520 JQ
Съгитыя		01		0 ×	o, ;	99	el :	21× 5	E
Cobalt		£ :	2 2 2) (80 (80 (80 (80 (80 (80 (80 (80 (80 (80	₹ ₹	7 = 1	9 S	1 × 13	₹ ₽
Cupper		111			2 2	9 7 7 7	17. E	81 951	21300
Iron				· v	V	Of 81	۶	₽	۶
Managemen		905	₹	3120 JQ	2620 JQ	2560 JQ	OF 0691	3240 JQ	3260 JQ
Manualka		20		76.2	512	39.3	262	1 19	<u>28</u>
Molyhdenum		7		<40 040	O † >	040	25 JQ	0 4 0	₹ .
Dxkel		OD		00 T	<100	0012	011V	3520 10	35.00
unisyno _t		(101)5	5440	08. ×	4 500 JQ	کر 1262 د 1262	Or nect	Στ 0.2c	λ
S. k. Riuo)		r <u>=</u>		7	; ₹) OF	; <u>0</u> ;	€	9 >
Silker		SOMS	• •	43600	8340	QL 0971	06/25	1780	4800 JQ
Variation		9	-	074 JQ	0\$>	€	<u>(§</u>	05>) (1
/IR		20		<20	30.9	<50	<20	<20	25.1
Allert L. City Vit. Antippe (Tatalymen)									
Alemana		200		246	<200	757	Se JC	<200), 174 JQ
Animony				۵	\$ ∰	δ.	o u	u د :	٥ إ
Arsent				- 5	ን ;	٠,	٠,	32 18	77.2
Вытит		500	_	Of 102	27 JQ	⊋ : a :	? ≈	2 1	957
Acryllium			2 % 2 %	₹ 5 2	€ς	≥ G € €	- C	3 0	? -
Cadminn		Z SONIO	3) (3230 JO	37 27 5 Of 01/78	2130 JO	Of 090t	2590 JQ
Cakuma		_		0I>	<10	, 01>	· 41>	el>	<10
Cobalt		•	0	o(>	O\$>	4.4 JQ	0 93 JB	₹.	56 30
Copper		_		0I ×	€ I>	19 70	OI>	91>	01>
fron		200		3290	518	<200	226	3 7	51818 71818
1 र बरी		60.72	Ş 25 - 26	\$ 5 5	3530 10	7540 10	1570 10	326.10	01 1823
Magazinan		וואאר מיב		78.4.87	7	7 98	26.1	62.7	861
Manganese Matchell and		• →		₹	OF V	×40	(† >	÷	OF>
Nicks Nicks		35		<100	(X)	× 190	<150 V	001>	OK 8.0
Polassur		SORK		1195	Of 0817	2970 JQ	2490 JQ	or also	3510 JQ
Vek mun			\$ \$	δ	Ŋ	: ۲	ζ:	∜ :	٠
MAC		_		01×	ell'	01>	0 3	011×	(H)
штрох		(KX)).	-	90/4	0574 0574	7 5		3	2 = -
Vanduum		re	20 05	\$5 \$5 \$0 \$7	§ 8] =	75, 5	(\$, , , ,
יייי									
Thallum - SW846, 7841 (Dissolved) µg/L. Thallum			2 <2 UI	<2 UI.	8	<2 UJ	\$	Q	å

Thallium . 5W846 7841 (Total) ug/L.

FABLE E-10

SUMMARY OF QUALIFIED DATA - OC FOBER 2002
UPPER WATER BEARING UNIT
Annual Grundwater Report - October 2002
Operable Unit 7
Defense Supply, Center Richmond
Richmond, Virginia

(II elumes)	r.Tipe	Sample MW FTA.3	Duplicate	Sample NWFTA-5	Sample MWFTA-7	Sample MWFTA-9	Sample MWFTA-10	Sample MWFTA-23
Sample Date	Limil (a)	10/17/2002	10/17/2002	10/29/2002	10/17/2002	10/29/2002	10/29/2002	10/15/2002
Thattum	L 1	IN 2>	<2 UI	۲	20	V	å	7
Polychlorinated Rightensk (PCBs) - 538 846 8082 ng/l.							;	;
PCB 1016	_	⊽	⊽	٧×	<z< td=""><td>Ž.</td><td>Z :</td><td>< :</td></z<>	Ž.	Z :	< :
IX B 1221	_	⊽	⊽ '	V.	ζ,	< :	ž ž	< <
PCB 1232	_	⊽ .	⊽ -	ď.	Ž.	< <u> </u>	< ×	< <
K-B-1242		⊽ .	⊽ .	<u> </u>	< 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	< 2 2	ξ ζ	. ×
PCB 1248		⊽.	₹ 1	< -	ž ž	< 2 2	ξ Z	: ×
አ в 124	 ,	⊽ :	V 7	< *	< Z	< ×	< Z	Ž
KB 1260	_	⊽	⊽	VNI	S		=	!
Surrogate . %				:	;	;	į	2
1 Ac at Hornthopk my l	1	19	9	SZ.	< Z	< Z	< :	<u> </u>
Letter blord-un-tyk ne	•		PI	۷ ۷	ζ Z	< Z	ζ Z	Š
Semi-Volutile Organic Communds - SW8468270C SIM ng/L								
Au nankth nu	0		<0.5	۲×	Š	×z.	Š.	ž:
Acen unhibited.	Ö		<0.5	<z< td=""><td>< Z</td><td>< Z</td><td>S :</td><td>S :</td></z<>	< Z	< Z	S :	S :
Anthracere	0		Q 5	۷ ۷	< Z	< :	Z :	V :
Benzola)anthraceir.	0		<0.2	۷.	< :	ζ:	ž :	× 2
Benzotatpyrene	Ç		9	< :	\	ζ.	< <	<u> </u>
Benzuthilumanthere	=		7.5	Z:	ς .	< 2 2	< 2	ŠŽ
Ֆեդշս(քիկ)γթեր և և	D		7 5	< ×	£ 2	< <	2	ž
Benza(k)Huoranth ne	5 5		7 =	: <	ź	ź	ž	×
Carbazok	s c		9 8	ž	ź	Š Z	×Z	×
Chrykate			9 9	Z	V.	< Z	٧X	٧٧
Date High Halian activ	3		€ 12	۷ ۷	٧٧	V.V.	٧X	Ϋ́
They're	0.2	;	⊲02	٧٧	Ž	٧X	×z	< :
Indeno(1.2.3 ed)pyrene	Ξ		₹	< Z	Š	₹ Z	V.	Y :
Naphthakine	 	<0.2	₹ 5	<	Z :	Š:	< -	<u> </u>
Phenanthran	Ď		\$ 5	X :	S :	S :	¥ 2	< * 2
Pyrein	0		<0.7	< Z	Ç Z	Š	Š	8
S. otnocritis								
3.4 6- Enhancetivinal		£	₹	۲ ۲	Y.	Š	ź	۲ ۷
2 Promobale nvl	1		3	<z< td=""><td>٧X</td><td>ς Σ</td><td>Š</td><td>< Z</td></z<>	٧X	ς Σ	Š	< Z
2 Huorophenol	•	58	69	۲ ۲	Š	VZ.	۲ ۲	SZ :
Nitrok na na ds	•		75	<z< td=""><td>< Z</td><td>ž:</td><td>₹;</td><td>Š.</td></z<>	< Z	ž:	₹;	Š.
Phenol ds			I	Ϋ́Ν,	۷ Z	ζ;	YZ :	V ;
T-տրիսոչ-Ս14	•		310	۲ ۲	V Z	< Z	¢ Z	S Z
Valente Orennie Community - SW846 8260 B ut/L								
1 1 12-17 trist blures than.		2	\$	⊽	⊽	⊽	~	<1200
1.1. Frehluro, than		4	4	⊽	⊽	⊽	⊽	<12(X)
1 2 2- Jerrachlores thate		4	8	⊽	⊽	⊽	▼ '	<1200
1.2-Truchlorecthan.		7	4	⊽	⊽	⊽	7	<1200
1 1-Dublorouthane		06 JQ	4	⊽	⊽	⊽	⊽ '	<1200
1-Dufflorouthun		J 069 JQ	0 54 54	⊽	⊽ '	⊽.	⊽.	<12(K)
1-Dahloroprop.nc		7	8	⊽	⊽	⊽ '	⊽ :	<1200
1.2.3-Textilorobenzen.		5	8	5	⊽ '	5 . ▼	f∩ .	<1200
1,2 3-Trichlorogropanic		7	Q	⊽		⊽ :	₹ :	<1200
124 Trubbroknan		4	\$	in . V	⊽ ′	Π. ▼	ñ.,	<1200
2.4 Trunk thy lbenzene		<u>-</u>	4	⊽'	⊽ '	⊽ ¹	⊽ 5	(1500) (1500)
l 2-Dibromo-3 chloropropane		2	3	3	ť	ť	ţ	7 × 7 ×

TABLF E-10

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
UPPER WATER BEARING UNIT
Annual Groundwate Report - October 2002
Operable Unit 7
Befense Suppl Center Ruhmund
Richmond, Verguita

			Sample	Duphcate	Sample	Sample	Sample	Sample	Sample
	Sample ID Sample Date	Reporting Linut (a)	MW FTA 3 10/17/2002	10/17/2002	10/29/2002	16/17/2002	16/29/2002	10/29/2002	10/15/2002
The state of the s			₽ -	Q	⊽	⊽	⊽	₹	<1200
1 2-10 blosmb na re			. —	a	⊽	⊽	⊽	⊽	<1,200
1.2 De filoroc than			~	8	⊽	⊽	⊽	⊽	<1200
1.2 Dichlorapropuis.			1 4	7	⊽	⊽	⊽	⊽ '	<1,200
135 franchilking ac			٠	3	⊽ '	⊽ :	⊽ '	⊽ :	<1200 1200 1200
13 Dicherolande			₽.	۵,	⊽.	⊽ `	⊽⊺	⊽ 7	<1200 1300 1300
І 3-10к Вакоргорал.			ر د	₽'	₹ .	₹ -	⊽ 7	⊽ ₹	1001
4 Dufberokazan			۳ 	3 9	⊽∜	⊽ ⊽	⊽ ₹	7	00217
2.2 Dachlorupropain			7 F	77 (, a	7 = 1	7 <u>°</u>	7 =	ORIGIN
2 Butanon		_	10 CO 10	7	¥ 7	5 7	<u> </u>		×1200
2 (filorotoluca.			7 7) C	7 =	111012	307	3 O.S	<12000
2 Hexanolic		_	505	0	; ;	; ;	⊽	⊽	<1200
4 Citionaloucine			- eg	, 8	10 O1>	ā,	<10.01>	<ii td="" ui<=""><td>< 2000</td></ii>	< 2000
A particular 2-particular			0 <20 UJ	<20 UJ	<10 K	12 JQ	<10 R	<10 R	<12000
(k pyciic			4	Ø	⊽	⊽	~	~	<1200
Branach			1 42	Q	⊽	⊽	⊽	⊽	<1200
Вязгис постава праве			₹ 7	\$	⊽	⊽	⊽	⊽	<1200
Bronudehloromethan			1 4	\$	⊽	⊽	⊽	⊽	<1200
Branotom			1 <2 UJ	<2 UJ	⊽	in .	⊽ '	⊽ '	- 1396 - 1396
Bronningham			2 <4	4.	٥.	. 43	₽-	۵ -	15/5/2 15/5/2
Carbon disulfide			♥ •	4,	⊽⁵	⊽ 7	⊽₹	₹ ₹	4877 ×
Curbon tetrachlorate				7 5	⊽ ₹	⊽ 7	7	7	<1200 1700 1700
Chlorobenzen			7 7	7	⊽ ?	, c	5 0	50	<2500
Charinethank			* °	5 %	,	; ⊽) ¬	; 7	<1200 <1200
			7	; ₹	: 4	: 7	4	a	<2500
C morotok titalik 1 m. 1 3 Da Morot ik m		~	. 95	Į	₹	Q0.5	\$ \$	\$ 05	\$20XX)
civel 3-12s blomprom.ne				Ø	⊽	⊽	~	⊽	<1200
Dibromochickers than			4	\$	⊽	⊽	~	~	<1200
Dibromomethark			1 2	V	⊽	⊽	⊽	⊽	<1200
Dr. blerodifluerom, than,			2 <4 UJ	4 UJ	2	<2 UJ	<2 UJ	<2 UJ	<250X)
1 thy the means			7	7	⊽ :	⊽ :		⊽ :	077
Hexachlorobutade.re			m ;	3,	3 -	S -	⊽ ¬	5,	(42.4)
Lograpylly nyery			~ ·	7 5	⊽ ₹	7	J 7	7	(K)(Z)
n-Vykne & p Aykn.			7 5	7 t	, T	, T	; T	7 7	1300
MALITY KITK CAROTHAL			7 7	7	; []	; ⊽	; 1 5	; T	<1200 <1200
n-Propy than an			2	Ġ	⊽	⊽	⊽	⊽	<1200
Nanhthak m.			∵ -	77	fn I>	~	(A) (S)	€ 1 € 1	<1200
o-Aykır.		=	05 <	7	₹	5 (₽	₹ 18	€.	<620
p twopropytrolucie			∵ -	A	⊽	⊽	⊽	⊽	<1200
sex-Butchenane			1	\$	īn v	⊽ .	Ē. ⊽		C13:00
Nyren			থ _	₽.	⊽ .	▼ .	⊽ .	⊽ .	<1200
ורנו-19מוץ לא חיר נא			⊽ : - :	♥ ;	⊽ -	⊽ .	⊽ -	⊽ :	0077
Tetrachlores there			- ·	×	⊽ -	₹ 7	⊽ 7	⊽ ₹	(A)7(V
Folks m.		•		₹ ₹	⊽ ₹	⊽ ₹	⊽ ₹	⊽ ₹	41.21.5 4.20.
trans 1.2 Dichlorex them.		-		۲, د	Ę,	37	į	آ	(12/A)
trans 13 Dkhloroprop.m.			7 5	, v ×	7	, √	7	7 ₹	<1200 <1200
Truthlogoethane			2 2	- 8 - 5	য	25 m	7 7	; 7	<2500
THE INCIDENCE IN COME.			7 7 7	4	9	4	8	\$	2500
Variet (not als			: 0	. A	· ¬	' ₹	' ▽	' ⊽	<1200
Aghan taring									

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
UPPER WA FER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Befense Supply Center Mechmond
Richmond, Virginia

	Sample 11) Sample Date	Reporting Libit (a)	Sample MW PTA-3 10/17/2002	Duplicate MW FTA-3 10/17/2002	Sample MW FTA-5 10/29/2002	Sample MW FTA-7 10/17/2002	Sample MWFTA-9 10/29/2002	Sample MW FTA-10 10/29/2002	MWFTA-23 10/15/2002
Survegate - 76 1 2 Dr. blorochara, 44 4-Bromolloorobenta, r. Poleomollourobenta, r. Poleomollourom, thanc.			5 & 5 t t t t t t t t t t t t t t t t t	2 2 3 3	25 55 55 55 55 55	129 529 829 129	93 83 101	93 81 100 91	88 85 92 88 82 92 88

PRI PARI D/DATI RMB 6/04/03 CHI.CKI D/DATI. JAH 6/05/03

1 Humated, based on QC data
1B I summated prossibly based high or take
posture based on blank contammation
1B I summated possibly based high based upon QC data
1I I summated possibly based high based upon QC data
1I I summated possibly based high based upon QC data
1I I summated bestibly based by based upon QC data
1Q I summated Value as k.iw.c.n reporting limit
and detection limit
1A Dinacket Reported Detection I mut as unprecese
1D Indicacted, Data based low - Reported
1D Lection I mut as higher than unbeated
1D Condected, Data based low - Reported
1D Condected, Data based low - Reported
1D Condected and the higher than unbeated
1D Condected and the method-required sample volume variated and analyzed
1D Sample reporting limits may sary due to sample, colume/weight extracted and/or sample and on the based of the sample colume/weight extracted and/or sample and on the based of the sample colume/weight extracted and/or sample and on the based of the sample columer.

Notes

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
LOW F R WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Richmond
Richmond, Meguid

	Sample ID	Reporting	Sample MWFTA-14 10/29/2002	Sample MWFTA-16 10/15/2002	Sample MW FTA-17 10/15/2002	Sample MW F1 A-18 10/16/2002	Sample MW-FTA-19 10/17/2002	Sample MW-FTA-28B 10/29/2002	Sample Atw.FTA-29B 10/17/2002
The state of the s	Sample						ļ		
FIELD PARAGELLEN Droodsed Oxygen Droodsed Oxygen		=	7	ж У	77	7 1	7	- 13	1.7
Ferrois, Iro <u>n - A'SOND mg/L.</u> Leftaus Iron		- - -	-	9	≘	er.	-	5 0	7
Oxidation Reduction Potential - A2580 AmA		;	195	- 149	ş	68-	-15	£ fr-	-82
<u>pil - F150 1 pH Units</u> pH		,	9 O8	12 21	12.33	7 14	68 01	60 L	12 44
Specific Conductance • F 120 1 mS/m Specific Conductance		0 (0)	\$610	26 1	4-	9510	0.725	1690	61
<u>Temperature - E170 deg C</u> Tx mparatur		10	7	181	9 81	11	191	12.4	18.7
Turbidity - E13/9 I NTU Turbidity		-	œ	ī	ю	œ	7	12	61
HIXED BASE LABORATORY ANALYSIS Amons - MCAN W 300 0A mg/L Chlond, Nutric in N volide			13.9 001.1Q 20.2	116 <01 71	5 6 (4) 1 (5) 8	47 <01	64 63 63	58.2 <0.1 5.6	21 <0.1 30.4
Dissolved Cousts - RNA SOP-175 mg/L Carban doxide Lithane I the ne Methane		0.001 0.002 0.001 0.001	0.22 JB <0.002 <0.001 0.0007 JB	<0.170.00550.0490.12	40 1740 00240 00140 13	15 <0.002 <0.003 0.043	<0.002 <0.002 <0.001 0.0028	18 <0 (4)1 <0 (5)1 0 41	<0.17 0.00039-3Q 0.0013 0.034
Uydnyen by Microseps - AM20GAN nM Hydngun		600	4.6	27	-	26	91	4 6	26
Total Alkalimiy - MCAWW 310 Ling/L Total Alkalimiy		•	₹	270	250	٤	130	99	340 Л
<u>Total Organe Carbon - SW&46 9060 mg/L</u> Total Organe Carbon		-	Òr 8 n	H -	7	2	HL 7-0	2	۴
Total Sulfide - M(AWW, 376 1 mgL, Total Sulfide		-	<u> </u>	049 JB	0.49 JB	U 81 JH	⊽	⊽	0 62 JQ

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
LOWER WATER BEARING UNIT
Annual Grounds after Report - October 2002
Operable Unit 7
Before Supply Center Richmond
Rechnound, Virguils

			Kuchmond, Virginia	V ingenda					
	Sample 1D Sample Date	Reporting Limit (a)	Sample MW FTA-14 10/29/2002	Sample MWFTA-16 10/15/2002	Sample MW FTA-17 10/15/2002	Sample MW FTA-18 10/16/2002	Sample NIW FTA-19 10/17/2002	Sample \1WF1A-28B 10/29/2002	Sample NWFTA-29B 18/17/2002
Menury			⊽	⊽	⊽	⊽	⊽	⊽	⊽
Mercury - 5W 846 7470 1 (Total) us/L.									7
Merus		-	₹	⊽	⊽	⊽	⊽	⊽	⊽
Metals SW 846 6010B (Dissolved) ng/L			i	;	į	į	,	1717	376
Aleminum		SE.	(X)(X)	% + JO	£ 50	(28) UI	ę,	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	(8) Y
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Arkine		, <u>.</u>	404 [5]	אר רב מרג	(17.10	Of You	01.18	Of &	07 881
Burum			7 = 3	3	201	2 2) <u></u>	(OF >	012
Berydium f. channer		<u> </u>	; ⊽	; ∨	٧	q	∜	7	<2>
Catanan Catanan		5000	7580	55500	924(10	8400	527IR)	151(K)	7175481
(hiomium		90	01>	01>	= >	SI >	010	ŧ	₹.
C obalt		35	() _L >	O.₹.>	0 ⁵ >	G-0	₹ :	₽:	€ 3
Cupper		Ξ,	2.1.18	۱۰ × ۱۵	Ð. ▼	<u> </u>	90	0 v	01 0
Inm			- 	97. *3	A) 7	14/0	(1) (1)	0.77 7	9 7
1 cad		\$ (MAX)	•	376 10	(XX)	OF 0757	2005	23310	<5000
M tgnestura		02		162	<20	612	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	707	Ç30
Numperiors Numbers		604	27 98 27 98	9€	9	×40	<40	\ \ \	Of 8.9
		991) (150	001>	<1001×	<100	<100	ð٢٤
Pot to turn		SIXIS	•	92500 J	21300	5590	9870	12500	574(8)
Schnum		5	\$	٥	٥	۶	٠	۸.	ζ∶
Silver		₹	01×	v 10	012	O.F.	01 v	07	⊕I>
Nedium		(XX)	4	17600	12600	7740	0/15	(1)(s) 7	4900
Vandum		€ ;	() ()	32 JO	Or 77) (× 7	₹ ₹) (*)
/Inc		2.		10 0Z>	<20 UL	10 0g>);*\ \	(T)	3
Metals - 5W846 6010B (Lotal) 12/1.				ı	į			į	100
Alumnum		300	<200	479	4820	<200 UJ	ž	1025	HC 11021
Апатову		•	S CI	۲ ک	۲ V	Ç	ָ ק	3 ₄	٠ ا
Arkmi		٠.	0 5	Ç Ş	2 22	S S E	OL 12	- F	at 2.2
វិ ជាឃាក		007) () ()	£ 5	26.77	2 5	2 = 2	2012	₹
Beryllium		2 ′	; ;	? ?	} ?	÷ ~	; 7	7	. 7
C solar One		CHX)5	,-	000111	101(88)	(8)88	57800	163(8)	(K)()89
(lasimsum		2		<10	ol>	0 V	917	ŧ	J. J.Q
(opali		OF.		o,√	O\$>	o, •	<u>ş</u>	() _{ >	<30
Cupper		10		23 10	Ξ,	QIV :	0 	01 S	Or 6-1
liva		CX)?		<u> </u>	Ę,	0641	1877 7	₹ 7	£ 7
면 :		i Ajug	\$ 55	i v	(A115)	Ç Ç	230 10	23340	() Sing
Magne stuff		OKAN II		124	5	77.3	- 3 JB	3135	01.72
Medical prices		7	75.10	077	~ 40	7	= 1 7∨	37) I JO
Nickel Nickel		100		<100	<100	12 JQ	< \$130 (N)\$ >	<\$110	3 x 3Q
Universe M.		SKKK	•	7890x) J	23200	5820	10200	1251K)	544(8)
չ. Ն.և ուսա		•	\$	\$	٥	٧	\$	ζ.	\$
Marc		2		0F>	<u>0</u>	01×	0	0 v	=
איאוווש		9006	7	24700 J	13500	8130	925	(K)147	462001
Vanadrum		8 8	₹ ₹	Dr 780	2 = 7	00 S 81	₹ ₹	5 5) *-
/inc		2		5000	5	?	<u>}</u>)	}
Thaltum - SW 846 7841 (Dissolved) <u>112/L</u> Thaltum		6	<2 UI	<2 UI.	7	\$	<2 UI	₹	<2 UJ
The chart that the first includes									
I natilitim - Sive 40 / 044 () Old () PEL Thalliam		2	₹	77	4	\$	es ui	\$	<2 UI

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
LOWER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 7
Defense Supply Center Rechanond
Rechmond, Virginia

							1000	Comple	Comple
	Sample 10	Reporting Limit (a)	Sample MW FFA-14 10/29/2002	Sample N3V-FTA-16 16/15/2002	Sample MWFTA-17 10/15/2002	Sample NIW FTA-18 10/16/2002	MWFTA-19 10/17/2002	MWFTA-28B 10/29/2002	MW FTA.29B 10/17/2002
Volatile Organic Compounds - SN 846 826015 µg/L							•	-	,
1.1.2-Tetrachlungthan		-	⊽ '	\$5 1	⊽⁻	⊽₹	7 7	⊽ ₹	₹ 7
-Fnchlonethan			⊽ 7	\$ 3	⊽ ₹	⊽ 7	⊽ 7	7 ₹	; 5
2 2-Tetrachlore, than			⊽⊽	F \$	7	7⊽	, ₹	; ⊽	⊽
F. F. T. T. C. Hoose, thank			7 ₹	, yo	; ¬	₹	⊽	⊽	⊽
1. De Block be		_	₽	9\$>	⊽	₹	⊽	⊽	₹
Dichlorapida in		-	₹	~ 26	⊽	⊽	⊽	⊽	⊽ '
123-Inchlorabnan		-	n l>	\$\$>	⊽	⊽	7	5 ·	⊽.
1 2 3-True Hyrropropane		-	7	9\$>	~	⊽	⊽	⊽ :	⊽ .
124-frichluschane		_	(n 1>	9 5>	▼ '	₹ '	⊽ -	m -	₹ ₹
1.24-Tamuh) lbanza		-	⊽ '	9\$>	⊽'	⊽ '	۰ ۲	⊽ ₹	⊽ ?
1,2 Dibromo-3-chloropopuna		7	♡.	2 2	ζ;	♥ ₹	7 7	7 7	3 T
1.2 Dibromosth me			⊽ ₹	00 %	5 7	7	7 7	, ¬	, √
1.2 Dichlorabename			₹ ₹	9 3	7 7	; 7	7 🔽	, √	; ⊽
3.2 Dichkara than			7	3 %	7 7	, ⊽	; ⊽	₹ 7	₹
2 Dichloroppopule		•	7	950	₹⊽	⊽	7	⊽	⊽
1 3 No Dismount Description		-	₹₽	\$\$ \$\$	⊽	⊽	⊽	⊽	⊽
1.3 De blacencemen		_	⊽	95>	⊽	⊽	⊽	⊽	⊽
to the land and the land		_	7	95>	ī	⊽	₹	⊽.	▽ '
2 2 Dachloropropara		_	~	95>	⊽	⊽	⊽	⊽∶	⊽ :
2 Butamon.		2	<10 R	<56! UJ	cha CD	ə; √	410 U	×10 K	in ola
2 Chlorotolacac		-	⊽ :	95>	⊽ :	⊽	₹ ₹	⊽ =	V .
2-Hexansn		Ξ.	× 0.	0 99€ 10 99€	(A) (1)	<u> </u>	, vie 02	¥ 7	500
4 Chluradiben.		- :	₹	0,550	⊽ ₹	7 =	7 =	- =	;
4-Mcthyl-2 pentanone		= =		560.18	er -	9 =) Hoto	2 E S	
ALLKING		= -	¥ 7	S 29	-	; 7	S -	V	V
Bunkan.			, T	95	⊽	₹	⊽	⊽	⊽
Bromes Moren.		_	; ⊽	95>	⊽	⊽	⊽	⊽	⊽
Borneds Morney than		_	~	o\$>	⊽	⊽	⊽	⊽	<u>~</u>
Вляниот		_	⊽	<56 UJ	II I	⊽	e u	⊽ '	∏ .
Bronwinethan			7	DI 7	Q .	ζ.	Q :	♥ -	₹ ₹
Հարտ ժուսունե			⊽ -	\$ \$	⊽ ₹	⊽ 7	₹ 7	⊽ ₹	₹ ₹
Carbon tetrachbande		-	J 7	e 7	7 7	7 7	; 7	, √	; ₹
C hlorothentent			7 0	2 T	; 7	: 4	: 0	ů	\$
C Blockers			; ⊽	95>	⊽	⊽	⊽	⊽	⊽
(hloromytham		••		<110	Ç	\$	\$	۲۶	₽
civ 1 2 Dublorsethen.		6.5		1500	<0 >	7	_	دا> د	Ş.
cn i 3 Dubloropropenc			⊽	95	⊽ :	⊽ -	⊽ :	⊽ -	
Dibramochlorumethun			₩ -	95° >	⊽ :	∵ ₹	₹ ₹	⊽ 7	⊽ ₹
Dibermonethane		- ,	; E	0.5 11011	7 5	; °	77	<2.03	1, C
Dichloredillustrank than			3 -	6 5	; -	† T	; 7	; -	; -
I by the noting			; - =	679 CM	in I>	; ⊽	[n v	i n	: T
Fr. Var Ellofordu son, in.			; ⊽	\$\$	₹	⊽	⊽	7	⊽
m Xxlanc & n Xxlanc			~	9\$>	⊽	⊽	⊽	⊽	~
Methylen chlonde			⊽	<\$6	⊽	⊽	₹	⊽	⊽
n Butylkrazini			M ->	~ \$6	⊽	⊽	⊽ '	101	⊽
ո Իւսթյ հեռու ու			₹	<\$0.	⊽ .	⊽ '		⊽ ;	⊽ :
Ո ւդրինի մեռջ		_ :		ŞŞ Ç	⊽ ₹	₹ ₹	⊽ ₹) () ()	⊽ ₹
0-Vykne				3 8	<u> </u>	; 7) V	; ⊽	<u>;</u> ¬
p kapaapylloitene e i Beitally na re			, 5 , v) 9 5	; ⊽	; ⊽	7	ſ∩ ≀>	. △
*(1-10m2)11/211/211/211/211/211/211/211/211/211									

SUMMARY OF QUALIFIED DATA - OCTOBER 2002
LOWER WATER BEARING UNIT
Annual Groundwater Report - October 2002
Operable Unit 1
Defense Supply Center Rulmund
Richmond, Virgnia

IRS.	Sample 1D	Reporting	Sample MW FTA-14	Sample MWFTA-16	Sample MWFTA-17	Sample MWFTA-18	Sample MWFTA-19	Sample MWFTA-28B	Sample NIW FTA-29B
Sami	Sample Date	Limit (a)	10/29/2002	10/15/2002	10/15/2002	10/16/2002	10/17/2002	7007/67/01	1011/15002
Chan		-	⊽	95>	⊽	⊽	⊽	⊽	7
Spring to a Result of the Control of		-	~	95>	⊽	⊽	⊽	⊽	₹
Teras high at		-	⊽	95>	₹	⊽	1.2	⊽	⊽
Toluen		_	⊽	<56	₹	⊽	⊽	⊽	⊽
trans-12 Duhloreeth is.		6.0	√ •	<28	₹ 0>	< () <	₹	₹ ₹	\$
train 1.3 Dichlompropers.		_	∵	\$\$ 	۵.	⊽.	⊽ ;	⊽ -	▼ 7
Tucklorachera		_	⊽.	\$\ \ !	⊽ :	⊽ ′	2:5	۰ ۲	₹ ₹
Tecklorotheroun than		C4	\$	10 el >	65 C	7 (7 , 7 ,	Ų f	TO 7.
Vinyl-chlorede		c.	\$	920	Ç	Ç ·	3 .	ÿ -	₹ :
Xyk nes (total)		_	⊽	<\$6	₹	⊽	7	v	⊽
Surregaring									
2-Du best There All		;	93	16	90	98	74	56	91
4 Bromodunobenzene			83	G.	×	96	04	¥	68
[Դիռատիլոսուսել հառ		•	101	94	#2	36	93	103	٠,
Tolucia, 48		r	ር ሉ	<u>۲</u>	92	£	95	92	42
Volumb Oceanic Community - SW 846 #26011, 11NPRF5 ug/L.									
1112-Terephony than		_	٧X	<62	V.	۲ N	< Z	×	ν. V.
ווייתו זיית אוריוווו		_	VZ.	<62	<z< td=""><td>Y Z</td><td>۷ ۷</td><td>ž</td><td>ž</td></z<>	Y Z	۷ ۷	ž	ž
1 1 2 2 Tetrachharachhane		_	Ϋ́N	<62	۲×	< Z	< Z	×z	₹Z:
1.12-Frathmathura		_	Š.	65	Ý.	Ϋ́	Ž:	ź:	ž
1.Duhorathm			ž:	Ç95	V :	ζ:	ž:	ž :	Ž.
1 I-Dachloracthen.			ź;	795	Š i	ζź	S S	ζ ź	Š Ž
1. Use blomprope ne			ž	70>	< ×	< ×	× × ×	ž Z	ž
124 Inchlambrazar			< <	70 7	č Z	< <	ξ <u>χ</u>	ž Z	źź
1.2 V-1 numbriophopan.			2	c 62	ź	Ž	z z	ź	\Z
1.2.4. Internal as internal and a second and			ź	<62	Š	< Z	\Z	×z	V.V.
1 2 Dibrance 3 chloriogapaos		. 4	×z	c130	Š	ź	۷۷	ž	×z.
1.2 Dibroms, than		-	ž	<62	Š	< Z	Š	Ϋ́Z	Š
1.2 Dichloroby niene		_	ž	<62	< Z	S Z	< Z	۲ ۲	Š
1.2 Dichlorechan.		_	×z	6 62	Š.	Ś:	ž:	ž:	ź:
E. 2. Dic blon opropane			ž ž	Ç Ç	ž:	< :	× ×	Z 2	ζź
135 fram dy lbenzene			× 2	797	ž ž	< <	\$ \$	ć z	ŽŽ
1,4 Disharatak ayan			<u> </u>	; 69 (4)	ź	Š	ž	ź	ź
1.4 The Blench point		_	ž	Ç.	×z	×Z.	×Z	Š.	×
2.2 Dtc blotopropare		_	ž	29>	Ž	×	×Z	Š	Š
2 Butanana		2		<620 UJ	< Z	Ϋ́Z	٧	Š	Ş
2 է հիռամանու		_		C 95	₹ Z	۷.	Š	₹.	٧z
2 Hevanone		2		<620 UJ	ž:	₹:	ź:	Š.	2 :
4 Chlorototuca.		- ;		79>	S :	Z i	<u> </u>	Z Z	Ç,
4 Mulhyl-2 pentanone		2 3		0792	ž ž	žž	2 2	X 2	* 2
Actions		Ξ.		<620 UJ	S :	<u> </u>	< < Z Z	<u> </u>	< :
Buna ik		-	ž ž	79>	Š ž	<u> </u>	< -	< ×	Š ž
Вготновиличен		-	žž	70 5		<u> </u>	Š Z	< z	<u> </u>
Bromischloromichane		-	ž ž	70>	X 2	2 2	× 2	< × ×	< ×
Uranouli ntorom than			2 2	707	S S	ž Z	< Z	ξ ζ	ž
Under State		- (ž	00.00	Ž	S 2	S Z	;	;
Digitoricinate		4 -	ž	795	ź	ź	Ž	ź	ź
Carbon Letter Honde		_	VZ	<62	ź	۲ ۲	×Z	Ϋ́Z	×
Chlorabinoune		_	ž	<62	۲ ۲	۷ Z	×	Ϋ́Z	V.V.
Chlorexthan		rı	×	<130	×	Y.	Š	VN	V
C hlumform		_	V.	~62	SZ.	۷ Z	Ý.	۲ ۲	\ X
Chloromethan		F4	Ϋ́Z	<120	Š	< <u>Z</u>	Y X	××	< Z

TABLE E-11

SUMMARY OF QUALIFIED DATA - OCTOBER 2002 1 OWER WATER BEARING UNIT Annual Groudwater Report - October 2002 Opcrable Unit 7 Defines Supply Center Richmond Richmond, Virgina

	Sample ID Sample Date	Reporting Limit (a)	Sample NIW FTA-14 10/29/2002	Sample MWFTA-16 10/15/2002	Sample MW FTA-17 10/15/2002	Sample MW FTA-18 10/16/2002	Sample NIWFTA-19 10/17/2002	Sample MW FTA-28B 10/29/2002	Sumple MWFTA-29B 10/17/2002
es 1.1 Da Moovith o		\$1	Š	1400	×	Ž	V.	V.	V.
ers 1 3-Dechloropage ne		_	Š	<62	۲ ۲	×	×Z	ž	<z< td=""></z<>
Debrams blooms than		_	×z	<62	۷Z	ž	×2	Š	< Z
Debramens		~	Š	<62	×z	Š	×	Š	Ϋ́Z
Dr. Horsyloff non-ym, than.		2	۷Z	<120 UJ	٧×	Š	VZ Z	Ϋ́ Z	۲ Z
th have		-	۷×	<05	×z	ž	ž	Υ _Z	۲ ۲
B. r.a. blandoutsdune		•	×z	<62 UJ	×z	Š	Ϋ́	Š	٧×
Sentony III. 114.114		-	×z	<62	٧×	ž	ž	ž	۲ ک
o Vykov K o Vykov		-	Ž	<62	٧Z	×	Š	<u>۷</u>	Ş
Methylene chloride		-	Ϋ́Z	<62	×z	Š	ν. V.	V.	۲ ۲
n-Berylly norm		-	VZ	<62	Š	×Z	۲×	Ϋ́N	ž
n Propylitance		-	Z	<62	V.	<z< td=""><td>×</td><td>×</td><td>V</td></z<>	×	×	V
Naphhakae		-	< Z	<62	×	٧	ź	Š	ž
o Aykar		5 0	٧Z	۴۶	ζ,	۷ ک	×	Š	ž
p Sopropyllolucia		-	<z< td=""><td><62</td><td>٧×</td><td>×</td><td>×</td><td>۷ ۲</td><td>< Z</td></z<>	<62	٧×	×	×	۷ ۲	< Z
A. Butylk ny ne		-	ž	<62	Ϋ́Z	×Z	Š	٧X	Š
445		-	Š	79>	×	Ϋ́	ž	Ϋ́	×
Lit Buy than in		-	Š	<62	N N	VZ	ž	ž	× Z
Petrachlopschene		-	ź	<62	ž	Ν̈́	Ş	VV	ž
Folura		-	Š	29 >	٧X	×	V.	Š	Š
rans-1 2-Dichlorovihene		0.5	ž	€	Š	ΝΑ	٧×	VZ	Y Z
trans 1.3 Du filompropene		-	×z	<62	×	Ϋ́	××	VN	Ϋ́ N
Trichloraction		_	√N,	<62	٧×	×	ž	SZ.	S Z
Forblorolluoromethan		2	ź	<120 UJ	٧٧	Ϋ́	V.	VZ VZ	Š
Viaylichtoride		7	NA VA	920	٧	×	ž	×	< Z
Xytenes (total)		_	ζ Z	<62	Š	Š	₹	Š	Š
Surrogate - %									
1.2 Duhlusuthan d4		•	ž	44	×2	V.	Š	×Z	ź
4- Βռյում և առեւ ու		1	Š	5	×Z	VN	۷ ۷	٧X	ž
Մւնություներ		•	Š	CX)	×	N.	ž	V X	ź
		•	Š	56	\N	×	×	٧X	×z

The Part of the Pa	sidescon beautiful	positive based on h	
_	, <u>=</u>	1	

Listmated possibly found that of take possibly found high or take possibly found that cont unmation is similarly possibly found high based upon (K. data is similared possibly found they bear upon (K. data is similared by dute, w. k. twee, n. porting limit and december in the hily ed. Universible the similar of the similar is similarly that is similar than the similar in the similar is similar than the similar in the similar is similar than the ±=2 2×35 €

Underected Reported Desection Limits impresses. Underected Data based low - Reported Detection Limits higher than indeed of Exection Limits higher than indeed of the control limits higher than indeed o

Repering limits presented are the best that car be as hiered under morn d'operating procedures with the method required sample volume, extracted and analyzed. Sample reporting limits may sary due to sample, volume/weight extracted and/or sample ditutions.

PRI PARI D/DATI <u>RMB 6/04/13</u> CHI CKI D/DATI <u>DAH 6/05/13</u>

SUMMARY OF QUALIFIED DATA - OCTOBER 2002 FRACTURED BEDROCK Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Cneter Richmond

	Sample ID Sample Date	Reporting Limit (a)	Sample MWFTA-20 10/17/2002	Duplicate MWFTA-20 10/17/2002
FIELD PARAMETER Dissolved Oxygen - E360.1 me/L				
Dissolved Oxygen		0 1	35	3 5
Ferrous Iron - A3500D mg/L Ferrous Iron		0 1	4	4
Oxidation Reduction Potential - A2580A mV Oxidation Reduction Potential			15	15
oH - E150.1 pH Units oH			9 41	9 41
Specific Conductance - E120.1 mS/cm Specific Conductance		0 001	0 215	0 215
<u> Temperature - E 170.1 dez C</u> Femperature		0 1	18	18
Furbidity - E180.1 NTU Furbidity		1	10	10
PIXED BASE LABORATORY ANALYSISTATIONS - MCAWW 300,0A mg/L				
Chionde Vitrate as N		1 0 1	37 <01	3 8 <0 1
Sulfate		l	44	45
Dissolved Gases - RSK SOP-175 me/L				
Carbon dioxide		0 001	0 12 ЛВ	0 13 JB
ithane ithene		0 002 0 001	<0 002 0 01	<0 002 0 01 1
dethane		0 001	0 027	0 031
lydrogen by Microseeps - AM20GAX nM lydrogen		0 03	27	2 8
Total Alkalinity - MCAWW 310.1 mg/L		5	74	74
Total Organic Carbon - SW846 9060 mg/L. Total Organic Carbon		1	<l< td=""><td>ત</td></l<>	ત
Total Sulfide - MCAWW 376,1 mg/L Oral Sulfide		1	0 46 JQ	03 JO
Hercury - SW846 7470A (Dissolved) up/L		,	0 40 JQ	03.10
Mercury		İ	</td <td><l< td=""></l<></td>	<l< td=""></l<>
Hercury - SW846 7470A (Total) ug/L Hercury		1	<1	<i< td=""></i<>
Tetals - SW846 6010B (Dissolved) ug/L				
duminum		200	<200 UJ	<200 UI
intimony irsenk		5 5	< <	ده ده
a second			68 2 10	65 7 JQ
arium		200		
eryllium		10	<10	<10
ieryllium iadmium		10 2	<10 <2	<2
eryllum Zalmum Zakum		10 2 5000	<10 <2 14900	<2 14300
eryllium Adminin Alcium Irromium		10 2	<10 <2	<2
eryllium Calmium Calcium Chromium Cobalt Copper		10 2 5000 10 30 10	<10 <2 14900 <10 <30 <10	<2 14300 <10 <30 <10
larium Cadmium Cadmium Chromium Cobalt Copper		10 2 5000 10 30 10 200	<10 <2 14900 <10 <30 <10 193 JQ	<2 14300 <10 <30 <10 97 JQ
eryllum Palmum Palmum Promum Pobalt Popper ron ead		10 2 5000 10 30 10 200 3	<10 <2 14900 <10 <30 <10 193 JQ <3	<2 14300 <10 <30 <10 97 JQ <3
eryllium adminin alcium chromium cobalt coper		10 2 5000 10 30 10 200	<10 <2 14900 <10 <30 <10 193 JQ	<2 14300 <10 <30 <10 97 JQ
eryllium Calmium Calcium Chromium Copper Corn Cad Augnissium Aanganisse folybdenum		10 2 5000 10 30 10 200 3 5000 20 40	<10 <2 14900 <10 <30 <10 193 JQ <3 4780 JQ 97 5 <40	<2 14300 <10 <30 <10 97 1 JQ <3 4640 JQ 91 7 <40
teryllium ladriium lalcium lahriium		10 2 5000 10 30 10 200 3 5000 20 40	<10 <2 14900 <10 <30 <10 193 JQ <3 4780 JQ 97 5 <40 <100	<2 14300 <10 <30 <10 97 JQ <3 4640 JQ 91 7 <40 <100
teryllium adminin falcium chromium chalt copper con ead dagnessiem danganese folybdenum bekel		10 2 5000 10 30 10 200 3 5000 20 40 100 5000	<10 <2 14900 <10 <30 <10 193 JQ <3 4780 JQ 97 5 <40 <100 7040	<2 14300 <10 <30 <10 97 JQ <3 4640 JQ 91 7 <40 <100 6870
teryllium ladriium lalcium lahriium		10 2 5000 10 30 10 200 3 5000 20 40	<10 <2 14900 <10 <30 <10 193 JQ <3 4780 JQ 97 5 <40 <100	<2 14300 <10 <30 <10 97 JQ <3 4640 JQ 91 7 <40 <100
teryllium adminim falcium falcium fohalt fopper fon ead fagnesium fanganese folybdenum lickel		10 2 5000 10 30 10 200 3 5000 20 40 100 5000	<10 <2 14900 <10 <30 <10 193 JQ <3 4780 JQ 97 5 <40 <100 7040 <5	<2 14300 <10 <30 <10 97 JQ <3 4640 JQ 91 7 <40 <100 6870 <5

SUMMARY OF QUALIFIED DATA - OCTOBER 2002 FRACTURED BEDROCK Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Cneter Richmond Richmond, Virginia

	Sample ID Sample Date	Reporting Limit (a)	Sample MWFTA-20 10/17/2002	Duplicate MWFTA-2 10/17/200
Metals - SW846 6010B (Total) uz/L		200	<200 UJ	<200 UJ
Aluminum		200 5	<200 DJ <5	<5
Antimony		5	22 JB	্ ক
Arsenic		200	65 8 JO	68 2 JQ
Barrum			<10	<10
Beryllium		10		<2
Cadmium		5000	<2 14200	15100
Calcium		10		<10
Chromium			<10 <30	<30
Cobali		30		
Copper		10	<10	<10
TON		200	281	259
æad		3	ح د	دع ده
Magnesium		5000	4540 JQ	4400 JQ
Manganese		20	96 1	918
Aolybdenum		40	<40	<40
łickel		100	<100	<100
otassium		5000	6830	7180
lelenum		5	<5	<5
idver		10	<10	<10
lodium		5000	10200	10400
/anadium		50	<50	<50
inc		20	<20	<20
hallium - SW846 7841 (Dissolved) uz/L. hallium		2	<2 UL	<2 UJ
Thallium - SW846 7841 (Total) ur/L Thallium		2	עט 2	<2 UJ
olatile Organic Compounds - SW846 8260B ug/L				
,1,1 2-Tetrachloroethane		1	<4	<4
,1,1-Trichloroethane		1	<4	<4
,1 2 2 Tetrachloroethane		1	<4	<4
.1,2-Trichloroethane		1	<4	<4
,1-10chloroethane		1	15	16
1-Dichloroethene		1	7.5	76
,1-Dichloropropune		1	<4	<4
,2,3-Trichlorobenzene		1	<4	<4
2,3-Trichloropropane		1	<4	<4
2,4-Triuhlorobenzene		1	<4	<4
2 4-Trimethylbenzene		1	<4	<4
2-Dibromo-3 chloropropane		2	<8	<8
2-Dibromoethane		1	<4	<4
2 Dichlorobenzene		1	<4	<4
,2 Dichloroethane		1	<4	<4
,2 Dichloropropane		1	<4	<4
3,5-Trumethylbenzene		1	<4	<4
3-Dichlorobinzene		1	<4	<4
3 Dichloropropane		1	<4	<4
4 Dichlorobenzene		1	<4	<4
2-Dichloropropane		í	<4	<4
Butanone		10	<40 UJ	<40 UJ
Chlorotoluene		1	<4	<4
-Hexanone		10	<40 UJ	<40 UJ
-Chlorotoluene		1	<4	<4
Methyl 2 pentanone		10	<40	<40
cetone		10	<40 UJ	<40 UJ
enzene		1	<4	<4
remzene kromobenzune		i	<4	<4
romoenzene Iromoenloromethane		i	<4	<4
romountoromethane fromodichloromethane		i	<4	<4
romotorm tromotorm		i	<4 UJ	<4 UJ
		2	<8	<8
fromomethano Na born disulfide		1	<‡	<4
larpon distince larbon tetrachloride			<4	<4
airpon terracnionae Pilorobenzene		1	<4	<4
		2	<8	<8
Chloroethane		1	<4	<4
Phlorotorm		2	<8	<8
Informethane		0.5	92	<o (0)</o
is 1.2-Dichlorouthene		ر ا	92 <1	(I
is 13 Dichloropropens		1	<1 <1	<+ <+
hbromochloromethane		ı l		
Ophromonic th inc		1 2	<1	< !
hichlorodithiorometh inc			<8 (1)	<4.1.1
thylb; nz; nc		I	<+	
lexachkrobutadienc sopiopylbanzana			<1 <1 []]	:1 <1 (i)

SUMMARY OF QUALIFIED DATA - OCTOBER 2002 FRACTURED BEDROCK Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Cneter Richmond Bedroom! Virginia

Sample ID Sample Date	Reporting Limit (a)	Sample MWFTA-20 10/17/2002	Duplicate MWFTA-2/ 10/17/2002
Methylene chloride	1	<4	<4
n-Butylbenzene	1	<4	<4
- Propylbenzene	1	<4	<4
Naphthalene	1	<4	<4
o-Xylene	0.5	<2	<2
o-Isopropyltoluene	;	<4	<4
ec-Butylbenzene	1	<4	<4
Styrene	Ī	<4	<4
ert-Butylbenzene	ŀ	<4	<4
Tetrachloroethene	i	<4	<4
Toluene	i	<4	<4
	0.5	<u>a</u>	<2
rans-1 2-Dichloroethene	1	<4	<4
rans-1,3-Dichloropropene	i	48	5 1
Trichloroethene	2	<8 UJ	<8 UJ
Inchlorofluoromethane	2	12	12
Vinyl chloride Kylenes (total)	1	<4	<4
Surrogate - %			
1.2-Dichloroethane d4		91	94
4-Bromofluorobenzene		88	90
Dibromofluoromethane		97	99
Foluene-d8		92	96
Volatile Organic Compounds - SW846 8260B, UNPRES ug/L			
1,1,2-Tetrachloroethane	1	<4	NA
1,1,1-Trichloroethane	1	<4	NA
1,2,2-Tetrachloroethane	1	<4	NA
1 2-Trichloroethane	1	<4	NA
1,1-Dichloroethane	1	13	NA
I,I-Dichloroethene	1	66	NA
1 I-Dichloropropene	1	<4	NA
2 3-Trichlorobenzene	ı	<4	NA
1,2 3-Trichloropropane	1	<4	NA
1,2 4-Trichlorobenzene	1	<4	NA
2,4-Trumethylbenzene	ī	<4	NΑ
1,2-Dibromo 3-chloropropane	2	<8	NA
2-Dibromoethane	ī	<4	NA
	i	<4	NA
1,2-Dichlorobenzene	i	<4	NA
2-Dichloroethane	1	<4	NA.
2-Dichloropropane	1	<1	NA.
1,3 5-Trimethylbenzene	1		NA NA
1,3-Dichlorobenzene	1	<4	NA NA
3-Dichlotopropane		<4	
4-Dichlorobenzene	1	<4	NA NA
2 2-Dichloropropane	1	<4	NA
2-Butanone	10	<40 UJ	NA
2 Chlorotoluene	ì	<4	NΛ
2-Hexanone	10	<40 UJ	NA
4-Chlorotoluene	i	<4	NA
4-Methyl-2-pentanone	10	<40	NΛ
Accione	10	<40 UJ	NA
Benzene	1	<4	NΛ
Bromohenzene	1	<4	NΛ
Bromochloromethane	1	<1	NA
Biomodichloromethane	i	<4	NΛ
Bromotoum	i	<4 UJ	NA
Bromomethane	2	<8	NA
Carbon disulfide	1	<4	NA
Carbon disduide Carbon tetrachloride	1	<4	NA
Carpon tetraentoride Chlorobenzene	i	<4	NΛ
	2	<8	NA
Chloroethanu	1	<n <4</n 	NA NA
Chlorotorm	1 2		NA NA
Chloromethane	_	<8	
cis-1 2-Dichloroethene	0.5	87	NΛ
ets 1/3 Dichloropropene	!	<4	NΛ
Dibromochloromethane	I	<-4	NA
Dibromomethane	1	<4	NA
Dichlorodifluoromethanic	2	<8 UJ	NΛ
Fihylbenzenc	1	<4	NA
Hexachlorobotadicae	i	<4 U1	NA
Isopropylbenzenc	i	<4	NA
n Aylana & p Aylane	i	<1	٧٨
	i	<4	NΛ
Methylene chiloride	i	<1	NA
1 Butylbenzene		<4	NA NA
r Propythenzene	!		
	 	<1 <2	NA NA

SUMMARY OF QUALIFIED DATA - OCTOBER 2002 FRACTURED BEDROCK

Annual Groundwater Report - October 2002 Operable Unit 7 Defense Supply Cneter Richmond Richmond, Virginia

	Sample ID Sample Date	Reporting Limit (a)	Sample MWFTA-20 10/17/2002	Duplicate MWFTA-26 10/17/2002
sec-Butylbenzene		1	<4	NA
Styrene		1	<4	NA
tert-Butylbenzene		ŧ	<4	NA
Tetrachloroethene		1	<4	NA
Toluene		l	<4	NA
trans-1,2-Dichloroethene		0.5	<2	NA
trans-1 3-Dichloropropene		1	<4	NA
Trichlorpethene		1	4 2	NA
Trichlorofluoromethane		2	<8 UJ	NA
Vinyl chloride		2	11	NA
Xylenes (total)		1	<4	NA
Surrogate - %				
1 2-Dichloroethane-d4		4-	91	NA
4-Bromofluorobenzene			87	NA
Dibromofluoromethane		-	94	NΛ
Toluene-d8		-	90	NA

Notes.

- лв
- Estimated based on QC data
 Estimated, possibly biased high or false
 positive based on blank contamination
 Estimated, possibly biased high based upon QC data. н
- Estimated, possibly biased low based upon QC data Estimated, Value is between reporting limit
- JQ
 - and detection limit
- NΑ Not Analyzed
- R UJ Unusable
- Undetected, Reported Detection Limit is imprecise.
- Undetected, Data biased low Reported UL Detection Limit is higher than indicated
- Reporting limits presented are the best that can be achieved under normal operating procedures with the method-required sample volume extracted and analyzed. Sample reporting limits may vary due to sample volume/weight extracted and/or sample dilutions.

PREPARED/DATE RMB 6/04/03 CHECKED/DATE JAH 6/05/03

TAB

Appendix F

APPENDIX F
OCTOBER 2002 FIELD SAMPLING REPORTS

7	n	4	1	2	5
•	u	4	4	-	u

FIELD SAMPLING REPORT

JOB No. <u>12001-2-07</u>	701
JOB NAME_DSCR	<u>– MNA OU7</u>
DATE ICIE	
SAMPLING POINT.	
DEPTH	71 -
DLF III	

AMPLE INFORMATIO	N SAM	IPLE I.D NO.:	: AEHADO	5-10		
MATERIAL:	WATER	SOIL		☐ SLUDGE	OTHE	R (LIST)
TYPE:	☑ GRAB	COMP	OSITE	OTHER (LIST)		
HAZARDOUS?: [] YES	⊠ NO		☐ NNKNOMN		
	TAINER		NUMBER	PRESERVAT PREPARAT	1	COMMENTS
TYPE		UME		 		VOCs by SW8260B
VOA VIAL		ml	3	HCI to pH<2, Coo		Methane, ethane, ethene
VOA VIAL) ml		H ₂ SO ₄ to pH<2,C		by RSK-175
VOA VIAL	40) ml	3			TOC by SW9060
VOA VIAL	40) ml	2	Cool to 4°		CO₂ by RSK-175
Poly	50	0 ml	1	ZnAc & NaOH, Co	ool to 4°C	Sulfide by E376.1
Poly	25	60 ml	1	Cool to 4°	c o	Alkalinity by E310.1
Poly	25	i0 ml	1	Cool to 4	·C	NO ₃ , SO ₄ , CI by E300.0
Poly	 	1 L	1	HNO ₃ to pH<2, C	ool to 4°C	Tot. Metals by 6010B,7470A,7841
Poly	- 	1 L	1	HNO ₃ to pH<2, C	ool to 4°C	Dis. Metals by 6010B,7470A,7841
VOA VIAL	2	0 ml	1	None		Hydrogen by AM 20
COMMENTS (WE		VOLUME: SA	AMPLE APPE	ARANCE; ODOR, C	OLOR, ETC	
COMMENTS (WE	2060	VOLUME: SA	AMPLE APPE	ARANCE; ODOR, C	OLOR, ETC	
COMMENTS (WE	NTS		AMPLE APPE	RESULTS		COMMENTS
COMMENTS (WE	NTS	EQUIPM			UNITS)	
FIELD MEASUREMENTS PARAMETE N/A	NTS ER	EQUIPM	1ENT I.D	RESULTS (UNITS)	COMMENTS N/A
FIELD MEASUREMENTS PARAMETE N/A	NTS ER ELL PURGING	EQUIPM	MENT I.D I/A AMPLE APPE	RESULTS (N/A EARANCE; ODOR; C	UNITS) COLOR, ETC	COMMENTS N/A
PARAMETS PARAMETS N/A COMMENTS. (WE	NTS ER ELL PURGING	EQUIPM N VOLUME. S WEATHER _	MENT I.D I/A AMPLE APPE	RESULTS (N/AEARANCE; ODOR; C	OLOR, ETC	COMMENTS N/A C.)
PARAMETS PARAMETS N/A COMMENTS. (WE	NTS ER ELL PURGING	EQUIPM N VOLUME. S WEATHER _	MENT I.D I/A AMPLE APPE	RESULTS (N/A EARANCE; ODOR; C	OLOR, ETC	COMMENTS N/A C.)
PARAMETE PARAMETE PARAMETE N/A COMMENTS. (WE GENERAL INFORMA SAMPLES SHIPPE SPECIAL HANDLE	TION ED TO: STL-N NG: FedEx	EQUIPM N VOLUME. S WEATHER _	الاA AMPLE APPE	RESULTS (N/A EARANCE; ODOR; C	OLOR, ETC	COMMENTS N/A C.) PERATURE
PARAMETE PARAMETE PARAMETE N/A COMMENTS. (WE	TION ED TO: STL-N NG: FedEx	EQUIPM NOLUME. S WEATHER	الاA AMPLE APPE	RESULTS (N/A EARANCE; ODOR; Co	OLOR, ETC	COMMENTS N/A C.) PERATURE
PARAMETE PARAMETE PARAMETE N/A COMMENTS. (WE GENERAL INFORMA SAMPLES SHIPPE SPECIAL HANDLE MODE OF SHIPME	ELL PURGING TION TO: STL-N NG: FedEx ENT	EQUIPM NOLUME. S WEATHER	الاA AMPLE APPE	RESULTS (N/A EARANCE; ODOR; Co	OLOR, ETC	COMMENTS N/A C.)

FIELD SAMPLING REPORT

JOB No 12001-2-0)701
JOB NAME_DSCR	- MNA OU7
DATE 10/16/23	TIME 1190
SAMPLING POINT	EHADG-10

					DEPTH	<u> </u>
AMPLE INFORMA	ATION S	SAMPLE I.D NO	· AEYADG	-10 QA		
MATERIAL.				SLUDGE		R (LIST)
TYPE:	☐ ☐ GRAB	□ сомг	POSITE	OTHER (LIST))	
HAZARDOUS?:	YES	⊠ NO		UNKNOWN		
	CONTAINER		NUMBER	PRESERVA		COMMENTS
TYPE	V	OLUME		PREPARAT		VOCa by SW9260B
VOA VIAL		40 ml	3	HCI to pH<2, Co		VOCs by SW8260B Methane, ethane, ethene
VOA VIAL		40 ml	3	HCl to pH<2, Co		by RSK-175
VOA VIAL		40 ml	3	H₂SO₄ to pH<2,C	Cool to 4°C	TOC by SW9060
VOA VIAL		40 ml	2	Cool to 4	°C	CO₂ by RSK-175
Poly		500 ml	1	ZnAc & NaOH, C	ool to 4°C	Sulfide by E376.1
Poly		250 ml	1	Cool to 4	l _o C	Alkalınity by E310.1
Poly		250 ml	1	Cool to 4	I°C	NO ₃ , SO ₄ , Cl by E300.0
Poly		1 L	1	HNO ₃ to pH<2, 0	Cool to 4°C	Tot. Metals by 6010B,7470A,7841
Poly		1 L	1	HNO ₃ to pH<2, 0	Cool to 4°C	Dis. Metals by 6010B.7470A.7841
	or purces					
FIELD MEASURE	MENTS					
PARAM	METER	EQUIP	MENT I.D	RESULTS	(UNITS)	COMMENTS
N	/A	1	N/A	N/A		N/A
COMMENTS:	(WELL PURGI	NG VOLUME. S	SAMPLE APPE	ARANCE; ODOR; (COLOR, ET	C.)
GENERAL INFO	RMATION	WEATHER_	KH.N		AIR TEM	PERATURESOS
k	IIPPED TO: <u>CEN</u> NDLING: <u>FedEx</u>	MRD – Omaha, N	Nebraska			
MODE OF SH		☐ CAR/TRU	CK [] BUS] PLANE	COMMERCIAL VEHI
QA/QC		<u> </u>	6			
}	LECTED BY: _	AHW. E	1	SAMPLING O	BSERVED	BY Anva

FIELD SAMPLING REPORT

JOB No. 12001-2-07	01					
JOB NAME DSCR - MNA OU7						
DATE 10/11/02	TIME HOC					
DATE TOURDS	AEHADGIO					
SAMPLING POINT	ACHABOT					
DEPTH						

					DEPTH	
AMPLE INFORM	ATION	SAMPLE I D. NO	.: OU7D	4P-1		
MATERIAL	⊠ WATE	ER SOIL		SLUDGE		R (LIST)
TYPE	⊠ GRA	в 🗍 СОМ	POSITE	OTHER (LIST)	·	
HAZARDOUS?:	YES	⊠ NO		UNKNOWN		
, <u>, , , , , , , , , , , , , , , , , , </u>	CONTAINE	R	NUMBER	PRESERVAT	1	COMMENTS
TYPE		VOLUME		PREPARAT		VOCs by SW8260B
VOA VIAL		40 ml	3	HCl to pH<2, Co		Methane, ethane, ethene
VOA VIAL	.	40 ml	3	HCl to pH<2, Co		by RSK-175
VOA VIAL	_	40 ml	3	H₂SO₄ to pH<2,C	ool to 4°C	TOC by SW9060
VOA VIAI		40 ml	2	Cool to 4	°C	CO₂ by RSK-175
Poly	-	500 ml	1	ZnAc & NaOH, C	ool to 4°C	Sulfide by E376.1
Poly		250 ml	1	Cool to 4	°C	Alkalınıty by E310.1
		250 ml	1	Cool to 4	l°C	NO ₃ , SO ₄ , Cl by E300.0
Poly Poly		1 L	1	HNO ₃ to pH<2, (Cool to 4°C	Tot Metals by 6010B,7470A,7841
Poly		1 L	1	HNO ₃ to pH<2, Cool to 4°C		Dis Metals by 6010B,7470A,7841
VOA VIA	i	20 ml	1	None		Hydrogen by AM 20
FIELD MEASUR						
			PMENT I.D	RESULTS	(UNITS)	COMMENTS
	METER N/A	Egon	N/A	N/A		N/A
COMMENTS	(WELL PU	RGING VOLUME	SAMPLE APPI	EARANCE, ODOR,	COLOR, ET	C.)
GENERAL INF	ORMATION	WEATHER	RAW		AIR TEM	PERATUREزنوی
SAMPLES S	HIPPED TO	STL-North Canton	n, Ohio / Micros	<u>eeps – Pittsburg, PA</u>	<u> </u>	
SPECIAL HA	ANDLING <u>F</u> e	edEx				
MODE OF S		☐ CAR/TRI	UCK [BUS 2	PLANE	COMMERCIAL VEHIC
QA/QC			:1			2
SAMPLE CO	OLLECTED E	BY: Ant W		SAMPLING C	BSERVED	BY: pluting
DISCREPA			5			
		,	,, <u>,</u>			

ا 5

FIELD SAMPLING REPORT

JOB No 12001-2-0701

JOB NAME DSCR - MNA OUT

DATE 10/16/02 TIME 11/00

SAMPLING POINT. DWW-13/4

DEPTH 10.8/ FX.

					DEPTH	10:3/ //
MPLE INFORMAT	ION SA	AMPLE I.D NO	" DWG		_	
MATERIAL.	WATER	☐ SOIL		SLUDGE		R (LIST)
TYPE:	☑ GRAB		POSITE	OTHER (LIST)	
HAZARDOUS?.	☐ YES	⊠ NO		UNKNOWN	<u> </u>	
	ONTAINER		NUMBER	PRESERVA PREPARAT		COMMENTS
TYPE		OLUME 40 ml	3	HCl to pH<2, Co		VOCs by SW8260B
VOA VIAL		40 ml	3	HCI to pH<2, Co		Methane, ethane, ethene by RSK-175
VOA VIAL		40 ml	3	H₂SO₄ to pH<2,C	Cool to 4°C	TOC by SW9060
VOA VIAL		40 ml	2	Cool to 4	.°C	CO₂ by RSK-175
Poly		500 ml	1	ZnAc & NaOH, C	ool to 4°C	Sulfide by E376.1
Poly		250 ml	1	Cool to 4	I°C	Alkalinity by E310.1
Poly		250 ml	1	Cool to 4	1°C	NO ₃ , SO ₄ , CI by E300 0
Poly		1 L	1	HNO ₃ to pH<2, (Cool to 4°C	Tot Metals by 6010B,7470A,7841
Poly		1 L	1	HNO ₃ to pH<2, (Cool to 4°C	Dis Metals by 6010B,7470A,7841
VOA VIAL		20 ml	1	None		Hydrogen by AM 20
FIELD MEASUREN	MENTS					
PARAME	TER	EQUIP	MENT I.D	RESULTS	(UNITS)	COMMENTS
N/A			N/A	N/A	A	N/A
COMMENTS: (\	WELL PURGIN	NG VOLUME:	SAMPLE APPE	EARANCE; ODOR;	COLOR, ET	C.)
GENERAL INFOR	MATION	WEATHER _	Rain/ci	êrcast	AIR TEMP	PERATURE 50°F
SAMPLES SHIF	PPED TO STU	-North Canton.	Ohio / Microse	eps - Pittsburg, PA	\	
SPECIAL HAND						
MODE OF SHIF		CAR/TRL	ick [] BUS 🗵	PLANE	COMMERCIAL VEHIC
∩A/QC	<u> </u>					
SAMPLE COLL	ECTED BY'_	JVECS	iy	SAMPLING C	BSERVED	BY:
DISCREPANCI	ES					

Location DSCR	DSCR -	507	-7 Site Name		Identify Measuring Point (MP): (eg. Top of Casing)	ing Point (ing)	[MP):								704
Well ID: Field Sar	Well ID: Field Sampling Personnel.	DM 6	DM W- 13 A Jacs	220	Depth to Screen below MP:	n below M (ft. below (Pump Ty	1 ! !	Top	of screen	Bottom	of screen	E 0	I	Best Available Copy	430
Date	Time	Depth to	Pump Dial	Purge Rate	Purge Rate Cum. Volume Purged	Temp.	Spec Cond.	H.	DO Flow Cell	DO Hach Test Kit	Ferrous Kir Iron	<u> </u>	Redox Potential	Соммень	
		Below MP	E III	oia, la	fters	dag. C. un	umhos/cm pH Units	H Units	mg/L	(hgh) (low)	Mg/L	$-\dagger$	```	10, 6.	
	24 hr	Ξ .	7.7.	****			C.11.R	363	1 oE	\dashv	$\frac{1}{1}$	1	200	<u>ق</u> - ئ	
9/0/	27.5	20 =	0 5	730				3.5.6	0.83	+	_	1	32,7	\ -	
	200	×5 c4	1505	2002		21.45		_	0.50	-	+	+	5/5	1.3	
	1015		141	1.		22.5	12/10		7,80	-	+	+-	x 3		
	5201	┡┈╂	-	:			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	7,7	0 2	3	3.50	┼─	199	7 1-1	-
	16 35	<u>;</u>	1	-		3	- - - -		7	-	3		200	ical - Ry . Sa	1.1/4
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JOB No. 12001-2-0701

JOB NAME DSCR - MNA OUT

DATE 10-16-02 TIME 1300

SAMPLING POINT. DMW-201

OMMENTS
s by SW8260B
ne, ethane, ethene by RSK-175
C by SW9060
0₂ by RSK-175
lfide by E376 1
alinity by E310.1
SO ₄ , Cl by E300.0
als by 6010B,7470A,7841
als by 6010B,7470A,7841
drogen by AM 20
COMMENTS
N/A
N/A
N/A RE <u>50</u> 'S
RE <u>50</u> 'S
RE <u>50</u> 'S
RE <u>50</u> 'S
1 2 2

JOB No. 12001-2-0701	
JOB NAME DSCR - N	INA OU7
	TIME ICID
DATE 1030-02	
SAMPLING POINT I	DMM-9JA
DEPTH 4.80	

					DEPTH	4.80
AMPLE INFORMATI	ON SA	MPLE I D. NO	: Dmw	- 92K		
MATERIAL.	WATER	SOIL		SLUDGE	OTHE	R (LIST)
TYPE:	☐ GRAB	□ сомі	POSITE	OTHER (LIST)	
HAZARDOUS?.	YES	⊠ NO		UNKNOWN		
	NTAINER		NUMBER	PRESERVA		COMMENTS
TYPE	VC	LUME		PREPARAT		VOCs by SW8260B
VOA VIAL		40 ml	3	HCl to pH<2, Co		Methane, ethane, ethene
VOA VIAL		40 ml	3	HCl to pH<2, Co		by RSK-175
VOA VIAL		40 ml	3	H₂SO₄ to pH<2,0	Cool to 4°C	TOC by SW9060
VOA VIAL		40 ml	2	Cool to 4	l°C	CO₂ by RSK-175
Poly		500 ml	1	ZnAc & NaOH, C	Cool to 4°C	Sulfide by E376.1
Poly	- ·	250 ml	1	Cool to	4°C	Alkalinity by E310.1
Poly		250 ml	1	Cool to	4°C	NO ₃ , SO ₄ , Cl by E300.0
Poly		1 L	1	HNO ₃ to pH<2,	Cool to 4°C	Tot Metals by 6010B,7470A,7841
Poly		1 L	1	HNO ₃ to pH<2,	Cool to 4°C	Dis. Metals by 6010B,7470A,7841
VOA VIAL		20 ml	1	None		Hydrogen by AM 20
<u>water</u>	mestly c	ear, sm	ethed bre	ARANCE; ODOR; (L (sotten ey	gy odor	
FIELD MEASUREM				RESULTS	(I INITS)	COMMENTS
PARAME	TER	EQUIP	MENT I.D.	RESULTS	(OIVITS)	OOMMEVITO
N/A		,	N/A	N/	'A	N/A
COMMENTS: (V	VELL PURGIN	I NG VOLUME	SAMPLE APPE	EARANCE; ODOR;	COLOR, ET	C.)
GENERAL INFORI	MATION	WEATHER _	rainy/c	old .	AIR TEM	PERATURE 45°F
SAMPLES SHIP	PED TO: <u>STL</u>	-North Canton	, Ohio / Microse	eeps - Pittsburg, Pi	Α	
SPECIAL HAND	LING: FedEx					
MODE OF SHIP	MENT:	☐ CAR/TRU	JCK [BUS	PLANE	COMMERCIAL VEHIC
QA/QC						_
SAMPLE COLL	ECTED BY: _	1 Vecas	7	SAMPLING	DBSERVED	BY. L. Barlow
DISCREPANCII	ES [.]					

Location OSC.	. 086.		Site Name		Identify Measuring Point (eg. Top of Casing)	ing Point (ng)	(MP).						704	704
Well ID. Fleld Sar	Weil ID. Field Sampling Personnel:		DMW-22A Vecse L Back	المحا	Depth to Screen below MP: Pump Intake at (ff. below MP): Purging Device (Pump Type):	ff. below Mi (ff. below (Pump T)	a Wasi	Top of	of screen	Bottom	of screen			434
Date	Time	Depth to	│ ├ ─	Purge Rate	2	Temp.	Spec	Hd	Plow Cell	DO Hach Test Kit	Ferrous	Redox Potential	Comments	
		Water Below MP	Setting (1)				200	oH Units		mg/L (high) (low)	mg/L	λ Ε	10.7 b	
-	- 11	H.	4	mUmin	Mers	7.5	5820	561		u i		81	0	
10/ss/01	0805	Ch h	3	3) =		+-			0 60			19	0	
	5X(5)	2 2 2	=	:		-	\vdash	5 83	052			70	9	
	28.5		ř	1		- +	—+		0 49			7/	5	
	3 8	د لا	=	1.1		13/2/2	- +	5.86	047			76		
	77.2		1	11		10010	0.281	585	2 45	\ \ 		- 0	2 (
	7 7 7	1	1),		_			950			22		
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	221,0	_	3	11		1881	1120	38.5	0 44			9 :		
	75.20	<u> </u>		1.7		15.80	2/2 0		3 4 5			, <u>,</u> ,	0	
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	33.5	ļ.		-					0 41			70		
	700/	=	1'	-		15 79	1170	2.87	0 41			- 00	1. 10 Act 31. 5. 1.22	-
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	_	-												

JOB No. <u>12001-2-070</u>	1
JOB NAME_DSCR -	MNA OU7
DATE 10-16-02	TIME 1530
SAMPLING POINT.	5mw-25A
	•
DEPTH	

			DEPTH	
MPLE INFORMATIO	N SAMPLE I.D. N	O: DMW	-25A	
] WATER ☐ SOI			R (LIST)
	GRAB □ COI	MPOSITE	OTHER (LIST)	
	YES NO		UNKNOWN	
CON	TAINER VOLUME	NUMBER	PRESERVATIVE/ PREPARATION	COMMENTS
TYPE	40 ml	3	HCl to pH<2, Cool to 4°C	VOCs by SW8260B
VOA VIAL	40 ml	3	HCl to pH<2, Cool to 4°C	Methane, ethane, ethene by RSK-175
VOA VIAL	40 ml	3	H₂SO₄ to pH<2,Cool to 4°C	TOC by SW9060
VOA VIAL	40 ml	2	Cool to 4°C	CO₂ by RSK-175
Poly	500 ml	1	ZnAc & NaOH, Cool to 4°C	Sulfide by E376.1
Poly	· 250 ml	1	Cool to 4°C	Alkalinity by E310.1
Poly	250 ml	1	Cool to 4°C	NO ₃ , SO ₄ , Cl by E300.0
Poly	1 L	1	HNO ₃ to pH<2, Cool to 4°C	Tot Metals by 6010B,7470A,7841
Poly	1 L	1	HNO ₃ to pH<2, Cool to 4°C	Dis Metals by 6010B,7470A,7841
VOA VIAL	20 ml	1	None	Hydrogen by AM 20
IELD MEASUREME	NTS			
PARAMETE	R EQU	PMENT I.D.	RESULTS (UNITS)	COMMENTS
N/A		N/A	N/A	N/A
COMMENTS (WE	LL PURGING VOLUME	SAMPLE APPE	ARANCE; ODOR; COLOR, ET	C.)
GENERAL INFORMA	ATION WEATHER	tverca 1	AIR TEM	PERATURE <u>60</u>
SAMPLES SHIPPE	ED TO STL-North Canto	on, Ohio / Microse	eeps - Pittsburg, PA	
SPECIAL HANDLI	NG FedEx			
MODE OF SHIPM	ENT [.] CAR/TF	RUCK E]BUS ⊠ PLANE	COMMERCIAL VEHICL
`A/QC				
	CTED BY: But.	lar	SAMPLING OBSERVED	BY
DISCREPANCIES	<u></u>			

JOB No 12001-2-070)1
JOB NAME DSCR -	MNA OU7
DATE 10/15	TIME 1315
SAMPLING POINT.	DMW-26A
DEPTH	

	IVEI OI	\ 1		DEPTH_	SPOINT. D
MPLE INFORMATION	SAMPLE I.D	NO.: DMW.	-36A		
MATERIAL W			SLUDGE	OTHE	R (LIST)
TYPE: SGF		COMPOSITE	OTHER (LIST))	
HAZARDOUS?: ☐ YE	<u> </u>		UNKNOWN		
CONTAIN		NUMBER	PRESERVA	i i	COMMENTS
TYPE	VOLUME	NOMBER	PREPARAT		VOC- 1 CW9260B
VOA VIAL	40 ml	3	HCI to pH<2, Co		VOCs by SW8260B Methane, ethane, ethene
VOA VIAL	40 ml	3	HCl to pH<2, Co		by RSK-175
VOA VIAL	40 ml	3	H₂SO₄ to pH<2,C	Cool to 4°C	TOC by SW9060
VOA VIAL	40 ml	2	Cool to 4	°C	CO₂ by RSK-175
Poly	500 ml	1	ZnAc & NaOH, C	ool to 4°C	Sulfide by E376.1
Poly	250 ml	1	Cool to 4	I°C	Alkalinity by E310.1
Poly	250 ml	1	Cool to 4	1°C	NO ₃ , SO ₄ , Cl by E300.0
Poly	1 L	1	HNO ₃ to pH<2, 0	Cool to 4°C	Tot Metals by 6010B,7470A,7841
Poly	1 L	1	HNO ₃ to pH<2,	Cool to 4°C	Dis. Metals by 6010B,7470A,7841
VOA VIAL	20 ml	1	None		Hydrogen by AM 20
Light brows					
PARAMETER		OUIPMENT I.D.	RESULTS	(UNITS)	COMMENTS
N/A		N/A	N/.		N/A
COMMENTS: (WELL F	PURGING VOLU	ME: SAMPLE APPE	ARANCE; ODOR;	COLOR, ET	C.)
GENERAL INFORMATIO	N WEATH	HER OVERCAS	+	AIR TEMI	PERATURE 50°F
SAMPLES SHIPPED T	O STL-North Ca	inton, Ohio / Microse	eps - Pittsburg, PA	<u> </u>	
SPECIAL HANDLING				 	
MODE OF SHIPMENT		TRUCK []BUS 🗵	PLANE	COMMERCIAL VEHIC
QA/QC					
SAMPLE COLLECTE	BY: Jay	Vecsey	SAMPLING C	BSERVED	BY:

);;) ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	3 3	;		į Į					3
Location DSCh.	DSCh.	去	DAN ZEA OU 7		Identify Measuring Point (MP): (eg Top of Casing)	ing Point ng)	(MP):							704
Well ID: Fleid Sa	mpling Pe	Well ID: Field Sampling Personnel:	200A 100A 1005 1005 1005 1005 1005 1005 1	1 32	Depth to Screen below MP: Pump Intake at (ft. below MP): purging Device (Pump Type):	ft. below M (ft. below (Pump T)	1 ! 1	Top of \$	of screen	Bottom	of screen	Be	Best Available Copy	
Date	Time	Depth to	Pump Dial	Purge Rate	Purge Rate Cum. Volume	Temp.	_	HE.	DO Flow Cell	DO Hach Test Kit	Ferrous	Redox Potential	Comments	10
	;	Below MP		nim)Tw		deg C un	umhos/cm pH Units		mg/L	mg/L (high) (low)	mg/L	È	© rb	
40/10	24 nr)L 2	7	202			0.8665	_;	25.0	-		2	8	
51/5/	4 7	9 5	15.	753			1280	┵	ज्ञ			05-	74	f
	7211	┞	<u>5_</u>	300		- 1		- I		-		145	7.5	
	1135	8	19	37		- 1	1280	15 7	7 5			34.	7 7	1
	쏡미	-+		253			<u> </u>	}	0,0			-50	7.7	
	11.55	16.3	\rfloor	93		2 3	130.0	╄-				25-	79	
	502)	673		201		,		3	900			55	8 \$	
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													Pech Chrmx	From limi
													Sampling Line	1315
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	- 4 - 4 - 6 - 6
	JOB No 12001-2-0701
١	JOB NAME DSCR - MNA OU7
	DATE 10-16-02 TIME 1320
	SAMPLING POINT: DWW-27A
	DEPTH

PLE INFORMATION	SAMP	LE I.D NO.:	DMW-	27A		
	WATER	SOIL		SLUDGE		R (LIST)
	GRAB	СОМР	OSITE	OTHER (LIST))	
	YES	⊠ NO		□ UNKNOWN		
	AINER		NUMBER	PRESERVA	1	COMMENTS
TYPE	VOLU			PREPARAT		VOCs by SW8260B
VOA VIAL	40 n	nl		HCI to pH<2, Co		Methane, ethane, ethene
VOA VIAL	40 n	nl	3	HCI to pH<2, Co	ool to 4°C	by RSK-175
VOA VIAL	40 r	mi	3	H₂SO₄ to pH<2,C	Cool to 4°C	TOC by SW9060
VOA VIAL	40 г	ml	2	Cool to 4	°C	CO₂ by RSK-175
Poly	500	ml	1	ZnAc & NaOH, C	ool to 4°C	Sulfide by E376 1
Poly	250	ml	1	Cool to 4	I°C	Alkalinity by E310.1
	250	ml	1	Cool to 4	1°C	NO ₃ , SO ₄ , Cl by E300.0
Poly Poly	1		1	HNO ₃ to pH<2, 0	Cool to 4°C	Tot Metals by 6010B,7470A,78
Poly	1		1	HNO ₃ to pH<2,	Cool to 4°C	Dis. Metals by 6010B,7470A,78
VOA VIAL	20		1	None		Hydrogen by AM 20
COMMENTS. (WELL	PURGING V		MPLE APPE	ARANCE; ODOR; (COLOR, ETC	
COMMENTS. (WELL			MPLE APPE	ARANCE; ODOR; (COLOR, ETC	
	тѕ	OLUME SA	MPLE APPE	ARANCE; ODOR; O		COMMENTS
ELD MEASUREMEN	тѕ	OLUME SA			(UNITS)	
ELD MEASUREMEN PARAMETE	TS R	EQUIPM	IENT I D.	RESULTS N/	(UNITS) A	COMMENTS N/A
PARAMETEI	TS R L PURGING	EQUIPM N VOLUME. S	IENT I D. I/A AMPLE APPI	RESULTS N/	(UNITS) A COLOR, ET	COMMENTS N/A
PARAMETEI N/A COMMENTS. (WEL	TS R L PURGING V	EQUIPM VOLUME. S VEATHER	IENT I D. I/A AMPLE APPI	RESULTS N/ EARANCE; ODOR;	(UNITS) A COLOR, ET	COMMENTS N/A C.) PERATURE
PARAMETEI N/A COMMENTS. (WELL ENERAL INFORMA SAMPLES SHIPPE	TS R L PURGING V TION W D TO STL-No	EQUIPM VOLUME. S VEATHER	IENT I D. I/A AMPLE APPI	RESULTS N/ EARANCE; ODOR;	(UNITS) A COLOR, ET	COMMENTS N/A C.) PERATURE
PARAMETEI N/A COMMENTS. (WELL ENERAL INFORMA SAMPLES SHIPPE SPECIAL HANDLIN	TION W D TO STL-No	EQUIPM VOLUME. S VEATHER	DENT I D. I/A AMPLE APPL Ohio / Micros	RESULTS N/ EARANCE; ODOR; eeps - Pittsburg, P/	(UNITS) A COLOR, ET	COMMENTS N/A C.) PERATURE
PARAMETEI N/A COMMENTS. (WEL ENERAL INFORMA SAMPLES SHIPPE SPECIAL HANDLIN MODE OF SHIPME NA/QC	TION W D TO STL-No	EQUIPM N VOLUME. S VEATHER orth Canton, (Ohio / Micros	RESULTS N/ EARANCE; ODOR; eeps - Pittsburg, PA	(UNITS) A COLOR, ET AIR TEMI	COMMENTS N/A C.) PERATURE

440 704 Comments Best Available Copy (WW) C/ JUE 0 \mathcal{O} \mathcal{O} 0 þ d 0 C S 1 Potential A series 3 091 ジナ・ 15 ₹ **⟨**∕) 子一 5 17--51 81о (V of screen Bottom Ferrous <u>ro</u> mg/L Hach Test Kil (high) (low) いかれるからいっている 1.0. Identify Measuring Point (MP): of screen Flow Cell 3.75 6 70 5.1 ر ده 105 70.1 d 4 32 21.5/75/013/13/14 <u> ၅</u> __ -mg/L 8 22.24 Control 2.5m 3 8 4 06 3 80 367 umhos/cm pH Units S S Top 표 ~ 0,123 0,137 0.123 21.32 (7) 124 1-21.03 82 25 21.0 12 22 00 01136 801 0 22,25 hors, 20 12108517 22 22 0.149 122 18 10.159 Spec Cond. Pump Intake at (ft below MP): Purging Device (Pump Type): Depth to Screen below MP ייברר י ייייי deg. C 22 28 21.13 32 72 Purge Rate Cum. Volume Temp. 223 ~ B. U.J. 1 0. Ed 2 5 5 cm 28.25 کی کار 24.5 a. 2 J. 5.5.4.1 ジェく ていし V 12 5 pc/ いっとく ~ 20 5 ters. 7.61 1320 1440 250 Trapping Come шUmin 7774 220 @ 346 220 012 220 08 73 220 Sample Howe 0.61 022 220 220 520 022 SOMOS يديكاركاماء Pump Dial Site Name Setting (1) Below MP # 1001 Depth to 10,94 4P.CI 76161 10.91 Well ID: Field Sampling Personnel 10 75 Hb 01 60.01 Water 10.01 ال <u>عالم</u> 16.01 17 4H 13. 43 46 01 US 50 Location DSCh. 1040 Time 150 000 1210 12213 1350 QOII 1120 1130 <u>0</u> J 30 1240 24 hr 1110 10/15/62 Date

⁵ 704	441					15 Yes.	<u>.</u>		26A.W?) Hin 66																	
		ents	0300				ChipApide Const CHAME		SUAIN						\$											
	Best Available Copy	Comments	TIME =	1.5	17.4 (ust the Ho)		L Middy	76.4 (FREGOR)	10.5.0 (7.7.7) (WIRKS	04	++	1,01	5 t. f		· CENTIPLY											
	ก 4 ∵ั.	Redox	λE!			5 L				+-+	╌┼	┿	1.5.4		d											-
	of screen	<u> </u>	mg/L								1		2,40	+-	MANJK KP											
		├ ──	mg/L (high) (low)												7	\neg										1
	of screen	DO Flow Call	mg/L (r	2.90	50.1	210	0, 0	0 54	0.53	0.61	540	0.56	5.	\top	10	2	1/	2								
	Top	Hd	pH Units	710 1-	4.84	4.95	5.00	501	5.02	5.14	5.12							1	-	ļ	 				 	 {
	MP: ow MP): Type).	Spec Cond.	umhos/cm pH Units	0.331		0.321			0 318	4 K D				4K-7		L.	103	2		<u> </u>	<u> </u>				_	
need of Casing)	sen below at (ft. belo ce (Pump	e Temp.	089. C	10.55	358	18.65 18.05	13.55	18.53	등 5 5	ر چ څ	16.53	18.5.3	1855	18.55) #JZ	LB	AN INE		-	-	 			$\frac{1}{1}$	_
ntify P	Depth to Screen below MP: Pump Intake at (ft. below MP): Purging Device (Pump Type).	Purge Rate Cum. Volume	Kers												,	C1743(WAY.								
12240		Purge Rate	mUmin	380	38	0	202	ل عر		300	360	300		200		27777	SAMBE	1					-			
(VERHA) PR - OFF SITE Site Name	-334 R. Brister	Pump Dial	Setting (1)													7										
100	3	Depth to	Water Below MP ft	3 + 8	5 90	6.17	91.9	71 4	그	۴. ۱۱	1- 6	= -	11.2											\ \ \		
DSCR.	Well 10. Field Sampling Personnel	Time	24 hr	الاطنين	5000	27.00	5555	7790	0905	07.15	271.0	\$ 1.5 \$ 1.5	355	100												
Location DSCR -	Well ID. Field San	Date		15/01			1			X	-															

JOB No. <u>12001-2-070</u>	1
JOB NAME_DSCR -	MNA OU7
DATE 10-29-02	(a^ A
SAMPLING POINT:	A
T W.I	IJ-33 A

AMPLE INFORMATION	SAMPLE I.D. NO	: DWM	- 33A					
MATERIAL. WATE	R SOIL		SLUDGE	OTHE	R (LIST)			
TYPE: SRAE	в □сом	POSITE	OTHER (LIST)				
HAZARDOUS?. YES	⊠ NO		□ UNKNOWN					
CONTAINER		NUMBER	PRESERVA*		COMMENTS			
TYPE VOA VIAL	VOLUME 40 ml	3	HCI to pH<2, Co		VOCs by SW8260B			
VOA VIAL	40 ml	3	HCl to pH<2, Co		Methane, ethane, ethene by RSK-175			
VOA VIAL	40 ml	3	H₂SO₄ to pH<2,C	Cool to 4°C	TOC by SW9060			
VOA VIAL	40 ml	2	Cool to 4	°C	CO₂ by RSK-175			
Poly	500 ml	1	ZnAc & NaOH, C	ool to 4°C	Sulfide by E376.1			
Poly	250 ml	1	Cool to 4	°C	Alkalinity by E310.1			
Poly 250 ml 1 Cool to 4°C NO ₃ , SO ₄ , Cl by E300.0								
Poly 1 L 1 HNO ₃ to pH<2, Cool to 4°C Tot Metals by 6010B,7470A,7841								
Poly 1 L 1 HNO ₃ to pH<2, Cool to 4°C Dis Metals by 6010B,7470A,7841								
VOA VIAL 20 ml 1 None Hydrogen by AM 20								
FIELD MEASUREMENTS								
PARAMETER EQUIPMENT I.D RESULTS (UNITS) COMMENTS								
N/A N/A N/A								
COMMENTS: (WELL PURGING VOLUME SAMPLE APPEARANCE, ODOR, COLOR, ETC.)								
BAD DUR , CLEAR								
GENERAL INFORMATION WEATHER TAN AIR TEMPERATURE 46°F								
SAMPLES SHIPPED TO	STL-North Canton,	Ohio / Microsee	eps – Pittsburg, PA	····				
SPECIAL HANDLING: Fee	dEx			<u></u>				
MODE OF SHIPMENT:	☐ CAR/TRU	ск 🗆	BUS 🗵	PLANE	COMMERCIAL VEHICL			
QA/QC		as-	γ) 					
SAMPLE COLLECTED BY	Y: R FOR EILE	(h) 49/	SAMPLING O	BSERVED E	3Y [.]			
DISCREPANCIES:		1 95						

JOB No. <u>12001-2-0701</u>
JOB NAME_DSCR - MNA OU7
DATE 10:11:02 TIME 1045_
SAMPLING POINT: DMW-35A
SAMPLING POINT: 27 100 50 11

IPLE INFORMATION	SAMPLE I.D. N	O.: DMU	>-35A			
	——I WATER ☐ SOI	L	SLUDGE OTHE	R (LIST)		
		MPOSITE	OTHER (LIST)			
	YES 🖾 NO		☐ UNKNOWN			
CONT		NUMBER	PRESERVATIVE/	COMMENTS		
TYPE	VOLUME		PREPARATION	VOCs by SW8260B		
VOA VIAL	40 ml	3	HCl to pH<2, Cool to 4°C	Methane, ethane, ethene		
VOA VIAL	40 ml	3	HCl to pH<2, Cool to 4°C	by RSK-175		
VOA VIAL	40 ml	3	H₂SO₄ to pH<2,Cool to 4°C	TOC by SW9060		
VOA VIAL	40 ml	2	Cool to 4°C	CO₂ by RSK-175		
Poly	500 ml	1	ZnAc & NaOH, Cool to 4°C	Sulfide by E376.1		
Poly 250 ml 1 Cool to 4°C Alkalınıty by E310 1						
Poly 250 ml 1 Cool to 4°C NO ₃ , SO ₄ , Cl by E300.0						
Poly 1 L 1 HNO ₃ to pH<2, Cool to 4°C Tot. Metals by 6010B,7470A,7841						
Poly 1 L 1 HNO ₃ to pH<2, Cool to 4°C Dis. Metals by 6010B,7470A,7841						
VOA VIAL 20 ml 1 None Hydrogen by AM 20						
			ARANCE; ODOR; COLOR, ETC			
ELD MEASUREMEN	тѕ			COMMENTS		
ELD MEASUREMENT PARAMETER N/A	тѕ	PMENT I.D.	RESULTS (UNITS) N/A			
ELD MEASUREMENT PARAMETER N/A	TS EQU	PMENT I.D.	RESULTS (UNITS)	COMMENTS N/A		
ELD MEASUREMENT PARAMETER N/A	EQUI	PMENT I.D.	RESULTS (UNITS) N/A ARANCE; ODOR, COLOR, ET	COMMENTS N/A		
PARAMETER N/A COMMENTS. (WEL	EQUI	PMENT I.D. N/A SAMPLE APPE	RESULTS (UNITS) N/A ARANCE; ODOR, COLOR, ET	COMMENTS N/A C.)		
PARAMETER N/A COMMENTS. (WEL	EQUIL PURGING VOLUME TION WEATHER D TO STL-North Canto	PMENT I.D. N/A SAMPLE APPE	RESULTS (UNITS) N/A ARANCE; ODOR, COLOR, ET	COMMENTS N/A C.) PERATURE 60		
PARAMETER N/A COMMENTS. (WELL SENERAL INFORMAT	EQUIDENTION WEATHER TO STL-North Canto	PMENT I.D. N/A SAMPLE APPE (1) Ver cast fa	RESULTS (UNITS) N/A ARANCE; ODOR, COLOR, ET	COMMENTS N/A C.) PERATURE 60		
PARAMETER N/A COMMENTS. (WELL SENERAL INFORMAT SAMPLES SHIPPED SPECIAL HANDLIN	EQUIDENTION WEATHER TO STL-North Canto	PMENT I.D. N/A SAMPLE APPE (1) Ver cast fa	RESULTS (UNITS) N/A ARANCE; ODOR, COLOR, ET AIR TEMP eps - Pittsburg, PA	COMMENTS N/A C.) PERATURE 60		
PARAMETER N/A COMMENTS. (WELL SENERAL INFORMAT SAMPLES SHIPPER SPECIAL HANDLIN MODE OF SHIPME VQC	EQUIDENTION WEATHER TO STL-North Canto	PMENT I.D. N/A SAMPLE APPE Civercast fa on, Ohio / Microse RUCK	RESULTS (UNITS) N/A ARANCE; ODOR, COLOR, ET AIR TEMP eps - Pittsburg, PA	COMMENTS N/A C.) PERATURE 60		

Location DSC _h	DSCh		OO 7		Identify Measuring Point (MP). (eg. Top of Casing)	ring Point	(MP).						-	5 71
Well ID:		کَ	DIM 35/		Depth to Screen below	<u></u>	MP:	1	of screen	100	of screen			04
Field Sampling Personnel:	pling Pe	rsonnel:	Louven Baylar		Pump Intake at (ft. below MP): Purging Device (Pump Type):	(ft. below (Pump T	! 1	do		Bollon		ď	Best Available Copy	444
Date	Time	Depth to Water	Pump Dial Setting (1)	Purge Rate	Purge Rate Cum. Volume Temp.		Spec Cond.	¥	DO Flow Cell	DO Hach Test Kit	Ferrous	Redox Potential	Comments	
	24 hr	Below MP		mUmin	hers	deg. C ur	투	pH Units	H,	mg/L (high) (low)	mg/L	λE	J. V. J.	
10-16-02	420	7.75	20,51	30			1800	7	213	-		101	3.0	,
	433	12,81	- ,	200		19.57 0		- i-	707			157	79.	
	040	12.81	3	200		17 50 2 C.7 6	0.075	3 7 S	88 1			151	42	
	926	12.81	5 3	, ,					0.74			64/	7.5	
	20 3	12/21	,	L L	į		1		0.67			147	0	
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					DEPTH			
MPLE INFORMATION	I SA	MPLE I.D. NO	: MW11	タ- ブ				
MATERIAL 🖂	WATER	☐ SOIL		SLUDGE	OTHE	R (LIST)		
	GRAB	СОМ	POSITE	OTHER (LIST))			
	YES	⊠ NO		UNKNOWN				
	AINER		NUMBER	PRESERVA		COMMENTS		
TYPE	 	LUME		PREPARAT		VOCs by SW8260B		
VOA VIAL		40 ml	3	HCl to pH<2, Co		Methane, ethane, ethene		
VOA VIAL	4	40 ml	3	HCl to pH<2, Co		by RSK-175		
VOA VIAL		40 ml	3	H ₂ SO ₄ to pH<2,C	Cool to 4°C	TOC by SW9060		
VOA VIAL	<u> </u>	40 ml	2	Cool to 4	•°C _	CO₂ by RSK-175		
Poly	- 5	500 ml	1	ZnAc & NaOH, C	cool to 4°C	Sulfide by E376.1		
Poly · 250 ml 1 Cool to 4°C Alkalinity by E310.1								
Poly 250 ml 1 Cool to 4°C NO ₃ , SO ₄ , Cl by E300.0								
Poly 250 III 1 HNO ₃ to pH<2, Cool to 4°C Tot. Metals by 6010B,7470A,7841								
Poly 1 L 1 HNO ₃ to pH<2, Cool to 4°C Dis Metals by 6010B,7470A,7841								
VOA VIAL 20 ml 1 None Hydrogen by AM 20								
FIELD MEASUREMENTS								
PARAMETER EQUIPMENT I.D. RESULTS (UNITS) COMMENTS								
N/A N/A N/A								
COMMENTS. (WELL PURGING VOLUME. SAMPLE APPEARANCE; ODOR; COLOR, ETC.)								
GENERAL INFORMATION WEATHER COLA MISTER AIR TEMPERATURE 600								
SAMPLES SHIPPE	D TO STL	-North Canton	, Ohio / Microse	eeps – Pittsburg, PA	Α			
SPECIAL HANDLIN								
MODE OF SHIPME		☐ CAR/TRU	JCK [] BUS [2	PLANE	COMMERCIAL VEHIC		
JAIQC		1						
SAMPLE COLLECT		1 Tip	an k Ga		DBSERVED	BY:		

Location DSC.,.	05د.، .	00 }	Site Name		tdentify Measuring Point (MP): (eg. Top of Casing)	ring Poir iing)	ıt (MP):	可 1	J- WS10 - G2	\(\rightarrow \)				704
Well ID.		7-711 MH	7-71		Depth to Screen below MP.	n below	MP.		of screen _	#0# #0#	of screen		Best Available Copy	4
Field Sampling Personnel:	spling Pe	1	Robert Forista		Pump Intake at (ft. below MP): Purging Davice (Pump Type):	t (ft. belo		90 C	doi do do do do do do do do do do do do do	0	_			46
						Tomor	- 1	E	8	8	Ferrous	\vdash	Comments	
Date	Time	Depth to	Pump Dial		Purge Rate Cum. Volume	<u>i</u>	Cond.		Flow Cell	Hach Test Kit		Potentia	-	
	į	Below MP		(m) (m) in	deg C	umhos/cm pH Units	pH Units	mg/L	mg/L (hgh) (low)	w) mg/L	λE	4,4 (VV)	
	24 hr	n 1,4 1,4 1,0		7 40	0,10,12		0.149	_				209	—————————————————————————————————————	
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	2 6	2 6		2 %	15000	_	_	Ho b	125			223	128	
	1520	(a) 41		280	~ 2 gul			4.92	1.10			427		
	7,	12		280	لسكيف		\rightarrow	4 90	၁ ၀ -	_	- 0	225	_	
	330	9 1		28.5	13 gal	19.94	611.0	20. F	10.1	ন	7	7,77	35.60	
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JOB No. <u>12001-2-0701</u>
JOB NAME_DSCR ~ MNA OU7
DATE 10/15/02 TIME 14/5
SAMPLING POINT MW FOS - 1
DEPTH

					DEPTH			
SAMPLE INFORMATION	SAMP	LEID NO	. MWF	O5-1				
MATERIAL:	WATER	SOIL		SLUDGE	OTHE	R (LIST)		
	GRAB	□ сом	POSITE	OTHER (LIST))			
	YES	⊠ NO		☐ UNKNOWN				
	AINER		NUMBER	PRESERVAT PREPARAT		COMMENTS		
TYPE	VOLU		3	HCI to pH<2, Co		VOCs by SW8260B		
VOA VIAL	40 n	nı				Methane, ethane, ethene		
VOA VIAL	40 r	ni	3	HCI to pH<2, Co		by RSK-175		
VOA VIAL	40 r	ml	3	H₂SO₄ to pH<2,C	Cool to 4°C	TOC by SW9060		
VOA VIAL	40 r	ml	2	Cool to 4	.c	CO₂ by RSK-175		
Poly								
Poly 250 ml 1 Cool to 4°C Alkalinity by E310.1								
Poly 250 ml 1 Cool to 4°C NO ₃ , SO ₄ , Cl by E300.0								
Poly 250 IIII 1 HNO ₃ to pH<2, Cool to 4°C Tot Metals by 6010B,7470A,7841								
Poly 1 L 1 HNO ₃ to pH<2, Cool to 4°C Dis Metals by 6010B,7470A,7841								
VOA VIAL 20 ml 1 None Hydrogen by AM 20								
5 gais purged								
FIELD MEASUREMENTS FOURIEMENT LD RESULTS (UNITS) COMMENTS								
PARAMETER EQUIPMENT I.D. TRESSETS (S.M.S)								
N/A N/A N/A								
COMMENTS: (WELL PURGING VOLUME SAMPLE APPEARANCE; ODOR, COLOR, ETC.) Water - Clear - No odor - No color								
GENERAL INFORMATION WEATHER COOL, breezy, OVERLUET AIR TEMPERATURE ~ 600 f								
SAMPLES SHIPPE	DTO STL-No	rth Canton,	Ohio / Microse	eps - Pittsburg, PA	١			
SPECIAL HANDLIN	IG. <u>FedEx</u>							
MODE OF SHIPME	NT·] CAR/TRU	ск [] BUS 🗵	PLANE	COMMERCIAL VEHIC		
TAIQC								
SAMPLE COLLECT		Clark	D. Knaut	SAMPLING C	BSERVED	BY:		

JOB No. 12001-2-0701

JOB NAME DSCR - MNA OU7

DATE JO/15/02 TIME 12:30

SAMPLING POINT: MWFOS-3

DEPTH_______

					DEPTH			
MPLE INFORMAT	ION	SAMPLE I.D. NO	: MWF	05-3		-		
MATERIAL:	⊠ WATE	R SOIL		☐ SLUDGE	OTHE	R (LIST)		
TYPE:	☐ GRAE	□ СОМЕ	POSITE	OTHER (LIST)				
HAZARDOUS?	 ☐ YES	⊠ NO		UNKNOWN				
_	ONTAINER	₹	NUMBER	PRESERVAT		COMMENTS		
TYPE		VOLUME		PREPARAT		VOCs by SW8260B		
VOA VIAL		40 ml	3	HCI to pH<2, Co		Methane, ethane, ethene		
VOA VIAL		40 ml	3	HCl to pH<2, Co	1	by RSK-175		
VOA VIAL		40 ml	3	H₂SO₄ to pH<2,C	ool to 4°C	TOC by SW9060		
VOA VIAL		40 ml	2	Cool to 4	°C	CO₂ by RSK-175		
Poly		500 ml	1	ZnAc & NaOH, C	ool to 4°C	Sulfide by E376 1		
Poly	Poly 250 ml 1 Cool to 4°C Alkalinity by E310.1							
Poly		250 ml	1	Cool to 4	°C	NO ₃ , SO ₄ , CI by E300.0		
Poly 1 L 1 HNO ₃ to pH<2, Cool to 4°C Tot. Metals by 6010B,7470A,7841								
Poly 1 L 1 HNO ₃ to pH<2, Cool to 4°C Dis. Metals by 6010B,7470A,7841								
VOA VIAL		20 ml	1	None	!	Hydrogen by AM 20		
FIELD MEASUREMENTS								
COMMENTS (UNITS)								
PARAMI	IER	EGGIP	MENT I.D	1 1,2002.19	(0)11.07			
N/A N/A N/A						N/A		
COMMENTS. (WELL PURGING VOLUME. SAMPLE APPEARANCE, ODOR; COLOR, ETC.)								
SAMPLE	CLEAR	, SLIGHT	ODOR_					
GENERAL INFORMATION WEATHER CLOUDY AIR TEMPERATURE 500-600F								
CAMDI ES SHII	DDED TO:	 STL-North Canton	. Ohio / Microse	eeps – Pittsburg, PA	\			
SPECIAL HAN								
MODE OF SHI		☐ CAR/TRU	JCK [∃BUS ∑	PLANE	COMMERCIAL VEHIC		
QA/QC	INITIAL	3.110						
				CANADI ING C	RSEDVED	BY		
SAMPLE COLI	LECTED B	Y. Jan V		SAIVIPLING C	JUSEIN VED			
DISCREPANC	IES							

JOB No. 12001-2-07	01
JOB NAME_DSCR -	- MNA OU7
DATE 10/29/02	TIME <u>093</u> 3
SAMPLING POINT:	mwfTA-5
DEPTH	

					DEPTH	
AMPLE INFORMATI	ON S	SAMPLE I D. NO	: MWF7	rA -5	<u> </u>	
MATERIAL				SLUDGE		R (LIST)
TYPE:	⊠ GRAB	□ сомі	POSITE	OTHER (LIST))	
HAZARDOUS?:	YES	⊠ NO		□ UNKNOWN		
CC	NTAINER		NUMBER	PRESERVA	The state of the s	COMMENTS
TYPE	V	OLUME		PREPARAT		
VOA VIAL		40 ml	3	HCl to pH<2, Co	ool to 4°C	VOCs by SW8260B
VOA VIAL		40 ml	3	HCI to pH<2, Co		Methane, ethane, ethene by RSK-175
VOA VIAL		40 ml	3	H₂SO₄ to pH<2,C	cool to 4°C	TOC by SW9060
VOA VIAL		40 ml	2	Cool to 4	°C	CO₂ by RSK-175
Poly		500 ml	1	ZnAc & NaOH, C	ool to 4°C	Sulfide by E376.1
Poly	•	250 mi	1	Cool to 4	°C	Alkalinity by E310.1
Poly		250 ml	1	Cool to 4	l°C	NO ₃ , SO ₄ , Cl by E300.0
Poly		1 L	1	HNO₃ to pH<2, 0	Cool to 4°C	Tot Metals by 6010B,7470A,7841
Poly		1 L	1	HNO ₃ to pH<2, 0	Cool to 4°C	Dis Metals by 6010B,7470A,7841
VOA VIAL		20 ml	1	None	!	Hydrogen by AM 20
FIELD MEASUREM						0011151170
PARAME	ΓER	EQUIPN	MENT I.D	RESULTS	(UNITS)	COMMENTS
N/A		1	N/A	N/A	A	N/A
COMMENTS (W	ELL PURGII	NG VOLUME: S		ARANCE, ODOR; (COLOR, ET	c)
GENERAL INFORM	IATION	WEATHER _	ourcost		AIR TEMP	PERATURE 50°F
SPECIAL HANDI	.ING [.] <u>FedEx</u>			eps – Pittsburg, PA	PLANE	COMMERCIAL VEHIC
MODE OF SHIPM		CAR/TRU			/ LANE	
SAMPLE COLLE DISCREPANCIE	CTED BY	5 Garner	Sania to Gran	പ^ SAMPLING OI	BSERVED E	BY:

JOB No. 12001-2-0701

JOB NAME DSCR - MNA OU7

DATE 10 -17 - 02 TIME 14/0

SAMPLING POINT: MWFTA-7

DEPTH

					DEF III	
MPLE INFORMATIO	ON SA	AMPLE I.D. NO	MWF	TA-7		
MATERIAL:	■ WATER	☐ soil		SLUDGE	☐ OTHE	R (LIST)
	⊠ GRAB	□сом	POSITE	OTHER (LIST)	
	YES	⊠ NO		□ UNKNOWN		
CON	TAINER		NUMBER	PRESERVA		COMMENTS
TYPE		DLUME		PREPARAT		VOCs by SW8260B
VOA VIAL		40 ml	3	HCl to pH<2, Co		Methane, ethane, ethene
VOA VIAL		40 ml	3	HCI to pH<2, Co	ool to 4°C	by RSK-175
VOA VIAL		40 ml	3	H₂SO₄ to pH<2,C	Cool to 4°C	TOC by SW9060
VOA VIAL		40 ml	2	Cool to 4	°C	CO₂ by RSK-175
Poly		500 ml	1	ZnAc & NaOH, C	ool to 4°C	Sulfide by E376.1
Poly	· :	250 ml	1	Cool to 4	l°C	Alkalinity by E310.1
Poly		 250 ml	1	Cool to 4	I°C	NO ₃ , SO ₄ , Cl by E300.0
Poly		1 L	1	HNO₃ to pH<2, (Cool to 4°C	Tot Metals by 6010B,7470A,7841
Poly		1 L	1	HNO₃ to pH<2, (Cool to 4°C	Dis Metals by 6010B,7470A,7841
VOA VIAL		20 ml	1	None		Hydrogen by AM 20
TIELD MEASUREME	NTS				<u> </u>	
PARAMET	ER	EQUIP	MENT I.D.	RESULTS	(UNITS)	COMMENTS
N/A			N/A	N/A	4	N/A
COMMENTS: (WI	ELL PURGIN	I IG VOLUME. :	SAMPLE APPE	EARANCE, ODOR,	COLOR, ET	C.)
GENERAL INFORM	ATION	WEATHER _	Toudy to	Sunry	AIR TEM	PERATURE 62°
SAMPLES SHIPP	ED TO: <u>STL</u>	-North Canton,	Ohio / Microse	eeps – Pittsburg, PA	<u> </u>	
SPECIAL HANDL						
MODE OF SHIPM		☐ CAR/TRU	ick [] BUS 🗵	PLANE	COMMERCIAL VEHI
QA/QC						
CAMPLE COLLE	TED BV	Lula.		SAMPLING O	BSERVED	BY:
DISCREPANCIES						
DISCREPANCIES	··					

1 +

Location DSCR	DSCR.	3	Site Name		identify Measuring Point (eg Top of Casing)	Ing Point (1 Ing)	(MP):		1	•				704
Well ID. Field Sampling Personnel:	Johng Pe	₩	1 - 7 Luwer	Kulow	Depth to Screen below MP: Pump Intake at (ft. below MP); Purging Device (Pump Type):	n below MF (ft. below i) (Pump Ty)	,	of screen Top Actically pury		Bottom	of screen		\	454
,	I.	Denth to	Pump Dial	Purge Rate	Purge Rate Cum. Volume Temp.		-	pH DO	 	<u> </u>	Ferrous	Redox Potential	Commence	
	بر او ا	Water Below MP		: 	pagund		<u>_</u>	pH Units mg/L		mg/L {nigh} (low}	mg/L		qm!	
10-17-02	24 hr	=		mUmin	Mero	0 24 0	0 118 3	(2)				338	6.0	
08	12.30	10.15	20,00	3		+		· 1	+			295	10 J	
1240. Ofer.	1250	10.10 10.13	11				1	3-24 1 4	12			395	<i>i</i>	
S S	1300	+		-		25.55 	1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 =		3,50			345	1.2	
agan	1310			:	1	-	1	70.	19			456	2,7	
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	1360	<u> </u>				708.1	5 111.0	5.0 0.5			4		Land Stabled	
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JOB No. 12001-2-0701

JOB NAME DSCR - MNA OUT

DATE 10-29-02 TIME 900

SAMPLING POINT: MWF 7A-9

DEPTH 14 fcct

					DEPTH_	14 1007
MPLE INFORMAT	ION SA	MPLE I.D. NO	: mwF	TA-9		
MATERIAL:		SOIL		☐ SLUDGE	OTHE	R (LIST)
TYPE:	☐ GRAB	□ сомя	POSITE	OTHER (LIST	T)	
HAZARDOUS?:	YES	_ ⊠ NO		UNKNOWN		
	ONTAINER		NUMBER	PRESERVA		COMMENTS
TYPE		DLUME	NOWIDER	PREPARA		
VOA VIAL		40 ml	3	HCI to pH<2, C	ool to 4°C	VOCs by SW8260B
VOA VIAL		40 ml	3	HCI to pH<2, C		Methane, ethane, ethene by RSK-175
VOA VIAL		40 ml	3	H₂SO₄ to pH<2,	Cool to 4°C	TOC by SW9060
VOA VIAL		40 ml	2	Cool to	4°C	CO ₂ by RSK-175
Poly		500 ml	1	ZnAc & NaOH, 0	Cool to 4°C	Sulfide by E376.1
Poly		250 ml	1	Cool to	4°C	Alkalinity by E310.1
Poly		 250 ml	1	Cool to	4°C	NO ₃ , SO ₄ , CI by E300 0
Poly		1 L	1	HNO ₃ to pH<2,	Cool to 4°C	Tot Metals by 6010B,7470A,7841
Poly		1 L	1	HNO ₃ to pH<2,	Cool to 4°C	Dis. Metals by 6010B,7470A,7841
VOA VIAL		20 ml	1	Non	e	Hydrogen by AM 20
FIELD MEASUREN	MENTS					
		FOLID	MENT I D.	RESULTS	S (UNITS)	COMMENTS
PARAMI	ETER	EGOIP	WENT D.	TREODETT	3 (35)	
N/A	4		N/A	N	/A	N/A
COMMENTS (WELL PURGI	NG VOLUME.	SAMPLE APP	EARANCE; ODOR	, COLOR, ET	C)
GENERAL INFOR	PMATION	WEATHER	OVUICAS	t, dr.zzle	AIR TEMI	PERATURE 50°F
			Ohio / Micros	<u>eeps – Pittsburg, P</u>	Ά	
SPECIAL HAN		☐ CAR/TRU	ick 1	BUS	☑ PLANE	COMMERCIAL VEH
MODE OF SHI	PMEN!	CARTRO				
SAMPLE COLI	FOTED DV	1 - Norson	Lſ	SAMPI ING	OBSERVED	BY. L Barlow
		- VELGA	1			
DISCREPANC	IEQ					

ייקרר רטויטווטר יירר

JOB No 12001-2-0701
JOB NAME DSCR - MNA OU7
DATE 10-29-02 TIME 250
SAMPLING POINT. MWFTA-10
DEPTH

			DEPTH	
MPLE INFORMATION	SAMPLE I D. NO	mwf	TA-10	
	 VATER ☐ SOIL			R (LIST)
		IPOSITE	OTHER (LIST)	
-	YES 🖾 NO		□ UNKNOWN	
CONTA	· - <u></u>	NUMBER	PRESERVATIVE/	COMMENTS
TYPE	VOLUME	NUMBER	PREPARATION	
VOA VIAL	40 ml	3	HCl to pH<2, Cool to 4°C	VOCs by SW8260B
VOA VIAL	40 ml	3	HCl to pH<2, Cool to 4°C	Methane, ethane, ethene by RSK-175
VOA VIAL	40 ml	3	H₂SO₄ to pH<2,Cool to 4°C	TOC by SW9060
VOA VIAL	40 ml	2	Cool to 4°C	CO₂ by RSK-175
Poly	500 ml	1	ZnAc & NaOH, Cool to 4°C	Sulfide by E376.1
Poly	· 250 ml	1	Cool to 4°C	Alkalinity by E310.1
	250 ml	1	Cool to 4°C	NO ₃ , SO ₄ , CI by E300 0
Poly	250 iiii	1	HNO ₃ to pH<2, Cool to 4°C	Tot Metals by 6010B,7470A,7841
Poly	1 L	1	HNO ₃ to pH<2, Cool to 4°C	Dis Metals by 6010B,7470A,784*
Poly VOA VIAL	20 ml	1	None	Hydrogen by AM 20
IELD MEASUREMENT	s			
PARAMETER		MENT I D.	RESULTS (UNITS)	COMMENTS
N/A		N/A	N/A	N/A
COMMENTS. (WELL	PURGING VOLUME	SAMPLE APPE	ARANCE; ODOR; COLOR, ET	C.)
GENERAL INFORMAT	ION WEATHER	over ast	AIR TEM	PERATURE 52°
CAMPLES SHIPPET	TO STL-North Cantor	n. Ohio / Microse	eeps - Pittsburg, PA	
		.,		
SPECIAL HANDLING		UCK [BUS PLANE	COMMERCIAL VEH
MODE OF SHIPMET	T CAIVIN		<u> </u>	
SAMPLE COLLECT DISCREPANCIES	_ ED BY ^l		SAMPLING OBSERVED	BY·

					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	;	, 1					1	+ 5 -1
Location Well ID. Field Sa	Location DSCR)))	Site Name		(eg. Top of Casing) Depth to Screen below MP: Pump Intake at (ft. below MP):	Ing Point (Ning) below MP (ft. below W	•	of screen Top	Bottom	of screen		Best Available Copy	704 458
Date	Time	Depth to	Dial	Purge Rate	Purge Rate Cum. Volume Temp. Spec	、 _		DO Flow Call	DO Hach Test Kit	Ferrous	Redox Potential	Comments	
	24 hr	Below MP	i Simac	mUmin		O.	umhos/cm pH Units	alts mg/L	(high) (low)	mg/L	Λω	1916	
10 - 4.04	1	37.72	1,6%	120		15 21 012 15 21 012	7 7	75	<u> </u>		73	7 111	
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	130					10 or 51	0.116 5.77	00 0 16	$\neg \vdash$	\	3	7	
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JOB No. 12001-2-0701

JOB NAME DSCR MNA - OU 7

DATE 10-29-02 TIME 9:30

SAMPLING POINT MWFTA-14.

(LOCATION)

DEPTH N/A

	L	CLFORI			(LOC	ATION)
					DEPTH	N/A
SAMPLE INFORMATION	ON S	SAMPLE I.D. NC	: <u>MW</u>	FTA-14		
MATERIAL.	✓ WATER	. □ SOIL	•	SLUDGE	□ отн	HER (LIST)
TYPE:	⊠ GRAB	□сом	POSITE	OTHER (LIST)	
HAZARDOUS?:	☐ YES	⊠ NO		UNKNOWN		
	NTAINER		NUMBER	PRESERVAT		COMMENTS
TYPE	<u> </u>	VOLUME		PREPARAT	ION	NOO. b. CMOOCOB
VOA VIAL		40 ml	3	Cool to 4°C ****		VOCs by SW8260B Methane, Ethane &
VOA VIAL		40 ml	3	Cool to 4°C		Ethene by RSK175
VOA VIAL		40 ml	3	H₂SO₄ to pH<2, 0 4°C	Cool to	TOC by SW9060
VOA VIAL		40 mi	2	Cool to 4°C		Carbon Dioxide by RSK175
Poly		500 ml	1	Zn Acetate & Na Coo1 to 4°C	OH;	Sulfide by E376.1
Poly		250 ml	1	Cool to 4°C		Alkalinity by E310.1
Poly		250 ml	1	Cool to 4°C		NO ₃ , SO ₄ , & Cl ₂ by E300
Poly		1 Liter	1	HNO ₃ to pH<2; (Total Metals by 6010B/7470A/7841
Poly		1 Liter	1	HNO ₃ to pH<2; (Cool to	Dissolved Metals by 6010B/7470A/7841
VOA VIAL		20 ml	1	None		Hydrogen by AM 20
TOTAL PUR	ட€].6 ८ ENTS	ALLON; SAN	ple clar,			Day Hold Time!!!
PARAMET	IER	I EQUIP	MENT I.D	RESULTS	(OINTIS)	COMMENTO
			SEE ATTACI	HED TABLE		
		HULLON, SAM		ARANCE, ODOR, 1	COLOR, E	ETC)
GENERAL INFORM	ATION	WEATHER_	RAIN		AIR TEI	MPERATURE 505.
SAMPLES SHIPF			n, Ohio/Microse	eps - Pittsburgh, Pi	Α	
MODE OF SHIPM		☐ CAR/TRU	ICK []BUS 🗵	PLANE	COMMERCIAL VEH
QA/QC				Ţ		
SAMPLE COLLE	CTED BY	Du lla		SAMPLING O	BSERVE	D BY·
DISCREPANCIE						

ampling Per Time 24 hr 825 835	MWF TA - 14 sonnel: Phy Wss bepth to Pump Dial water Setting (1) 21.55 22.55 23.50 23.50 23.50 23.50 23.50 23.50	Ç-ŞV	Depth to Screen below MP:	n below MP:	Top	of screen	Bottom	of screen		Best Available Copy	4
71me 24 hr 24 hr 825 835	· · · · · · · · · · · · · · · · · · ·		Pump Intake at (ft. below MP):	(ft. below MP):							460
7 Ime 24 hr 815 825 835	▗▗ ▗ ▗ ▗┈ ╏ ┈┞┈┞┈┞┈┞┈┞	1 1	Language Burgara			2	od	Ferrous	Redox	Comments Comments	
24 hr 2655 835 835	20 20 20 20 20 20 20 20 20 20 20 20 20 2		Purge Rate Cum. Volume Purged	lemp. Spec		Flow Cell	Hach Test Kit	Iron	Potential	, , , , , , , , , , , , , , , , , , ,	
835 835	58500	 E L ^m in		deg. C umhos/	cm pH Units	mg/L	(high) (low)	mg/L	λE		
528 528	20 15 8 20	001	03	15.3 1057	65.5	35.	_ _ _		265	رزع	
835	25 CS CS CS CS CS CS CS CS CS CS CS CS CS	5		148 0.513	8).8	3.13			238	(, b	
	20 20 20 20 20 20 20 20 20 20 20 20 20 2	3	0.8	j		1			212	0.1	
7/ 240 - 201	15 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	30	0.7						707	7.5	
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50%	70	30	<u>5</u>	9	一.	2.43			36	, ,	
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0 17.0 17.0 T	C. 1 C. Winn lan Horry rurles/min. etc.	es/min. etc)			! 						

JOB No. 12001-2-0701

JOB NAME DSCR MNA - OU 7

DATE 10.15, 02 TIME 1300

SAMPLING POINT MWFTA-16

(LOCATION)

			DEPTH	N/A
AMPLE INFORMATIO	N SAMPLE I.D. N	0.: <u></u> MW	FTA-16	
MATERIAL 2	WATER ☐ SOI	L	SLUDGE OT	HER (LIST)
TYPE:	GRAB □ CO	MPOSITE	OTHER (LIST)	
	_] YES ⊠ NO		UNKNOWN	
	TAINER	NUMBER	PRESERVATIVE/	COMMENTS
TYPE	VOLUME		PREPARATION	
VOA VIAL	40 ml	3	Cool to 4°C ****	VOCs by SW8260B
VOA VIAL	40 ml	3	Cool to 4°C	Methane, Ethane & Ethene by RSK175
VOA VIAL	40 ml	3	H ₂ SO ₄ to pH<2, Cool to 4°C	TOC by SW9060
VOA VIAL	40 ml	2	Cool to 4°C	Carbon Dioxide by RSK175
Poly	500 ml	1	Zn Acetate & NaOH, Coo1 to 4°C	Sulfide by E376.1
Poly	250 ml	1	Cool to 4°C	Alkalınıty by E310 1
Poly	250 ml	1	Cool to 4°C	NO ₃ , SO ₄ , & Cl ₂ by E300
Poly	1 Liter	1	HNO₃ to pH<2; Cool to 4°C	Total Metals by 6010B/7470A/7841
Poly	1 Liter	1	HNO₃ to pH<2, Cool to 4°C	Dissolved Metals by 6010B/7470A/7841
VOA VIAL	20 ml	1	None	Hydrogen by AM 20
FIELD MEASUREMEN	NTS	PMENT I.D	RESULTS (UNITS)	COMMENTS
PARAMETE	R EQUI	PMENT I.D	RESULTS (UNITS)	COMMENTO
		SEE ATTAC	HED TABLE	
COMMENTS (WE			EARANCE, ODOR; COLOR, CLEAR WATER, NO	
GENERAL INFORMA	TION WEATHER	choudy	AIR TE	MPERATURE ×54 F
SAMPLES SHIPPE SPECIAL HANDLI				
MODE OF SHIPME	ENT: CAR/TR	UCK L	BUS PLANE	COMMERCIAL VEP
QA/QC				
SAMPLE COLLEC	TED BY R. FORIS	STER	SAMPLING OBSERVE	D BY R. FOR STER

JOB No 12001-	2-0701
JOB NAME DS	CR – MNA OU7
DATE 10.15.	72 TIME 1300
SAMPLING PO	INT: MWFTH-16
DEPTH	,

				DEPTH	
MPLE INFORMATION	SAMPLE I.D N	o. MWFT	A-16 P	-	
MATERIAL: X WAT	ER 🗌 SOIL	_	SLUDGE	OTHE	R (LIST)
TYPE: SRA	B CON	MPOSITE	OTHER (LIS	Τ)	
HAZARDOUS? YES	⊠ NO		UNKNOWN		
CONTAINE		NUMBER	PRESERVA		COMMENTS
TYPE	VOLUME		PREPARA	 }-	VOCa by \$1/18260B
VOA VIAL	40 ml	3	HCI to pH<2, C	2001 to 4°C	VOCs by SW8260B
1		1	1		}
OMMENTS. (WELL PUR	RGING VOLUME.	SAMPLE APPEA	RANCE, ODOR,	COLOR, ETC	2.)
OMMENTS. (WELL PUR	RGING VOLUME.	SAMPLE APPEA	RANCE, ODOR,	COLOR, ETC	;;)
	RGING VOLUME.	SAMPLE APPEA	RANCE, ODOR,	COLOR, ETC	2.)
OMMENTS. (WELL PUR					
		SAMPLE APPEA		COLOR, ETC	COMMENTS
FIELD MEASUREMENTS PARAMETER			RESULTS		
FIELD MEASUREMENTS		PMENT I D.	RESULTS	S (UNITS)	COMMENTS
PARAMETER N/A	EQUIF	PMENT I D. N/A	RESULTS	S (UNITS) I/A	COMMENTS N/A
PARAMETER N/A COMMENTS: (WELL PU	EQUIF	PMENT I D. N/A SAMPLE APPE	RESULTS N ARANCE; ODOR	S (UNITS) I/A ; COLOR, ETC	COMMENTS N/A
PARAMETER N/A	EQUIF	PMENT I D. N/A SAMPLE APPE	RESULTS	S (UNITS) I/A ; COLOR, ETC	COMMENTS N/A
PARAMETER N/A COMMENTS: (WELL PU FLAVE CHUNI	EQUIF RGING VOLUME: US OF WHI	PMENT I D. N/A SAMPLE APPEA TI SH FLOC	RESULTS N ARANCE; ODOR	S (UNITS) I/A ; COLOR, ETO (2 WATER	COMMENTS N/A C) WITH NO ODOR.
PARAMETER N/A COMMENTS: (WELL PU FLAKE CHUNI GENERAL INFORMATION	RGING VOLUME: US OF WHI	PMENTID. N/A SAMPLE APPEA TI SH FLOC CLOUDY B	RESULTS N ARANCE; ODOR IN CLEA	S (UNITS) I/A ; COLOR, ETC C WATER AIR TEMF	COMMENTS N/A
PARAMETER N/A COMMENTS: (WELL PU FLAVE CHUNI	RGING VOLUME: US OF WHI	PMENTID. N/A SAMPLE APPEA TI SH FLOC CLOUDY B	RESULTS N ARANCE; ODOR IN CLEA	S (UNITS) I/A ; COLOR, ETC C WATER AIR TEMF	COMMENTS N/A C) WITH NO ODOR.
PARAMETER N/A COMMENTS: (WELL PU FLAKE CHUNI GENERAL INFORMATION	EQUIF RGING VOLUME: 25 OF WHI WEATHER STL-North Cantor dEx	PMENTID. N/A SAMPLE APPEATISH FLOC CLOUDY B. CLOUDY B. CLOUDY B.	RESULTS N ARANCE; ODOR , IN CLEA	S (UNITS) I/A ; COLOR, ETC C WATER AIR TEMP	COMMENTS N/A C) WITH NO ODOR. PERATURE \$54°F
PARAMETER N/A COMMENTS: (WELL PU FLAVE (HUN) GENERAL INFORMATION SAMPLES SHIPPED TO	EQUIF RGING VOLUME: 25 OF WHI WEATHER STL-North Cantor	PMENTID. N/A SAMPLE APPEATISH FLOC CLOUDY B. CLOUDY B. CLOUDY B.	RESULTS N ARANCE; ODOR N CLFA PERS – Pittsburg, P	S (UNITS) I/A ; COLOR, ETC C WATER AIR TEMF	COMMENTS N/A C) WITH NO ODOR. PERATURE \$54°F
PARAMETER N/A COMMENTS: (WELL PU FLAVE CHUNI GENERAL INFORMATION SAMPLES SHIPPED TO SPECIAL HANDLING FE	EQUIF RGING VOLUME: 25 OF WHI WEATHER STL-North Cantor dEx	PMENTID. N/A SAMPLE APPEATISH FLOC CLOUDY B. CLOUDY B. CLOUDY B.	RESULTS N ARANCE; ODOR , IN CLEA	S (UNITS) I/A ; COLOR, ETC C WATER AIR TEMP	COMMENTS N/A C) WITH NO ODOR.
PARAMETER N/A COMMENTS: (WELL PU FLAVE CHUNI GENERAL INFORMATION SAMPLES SHIPPED TO SPECIAL HANDLING FORMATION	EQUIF RGING VOLUME: 25 OF WHI WEATHER STL-North Cantor dEx CAR/TR	PMENTID. N/A SAMPLE APPEA TI SH FLOC CLOUDY B CLOUDY B On, Ohio / Microser UCK	RESULTS N ARANCE; ODOR , IN CLEA PERS - Pittsburg, P	S (UNITS) I/A ; COLOR, ETC © WATER AIR TEMP	COMMENTS N/A C) WITH NO ODOR. PERATURE \$54°F

Location DSCh	ا - بغ	LOO	Site Name		Identity Measuring Point (MP). (eg Top of Casing)	ırlng Poin sing)	t (MP)	U I				Be	Best Available Copy	70
Well ID: The Field Sampling Personnel:	ing Per	MUT FANT Sonnel:	7.7 FOS -16 R. FORISTER		Depth to Screen below MP.	an below	MP.	C Top	of screen _	> Bottom	of screen			4 46
	,	, •			Pump Intake at (fr. below MP): Purging Device (Pump Type):	it (ft. belo a (Pump		Dedica4	Dedicated Bladder	ا ن				
\vdash	Time	Depth to	Pump Dial	Purge Rate	긶	Temp.	Spec	H	DO Flow Coll	DO Hach Teat Kit	Ferrous Iron	Redox Potential	Соттепт	য
150		Water Below MP	Setting (1)		Furgeo		,	Si Si Si		mg/L (high) (low)	mg/L	>	TURBIOTLY (N+v'S)	
∦-		2		mUmin	- were	200	4,10 12,24					لمل	244	
	\top	34.30		275	,,,	+		+-	8.12			-98	110	
21/01	01.0			000	,	1,			8.41			01-		
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		9110		220	30	11 99			7.17			7.21-	9,6	
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-	1130	,		220	4.0	18 24	3.03	_	7.17			761-	V. 01	
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7	1.50				5.0	19.18			9.17			25.	-,-	
	25	43.35			5.5			$\overline{}$	6.47		-	-140	11.0	
1	17 10				60	18.03	2.57	12.28	6.53	+		2 ;	1.7.1	
-	1220				69	18.02		12,2(6.64			747	12.	
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JOB No. 12001-2-0701

JOB NAME DSCR MNA - OU 7

DATE 10-15-02 TIME 1/45

SAMPLING POINT MWFT A-17

(LOCATION)

DEPTH N/A

·····	SAMPLE ID NO	J.MILJF	TA-17	
AMPLE INFORMATION			-	HER (LIST)
	_		OTHER (LIST)	` · · · -
		POSITE		
	YES NO	NUMBER	PRESERVATIVE/	COMMENTS
TYPE	VOLUME	NOWIDER	PREPARATION	
VOA VIAL	40 ml	3	Cool to 4°C ****	VOCs by SW8260B
VOA VIAL	40 ml	3	Cool to 4°C	Methane, Ethane & Ethene by RSK175
VOA VIAL	40 ml	3	H₂SO₄ to pH<2, Cool to 4°C	TOC by SW9060
VOA VIAL	40 ml	2	Cool to 4°C	Carbon Dioxide by RSK175
Poly	500 ml	1	Zn Acetate & NaOH, Coo1 to 4°C	Sulfide by E376.1
Poly	250 ml	1	Cool to 4°C	Alkalinity by E310 1
Poly	250 ml	1	Cool to 4°C	NO ₃ , SO ₄ , & Cl ₂ by E300
Poly	1 Liter	1	HNO ₃ to pH<2; Cool to 4°C	Total Metals by 6010B/7470A/7841
Poly	1 Liter	1	HNO ₃ to pH<2, Cool to 4°C	Dissolved Metals by 6010B/7470A/7841
VOA VIAL	20 ml	1	None	Hydrogen by AM 20
FIELD MEASUREMEN			s collected w/o HCl - 7	
PARAMETER		MENT I D.	RESULTS (UNITS)	COMMENTS
COMMENTS: (WEL	L PURGING VOLUME	SEE ATTAC	HED TABLE EARANCE, ODOR, COLOR,	ETC)
GENERAL INFORMAT	ON WEATHER	Closdy .c.	AIR TE	EMPERATURE <u>と</u>
SAMPLES SHIPPEI SPECIAL HANDLIN	TO <u>STL - North Canto</u> G: <u>FedEx</u>	n, Ohio/Microse	eeps - Pittsburgh, PA	
MODE OF SHIPME	NT. CAR/TRU	ICK [BUS PLANE	COMMERCIAL VEHICL
QA/QC				
SAMPLE COLLECT	EDBY L Enlen		SAMPLING OBSERVE	ED BY

.					WELL	WELL PURSHING	- 7 7	:	1	ı				-	- - -
Locatio	Location DSCk .		Site Name		Identify Measuring Point (MP): (eg Top of Casing)	ing Point ing)	(MP):						Best Available Copy		704
Well ID: Field Sa	Well ID: 1100 Field Sampling Personnel:	l l	14-17 Lumi "0 B	Sactor	Depth to Screen below MP Pump Intake at (ft. below MP): Purging Device (Pump Type):	n below M (ft. below (Pump T)	1 ! 1	do Top	of screen	Bottom	of screen				4 465
Date	Time	Depth to Water Below MP	Pump Dial Setting (1)	<u> </u>	aET.		Spec	•		DO Hach Test Kis mg/L	Ferrous	Redox Potential	Comments	ents	
20.51.01		27.15	25 mi	JOO	ifters	18 38 1 18 08 1	Umnosiem - La Series	11.97	20 4		 	-44	3.5		
	2011	27.77				 - -		2. Y. 5.	4.07			57-	2, 2 2, 5 5		
	1125	48,04				1. 1		1-5	3 47	5	0	49.	2,5		
													12		
													Lydrogers swirge downs	(3/2/4) 51	
													7		
		-													
					}										

FIELD SAMPLING REPORT

			DEPTH	1 N/A
				111111111111111111111111111111111111111
AMPLE INFORMATIO		D. NO MWE		THED (1 (OT)
MATERIAL.		SOIL	_	THER (LIST)
TYPE:]GRAB	COMPOSITE	OTHER (LIST)	
HAZARDOUS? [] YES 🗵	NO	UNKNOWN	
	TAINER	NUMBER	PRESERVATIVE/ PREPARATION	COMMENTS
TYPE	VOLUME		Cool to 4°C ****	VOCs by SW8260B
VOA VIAL	40 ml	3		Methane, Ethane &
VOA VIAL	40 ml	3	Cool to 4°C	Ethene by RSK175
VOA VIAL	40 ml	3	H₂SO₄ to pH<2, Cool to 4°C	TOC by SW9060
VOA VIAL	40 ml	2	Cool to 4°C	Carbon Dioxide by RSK175
Poly	500 ml	1	Zn Acetate & NaOH; Coo1 to 4°C	Sulfide by E376.1
Poly	250 ml	1	Cool to 4°C	Alkalinity by E310.1
Poly	250 ml	1	Cool to 4°C	NO ₃ , SO ₄ , & Cl ₂ by E300
Poly	1 Liter	1	HNO ₃ to pH<2, Cool to 4°C	Total Metals by 6010B/7470A/7841
l Poly	1 Liter	1	HNO ₃ to pH<2; Cool to 4°C	Dissolved Metals by 6010B/7470A/7841
VOA VIAL	20 ml	1	None	Hydrogen by AM 20
Lower aquifer w		dissolved gasse	es collected w/o HCI - 7	
PARAMETE	R E	QUIPMENT I D	RESULTS (UNITS)	COMMENTS
COMMENTS (WE	LL PURGING VOLU		CHED TABLE EARANCE, ODOR, COLOR,	ETC)
GENERAL INFORMA	ATION WEAT	HER	AIR T	EMPERATURE
SAMPLES SHIPPE SPECIAL HANDLI		Canton, Ohio/Micros	eeps - Pittsburgh, PA	
MODE OF SHIPM	ENT: CAF	R/TRUCK [☐ BUS 🗵 PLANE	COMMERCIAL VEHIC
QA/QC		U		v
SAMPLE COLLEC		1/2 CSEY	SAMPLING OBSERV	ED BY

Location DSCK -	DSCH.	Ö	CU 7 Site Name		Identify Measuring Point (eg Top of Casing)	ing Poin Ing)	ıt (MP):					Bes	Best Available Copy	704
Well 10: Field Sampling Personnel.	pling Pe	Hw.t.	74-18 2-1/465227 Colorier Bri	7.0	Depth to Screen below MP: Pump Intake at (ft. below MP): Purging Device (Pump Type):	n below (ft. belov , (Pump	MP:	Top	of screen	Bottom	of screen			467
				1	Temporal Com Volume Tempo	Temp	Spec	Æ	00	og	15	Redox	Comments	
Date	Time	Depth to Water	Setting (1)	Purge Kate	Purged		Cond.	<u></u>	Flow Cell	Hech Test Kill mg/L		Potential		
	2	Below MP		m/Jmin	there	deg C	umhos/cm pH Units	pH Units	— 1.	(high) (low)	mg/L	ΛE	2010-	
	2 / 7 / P	720 87		200		1/5 2/	0.160	6,92	8 41			1.50	/	
9/2/	3 7	26 %	8	60		1661	0910	227	90 %			2	7	
		21.03	上	ت		16.77	0.158		170	-		185	0 6	
			-	-		16.92		abla	7.72	,	1	300	0.0	
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				DB No. <u>12001-</u> 2	
-		OLINIC	JO	OB NAME <u>DSC</u>	CR MNA – OU 7
F	IELD SAMF		D	ATE 10.17.0	72 TIME 1150
	REPOR'	T	L L	AMPLING POI	NT MWFTA-19
-k-up well		2"well d	ledicated bladder of	(LOCATION) EPTH <u>N/A</u>	
abeled - MW - 1	91,		$\frac{2}{2}$	EFILINIA	
MPLE INFORMATION	SAMPLE I.D. N	10. <u>WW F</u>			OT)
MATERIAL:	WATER SOI	L		OTHER (LI	•
TYPE: ⊠	GRAB CO	MPOSITE	OTHER (LIST)		
HAZARDOUS?:	YES NO		UNKNOWN		
	AINER	NUMBER	PRESERVATIV PREPARATIO	L	COMMENTS
TYPE	VOLUME 40 ml	3	Cool to 4°C ****		by SW8260B
VOA VIAL	40 mi			1	ane, Ethane &
VOA VIAL	40 ml	3	Cool to 4°C	Ether	ne by RSK175
VOA VIAL	40 ml	3	H₂SO₄ to pH<2, Co 4°C	ol to	by SW9060
VOA VIAL	40 ml	2	Cool to 4°C	Carbo RSK1	on Dioxide by
Poly	500 ml	1	Zn Acetate & NaOl-	00	le by E376 1
Poly	250 ml	1	Cool to 4°C	1	inity by E310.1
Poly	250 ml	1	Cool to 4°C	NO ₃ ,	SO ₄ , & Cl ₂ by E300
Poly	1 Liter	1	HNO ₃ to pH<2; Co	6010	Metals by B/7470A/7841
Poly	1 Liter	1	HNO ₃ to pH<2; Co 4°C	6010	olved Metals by 0B/7470A/7841
VOA VIAL	20 ml	1	None	Hydr	rogen by AM 20
COMMENTS (WELL	PURGING VOLUME.	SAMPLE APPE solved gasse	s collected w/o H	CI - 7 Day H	old Time!!!
FIELD MEASUREMEN	TS				
PARAMETER	R EQU	IPMENT I.D	RESULTS (U	NITS)	COMMENTS
	•		NUED TARLE		
<u>.</u>		SEE ATTAC	CHED TABLE		
COMMENTS: (WEL	L PURGING VOLUME	SAMPLE APPI	EARANCE, ODOR, CO	OLOR, ETC)	
	der, phk				
	, I				
GENERAL INFORMAT	TION WEATHER	₹		AIR TEMPERA	ATURE
SAMPLES SHIPPEI	D TO STL - North Can	ton, Ohio/Micros	eeps - Pittsburgh, PA		
SPECIAL HANDLIN					TOURSEDOM VEU
MODE OF SHIPME	NT CAR/TF	RUCK [□ BUS 💹 F	LANE L	COMMERCIAL VEHI
QA/QC		10-6			
SAMPLE COLLECT	FDRY R. Fursi	W XUZ	SAMPLING OB	SERVED BY	S. Garry XSir

DISCREPANCIES

Location DSC	700	Site Name		Identify Measuring Point (MP): (eg. Top of Casing)	ring Point ing)	(MP);						Best Available Copy	ble Copy	704
well ID: AND ETA Field Sampling Personnel.	MW FT ersonnel.	A - 19 R. FOR 15TE		Depth to Screen below MP. Pump Intake at (ft. below MP): Purging Device (Pump Type).	n below M I (ft. below e (Pump T		of screen Top Diadae (Ded. cz ked	of screen	Sottom (of screen				4 469
1	40000	P. O omi	Purge Rate	Purge Rate Cum. Volume	Temp.		Ha	8	8	Ferrous	Redox		Comments	
	Water		,	Purged		Cond.			Hach Test Kit Mg/L					
24 hr	Helow Mr		mL/min	Mens			L	٦.	(high) (low)	mg/L	۸۳ -	V		
0201 10 7101	26 16		2.55	7				1,35	+		Γ .		ADJUSTING FLAN PATE	الم عدد الم
	33,33		255	ا, 5ع				71 9	-		ט ע	6 7 raducoc	ococ From Parce To	DIGOTO CONTRACTO TO
₩	32,45		18	2.25 5			10.87	1.0.1			- [-	_		STILL HAltening THOIGH ANTI-
10,11,02,11,00	34.23		140	21.2 25.4		77.0	+-	1	3	0	617			
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			DEPT	H <u>N/A</u>
MPLE INFORMATION	SAMPLE I.D NO	O. MWF	TA-20	
	WATER ☐ SOIL	_	☐ SLUDGE ☐ C	THER (LIST)
		MPOSITE	OTHER (LIST)	
	YES 🖾 NO		UNKNOWN	
CONT	AINER	NUMBER	PRESERVATIVE/ PREPARATION	COMMENTS
TYPE	VOLUME			VOCs by SW8260B
VOA VIAL	40 ml	3	Cool to 4°C ****	Methane, Ethane &
VOA VIAL	40 ml	3	Cool to 4°C	Ethene by RSK175
VOA VIAL	40 ml	3	H ₂ SO ₄ to pH<2, Cool to 4°C	TOC by SW9060
VOA VIAL	40 ml	2	Cool to 4°C	Carbon Dioxide by RSK175
Poly	500 ml	1	Zn Acetate & NaOH, Coo1 to 4°C	Sulfide by E376.1
Poly	250 ml	1	Cool to 4°C	Alkalınity by E310.1
Poly	250 ml	1	Cool to 4°C	NO ₃ , SO ₄ , & Cl ₂ by E300
Poly	1 Liter	1	HNO ₃ to pH<2, Cool to 4°C	Total Metals by 6010B/7470A/7841
Poly	1 Liter	1	HNO ₃ to pH<2; Cool to 4°C	Dissolved Metals by 6010B/7470A/7841
VOA VIAL	20 ml	1	None	Hydrogen by AM 20
Lower aquifer we			s collected w/o HCl -	
PARAMETER	R EQUI	PMENT I.D.	RESULTS (UNITS	COMMENTS
COMMENTS (WEL	L PURGING VOLUME		CHED TABLE EARANCE, ODOR, COLOR	R, ETC.)
	MEATUED	AART S	AIR AIR	TEMPERATURE6ο΄5
GENERAL INFORMAT		fort 5		<u> </u>
SAMPLES SHIPPEI SPECIAL HANDLIN	D TO: <u>STL - North Cant</u> G [.] <u>FedEx</u>	on, Ohio/Micros	eeps - Pittsburgh, PA	
MODE OF SHIPME		uck []BUS ⊠PLAN	E COMMERCIAL VE
QA/QC	al.	11		VED BY. Dan V-

JOB No. <u>12001-2-0</u>	701
JOB NAME_DSCR	- MNA OU7
DATE inhalia	TIME _1300
SAMPLING POINT	: MWFTA-20
DEPTH	

				DEPTH	
TION	SAMPLE I.D. NO	MWF	rA-20P		*
			☐ SLUDGE	OTHE	R (LIST)
			OTHER (LIST	Г)	
					
				TIVE/	COMMENTS
	VOLUME	NOWREK	PREPARA	TION	COMMENTS
	40 ml	3	HCI to pH<2, C	ool to 4°C	VOCs by SW8260B
	<u> </u>				
MENTS]				
IETER	EQUIP	MENT I.D	RESULTS	(UNITS)	COMMENTS
Ά		N/A	N	/A	N/A
(WELL PURG	ING VOLUME:	SAMPLE APPE	ARANCE; ODOR,	COLOR, ET	C)
RMATION	WEATHER_	pagi	SNA	AIR TEMP	PERATURE
IPPED TO SI	L-North Canton,	Ohio / Microse	eps – Pittsburg, P	Α	
IDLING FedE	х				
IPMENT	☐ CAR/TRU	ick E]BUS [⊠ PLANE	COMMERCIAL VEHIC
		0 1			
	- Att	J. E.J.	SAMPLING (OBSERVED I	BY: Dow Vr
CIES					
	WELL PURGI	WATER SOIL GRAB COM YES NO CONTAINER VOLUME 40 ml WELL PURGING VOLUME: S MENTS METER EQUIP (WELL PURGING VOLUME: S MENTS A (WELL PURGING VOLUME: S DIPPED TO STL-North Canton, SIDLING FEEEX IPMENT CAR/TRU LECTED BY A LECTED	WATER SOIL GRAB COMPOSITE YES NO CONTAINER NUMBER 40 ml 3 WELL PURGING VOLUME SAMPLE APPEA MENTS METER EQUIPMENT I.D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT I.D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A A N/A (WELL PURGING VOLUME: SAMPLE APPEA BETER EQUIPMENT D A N/A A	WATER SOIL SLUDGE GRAB COMPOSITE OTHER (LIST YES NO UNKNOWN CONTAINER NUMBER PREPARA VOLUME PRESERVA 40 ml 3 HCl to pH<2, Cl 40 ml 3 HCl to pH<2, Cl WELL PURGING VOLUME: SAMPLE APPEARANCE; ODOR, MENTS METER EQUIPMENT I.D RESULTS YA N/A N (WELL PURGING VOLUME: SAMPLE APPEARANCE; ODOR, MENTS) WELL PURGING VOLUME: SAMPLE APPEARANCE; ODOR, MENTS YA N/A N (WELL PURGING VOLUME: SAMPLE APPEARANCE; ODOR, MENTS) IPPED TO STL-North Canton, Ohio / Microseeps — Pittsburg, P. JULING FedEx IPMENT CAR/TRUCK BUS LECTED BY: A JULIA SAMPLING C	MATER SOIL SLUDGE OTHER GRAB COMPOSITE OTHER (LIST) YES NO UNKNOWN CONTAINER NUMBER PRESERVATIVE/ PREPARATION 40 ml 3 HCl to pH<2, Cool to 4°C MENTS METER EQUIPMENT LD RESULTS (UNITS) A N/A N/A (WELL PURGING VOLUME: SAMPLE APPEARANCE; ODOR, COLOR, ETC MENTS METER EQUIPMENT LD RESULTS (UNITS) A N/A N/A (WELL PURGING VOLUME: SAMPLE APPEARANCE; ODOR, COLOR, ETC MENTS METER EQUIPMENT LD RESULTS (UNITS) A N/A N/A (WELL PURGING VOLUME: SAMPLE APPEARANCE; ODOR, COLOR, ETC MENTS METER EQUIPMENT LD RESULTS (UNITS) A N/A N/A MICROSCEPS — PIttsburg, PA MICROSCEPS — PITTSBUR

JOB No 12001-2-0701

JOB NAME DSCR MNA - OU 7

DATE _______ TIME ______ TIME _______

SAMPLING POINT _______ MWFTA-20

(LOCATION)

DEPTH N/A

			DEPTH	N/A
AMPLE INFORMATIO	N SAMPLE I.D NO	D.: MWFT	ADDA	
] WATER ☐ SOIL			HER (LIST)
	GRAB ☐ COM	POSITE	OTHER (LIST)	
	YES NO		UNKNOWN	
	TAINER	NUMBER	PRESERVATIVE/	COMMENTS
TYPE	VOLUME		PREPARATION	
VOA VIAL	40 ml	3	Cool to 4°C ****	VOCs by SW8260B Methane, Ethane &
VOA VIAL	40 mi	3	Cool to 4°C	Ethene by RSK175
VOA VIAL	40 ml	3	H₂SO₄ to pH<2, Cool to 4°C	TOC by SW9060
VOA VIAL	40 ml	2	Cool to 4°C	Carbon Dioxide by RSK175
Poly	500 ml	1	Zn Acetate & NaOH, Coo1 to 4°C	Sulfide by E376.1
Poly	250 ml	1	Cool to 4°C	Alkalinity by E310.1
Poly	250 ml	1	Cool to 4°C	NO ₃ , SO ₄ , & Cl ₂ by E300
Poly	1 Liter	1	HNO ₃ to pH<2; Cool to 4°C	Total Metals by 6010B/7470A/7841
Poly	1 Liter	1	HNO ₃ to pH<2; Cool to 4°C	Dissolved Metals by 6010B/7470A/7841
FIELD MEASUREMEN	ITS			
PARAMETE	R EQUIF	PMENT I.D	RESULTS (UNITS)	COMMENTS
COMMENTS. (WE	LL PURGING VOLUME	SEE ATTACI	HED TABLE ARANCE; ODOR, COLOR,	ETC.)
GENERAL INFORMA	TION WEATHER	िसंदर्	AIR TE	MPERATUREb0's
SAMPLES SHIPPE SPECIAL HANDLIN	D TO: <u>CEMRD – Omaha</u> NG: <u>FedEx</u>	, Nebraska ,		
MODE OF SHIPME	<u> </u>	JCK [BUS PLANE	COMMERCIAL VEH
QA/QC		. 11	1	10 11
SAMPLE COLLECT		W. Engl	SAMPLING OBSERVE	DBY: Da Von

JOB No. 12001-2-0701

JOB NAME DSCR MNA - OU 7

DATE ______TIME _____SCU

SAMPLING POINT _MW FTA >>>
(LOCATION)

			DEPTH	N/A
AMPLE INFORMATION	SAMPLE I D. N	10: 047I	UP-3	
	——J WATER □ SO			HER (LIST)
	—	MPOSITE	OTHER (LIST)	
	YES NO		UNKNOWN	_
	AINER	NUMBER	PRESERVATIVE/	COMMENTS
TYPE	VOLUME		PREPARATION	
VOA VIAL	40 ml	3	Cool to 4°C ****	VOCs by SW8260B Methane, Ethane &
VOA VIAL	40 ml	3	Cool to 4°C	Ethene by RSK175
VOA VIAL	40 ml	3	H₂SO₄ to pH<2, Cool to 4°C	TOC by SW9060
VOA VIAL	40 mi	2	Cool to 4°C	Carbon Dioxide by RSK175
Poly	500 ml	1	Zn Acetate & NaOH; Coo1 to 4°C	Sulfide by E376 1
Poly	250 ml	1	Cool to 4°C	Alkalinity by E310.1
Poly	250 ml	1	Cool to 4°C	NO ₃ , SO ₄ , & Cl ₂ by E300
Poly	1 Liter	1	HNO ₃ to pH<2, Cool to	Total Metals by 6010B/7470A/7841
Poly	1 Liter	1	HNO ₃ to pH<2; Cool to	Dissolved Metals by 6010B/7470A/7841
VOA VIAL	20 ml	1	None	Hydrogen by AM 20
FIELD MEASUREMEN	TS		s collected w/o HCl - 7	
PARAMETE	R EQU	IPMENT I.D.	RESULTS (UNITS)	COMMENTS
COMMENTS (WE	LL PURGING VOLUME		HED TABLE EARANCE, ODOR, COLOR,	ETC)
				THE TANK
GENERAL INFORMA	TION WEATHER	R PARTS	AIR TE	EMPERATURE60.5
	D TO: STL - North Can	ton, Ohio/Micros	eeps - Pittsburgh, PA	
SPECIAL HANDLIN MODE OF SHIPME		RUCK []BUS ⊠ PLANE	☐ COMMERCIAL VE
QA/QC	1	. 1		
SAMPLE COLLECT	J	1 Engla	SAMPLING OBSERVE	ED BY. Dan Ve

					WELL	WELL רטמטוויט	פינורה ייטיביי		,					710-1
Location DSCR.	DSCR.		Site Name		Identify Measuring Point (MP): (eg Top of Casing)	ring Poin ing)	it (MP): _	725					Best Available Copy	704
Well ID. Field San	npling Pe	Well ID. Field Sampling Personnel:	MVJFTA-20 II THAY EAULWAT		Depth to Screen below MP: Pump Intake at (ft. below MP): Purging Device (Pump Type):	n below it (ft. below) (Pump	; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	Top Top	of screen	Bottom	of screen			474
Date	Time	Depth to Water Below MP	• ——	Purge Rate	Purge Rate Cum. Volume Purged C. 1.C.	Temp.	Spec Cond. m3[_m	pH pH Units	DO Flow Cell mg/L	DO Hech Test Kit mg/L (nigh) (low)	Ferrous I Iron mg/L	Redox Potential		Sì
क्रीरोठा	11 7 7	23.51		001			G.211	159	13.61	+		(07	8.2	
	3 3	16:57		<i>O</i> Ø1		16.21	0.216	7.22	۲ × ۲ × ۲ × × × × × × × × × × × × × × ×	-	-	<u> </u>	9 57 7	
	5211	26.22		242			K17 0	ार प्र	42.5	-	-	30	12.b	
	1150	34.42		226		16 82 17 15	217-0	9.84	14.1			2 2	2-11	
	17.10	26.56 26.64		9 7			6.2.9	01.10	3.55	_ _ c	7	× ×	10 9 STANDARY STANDED	41366
	1230	F4 42		7.6		a5. []	317-0	5	? ? ?			<u> </u>	7	16 (200
	1300													
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JOB No <u>12001-2-0701</u>
JOB NAME DSCR - MNA OU7
DATE 10/10-102 TIME 1315
SAMPLING POINT: MWFTA-23
DEPTH

				DEP III	
MPLE INFORMATION	SAMPLE I.D. NO	D. MWF	TA - 23		
	VATER ☐ SOIL		SLUDGE		R (LIST)
	GRAB COM	MPOSITE	OTHER (LIST)		
HAZARDOUS?:			UNKNOWN		
CONTA		NUMBER	PRESERVAT PREPARAT		COMMENTS
VOA VIAL	40 ml	3	HCI to pH<2, Co	ol to 4°C	VOCs by SW8260B
VOA VIAL	40 ml	3	HCI to pH<2, Co	ol to 4°C	Methane, ethane, ethene by RSK-175
VOA VIAL	40 ml	3	H₂SO₄ to pH<2,C	ool to 4°C	TOC by SW9060
VOA VIAL	40 ml	2	Cool to 4°	·C	CO₂ by RSK-175
Poly	500 ml	1	ZnAc & NaOH, Co	ool to 4°C	Sulfide by E376.1
Poly	· 250 ml	1	Cool to 4	°C	Alkalinity by E310.1
Poly	250 ml	1 1	Cool to 4	°C	NO ₃ , SO ₄ , CI by E300.0
Poly	1 L	1	HNO ₃ to pH<2, C	Cool to 4°C	Tot. Metals by 6010B,7470A,7841
Poly	1 L	1	HNO ₃ to pH<2, C	Cool to 4°C	Dis. Metals by 6010B,7470A,7841
VOA VIAL	20 ml	1	None	 	Hydrogen by AM 20
COMMENTS (WELL	PURGING VOLUME:	SAMPLE APPEA	ARANCE: ODOR; C	OLOR, ETC	S.)
4 GAL PURGED					
	<u> </u>				
IELD MEASUREMENT	e				
		·			COMMENTS
PARAMETER	EQUIF	PMENT I.D.	RESULTS	(UNITS)	COMMENTS
N/A		N/A	N/A	\	N/A
COMMENTS (WELL	PURGING VOLUME	SAMPLE APPE	ARANCE; ODOR, O	COLOR, ET	C.)
GENERAL INFORMATI	ON WEATHER	CLOUDY		AIR TEM	PERATURE 63'5
CAMPLES SUIDDED	TO STL-North Cantor	n Ohio / Microse	ens – Pittsbura, PA		
SPECIAL HANDLING		.,			
MODE OF SHIPMEN		uck r] BUS	PLANE	COMMERCIAL VEHIC
	T GONTON				
SAMPLE COLLECTE		11			BY:

Location DSCR	DSCR.	<u> </u>	Site Name		Identify Measuring Point (eg. Top of Casing)	ring Poin sing)	t (MP):	705						704
Well ID:		AM	MWPTB-23		Depth to Screen below MP:	n below	MP:	Top	of screen	Bottom	of screen		Best Available Copy	47
Field Sa	Field Sampling Personnel'	ersonnel'	TONY GUGLUND DAN VASSER	Q/Y	Pump Intake at (ft. below MP): Purging Device (Pump Type):	t (ft. beloi e (Pump]		B.4906R	~					76
Date	Time	Depth to	Pump Diat	Purge Rate	ડિ	Temp.	Spec	£	DO Flow Cell	DO Hech Test Kir	Ferrous	Redox Potential	TALB Comments	
		Water Below MP	Setting (1)		Sed ungen			Shu Units		mg/L (high) (low)	1	ΑE	NTW	
-	24 hr	2		e e e	WICH A					ļ 	<u> </u>		REGIV PUBLING	
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	1050	H-98		100		93 7		78.5	27.			17.	53.3	
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	2111	11.98		100		F - 5	┪	87.4	1:5			7	500	
	1125	11.98		100		19.91	0 -2 VB	4,98	5.06			2	2 8 2	
	5	11.98		100		19.45	342-0	20.5	5.70			70	54.5	
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	0 5	g :-		5		14.56	0.239	5.05	5.91			-	P.8.4	
	002	25.17				1	3 1 6	41.7	P1.9			- P8	0.24	
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JOB No. 12001-2-0701

JOB NAME DSCR MNA - OU 7

DATE 102 102 TIME 1109

SAMPLING POINT MWFTH 28.33

(LOCATION)

			DEPTI	H <u>N/A</u>
SAMPLE INFORMATION	SAMPLE I.D NO	MWF	TA-28B	
MATERIAL.	WATER SOIL		SLUDGE 0	THER (LIST)
TYPE:	GRAB COM	POSITE	OTHER (LIST)	
HAZARDOUS?:	YES 🖾 NO		UNKNOWN	
CONT	AINER	NUMBER	PRESERVATIVE/	COMMENTS
TYPE	VOLUME	NONBER	PREPARATION	
VOA VIAL	40 ml	3	Cool to 4°C ****	VOCs by SW8260B
VOA VIAL	40 ml	3	Cool to 4°C	Methane, Ethane & Ethene by RSK175
VOA VIAL	40 ml	3	H₂SO₄ to pH<2, Cool to 4°C	TOC by SW9060
VOA VIAL	40 ml	2	Cool to 4°C	Carbon Dioxide by RSK175
Poly	500 ml	1	Zn Acetate & NaOH; Coo1 to 4°C	Sulfide by E376.1
Poly	250 ml	1	Cool to 4°C	Alkalinity by E310.1
Poly	250 ml	1	Cool to 4°C	NO ₃ , SO ₄ , & Cl ₂ by E300
Poly	1 Liter	1	HNO ₃ to pH<2; Cool to 4°C	Total Metals by 6010B/7470A/7841
Poly	1 Liter	1	HNO ₃ to pH<2; Cool to	Dissolved Metals by 6010B/7470A/7841
VOA VIAL	20 ml	1	None	Hydrogen by AM 20
Lower aguifer we	ell - VOCs and disso ೧೬೮೯೧		ARANCE, ODOR; COLOR, I s collected w/o HCI - 7	
FIELD MEASUREMEN	TS			
PARAMETER	R EQUIP	MENT I D.	RESULTS (UNITS)	COMMENTS
COMMENTS (WEL	L PURGING VOLUME	SEE ATTACH	HED TABLE ARANCE; ODOR, COLOR,	ETC.)
				1.10
GENERAL INFORMAT	WEATHER_	RAW	AIR TE	MPERATURE
1	O TO: STL - North Cantor	n, Ohio/Microsei	eps - Pittsburgh, PA	
SPECIAL HANDLING			I DI LO STOLANT	COMMERCIAL VEHI
MODE OF SHIPME	NT CAR/TRU	CK L	BUS 🛛 PLANE	COMMERCIAL VERI
SAMPLE COLLECT DISCREPANCIES:	ED BY. Anth	1. E. J.S.	SAMPLING OBSERVE	DBY jen Win

Location DSCR	DSCR.		Site Name		Identify Measuring Point (MP): (eg Top of Casing)	ırlng Poir sing)	ıt (MP):	Ä					70
Well ID.		W/V/	MMFFA-2-4B		Depth to Screen below MP:	en below	MP:	Top	of screen _	Bottom	of screen	-	
	rieid Sampling Personnel		TONY BALLHAMD	GAAAD C	Pump Intake at (ft. below MP). Purging Device (Pump Type):	it (ft. belo e (Pump		Kunnaka	7) H
Date	Time	Depth to	Pump Dial	Purge Rate	Purge Rate Cum. Volume Temp.	Temp.	Spec Cond.	Hd	DO Flow Catl	DO Hach Test Kit	Ferrous	Redox Potential	TOARIBITY COMMENS
		Water Below MP	seming (1)	m /min	1 1 1 1 1 1 1 1 1 1	deg C	E	pH Units		mg/L (high) (low)	mg/L	λE	<i>/</i> /*すど/
-	┵	2											\$24. 17. 12. 12. 12. 12. 12. 12. 12. 12. 12. 12
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	016.	۲۰ ۱۲		2 2			3.76	P.S.4	14-1			-95	26.0
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	2000	3 5		9			0.135	८ ५८	دری ۰۲			-120	Shil
	0 0 0 0 0	3		2		11.11	2.123	7-01	31.1			1111	1,54
	0250	31.7											
	03,70						100	7.7.6	54.4			240	1.47
	C.135	רצ רו		57		1	97.5	1	5			7	14.5
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JOB No. <u>12001-2-0701</u>
JOB NAME DSCR - MNA OU7
DATE 10-17-02 TIME 1445
SAMPLING POINT: MWFTA 29B
DEPTH

				DEPTH_	
MPLE INFORMAT	TION	SAMPLE I D NO	D.: MWFT	1-298	
MATERIAL:	⊠ WAT	ER SOIL		☐ SLUDGE ☐ OTH	ER (LIST)
TYPE:	⊠ GRA		POSITE	OTHER (LIST)	
HAZARDOUS?.	☐ YES	<u> </u>		UNKNOWN	
	ONTAINE		NUMBER	PRESERVATIVE/	COMMENTS
TYPE		VOLUME	NOMBER	PREPARATION	
VOA VIAL		40 ml	9	Cool to 4°C	VOCs by SW8260B Methane, ethane, ethene
VOA VIAL		40 ml	3	Cool to 4°C	by RSK-175
VOA VIAL		40 ml	9	H₂SO₄ to pH<2,Cool to 4°C	
VOA VIAL		40 ml	2	Cool to 4°C	CO₂ by RSK-175
Poly		500 ml	3	ZnAc & NaOH, Cool to 4°C	Sulfide by E376 1
Poly		250 ml	3	Cool to 4°C	Alkalinity by E310.1
Poly		250 ml	3	Cool to 4°C	NO ₃ , SO ₄ , Cl by E300.0
Poly		1 L	1	HNO ₃ to pH<2, Cool to 4°C	Tot Metals by 6010B,7470A,7841
,		1 L	1	HNO ₃ to pH<2, Cool to 4°C	Dis Metals by 6010B,7470A,7841
Poly	i	· —			
Poly VOA VIAL COMMENTS: (\) Lower aquife	 WELL PUF	20 ml RGING VOLUME: \$	SAMPLE APPE	None ARANCE; ODOR; COLOR, ET s collected w/o HCl - 7 [Hydrogen by AM 20 TC) Day Hold Time!!!
VOA VIAL COMMENTS: (\ Lower aquife	WELL PUF	20 ml RGING VOLUME: \$	 SAMPLE APPE/	None ARANCE; ODOR; COLOR, ET	(C)
VOA VIAL COMMENTS: (\ Lower aquife	WELL PUR er well - '	20 ml RGING VOLUME: S VOCs and diss	SAMPLE APPEA	None ARANCE; ODOR; COLOR, ET s collected w/o HCl - 7 [(C)
VOA VIAL COMMENTS: (\ Lower aquife	WELL PUR er well - '	20 ml RGING VOLUME: S VOCs and diss	 SAMPLE APPE/	None ARANCE; ODOR; COLOR, ET	COMMENTS
VOA VIAL COMMENTS: (\ Lower aquife	WELL PUR er well - ' MENTS	20 ml RGING VOLUME: S VOCs and diss	SAMPLE APPEA	None ARANCE; ODOR; COLOR, ET s collected w/o HCl - 7 [Oay Hold Time!!!
VOA VIAL COMMENTS: (\ Lower aquife FIELD MEASURE PARAM	WELL PUR er well - Y MENTS METER	20 ml RGING VOLUME: S VOCs and disse	SAMPLE APPEA olved gasses PMENT I.D N/A	None ARANCE; ODOR; COLOR, ET S collected w/o HCl - 7 [RESULTS (UNITS)	COMMENTS N/A
VOA VIAL COMMENTS: (\(\) Lower aquife FIELD MEASURE PARAM N/ COMMENTS: (\)	WELL PURER WEIL - YENER	20 ml RGING VOLUME: S VOCs and disserted the second	SAMPLE APPEA OIVED GASSES PMENT I.D N/A SAMPLE APPEA	None ARANCE; ODOR; COLOR, ET S collected w/o HCl - 7 [RESULTS (UNITS) N/A EARANCE, ODOR, COLOR, E	COMMENTS N/A
VOA VIAL COMMENTS: (\(\) Lower aquife FIELD MEASURE PARAM N/ COMMENTS: (\)	WELL PURE MENTS METER (A (WELL PURE MATION)	20 ml RGING VOLUME: S VOCs and disserted to the second sec	PMENT I.D N/A SAMPLE APPE	None ARANCE; ODOR; COLOR, ET S collected w/o HCl - 7 [RESULTS (UNITS) N/A EARANCE, ODOR, COLOR, E	COMMENTS N/A
VOA VIAL COMMENTS: (\(\) Lower aquife FIELD MEASURE PARAM N/A COMMENTS: (\) GENERAL INFORMATION SAMPLES SHIP	WELL PURE MENTS METER (WELL PURE MATION IPPED TO	20 ml RGING VOLUME: S VOCs and dissert EQUIF URGING VOLUME WEATHER	PMENT I.D N/A SAMPLE APPE	None ARANCE; ODOR; COLOR, ET S collected w/o HCl - 7 [RESULTS (UNITS) N/A EARANCE, ODOR, COLOR, E	COMMENTS N/A
VOA VIAL COMMENTS: (\(\) Lower aquife FIELD MEASURE PARAM N/ COMMENTS: (\) GENERAL INFORM SAMPLES SHI SPECIAL HAN	WELL PUR EMENTS METER (WELL PUR RMATION HPPED TO	20 ml RGING VOLUME: S VOCs and dissert EQUIF PRESIDENT VOLUME WEATHER PRESIDENT STL-North Canton edex	PMENT I.D N/A SAMPLE APPE (loudy n, Ohio / Microse	None ARANCE; ODOR; COLOR, ET S collected w/o HCl - 7 [RESULTS (UNITS) N/A EARANCE, ODOR, COLOR, E AIR TEN Peeps - Pittsburg, PA	COMMENTS N/A TC) MPERATURE GO
VOA VIAL COMMENTS: (\(\) Lower aquife FIELD MEASURE PARAM N/A COMMENTS: (\) GENERAL INFORMATION SAMPLES SHIP	WELL PUR EMENTS METER (WELL PUR RMATION HPPED TO	20 ml RGING VOLUME: S VOCs and dissert EQUIF URGING VOLUME WEATHER	PMENT I.D N/A SAMPLE APPE (loudy n, Ohio / Microse	None ARANCE; ODOR; COLOR, ET S collected w/o HCl - 7 [RESULTS (UNITS) N/A EARANCE, ODOR, COLOR, E	COMMENTS N/A TC) MPERATURE GO
VOA VIAL COMMENTS: (V Lower aquife PARAM N/ COMMENTS: (V GENERAL INFORM SAMPLES SHI SPECIAL HAN	WELL PUR EMENTS METER (WELL PUR RMATION HPPED TO	20 ml RGING VOLUME: S VOCs and dissert EQUIF PRESIDENT VOLUME WEATHER PRESIDENT STL-North Canton edex	PMENT I.D N/A SAMPLE APPE (loudy n, Ohio / Microse	None ARANCE; ODOR; COLOR, ET S collected w/o HCl - 7 [RESULTS (UNITS) N/A ARANCE, ODOR, COLOR, E AIR TEN Peeps - Pittsburg, PA BUS PLANE	COMMENTS N/A TC) COMMENTS N/A CTC) COMMERCIAL VEHI
COMMENTS: (VELOWER AQUITED MEASURE) PARAM N/A COMMENTS: (VELOWER AQUITED MEASURE) PARAM N/A COMMENTS: (VELOWER AQUITED MEASURE) SAMPLES SHIP SPECIAL HAN MODE OF SHIP QA/QC	WELL PURER WEIL - YA WELL PURENTS WELL PURENT TO NOLING FOR HIPMENT	20 ml RGING VOLUME: S VOCs and dissert EQUIF PRESIDENT VOLUME WEATHER PRESIDENT STL-North Canton edex	PMENT I.D N/A SAMPLE APPE Cloudy D, Ohio / Microse UCK	None ARANCE; ODOR; COLOR, ET S collected w/o HCl - 7 [RESULTS (UNITS) N/A ARANCE, ODOR, COLOR, E AIR TEN Peeps - Pittsburg, PA BUS PLANE	COMMENTS N/A

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Location DSCR	DSCR.	`	Site Name		Identify Measuring Point (MP): (eg. Top of Casing)	ring Point ing)	:(MP):							70
Well ID. Field San	npling Pe	well ID. Field Sampling Personnel:	1917 293	53	Depth to Screen below MP: Pump Intake at (ff. below MP); Purging Device (Pump Type).	n below h (ft. below i (Pump T	1 ! !	Top	of screen	Bottom	of screen		Best Available Copy	4 480
Date	Time	Depth to	Pump Dial	Purge Rate	Purge Rate Cum. Volume	Temp.	Spec Cond.	H.	DO Flow Cell	DO Hach Test Kit	Ferrous	Redox Potential	Comments	
	_	Water Below MP	Setting (1)				umhos/cm pH Units			mg/L (high) (low)	mg/L	Æ	To16	
	11	L_		TIME OF STREET		1782	1 79 1	<u> </u>	\$ \$ 2			-73	25.7	
Cilic		50.12	, yd 5,			K 05	╁╼═╂	┞┈┤	L12			T .		
į	2 5			09		X/ X/	177		255	1		1,2	2 3)	
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JOB No. 12001-2-0701

JOB NAME DSCR MNA – OU 7

DATE // - / 6 TIME // 50

SAMPLING POINT MWFTA - (

(LOCATION)

DEPTH N/A

,			(LOC	ATION)
			DEPTH	N/A
MPLE INFORMATION	SAMPLE I.D NO).: MWF	7A-1	
MATERIAL.	 WATER ☐ SOIL			HER (LIST)
	_	POSITE	OTHER (LIST)	
	YES NO		UNKNOWN	
	AINER	AUMADED	PRESERVATIVE/	COMMENTS
TYPE	VOLUME	NUMBER	PREPARATION	COMMENTS
VOA VIAL	40 ml	9	HCl to pH<2, Cool to 4°C	VOCs by SW8260B
VOA VIAL	40 ml	3	HCI to pH<2, Cool to 4°C	Methane, Ethane & Ethene by RSK175
VOA VIAL	40 ml	9	H₂SO₄ to pH<2, Cool to 4°C	TOC by SW9060
VOA VIAL	40 ml	2	Cool to 4°C	Carbon Dioxide by RSK175
Amber Glass	1 Liter	6	Cool to 4°C	PAHs by 8270 SIM
Amber Glass	1 Liter	6	Cool to 4°C	PCBs by 8082
Poly	500 ml	3	Zn Acetate & NaOH; Coo1 to 4°C	Sulfide by E376.1
Poly	250 ml	3	Cool to 4°C	Alkalinity by E310.1
Poly	250 ml	3	Cool to 4°C	NO ₃ , SO ₄ , & Cl ₂ by E300
Poly	1 Liter	1	HNO ₃ to pH<2, Cool to 4°C	Total Metals by 6010B/7470A/7841
Poly	1 Liter	1	HNO ₃ to pH<2; Cool to 4°C	Dissolved Metals by 6010B/7470A/7841
VOA VIAL	20 ml	1	None	Hydrogen by AM 20
FIELD MEASUREMEN		sampling	. Il gal tota	
PARAMETER	R EQUIP	MENT I D	RESULTS (UNITS)	COMMENTS
COMMENTS (WEL	L PURGING VOLUME	SEE ATTACK	HED TABLE ARANCE, ODOR, COLOR, E 5 trong sulf:	etc.)
jale yell	6W (010Y - C.1	eur -	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	46 6461
GENERAL INFORMAT	ION WEATHER	Col-Ro	un, Light AIRTE	MPERATURE $ u$ 55-6
SPECIAL HANDLING				
MODE OF SHIPME	NT. CAR/TRU	CK _	BUS PLANE	COMMERCIAL VEH
SAMPLE COLLECT DISCREPANCIES.	ED BY J. Karan	l_	SAMPLING OBSERVE	DBY: C. C. Conk

JOB No. 12001-2-0701

JOB NAME DSCR MNA - OU 7

DATE _O/17/02 TIME /330

SAMPLING POINT_YNWFTA-3

(LOCATION)

DEPTH N/A

			DEPTH	N/A
AMPLE INFORMATION	SAMPLEID	D. NO ·	MWFTA	- 3
		SOIL	SLUDGE OTH	HER (LIST)
		COMPOSITE	OTHER (LIST)	
	YES 🖾		UNKNOWN	
	TAINER		PRESERVATIVE/	COMMENTS
TYPE	VOLUME	NUMBER	PREPARATION	CONNICTIO
VOA VIAL	40 ml	3	HCl to pH<2, Cool to 4°C	VOCs by SW8260B
VOA VIAL	40 ml	3	HCl to pH<2, Cool to 4°C	Methane, Ethane & Ethene by RSK175
VOA VIAL	40 ml	3	H₂SO₄ to pH<2, Cool to 4°C	TOC by SW9060
VOA VIAL	40 ml	2	Cool to 4°C	Carbon Dioxide by RSK175
Amber Glass	1 Liter	2	Cool to 4°C	PAHs by 8270 SIM
Amber Glass	1 Liter	2	Cool to 4°C	PCBs by 8082
Poly	500 ml	1	Zn Acetate & NaOH, Coo1 to 4°C	Sulfide by E376.1
Poly	250 ml	1	Cool to 4°C	Alkalinity by E310.1
Poly	250 ml	1	Cool to 4°C	NO ₃ , SO ₄ , & Cl₂ by E300
Poly	1 Liter	1	HNO ₃ to pH<2, Cool to 4°C	Total Metals by 6010B/7470A/7841
Poly	1 Liter	1	HNO ₃ to pH<2; Cool to 4°C	Dissolved Metals by 6010B/7470A/7841
VOA VIAL	20 ml	1 1	None	Hydrogen by AM 20
FIELD MEASUREMEN	rolorless			
PARAMETE	R E	QUIPMENT I.D.	RESULTS (UNITS)	COMMENTS
COMMENTS. (WEI	L PURGING VOLUI	SEE ATTACH	HED TABLE ARANCE; ODOR; COLOR, E	eTC.)
3 GALS PU				
GENERAL INFORMA	TION WEATH	IER increasing clo	uds, cooling AIRTE	MPERATURE <u>~ 55-60</u> ~ 65-70°
SAMPLES SHIPPE SPECIAL HANDLIN	D TO STL - North C			
MODE OF SHIPME	_	TRUCK [BUS PLANE	COMMERCIAL VEHI
QA/QC				01/ 1
SAMPLE COLLECT	red by: <u>C. C.lu</u>	<u> </u>	SAMPLING OBSERVE	DBY: // haul

JOB NAME DSCR MNA - OU 7

DATE 10/17/02 TIME 13:30

SAMPLING POINT MW FTA-3

(LOCATION)

DEPTH N/A

			DEPTH !	N/A
MPLE INFORMATION	SAMPLE I.D. NO	D.: MW 1	ETA-3QA	
	WATER ☐ SOIL		SLUDGE OTH	HER (LIST)
=		IPOSITE	OTHER (LIST)	
		00.12		
			PRESERVATIVE/	COMMENTS
TYPE	VOLUME	NUMBER	PREPARATION	COMMENTS
VOA VIAL	40 ml	3	HCl to pH<2, Cool to 4°C	VOCs by SW8260B
VOA VIAL	40 ml	3	HCI to pH<2, Cool to 4°C	Methane, Ethane & Ethene by RSK175
VOA VIAL	40 ml	3	H₂SO₄ to pH<2, Cool to 4°C	TOC by SW9060
VOA VIAL	40 ml	2	Cool to 4°C	Carbon Dioxide by RSK175
Amber Glass	1 Liter	2	Cool to 4°C	PAHs by 8270 SIM
Amber Glass	1 Liter	2	Cool to 4°C	PCBs by 8082
Poly	500 ml	1	Zn Acetate & NaOH, Coo1 to 4°C	Sulfide by E376.1
Poly	250 ml	1	Cool to 4°C	Alkalinity by E310.1
Poly	250 ml	1	Cool to 4°C	NO ₃ , SO ₄ , & Cl ₂ by E300
Poly	1 Liter	1	HNO ₃ to pH<2, Cool to 4°C	Total Metals by 6010B/7470A/7841
Poly	1 Liter	1	HNO ₃ to pH<2; Cool to 4°C	Dissolved Metals by 6010B/7470A/7841
	clear, color			
FIELD MEASUREMEN	TS	. <u> </u>		COMMENTS
PARAMETE	R EQUI	PMENT I.D.	RESULTS (UNITS)	COMMENTS
COMMENTS (WEL	L PURGING VOLUME	SEE ATTAC	EHED TABLE EARANCE; ODOR, COLOR,	ETC)
3 645 PUR	SED			
GENERAL INFORMA	TION WEATHER	Increasing	clouds, roding AIR TE	MPERATURE _ ル 65 - ス
SAMPLES SHIPPE SPECIAL HANDLIN	D TO: <u>CEMRD – Omah</u> IG [.] <u>FedEx</u>	a, Nebraska		☐ COMMERCIAL VEHI
MODE OF SHIPME	NT: CAR/TR	RUCK [☐ BUS ☐ PLANE	LI CONNINERCIAL VETT
QA/QC	P C Cl	. L	SAMPLING OBSERVE	DBY & Maul
	red by: <u>B. C. Clui</u>	-	SAIVIFLING OBSERVE	
DISCREPANCIES:				

JOB No. 12001-2-0701

JOB NAME DSCR MNA - OU 7

DATE MO/17/02 TIME / 3.00

SAMPLING POINT MW FTA-3

(LOCATION)

DEPTH N/A

				DEPTH	N/A
AMPLE INFORMAT	ION S	AMPLE I.D. NO	ofuo	UP-2	
MATERIAL:					HER (LIST)
TYPE.	⊠ GRAB		POSITE	OTHER (LIST)	
HAZARDOUS?:	☐ YES	— ⊠ NO		UNKNOWN	_
	ONTAINER		NUMBER	PRESERVATIVE/	COMMENTS
TYPE		OLUME	NOWBER	PREPARATION	
VOA VIAL		40 ml	3	HCI to pH<2, Cool to 4°C	VOCs by SW8260B
VOA VIAL		40 ml	3	HCl to pH<2, Cool to 4°C	Methane, Ethane & Ethene by RSK175
VOA VIAL		40 ml	3	H ₂ SO ₄ to pH<2, Cool to 4°C	TOC by SW9060
VOA VIAL		40 ml	2	Cool to 4°C	Carbon Dioxide by RSK175
Amber Glass		1 Liter	2	Cool to 4°C	PAHs by 8270 SIM
Amber Glass		1 Liter	2	Cool to 4°C	PCBs by 8082
Poly		500 ml	1	Zn Acetate & NaOH, Coo1 to 4°C	Sulfide by E376 1
Poly		250 ml	1	Cool to 4°C	Alkalinity by E310.1
Poly		250 ml	1	Cool to 4°C	NO ₃ , SO ₄ , & Cl ₂ by E300
Poly		1 Liter	1	HNO ₃ to pH<2, Cool to 4°C	Total Metals by 6010B/7470A/7841
Poly		1 Liter	1	HNO ₃ to pH<2, Cool to 4°C	Dissolved Metals by 6010B/7470A/7841
VOA VIAL		20 ml	1	None	Hydrogen by AM 20
FIELD MEASUREM		, 10to R.		ide odor	
PARAME	TER	EQUIP	MENT I.D	RESULTS (UNITS)	COMMENTS
COMMENTS			SEE ATTAC	HED TABLE	
COMMENTS (WELL PURGI	NG VOLUME	SAMPLE APPE	ARANCE, ODOR, COLOR,	ETC)
3 64LS		>			
	PURGET	>			ETC) EMPERATURE
うられら GENERAL INFOR SAMPLES SHIF SPECIAL HAND	PPED TO: STO	WEATHER 1	n(veasing ()	eps, Pittsburgh, PA	MPERATURE <u>~ 55-66</u> ~ 65 - 70
多られる GENERAL INFOR SAMPLES SHIF	PPED TO: STO	WEATHER 1	n(veasing ()	ouds, cooling AIR TE	·

TAB

Appendix G

APPENDIX G
MONITORED NATURAL ATTENUATION PARAMETERS

APPENDIX G - MONITORED NATURAL ATTENUATION PARAMETERS

Dissolved Oxygen - DO is the most thermodynamically favored electron acceptor used by microbes for the biodegradation of organic carbon, whether natural or anthropogenic. Anaerobic bacteria which facilitate the reductive dechlorination of VOCs, generally cannot function at DO concentrations greater than 0.5 milligrams per liter (mg/L) and, hence, rates for biotic reductive dechlorination will be greatly reduced under these conditions. DO concentrations in the upper WBU for the October 2002 sampling event ranged from less than 0.1 mg/L (MWFTA-10) to 4.9 mg/L (MWFTA-3) with an average concentration of 0.99 mg/L. However, of 19 monitoring well sampled, only four monitoring wells had a DO concentration above 1 mg/L (MWFTA-1, MWFTA-23, MWFTA-25A, and DMW-27A).

DO concentrations in the lower WBU for the October 2002 sampling event ranged from 1.5 mg/L (MWFTA-28B) to 7.1 mg/L (MWFTA-18). Measured DO concentrations in the upper WBU are generally stable over the four sampling events for the wells measured in the upper WBU and are generally favorable for continued natural attenuation. Lower WBU monitoring wells measured over the four sampling events have DO concentrations that fluctuate and range from favorable to not-favorable for MNA Generally, DO concentrations are favorable for sustaining reductive dechlorination in the upper and range from favorable to not-favorable in the lower WBU at OU 7

The DO concentration detected in MWFTA-20 (fractured bedrock) for the October 2002 sampling event was 3.5 mg/L, which is consistent with historically detected DO concentrations. This falls under the range of favorable to not-favorable for the fractured bedrock.

Nitrate – Nitrate may be used as an electron acceptor for anaerobic biodegradation of organic carbon via denitrification. In order for reductive dechlorination to continue at rates supporting of MNA, nitrate concentrations (measured as nitrate-nitrogen) in the contaminated portion of the aquifer should be less than 1.0 mg/L as N. Nitrate concentrations in the upper WBU for the October 2002 were less than 1 mg/L except for DMW-13A which was 1.4 JB mg/L. The JB flag indicates that this data was qualified as estimated and biased high and for the purposes for this report is considered not detected. Nitrate concentrations for the lower WBU during the October 2002, sampling event are less than 0.1 mg/L. For the fractured bedrock, nitrate has not been detected above the reporting limit. Results for nitrate in monitoring wells sampled in the upper and lower WBUs and the fractured bedrock (MWFTA-20 only) for the four sampling events indicate that nitrate concentrations will not compete with the reductive dechlorination pathway.

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Sulfate - Sulfate may be used as an electron acceptor for anaerobic dechlorination of VOCs This process is termed "sulfate reduction" and results in the production of sulfide. Concentrations of sulfate greater than 20 mg/L may cause competitive exclusion of dechlorination. However, in many plumes with high concentrations of sulfate, reductive dechlorination still occurs. According to analytical test results for the October 2002 sampling event, sulfate concentrations ranged in the upper WBU from 0.53 JQ mg/L (MWFTA-1) to 62.9 mg/L (MWFOS-1) with an average concentration of 19.94 mg/L. For the lower WBU, sulfate concentrations measured during the October 2002 sampling event ranged from 1.2 mg/L in MWFTA-18 to 30.4 in MWFTA-29B. Sulfate concentrations for MWFTA-20 were 4.5 mg/L. Sulfate concentrations over the four sampling events indicate that conditions are generally favorable for continued natural attenuation in the upper and lower WBUs and the fractured bedrock.

Sulfate concentrations were generally higher in areas upgradient and side-gradient to the contaminant plumes in the upper WBU. Generally, sulfate concentrations decreased along the plume flow path indicating the sulfate reduction is occurring in groundwater of the upper WBU. This is illustrated with MWFOS-1, MWFOS-3, DMW-27A, and MWFTA-1. MWFOS-1 is the background well for the contamination associated with the former FOS tank/Pit 3 and had the highest sulfate concentrations. Along the flow path downgradient from the potential source areas, sulfate concentrations decrease to below the reporting limits for the March/April 2002, July 2002, and October 2002 sampling events.

Carbon Dioxide - Carbon dioxide is a by-product of complete mineralization of organic compounds and can also serve as an electron acceptor during methanogenesis. Carbon dioxide concentrations measured in the upper WBU during the October 2002 sampling event ranged from 24 mg/L (DMW-25A) to 450 mg/L in MWFTA-1. As with sulfate, carbon dioxide concentrations increased in wells downgradient from source areas. Increases of carbon dioxide in areas where breakdown of VOCs is occurring indicate that mineralization of organic compounds is occurring. For the lower WBU and fractured bedrock, carbon dioxide concentrations were less than 0.17 mg/L in each well measured except for MWFTA-18 (15 mg/L) and MWFTA-28B (18 mg/L).

Dissolve Hydrogen - Dissolved hydrogen was detected in groundwater samples from most wells sampled during recent groundwater sampling events. Dissolved hydrogen concentrations ranging from 1 to 11 nanomoles (nM) are indicative of oxidation-reduction conditions that are favorable for reductive dechlorination of VOCs. For the October 2002 sampling event, hydrogen concentrations range from 2.3 nM (MWFTA-1) to 19 nM (MWFTA-2 and DMW-33A) with an average concentration of 5 nM Hydrogen concentrations in lower WBU monitoring wells ranged from 2.6 nM (MWFTA-18 and

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MWFTA-29B) to 27 nM (MWFTA-16) with an average concentration of 8.7 nM. Hydrogen concentrations in the fractured bedrock (MWFTA-20) were 2.8 nM. Hydrogen concentrations for wells measured in the upper and lower WBU and fractured bedrock are supportive of continuing MNA and are favorable for continuing reductive dechlorination.

Alkalinity - Microbial activity leads to increased alkalinity concentration. Increases in alkalinity result from the dissolution of rock, driven by the production of carbon dioxide produced by the metabolism of microorganisms. Alkalinity is important in the maintenance of groundwater pH because it buffers the groundwater system against acids generated during aerobic and anaerobic biodegradation. Groundwater in the upper WBU at OU 7 has alkalinity concentrations that ranged from 1 JH mg/L as calcium carbonate (CaCO₃) (MWFOS-1) to 190 mg/L as CaCO₃ (MWFTA-1) with alkalinity concentrations in groundwater above 10 mg/L as CaCO₃ in 13 of the 19 monitoring well tested. In the lower WBU, alkalinity ranged from 53 mg/L as CaCO₃ (MWFTA-18) to 340 JL mg/L as CaCO₃ (MWFTA-29B). Alkalinity within the fractured bedrock (MWFTA-20) was 74 mg/L as CaCO₃.

Oxidation-Reduction Potential - The oxidation-reduction potential (ORP) of groundwater is a measure of electron activity and is an indicator of the relative tendency of a solution to accept or transfer electrons. Oxidation-reduction reactions in groundwater containing organic compounds (natural or anthropogenic) are usually biologically mediated; therefore, the ORP of a groundwater system depends upon and influences rates of biodegradation. Knowledge of the ORP of groundwater also is important because some biological processes operate only within a prescribed range of ORP conditions. ORP measurements can be used to estimate the location of the contaminant plume, especially in areas undergoing anaerobic biodegradation. Results from the October 2002 sampling event for the upper WBU at OU 7 ranged between –158 (MWFTA-1) to 405 mV (MWFTA-7). For the lower WBU, ORP results ranged from -149 (MWFTA-16) to 195 mV (MWFTA-14). The ORP result for MWFTA-20 was 15 mV

pH - The pH of groundwater has an effect on the presence and activity of microbial populations in groundwater. This is especially true for methanogens Microbes capable of degrading VOCs and petroleum hydrocarbon compounds generally prefer pH values varying from 6 to 8. During the October 2002 sampling event, the upper WBU at OU 7 had pH results that ranged from 3.43 (MWFTA-7) to 6.63 (DMW-25A) For the same sampling event, the lower WBU had pH results that ranged from 7.09 (MWFTA-28B) to 12 44 (MWFTA-29B). The pH for MWFTA-20 was 9 41 Values for pH correlated well with carbon dioxide concentrations (increasing pH results in low carbon dioxide concentrations) in the lower WBU

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Ferrous Iron - Ferric iron is used as an electron acceptor during anaerobic biodegradation of organic carbon During this process, iron (III) is reduced to iron (II), which may be soluble in water. Iron (II) concentrations can thus be used as an indicator of anaerobic degradation of chlorinated solvents. Native organic matter may also support reduction of iron (II). Care must be taken when interpreting iron (II) concentrations because they may be biased low by reprecipitation as iron sulfides or carbonates. Ferrous iron concentrations for the upper WBU during the October 2002, sampling event ranged from less than 0.1 mg/L (AEHADG-10, MWFOS-1, MWFOS-3, DMW-20A, DMW-25A, and DMW-35A) to 3.4 mg/L (MWFTA-5) with an average concentration of 2.1 mg/L. Nineteen monitoring wells were sampled, of which, groundwater in 13 of the monitoring wells had ferrous iron concentrations above the reporting limit (0.1 mg/L). Ferrous iron concentrations in the lower WBU for the October 2002, sampling event ranged from less than 0.1 mg/L (MWFTA-14, MWFTA-16, MWFTA-17, and MWFTA-19) to 3 0 mg/L (MWFTA-18). From the seven monitoring wells sampled, three (MWFTA-18; 3.0 mg/L, MWFTA-28B; 0.5 mg/L and MWFTA-29B; 1.0 mg/L) had ferrous iron concentrations above 0.1 mg/L. Ferrous iron concentrations for MWFTA-20 were 4 mg/L.

Sulfide - Sulfide may be an indicator of sulfate reduction. In addition, as previously stated, reprecipitation of iron sulfides may lead to anomalously low ferrous iron and sulfide concentrations. Sulfide concentrations in the upper WBU for the October 2002, sampling event ranged from less than 1 mg/L to approximately 6.9 mg/L (DMW-26A). Thirteen monitoring wells had detectable concentrations and four monitoring wells had sulfide concentrations above 1 mg/L. For the lower WBU during the October 2002 sampling event, MWFTA-14 (1.4 mg/L) was the only well sampled with a sulfide concentration greater than 1 mg/L. Sulfide was detected in MWFTA-20 at 0.3 JQ mg/L.

Total Organic Carbon - Organic carbon is required as an electron donor and drives the biodegradation of organic contamination. Concentrations of TOC are generally low in both the upper and lower WBU and the fractured bedrock at OU 7 with the exception of MWFTA-1 in the upper WBU. Low organic carbon concentrations limit the rates of biological degradation, however, the concentration of organic carbon associated with the soils was not quantified as part of the groundwater sampling activities. Low organic carbon concentrations may be due to the utilization of dissolved organic matter in water from increased biological activity

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TAB

APPENDIX G TABLE

APPENDIX G TABLE

TABLE G-1

MNA PARAMETERS AND COLOR INTERPRETATION

Annual Groundwater Report - October 2002 Operable Unit 6

Defense Supply Center Richmond Richmond, Virginia

MNA Parameter	Concentration Threshold	Interpretation/Analysis	Color
DO*	<0.5 mg/L >5 mg/L	Reductive dechlorination is possible Reductive dechlorination is not possible	Green Blue
NO ₃	<1 mg/L >1 mg/L	Reductive pathway is possible (nitrate does not compete) Nitrate competes with reductive pathway	Green Blue
SO ₄	<20 mg/L	At higher concentrations, sulfate will compete with reductive pathway	Green
CO ₂ **	>2xbackground	Ultimate oxidative daughter product	Green
Н	>1 nM <1 nM	Reductive pathway is possible, VC may accumulate VC is oxidized	Green Blue
ALK**	>2xbackground	Results from interaction between CO ₂ and WBU minerals	Green
TOC	>20 mg/L	Carbon and energy source; drives dechlorination	Green
ORP*	<-110 mV >50 mV	Reductive pathway is likely Reductive dechlorination is not likely	Green Blue
pН	5 < pH < 9 5 > pH >9	Optimal range for reductive pathway to be possible Outside optimal range for reductive pathway	Green Blue
Fe ⁺²	>1 mg/L	Reductive pathway is possible	Green
Sulfide	>1 mg/L	Reductive pathway possible	Green
Chloride	>2xbackground	Daughter product of organic chlorine	NA
Temperature	>20 °C	Accelerates biochemical process	NA
Methane	<0.5 mg/L >0.5 mg/L	VC oxidizes Ultimate reductive daughter product, VC accumulates	NA

Notes:

MNA - Monitored Natural Attenuation

NA - Not applicable, constituent not included on MNA posting figures

*Ranges for the result are presented, if the result falls between the ranges a color of orange was assigned indicating that conditions are favorable for natural attenuation

**A background monitoring location for OU 7 is not available, therefore, concentrations detected at DMW-13A (an upgradient well) for the (a side gradient well) for the lower WBU was used upper WBU and

Green - Condition is supporting of natural attenuation

Blue - Condition is not supporting for natural attenuation

Adapted from ITRC, 1999 Natural Attenuation of Chlorinated Solvents in Groundwater Principals and Practices

DO - Dissolved Oxygen

NO₃ - Nitrate

SO₄ - Sulfate

CO2-Carbon dioxide

H - Dissolved hydrogen gas

ALK - Alkalinity

TOC - Total organic carbon

ORP - Oxidation reduction potential

pH – negative log of the hydrogen ion concentration Fe⁺² – Ferrous Iron

PREPARED/DATE MET 07/13/2003 CHECKED/DATE TLN 07/14/2003

TAB

Appendix H

APPENDIX H
MANN-KENDALL DATA EVALUATION

APPENDIX H – STATISTICAL METHODOLOGY MANN-KENDALL TREND TEST

When analyzing a data set for trends, the method first described by H. B. Mann in 1945 and later popularized by M. G. Kendall in 1975 has several advantages. First, it is a method that makes no assumptions about the distribution of the underlying population from which the samples were taken. Second, since it is a rank-order test, which depends only on the relative rankings of data and not their absolute values, it can accommodate censored data (data reported as "below detection limit" (BDL) with a specific detection limit). The Mann-Kendall test is commonly applied as a non-parametric test for zero-slope for a linear regression of the data set with time.

The basis of the Mann-Kendall test is a comparison of the number of increasing and decreasing differences among all the data points. Intuitively, if there is no trend in a data set, taking all possible differences between pairs of data points, one would expect approximately as many positive differences as there are negative (as many pairs would "go up" as "go down"). If there are significantly more "ups" than "downs" (or the opposite), one would have to conclude that the assumption of "no trend" is in error and, in fact, a trend does exist.

Just how many constitute a "significant difference" is dependent on how many data points are in the set, how much certainty of a trend is required (alpha), and how many of the data points have the same value ("ties") The result of the procedure is an S statistic that is compared to a table of probabilities of a value for S for a particular number of data points (n). One such table is table A-18 in Gilbert (1987). If the listed probability of the calculated S value exceeds the pre-determined (1- alpha/2 – two tailed distribution for increasing or decreasing trends) value, then the assumption of zero slope for the regression is accepted and "no trend" is assumed. If the listed probability of the calculated value is less than the pre-determined (1 - alpha) value, then the existence of a slope is indicated

To generate the calculated S value, the number of "down" pairs is subtracted from the number of "up" pairs. This gives the signed S value that can be compared to published tables. An alternate procedure can be used if there are at least n>10 data points (and preferably n>40, depending on the number of ties) which transforms the calculated S value into an approximate standard Z score (that is possibly adjusted for ties) and compared to readily available Z-score tables. This approximation method allows the test to be run for values of n for which no published tables exist. The exact S value comparison is preferred when table values are available and should always be used when n < 10.

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FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE