Base Realignment and Closure Property Remedy Multi-Area Five-Year Review

Patuxent Research Refuge-North Tract, Odenton, Maryland

Clean Fill Dump Operable Unit 33, Third Five-Year Review

Ordnance Demolition Area Operable Unit 15, First Five-Year Review

Draft Document

US Army Corps of Engineers
BALTIMORE DISTRICT
June 2016

Prepared for:
Department of Army – Assistant Chief of Staff for Installation Management; Base Realignment and Closure Division

FORT MEADE BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY
DRAFT MULTI-AREA FIVE-YEAR REVIEW
SITES AT
PATUXENT RESEARCH REFUGE-NORTH TRACT, ODENTON, MARYLAND

CLEAN FILL DUMP OPERABLE UNIT-33, THIRD FIVE-YEAR REVIEW
ORDNANCE DEMOLITION AREA OPERABLE UNIT-15, FIRST FIVE-YEAR REVIEW

1.0 INTRODUCTION

This Five-Year Review discusses two areas in the Fort Meade Base Realignment and Closure (BRAC) parcel called Patuxent Research Refuge-North Tract (PRR-NT). The PRR-NT is 8,100 acres of former range and maneuver land that was transferred from Fort George G. Meade (FGGM) to the Department of the Interior (DOI) U.S. Fish and Wildlife Service (USFWS) in 1991, as part of the 1988 BRAC mandate. The PRR-NT is bounded on the north by Highways 32 and 198, on the west by the Baltimore-Washington Parkway, on the south by the Patuxent River, and on the east by the Fort Meade active firing ranges, the Amtrak railroad right-of-way, and private property.

The two Five Year Review sites within PRR-NT are: (1) Clean Fill Dump (CFD) and (2) Ordnance Demolition Area (ODA). The CFD was specifically excluded from the 1991 transfer and remains under the administrative control of FGGM, but is pending transfer to the DOI.

The CFD is in the eastern portion of the PRR-NT, in an otherwise undeveloped wooded area along Wildlife Loop (Figure 1-1). The Amtrak railroad right-of-way is located to the east and the Little Patuxent River is to the south of the site.

The **Clean Fill Dump** was active from approximately 1972 through closure in 1985. The main dump covers an area of approximately 500 feet by 800 feet. Soil borings have revealed waste materials as deep as 16 feet at the site. The main dump extends to the tree line to the north and east and has a fill-face slope rise of at least 10 feet above the wetlands. Fill included miscellaneous debris such as stumps, trees, logs, concrete waste, construction debris, appliances, and fill soil (ERD, October 1989). Other disposal may have included garbage, food wastes, cans, bottles, ash, and possibly hazardous materials.

The CFD area is gated and partially enclosed by a fence; however, uncontrolled dumping continued outside the main perimeter after the 1985 site closure, primarily along the CFD margins and the access roads, but also in the wetlands south of the CFD and Boundary Road in an area referred to as the Uncontrolled Waste Site (UWS). Debris identified in the UWS

includes tires, appliances, drums, automobile parts, electronic equipment, construction debris, and discarded storage tanks. A debris removal action was conducted at the UWS from April 2007 to September 2008 (Plexus, January 2008 and USACE, 2008b).

The United States Army (Army) as the lead agency and the United States Environmental Protection Agency (EPA) Region III as the lead regulatory; in consultation with the Maryland Department of the Environment (MDE) issued a Record of Decision (ROD) for the selected remedial action at the CFD Operable Unit (OU) which includes the CFD and the UWS (FGGM, Sept 2000).

The selected remedy for the CFD OU is no further action (NFA) with regards to soils, sediment and surface water and groundwater monitoring which together address contamination at the CFD OU. The ROD incorporates by reference the September 2000 *Action Memorandum* which recommended the future use of the CFD be compatible with the continued presence of unexploded ordnance (UXO) and established the following land use controls (LUCs): (1) Disturbance of surface or subsurface soils require proper ordnance avoidance or clearance, (2) use of groundwater is prohibited except for use in conducting environmental studies, and (3) residential use of the property is prohibited without an evaluation of residential exposure risk.

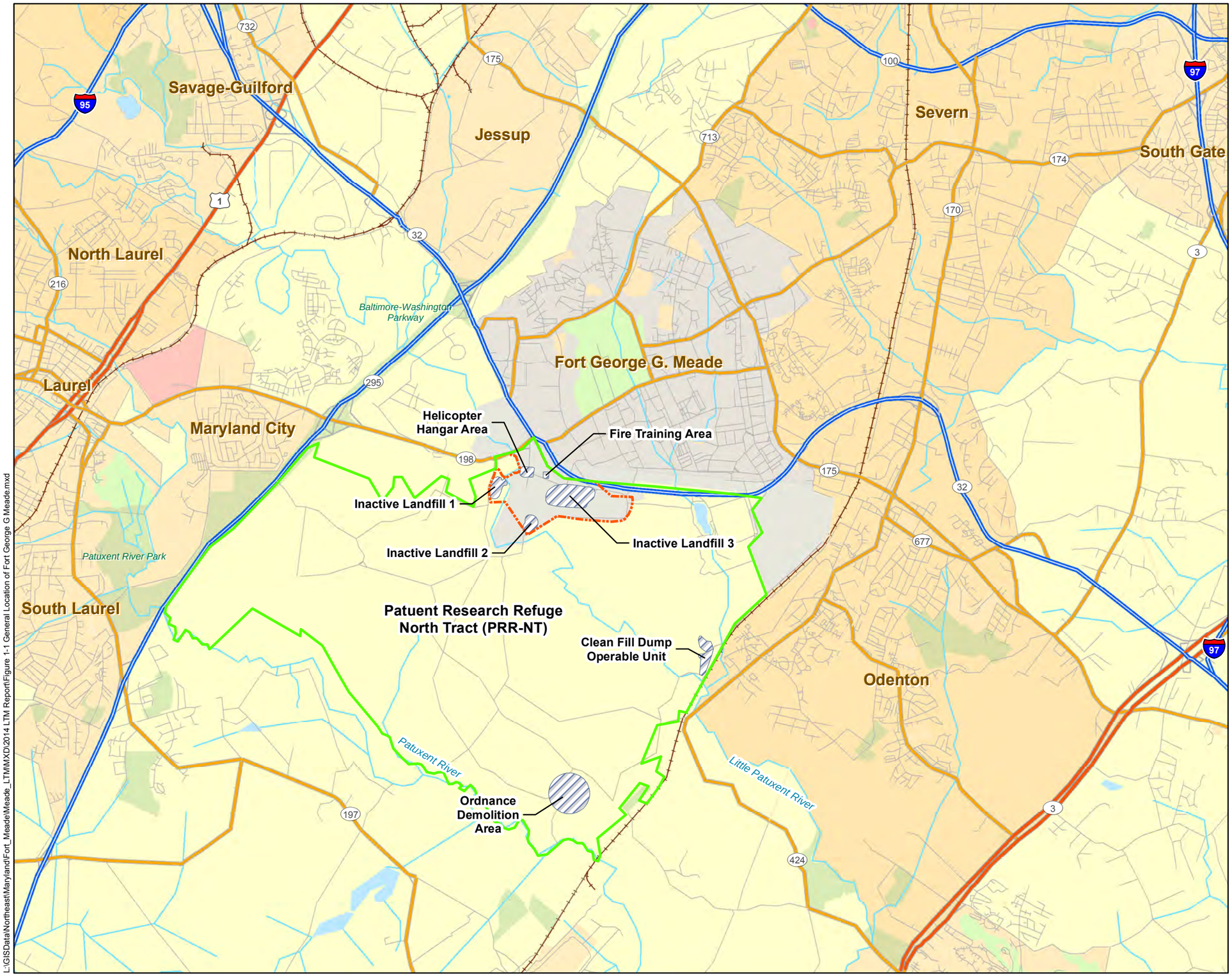
The **Ordnance Demolition Area** occupies a very small portion (approximately 2.5 acres) of PRR-NT in a remote, heavily wooded area off Wildlife Loop Road. Access to the ODA is limited because the USFWS controls access to the PRR-NT; and a wooden gate is present on the access road from Wildlife Loop Road. Surrounding features are the Baltimore Gas and Electric (BG& E) power line approximately 700-feet southwest and the Patuxent River approximately 2000-feet to the southwest (Figure 1-1).

Ordnance demolition occurred within the demolition pit, an approximately a 40 feet × 80 feet ellipse, predominantly filled with sand. The explosive limit on ordnance was 5 pounds of explosives, including the amount of donor explosives necessary to detonate the rounds (URS, June 2013). The site features surrounding the area where the demolition activities took place include an inner and outer earthen berm.

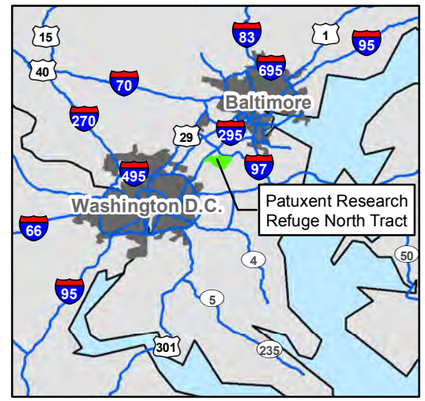
The Army and EPA, in consultation with MDE, issued a ROD for the selected remedial action for the ODA OU (USACE, Sept 2011). The selected remedy is NFA for soils, sediment and surface water and groundwater Monitored Natural Attenuation (MNA)with Land Use Controls (LUCs) (URS, September 2011). The ROD also established the following LUCs: (1) Disturbance of surface or subsurface soils require Munitions of Concern (MEC) avoidance or clearance, (2) use of groundwater is prohibited except for use in conducting environmental studies, and (3) residential use of the property is prohibited without an evaluation of residential exposure risk.

The purpose of a five-year review is to determine whether the remedy at the site is, and will continue to be, protective of human health and the environment. Five-year reviews are required because the remedial action chosen results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE). The CFD OU is included as part of the Fort Meade site, in the National Priorities List (NPL). ODA OU is not a NPL site.

The methods, findings, and conclusions of the two areas (CFD OU and ODA OU) are documented in the two parts of this report along with issues found during the reviews and recommendations to address them. The figures and tables, appendices, section numbers and page numbers for each report are specific to each site.



VICINITY MAP



Legend

- Evaluation Areas
- Patuxent Research Refuge North Tract Boundary
- Tipton Airfield Parcel Boundary

Map Date: April 2015
Data Sources: USACE 2010, ESRI 2011

N

0 1 2
Miles

FIGURE 1-1
GENERAL LOCATION OF
FORT GEORGE G. MEADE
Anne Arundel County, Maryland

Third Five Year Review

Clean Fill Dump Operable Unit 33

Base Realignment and Closure Property Remedy
Patuxent Research Refuge-North Tract
Odenton, Maryland

Draft Document

US Army Corps of Engineers
BALTIMORE DISTRICT
June 2016

Prepared for:
Office of the Assistant Chief of Staff for Installation Management; Base Realignment and Closure Division

THIRD FIVE YEAR REVIEW, DRAFT

CLEAN FILL DUMP OPERABLE UNIT 33

FORT MEADE, BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY

PATUXENT RESEARCH REFUGE-NORTH TRACT, ODENTON, MARYLAND

Prepared by:

US Army Corps of Engineers

North Atlantic Division, Baltimore District

Baltimore, Maryland

Prepared for:

Office of Assistant Chief of Staff for

Installation Management

Base Realignment and Closure Division

(DAIM-ODB)

_____ _____

Signature *Date*

William J. O'Donnell, II
Chief, Operational and Army and Medical Branch
Assistant Chief of Staff for Installation
Management: BRAC Division (DAIM-ODB)

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Clean Fill Dump OU 33		
EPA ID: MD9210020567		
Region: 3	**State:** MD	**City/County:** Odenton/Anne Arundel County

SITE STATUS	
NPL Status: Deleted	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: Other Federal Agency **If "Other Federal Agency" was selected above, enter Agency name:** IMCOM and BRAC
Author name (Federal or State Project Manager): USACE, NAB
Author affiliation: U.S. Army Corps of Engineers
Review period: May 2015 – October 2015
Date of site inspection: May 8, 2015
Type of review: Statutory
Review number: 3
Triggering action date: September 22, 2011
Due date *(five years after triggering action date)*: September 22, 2016

Five-Year Review Summary Form (continued)

The table below is for the purpose of the summary form and associated data entry and does not replace the two tables required in Section VIII and IX by the FYR guidance. Instead, data entry in this section should match information in Section VII and IX of the FYR report.

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
Clean Fill Dump OU 33

Protectiveness Statement(s)

Include each individual OU protectiveness determination and statement. If you need to add more protectiveness determinations and statements for additional OUs, copy and paste the table below as many times as necessary to complete for each OU evaluated in the FYR report.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
Clean Fill Dump OU-33	Protective	Click here to enter date.

Protectiveness Statement:
The remedy at Clean Fill Dump OU 33, is protective of human health and the environment. All impacts at the Site posed by contaminated groundwater have been addressed by the remedy: No Further Action, with Monitoring.

THIRD FIVE-YEAR REVIEW, DRAFT
CLEAN FILL DUMP OPERABLE UNIT 33
FORT MEADE, BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY
PATUXENT RESEARCH REFUGE-NORTH TRACT, ODENTON, MARYLAND

EXECUTIVE SUMMARY

This third Five-Year Review specifically addresses the Fort Meade Base Realignment and Closure (BRAC) property called Clean Fill Dump (CFD) Operable Unit (OU) 33 (hereafter referred to as CFD OU). CFD OU is part of the 8,100-acre transferred property called the Patuxent Research Refuge – North Tract (PRR-NT), a National Wildlife Refuge, administered by the U.S. Fish and Wildlife Service (USFWS). The PRR-NT, shown in Figure 1-1, is bounded on the north by Highways 32 and 198, on the west by the Baltimore-Washington Parkway, on the south by the Patuxent River, and on the east by the active firing ranges, the Amtrak railroad right-of-way, and private property.

For the CFD OU, the Five-Year Review is required because the remedial action chosen results in hazardous substances, pollutants, or contaminants remaining at the site above levels allowing for unlimited use and unrestricted exposure (UU/UE). This third review evaluates whether the No Further Action (NFA) with groundwater monitoring remedy selected in the September 29, 2000 Record of Decision (ROD) for the CFD OU remains protective of human health and the environment (Army, September 2000).

The triggering action for this statutory review is the previous Five-Year Review report submitted in September 2011. The United States Army (Army) is the lead agency and the United States Environmental Protection Agency (EPA) is the lead regulatory agency for CFD OU. The CFD OU is included as part of the Fort Meade site, in the National Priorities List (NPL).

The CFD OU comprises the CFD (13.6 acres) and the Uncontrolled Waste Site (UWS) (18.2 acres) in the eastern portion of the PRR-NT, in an otherwise undeveloped wooded area along Boundary Road (Figure 3-1).

The CFD OU was active from approximately 1972 through closure in 1985. The main dump covers an area of approximately 500 feet by 800 feet. Soil borings have revealed waste materials as deep as 16 feet at the site. The main dump extends to the tree line to the north and east and has a fill-face slope rise of at least 10 feet above the wetlands. Fill included miscellaneous debris such as stumps, trees, logs, concrete waste, construction debris, appliances, and fill soil (Environmental Research Division, October 1989). Other disposal may have included garbage, food wastes, cans, bottles, ash, and possibly hazardous materials.

Uncontrolled dumping continued outside the main perimeter after the 1985 site closure. This activity included sporadic surface dumping, primarily along the CFD margins and the access roads, but also in the wetlands south of the CFD and north of Boundary Road, also known as Wildlife Loop Road, in an area referred to as the Uncontrolled Waste Site.

A debris removal action was conducted at the UWS from April 2007 to September 2008 (Plexus, January 2008 and USACE, 2008b) wherein surface debris such as household materials (e.g., furniture, toys, and appliances), commercial materials (e.g., water heaters, paint and gas cans, and tanks and drums), construction debris (e.g., concrete, asphalt, metal scrap, and bricks) and miscellaneous items (e.g., filing cabinets, vehicle parts, tires, and batteries) were hauled off site for disposal. A total of 76 roll-offs and 641 tons of debris were removed from the UWS.

A 105-millimeter (mm) blank cartridge and two 90-mm blank cartridges were found during the removal action. All three cartridge cases had a live primer and flash tube, but no explosive content. No other munitions or unexploded ordnance were found at the UWS.

The CFD OU is located partially within the boundaries of the downrange fan for Firing Range 7 (OHM Remediation Services Corp., June 1995). A downrange fan is the firing area where potential Munitions and Explosives of Concern (MEC) may be found on the surface or buried. Because of its location, the hunters may be exposed to potential MEC and UXO at the CFD OU. The ROD incorporates by reference the *Action Memorandum* (Army, July 2000) which recommended the future use of the CFD be compatible with the continued presence of unexploded ordnance (UXO.

During the site visit to the CFD OU, no new uses of groundwater were observed. Signs are posted to warn that the area is not to be accessed, though USFWS personnel report hunters sometimes have access to the area. The site inspection indicated that the access road gate was securely locked and in good repair. However, hunters on foot generally have access to the CFD OU by circumventing the gate.

The remedy at Clean Fill Dump OU is protective of human health and the environment. The remedy is protective because there are no unacceptable risks to human health and the environment from groundwater and because there is no groundwater use except authorized environmental sampling.

A two part optimization recommendation is an adherence to ROD standards: 1) develop risk-based PRGs for the analytes that commonly exceed RSLs and 2) stakeholders should agree upon FGGM-specific groundwater background levels. Taken together, these two recommendations will optimize groundwater sampling, and present a valid exit strategy.

THIRD FIVE-YEAR REVIEW, DRAFT
CLEAN FILL DUMP OPERABLE UNIT 33
FORT MEADE, BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY
PATUXENT RESEARCH REFUGE-NORTH TRACT, ODENTON, MARYLAND

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LIST OF ACRONYMS AND ABBREVIATIONS

ADI	Allowable daily intake
bgs	below ground surface
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFD	Clean Fill Dump
CFR	Code of Federal Regulations
DC	District of Columbia
DCE	Dichloroethene
DOI	U.S. Department of the Interior
DoD	U.S. Department of Defense
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Difference
FFA	Federal Facility Agreement
FGGM	Fort George G. Meade
HEI	High Explosive Impact and Disposal Area
HHRA	human health risk assessment
HI	hazard index
LTGM	Long-Term Groundwater Monitoring
LUC	Land Use Controls
LUCIP	Land Use Control Implementation Plan
LUCRD	Land Use Control Remedial Design
µg/L	Microgram per liter
MCL	Maximum contaminant level
MCLG	Maximum contaminant level goal
MDCs	Maximum detected concentrations
MD	Maryland
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MEC	Munitions and Explosives of Concern
mm	millimeter
MNA	Monitored natural attenuation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action
NPL	National Priorities List
ODA	Ordnance Demolition Area
OE	Ordnance and Explosives

LIST OF ACRONYMS AND ABBREVIATIONS, CONTINUED

OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PA	Preliminary Assessment
PCE	Tetrachloroethene (or perchloroethene)
PRAP	Proposed Remedial Action Plan
PRG	Preliminary Remediation Goal
PRR	Patuxent Research Refuge
PRR-NT	Patuxent Research Refuge-North Tract
RAB	Restoration Advisory Board
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RIA	Remedial Investigation Addendum
ROD	Record of Decision
RSL	Regional Screening Level
SDWA	Safe Drinking Water Act
SI	Site Inspection
SIA	Site Inspection Addendum
TAL	Target Analyte List
TCL	Target Compound List
TCE	Trichloroethene
TOC	Total organic carbon
URS	URS Group, Inc.
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center (now U.S. Army Environmental Command)
USFWS	U.S. Fish and Wildlife Service
UWS	Uncontrolled Waste Site
UXO	Unexploded ordnance
VOC	Volatile organic compound

THIRD FIVE-YEAR REVIEW, DRAFT
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FORT MEADE, BASE REALIGNMENT AND CLOSURE PROPEERTY REMEDY
PATUXENT RESEARCH REFUGE-NORTH TRACT, ODENTON, MARYLAND

1.0 INTRODUCTION

This Five-Year Review evaluates the no further action (NFA) with monitoring remedy for the Clean Fill Dump (CFD) Operable Unit (OU) 33 (hereafter referred to as CFD OU) located on former Fort George G. Meade (FGGM) property. The CFD OU is a Base Realignment and Closure Act (BRAC) of 1988 (Public Law 100-526, 102 Stat. 2623) parcel.

The U.S. Army (Army) is the lead Agency for this Five-Year Review of the remedial actions implemented at the CFD OU. This review was conducted by the U.S. Army Corps of Engineers (USACE), Baltimore District. The triggering action for this statutory review is the previous Five-Year Review report submitted in September 2011.

The purpose of Five-Year Reviews is to determine whether the remedy at a site is protective of human health and the environment. For the CFD OU, the Five-Year Review is required because the remedial action chosen results in hazardous substances, pollutants, or contaminants remaining at the site above levels allowing for unlimited use and unrestricted exposure (UU/UE). This third review evaluates whether the NFA with monitoring remedy selected in the September 29, 2000, Record of Decision (ROD) for the CFD OU remains protective of human health and the environment (Army, 2000a).

The Army, as the Lead Agency, is preparing this Five-Year Review pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for*

which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The United States Environmental Protection Agency (EPA) interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This Five-Year Review was developed following the EPA Comprehensive Five-Year Review Guidance (2001) and its updates. In compliance with the requirements above, USACE-Baltimore performed a Five-Year Review to evaluate the implementation and performance of the remedies applied at the site, in order to determine if they remain protective of human health and the environment. The USACE-Baltimore has reviewed pertinent documents, conducted interviews with individuals knowledgeable of the site and remedy, and conducted a site visit. The methods, findings, and conclusions of the review are documented in this report along with issues found during the review and recommendations to address them. This third Five-Year Review of the CFD OU was conducted from May 2015 through September 2015.

2.0 SITE CHRONOLOGY

Table 2-1, Site Chronology provides a chronology of the investigations and cleanup activities that have occurred at CFD OU.

Table 2-1 Site Chronology

Event	Date
Waste disposal in the CFD OU began.	1972
The main dump was closed.	1985
Uncontrolled dumping occurred outside main perimeter of the CFD OU, after closure. Responsible parties are not known.	1985–unknown
BRAC mandated the closure and/or realignment of approximately 9,000 acres of FGGM property	1988

Enhanced Preliminary Assessment Report (Environmental Research Division (ERD), October 1989)	October 1989
Maryland Department of Natural Resources Study (MDNR, 1990)	January 1990
Draft Environmental Impact Statement (EIS) (RGH, 1990)	January 1990
Wetlands Identification Study (RGH/CH2M Hill, 1991)	January 1991
Final EIS Report (USACE, 1991)	July 1991
Army transferred 7,600 of the 9,000 acres to the Department of Interior Patuxent Research Refuge (PRR); CFD OU was excluded from PRR-North Tract (PRR-NT) Transfer Assembly	October 1991
Site Inspection (SI) Study (EA, 1992b)	October 1992
Final Active Sanitary Landfill and Clean Fill Dump Remedial Investigation (RI) (EA, December 1992)	December 1992
Ordnance Survey of 7,600-acre Parcel (OHM Remediation Services Corp. (OHM), June 1995)	June 1995
Site Inspection Addendum (SIA) (Arthur Little, December 1995)	December 1995
FGGM proposed for placement on National Priorities List (NPL)	April 1, 1997
Remedial Investigation Addendum (RIA) (Arthur Little, May 1997)	May 1997
Final NPL Listing for FGGM	July 28, 1998
Remedial Investigation Report for Inactive Landfills 1, 2, 3 and Clean Fill Dump. (ICF Kaiser, August 1998)	August 1998
Action Memorandum (Army, July 2000)	July 2000
CFD OU Proposed Plan (Army, August 2000)	August 2000
CFD OU ROD (Army, September 2000)	September 2000
Long-Term Groundwater Monitoring (LTGM) Plan for CFD OU (USACE, February 2002)	February 2002
First Five-Year Review Report for CFD OU (USACE, December 2005)	December 2005
Debris Removal at Uncontrolled Waste Site (UWS) (Plexus, January 2008 and USACE, 2008b)	April 2007–January 2008
Second Five-Year Review, Clean Fill Dump, Final (URS, September 2011)	September 2011
Combined Groundwater Operable Units (OUs) Long Term Monitoring (LTM) Work Plan, Final (URS, March 2012)	March 2012
Source: Second Five-Year Review, Clean Fill Dump, Final, URS, September 2011, EA, May 2015and EA, September 2015	

3.0 BACKGROUND

3.1 Physical Characteristics

FGGM formerly occupied 13,596 acres of land in the northwest corner of Anne Arundel County, Maryland, approximately halfway between Washington, DC, and Baltimore, MD. Figure 3-1 illustrates the regional location of FGGM with respect to the Baltimore-Washington metropolitan area. It also shows the BRAC parcel, also known as the Patuxent Research Refuge-North Tract (PRR-NT).

Figure 3-1 illustrates the location of the CFD OU, and surrounding features including the Little Patuxent River to the south, the Amtrak right-of-way to the east, and the PRR-NT to the west. The CFD OU covers approximately 13 acres in the southeastern portion of the PRR-NT in an otherwise undeveloped wooded area along Boundary Road. It consists of the 8-acre CFD and the 5-acre UWS (Figure 3-2). The UWS is located on the southern boundary of the CFD (URS, September 2011).

The northern boundary of the CFD OU is a level dirt road paralleling its edge. A locked gate prevents access to the site at the dirt road turnoff from Boundary Road. The U.S. Fish and Wildlife Service (USFWS) monitor the road entry points into the PRR-NT. Woods are located north and east of the site and wetlands are located to the south. Recreational fishing occurs downstream at the Bailey's Bridge Marsh and Little Patuxent River south and southwest of the CFD OU (Army, September 2000). Groundwater flow is generally to the south west, as shown in Figure 3-2, the 2014 groundwater elevation contour map for CFD OU. Figure 3-3 depicts the geologic cross-section of the CFD OU, shown in Figure 3-4.

The UWS is located along the northwestern side of Wildlife Loop Road below the CFD. Relief at the site ranges from approximately 35 feet on a 1:1 slope at the northern half of the site, to about 5 feet at the central and southern portions of the site. The site is rectangular in shape and varies from 150–250 feet wide by approximately 1,800 feet long. Wildlife Loop Road forms the southern and eastern borders and provides access to the UWS; a wetland borders the western portion of the UWS. The UWS is wooded throughout with dense underbrush in its northern half. Hardwood trees and pines up to 12 inches in diameter dominate the site. The wooded area grades into a wetland area to the west (Plexus, January 2008). Appendix A contains photographs of the CFD and UWS areas.

3.2 Land and Resource Use

In October 1991, the Army transferred 7,600 of the 9,000 acres to the Department of Interior (DOI) PRR, formerly known as the Patuxent Wildlife Research Center. The CFD was specifically excluded from the 1991 transfer and remains under the administrative control of

FGGM until the Army and the DOI have determined the site is environmentally clean. (URS, September 2011)

The intended transferee for the CFD property is the DOI and FWS, which would include this land as part of the PRR-NT. The CFD in located within the PRR-NT that will continue to be used as a wildlife refuge for the foreseeable future.

3.3 History of Contamination

3.3.1 Chemical Contamination

The CFD was active from approximately 1972 through closure in 1985. Soil borings have revealed waste materials as deep as 16 feet at the site. The main dump extends to the tree line to the north and east and has a fill-face slope rise of at least 10 feet above the wetlands. Fill included miscellaneous debris such as stumps, trees, logs, concrete waste, construction debris, appliances, and fill soil (ERD, October 1989). Other disposal may have included garbage, food wastes, cans, bottles, ash, and possibly hazardous materials.

Uncontrolled dumping continued outside the main perimeter after the 1985 site closure. This activity included sporadic surface dumping, primarily along the CFD margins and the access roads, but also in the wetlands south of the CFD and Boundary Road in an area referred to as the UWS. Debris identified in the UWS includes tires, appliances, drums, automobile parts, electronic equipment, construction debris, and discarded storage tanks. The responsible parties for the uncontrolled dumping activities are unknown. The uncontrolled dumping occurred before the BRAC parcel was transferred to the DOI. The PRR-NT property is now enclosed (fenced) and managed by the USFWS.

A debris removal action was conducted at the UWS from April 2007 to September 2008 (Plexus, January 2008 and USACE, 2008b). Surface debris such as household materials (e.g., furniture, toys, and appliances), commercial materials (e.g., water heaters, paint and gas cans, and tanks and drums), construction debris (e.g., concrete, asphalt, metal scrap, and bricks) and miscellaneous items (e.g., filing cabinets, vehicle parts, tires, and batteries) were disposed off site. A total of 76 roll-offs and 641 tons of debris (tires, concrete, construction and demolition debris, and metal) were removed from the UWS. Restoration activities (seeding disturbed areas, covering with straw, placing erosion control matting on slope areas) were implemented following the removal action. A *Final Closeout Report* for the UWS was submitted (Plexus, January 2008).

3.3.2 MEC Contamination

The CFD is located partially within the boundaries of the downrange fan for Firing Range 7 (OHM, June 1995). A downrange fan is the firing area where potential MEC may exist on the surface or buried. During the UWS debris removal; a 105-millimeter (mm) blank cartridge and two 90-mm blank cartridges were found during the removal action. All three cartridge cases had a live primer and flash tube, but no explosive content. No other munitions or unexploded ordnance was found at the UWS. As a result of its location, potential MEC may exist at the CFD OU.

An Ordnance Survey of the 7,600-acre parcel was conducted in 1995 (USAEC, 1995a). . The survey was completed in accessible areas and was conducted to a maximum depth of 6 inches (OHM, June 1995). Due to the presence of ubiquitous metallic debris, only a surface clearance was conducted within the CFD OU boundary.

The Army issued an *Action Memorandum (July 2000)* which addresses the risks related to unexploded ordnance (UXO) at the CFD and protects human health and the environment. The *Action Memorandum* includes the establishment and enforcement of land use restrictions, initially via the FGGM Master Plan and then via a transfer document for the CFD.

The Action Memorandum (Army, July 2000) about MEC was incorporated into the ROD by reference. The MEC LUCs contained in the Action Memorandum will be part of the High Explosives Impact Area (HEI) ROD for the 8100-acre PRR-NT, which includes the CFD.

3.4 Initial Response

Waste disposal at the CFD ceased in 1985. The environmental remediation at the CFD OU is managed under CERCLA because its usage had been associated with FGGM. FGGM was listed by the U.S. Environmental Protection Agency (EPA) as a Superfund site and was proposed for the NPL on April 1, 1997, and finalized on the NPL on July 28, 1998.

From August 2007 to October 2009, the environmental remediation was managed under a Resource Conservation and Recovery Act (RCRA) Section 7003 unilateral order. The Army, DOI, EPA Region 3, and the U.S. Architect of the Capitol signed a Federal Facility Agreement (FFA) in 2009. As of October 6, 2009, the FFA drives the comprehensive cleanup of the BRAC sites. The Army, as the Lead Agency, is responsible for the remedy selection and cleanup of the CFD OU; the Army will implement and incur all costs associated with the agreed upon response action(s).

3.5 Basis for Taking Action

The 1998 Human Health Risk Assessment (HHRA) identified the following contaminants detected in the CFD OU groundwater above their screening criteria: chloroform, perchloroethene (PCE), trichloroethene (TCE), 1,1- dichloroethene (DCE), cis-1,2-DCE, arsenic, beryllium, cadmium, chromium, copper, iron, lead, manganese, thallium, zinc, and bis(2-ethylhexyl)phthalate (a common laboratory contaminant) (USACE, 1998a). The contaminants were detected at concentrations that would be associated with unacceptable risks if the groundwater was used for potable purposes.

The HHRA results as part of the RI report (ICF Kaiser, August 1998), showed groundwater cancer risks posed to current/future site workers at the CFD OU are within EPA's acceptable risk range of 10^{-6} to 10^{-4} (i.e., there is likely to be from one in one million to one in ten thousand additional incidents of cancer beyond the normally anticipated cancer rate in the exposed population). The non-cancer hazard results for groundwater were above the hazard index (HI) of 1 in the shallow (Lower Patapsco) aquifer. The HHRA results produced a future site worker HI of 2 from incidental ingestion of groundwater at the CFD OU; inorganics were the main contributors. FGGM aquifer-specific background concentrations were derived for inorganics in the RI report (ICF Kaiser, August 1998); however, the Army, EPA, and Maryland Department of the Environment (MDE) have not established a background levels for inorganics.

Even though residential use is not anticipated in the area, the EPA Region 3 toxicologist used the groundwater data and derived HHRA results for a hypothetical residential scenario. These results were included in the 1998 RI report for informational purposes (ICF Kaiser, August 1998).

4.0 REMEDIAL ACTION

4.1 Remedy Selection

The ROD for Clean Fill Dump OU states, "A no further action with monitoring alternative is the selected remedy for the CFD OU." (Army, September 2000)

The ROD states, "The Army conducted extensive environmental investigations of groundwater, soils, sediments, and surface waters to assess the environmental impacts of related site activities. Results of these studies showed that risks posed to human health and the environment for workers, trespassers, and site visitors are within the EPA's acceptable risk range of 10^{-4} to 10^{-6}."

The ROD also states, "Additionally, groundwater use at the CFD is restricted for any potable or non-potable purposes, except for use in conducting environmental studies, until it has been tested and determined safe for its intended use."

The ROD determination is, "The selected remedy for the CFD OU is protective of human health and the environment, and complies with federal and Maryland requirements that are applicable or relevant and appropriate."

The reason Five-Year Reviews are performed at the site is, "Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within 5 years after the signing of the ROD to ensure that the remedy is, and will continue to be, protective of human health and the environment." (Army, September 2000) The ROD also states, "This is the final planned response action for the CFD OU."

A feasibility study, which normally develops and examines remedial action alternatives for a site, was not performed for the CFD OU since the results of the risk evaluation indicated that no further remedial action is required (Army, September 2000).

The ROD states that the groundwater analyses "…shall include the analysis of conventional Safe Drinking Water Act parameters, metals, volatile organic compounds, and semi-volatile organic compounds."

The ROD explains the analytes to be monitored and the frequency and comparison standards for monitoring thus:
"While not associated with facility activities, many metals detected during the investigations were found to be pervasive throughout the site, both in study areas, and in background samples of soil, sediments, surface water, and groundwater. Organic chemicals were intermittently detected. Because of these findings, within a two-year period after the date of this ROD, and within every two years thereafter until sampling results indicate concentrations are below legal limits (i.e., MCLs, SDWA) for two sampling periods, groundwater will be sampled and analyzed."

In response to EPA comments to the 2011 Five-Year Review, groundwater monitoring frequency was changed from once every two years to once per year.

Table 4-1: Summary of Affected Media and Selected Remedies for the CFD OU	
Affected Media	**Selected Remedy**
Soils, Surface Water and Sediment	No Further Action (NFA)
Groundwater	**LTGM** (1) (1) Sample and analyze the groundwater every 2 years. (2) Compare the detected concentrations with MCL and SDWA criteria. (3) Continue LTGM until sample results are below the criteria for two sampling periods.

NOTES:
CFD OU = Clean Fill Dump Operable Unit; NFA = no further action; MCL = Maximum Contaminant Level; SDWA = Safe Drinking Water Act; LTGM = long-term groundwater monitoring

(1) (United States Army (Army), September 2000) *Final Record of Decision Clean Fill Dump (CFD) Operable Unit 07,* September 2000. EPA/ROD/R03-00/058.

4.2 Remedy Implementation

The February 2002 LTGM Plan for the CFD OU describes the groundwater monitoring program, which began in 2002 (USACE, February 2002). The Fort Meade Environmental Partnership, which includes the Army, EPA Region 3, the MDE, and DOI selected six monitoring wells (MWC-5, MWC-3, CFD-3S, WP-2, WP-6, and CFD-5) in the Lower Patapsco aquifer for biennial groundwater monitoring (once every 2 years) (URS, September 2011). Monitoring well identification numbers, approximate well screen intervals, and a description of each well's location and purpose in the LTGM program are provided in Table 4-2. All the CFD OU well locations are presented in Figure 3-2, which also shows the 2014 water table elevation contours and groundwater flow direction at the CFD OU.

The LTGM Plan for the CFD OU (USACE, February 2002) states the following objectives for the CFD OU:

- Contaminant concentrations are not increasing over time
- New constituents are not appearing
- Contaminants are not migrating to potential offsite receptors
- Metals concentrations are consistent with background levels in the Lower Patapsco aquifer

The first three objectives are met. However, since the Army, MDE and EPA have not agreed on background concentrations for metal, the last objective can not be met. The LTGM program samples and analyzes for Target Compound List (TCL), volatile organic compounds (VOCs) and Target Analyte List (TAL) metals. The ROD did not identify specific performance standards for the LTGM program. However, the ROD mentions the MCLs and SDWA standards, so they are used for screening purposes. These standards are found at the EPA's Safe Drinking Water Web site: http://water.epa.gov/drink/contaminants/index.cfm. Annual LTGM reports are reviewed by the EPA and MDE.

Table 4-2: LTGM Monitoring Well Identification		
Well Identification No.	**Well Location/Purpose**	**Approximate Well Screen Interval (feet below grade)**
CFD-3S	Shallow well is located at the downgradient edge of CFD. It provides data on contaminants likely to originate at the CFD.	4.5 - 9.5
CFD-5	Shallow well is located at farthest downgradient edge of solvent plume and is 200 feet from the Little Patuxent River. It monitors groundwater conditions near the discharge point into the river.	3 - 8
MWC-3	Located at the downgradient edge of the CFD near CFD-3S and is screened in the middle portion of Lower Patapsco Aquifer. It provides data relevant to vertical migration of contaminants.	29 - 39
MWC-5	Shallow well is up gradient of the CFD. It characterizes groundwater conditions not influenced by CFD or UWS. It also confirms the CFD OU is not influenced by upgradient sources.	31 - 41
WP-2	Shallow well is several hundred feet downgradient of the CFD and is on the edge of UWS. It monitors conditions downgradient from the landfill.	2.5 - 5.5
WP-6	Monitors water quality at the edge of UWS and southeast property boundary. It monitors possible migration of contaminants off site. Well screen is positioned just below the water table.	44 - 54

Source: Second Five-Year Review, Final (URS, September 2011)

A review like this one occurs every 5 years to evaluate the frequency and need for continued LTGM and determine whether the remedy continues to provide adequate protection of human health and the environment.

4.3 Remedy, Operation and Maintenance

The monitoring wells are inspected for general condition and structural integrity prior to each LTGM sampling round. The following items are visually inspected each round:

- Outer protective casing or flush-mount cover to assess its structural integrity
- Well caps and locks to ensure both are in place and functioning properly
- Concrete pad for the presence of cracks and settlement
- The inner cap and riser pipe to ensure these items are intact and functioning properly

(URS, September 2011)

The LTGM program is analyzed during the Five-Year Review process to determine if the program is operating efficiently and cost effectively. The annual cost for the LTGM program is shown in Table 4-3.

Table 4-3: Long-Term Groundwater Monitoring Costs

LTGM Dates	Total Cost Rounded to the Nearest $1000
2010	$35,000
2011	$73,000
2012	$44,000
2013	$44,000
2014	$28,000
2015	$27,000

Notes: The costs shown for the LTGM program do not include Army supervision and administrative costs.
Source: USACE, PM, March 2016

5.0 PROGRESS SINCE LAST REVIEW

5.1 Protectiveness Statement from Last Review

The findings of the second Five-Year Review report for the CFD OU (URS, September 2011) were that the remedy at the CFD OU was short-term protective. The protectiveness statement said that the remedy, "…currently protects human health and the environment because the LUCs protect the public from exposure to contaminated groundwater and MEC; the LTGM program ensures the detected groundwater contaminants are naturally attenuating and are not migrating off property."

But the second Five-Year Review protectiveness statement continues, "However, in order for the remedy to be protective in the long term, the following actions need to be taken to ensure long-term protectiveness:

- Submit an ESD to modify the LTGM frequency from biennial to annual.
- Submit a Land Use Control Implementation Plan (LUCIP) to formally document and enforce existing LUCs within the CERCLA process for the CFD OU.
- Submit a ROD and LUCIP for the High Explosive Impact (HEI) Area to better enforce and document the protectiveness of the MEC LUCs for the PRR-NT parcel, which includes the CFD OU.
- Perform an updated risk assessment after the remedy achieves MCLs in accordance with EPA OSWER No. 9200.4-23 (22 Aug 97) *Clarification of the Roles of ARARs in Establishing PRGs under CERCLA."*

The status of the recommendations above are discussed in Table 5-1, below.

Table 5-1: Status of the Second Five-Year Review "Protectiveness" Recommendations (Section 10.0 of the CFD Five-Year Review, URS, September 2011)

Recommendations	Status of Recommendations
Submit an ESD to modify the LTGM frequency from biennial to annual.	**Partially Implemented**: The LTGM frequency has been changed from biennial to annual. However, an ESD was not submitted to formally modify the frequency of the LTGM from biennial to annual. Also, this recommendation was misclassified as a "protectiveness" issue, in the second Five-Year Review.
Submit a LUCIP to formally document the LUCs in the CERCLA process.	**Not Implemented**: A LUCIP has not been submitted, to formally document the LUCs in the CFD OU CERCLA process. Also, this recommendation does not belong in a review of the ROD whose remedy is NFA with groundwater monitoring.
Submit a ROD and LUCIP for the HEI Area to better enforce and document the protectiveness of the MEC LUCs for the PRR-NT parcel, which includes the CFD OU.	**Not Implemented**: Efforts toward a ROD and LUCIP for the HEI Area are underway. The ROD is expected to be finalized in 2016. In lieu of a LUCIP; a Land Use Control Remedial Design (LUCRD) will subsequently be submitted. Also, this recommendation does not belong in the CFD Five-Year Review since it is not for the CFD – it is for the HEI. (It is noted that the HEI includes the CFD area.)

Perform an updated risk assessment after the remedy achieves MCLs in accordance with EPA OSWER No. 9200.4-23 (22 Aug 97) *Clarification of the Roles of ARARs in Establishing PRGs under CERCLA.*	**Not Implemented**: The groundwater has not yet achieved MCLs at all monitoring wells. Also, this recommendation was misclassified as a "protectiveness" issue, in the second Five-Year Review.

5.2 Status of Recommendations from Previous Review Issues and Recommendations

Recommendations from the second Five-Year Review, that do not affect protectiveness, are summarized in Table 5-2 (URS, September 2011).

Table 5-2: Status of the Second Five-Year Review Recommendations That Do Not Affect Protectiveness (Sections 8.0 and 9.0 of the CFD Five-Year Review, URS, September 2011)

Recommendations	Status of Recommendations
Revise the LTGM Work Plan and add MNA parameters and VOC daughter products to the program per regulatory recommendations (First and Second Five-Year Reviews). Change the sampling schedule from biennial to annual.	**Implemented:** The LTGM Work Plan was revised by adding MNA parameters and VOC daughter products to the program in response to the recommendations to the 2011 Five-year Review. The 2016 Work Plan amendment to the 2014 Combined Groundwater OU Work Plan subsequently eliminated MNA sampling due to the determination that MNA parameters were largely unchanged due to the limited biodegradation occurring at the site. Also, the sampling schedule was changed from biennial to annual.
Install a new monitoring well (screened 60 to 70 feet mean sea level) downgradient from CFD-3S to better track vertical migration.	**Implemented**: A new monitoring well, CFD-6, screened 60 to 70 feet mean sea level, has been installed downgradient from CFD-3S to better track vertical migration.
Collect an upgradient and downgradient surface water sample from the seep adjacent to CFD-5 and two surface water samples from the Little Patuxent River—one upstream from where the tributary enters the Little Patuxent River and the other one downstream—to determine whether site-related metal concentrations are migrating off site**.** If seep water is present near CFD-5, an additional seep sample will be collected.	**Implemented**: A surface water sample was collected, upgradient and downgradient from the seep adjacent to CFD-5. Also, two surface water samples were collected from the Little Patuxent River—one upstream from where the tributary enters the Little Patuxent River and the other one downstream. If seep water is present near CFD-5, an additional seep sample is collected. (Such samples were collected in 2012, 2013 and 2014.)

Recommendations	Status of Recommendations
Conduct the necessary repair work on the washed out roadway and broken well casings as well as re-paint the well identification numbers.	**Implemented**: The necessary repairs were done on the washed out roadway and broken well casings.
The Army, EPA, and MDE discuss a strategy to develop FGGM-specific groundwater background levels.	**Not Implemented:** FGGM groundwater background levels have not yet been agreed upon between the Army, EPA and MDE.
Where possible, select reporting limits and method detection limits to be below RSLs to the extent practicable.	**Implemented:** Where possible, reporting limits and method detection limits have been selected, that are below RSLs, to the extent practicable. However the ROD notes MCLs and SDWA parameters only (not RSLs), as a screening level. It is a recommendation of the current Five-Year Review to discontinue comparing groundwater to RSL values.

Not all of the above recommendations have been fully incorporated into subsequent LTGM reports; therefore, not all of the 2001 Five-Year Review recommendations have achieved their intended purpose.

6.0 FIVE-YEAR REVIEW PROCESS

6.1 Administrative Components

This third Five-Year Review is conducted for the FGGM BRAC site Clean Fill Dump by USACE. Interested parties in the CFD OU Five-Year Review include representatives of the DoD, FGGM, EPA, MDE, DOI, and the surrounding community.

EPA is providing regulatory oversight with consultation from MDE. The Army, as the lead agency, maintains ongoing discussions with EPA and MDE in overseeing FGGM BRAC site Clean Fill Dump's environmental restoration program. EPA and MDE have been notified of the Army's intent to perform the Third Five-Year Review for the Clean Fill Dump. Copies of the document will be provided to EPA and MDE for their review and comment.

USACE-Baltimore established the review schedule whose components include:

- Community Involvement;
- Document Review;
- Data Review;
- Site Inspection;
- Local Interviews; and
- Five-Year Review report Development and Review.

The schedule extends through September 2016.

6.2 Community Involvement

Fort Meade has an active Restoration Advisory Board (RAB) that meets periodically to discuss ongoing environmental restoration activities. Initial notice of this Third Five-Year Review is in Appendix D. The initial notice was published in the Bowie Blade News and Crofton West County Gazette on April 14, 2016 and in the Maryland Gazette on April 16, 2016. No comments were received. Also, a Five-Year Review public notice will be placed in local area newspapers, when the document has been finalized. A copy of that 'conclusion' newspaper notice will be placed in this report's Appendix D.

6.3 Document Review

This Five-Year Review consisted of a review of relevant documents, which included:

- Action Memorandum (Army, July 2000)
- Final Record of Decision Clean Fill Dump (CFD) Operable Unit 07 (EPA/ROD/R03-00/058, Army, September 2000
- United States Environmental Protection Agency Region III and the United States Department of the Army and the United States Department of the Interior and the United States Architect of the Capitol, Federal Facility Agreement under CERCLA Section 120, Administrative Docket No. CERC-03-2009-0207FF (EPA/Army/DOI/USAOC, Effective October 9, 2009)
- Second Five-Year Review Report, Clean-Fill Dump Operable Unit, Fort George G. Meade, Legacy Base Realignment and Closure Program (URS, September 2011)
- Combined Groundwater Operable Units (OUs) Long Term Monitoring (LTM) Work Plan, Final (URS, March 2012)
- Combined Groundwater Operable Units (OUs) Long Term Monitoring (LTM) Report, Final (URS, August 2013)
- Combined Groundwater Operable Units (OUs) Long Term Monitoring (LTM) Report, 2013 Sampling Event, Final (URS, July 2014)
- Combined Groundwater Operable Units 2014 Long Term Monitoring Report, Final (EA Engineering, May 2015)
- Combined Groundwater Operable Units 2015 Long Term Monitoring Report, Internal Draft (EA Engineering, September 2015)

6.4 Data Review and Trends

The objective of the groundwater data review is to analyze the data for the CFD OU selected remedy (NFA with monitoring) and to ensure the remedy is meeting the requirements established in the 2000 ROD (Army, September 2000). Based on environmental samples from soil,

sediment, surface water and groundwater, the HHRA concluded that the risks posed by CFD to human health and the environment for workers, trespassers, and site visitors are within the EPA's acceptable risk range of 10^{-4} to 10^{-6} (Army, September 2000). The ROD required groundwater to be sampled for metals, VOCs and SVOCs every 2 years until sampling results indicate concentrations are below MCLs promulgated under the SDWA. [SVOCs are no longer analyzed because concentrations were below legal limits (i.e., MCLs, SDWA) for two sampling periods.]

Because VOC concentrations were decreasing very slowly over time in CFD OU's wells, the Army, with state and federal regulator concurrence, modified the (LTGM) program sampling from biennial to annual in 2011. (Annual sampling would generate more data for statistical evaluation of data trends,) The groundwater at CFD OU has been sampled annually, since 2012. VOC concentrations decreasing very gradually over time indicate a stable plume.

Because the remedy selected in the ROD allows hazardous substances to remain at the CFD OU above UU/UE, this Five-Year Review is conducted to evaluate the frequency and need for continued groundwater monitoring, to the reference criteria (MCLs). Currently, the LTGM reports compare groundwater to RSLs, if there are no established MCLs, but that is not required in the ROD. This review documents the groundwater data trends reported to date (2011–2015), against ROD requirements for the CFD OU.

Also, currently the LTGM sampling includes Monitored Natural Attenuation (MNA) parameters. The VOC concentrations have exhibited a decreasing or stable trend, and the concentrations have remained low. They appear to represent more of an asymptotic plateau condition and/or intermittent minimal leaching from the landfill. Under these conditions, MNA would not be expected to play a significant role in the remedy evaluation and its sampling parameters would be of limited or no value (i.e., dispersion, groundwater flushing, landfill leaching are drivers of the VOC trends.

Since the issuance of the 2000 ROD, the MCL for arsenic has changed from 50 to 10 micrograms per liter (µg/L). Except for arsenic, the other MCLs have not changed since the start of the LTGM program.

Table 6-1 presents the maximum detected concentrations (MDCs), where applicable, for the groundwater constituents detected in one or more LTGM events at the CFD OU. Tables 6-2, 6-3, 6-4 and 6-5 are the CFD OU LTGM results for 2015, 2014, 2013 and 2012, respectively. Figures 6-1, 6-2, 6-3 and 6-4 show the location of exceedances of the MCLs at CFD OU, for 2015, 2014, 2013 and 2012, respectively (EA, May and September 2015, URS, August 2013 and July 2014).

Examination of Tables 6-1 through 6-5 shows that only a few groundwater constituents have consistently been detected at concentrations greater than their respective MCLs. They are: TCE, PCE and arsenic.

6.4.1 MCL Exceedances

Although concentrations have decreased for PCE and TCE during the course of the 2011-2015 LTGM program; both were detected above their respective MCLs in all LTGM events at well CFD-3S. CFD-3S is a source area monitoring well screened in shallow groundwater 4.5 - 9.5 feet below ground surface (bgs) (URS, September 2011).

However, another monitoring well in the source area, MWC-3 (screened, 29 - 39 feet bgs), at the toe of the landfill, has not shown any arsenic, PCE or TCE contamination above MCLs. This leads to the conclusion that VOC groundwater contamination is present only in the shallow aquifer.

PCE, TCE and DCE isoconcentration maps are shown for 2015 and 2014 in Figures 6-5 and 6-6, respectively. TCE and cis 1, 2-DCE isoconcentration maps are given for 2013 in Figures 6-7 and 6-8, respectively. Figures 6-9 and 6-10 present the TCE and cis 1, 2-DCE isoconcentration maps, respectively, for 2012.

At well WP-2, a mid-plume monitoring well, the only exceedance for any VOC above the MCL from 2011 to 2015 was one detection of TCE (23.3 ug/L) in 2014.

Downgradient monitoring well CFD-5 showed no detections of any VOC above any MCL, 2011 to 2015. At well CFD-5, arsenic was detected above the MCL in all LTGM events, 2002 to 2014, but not in 2015. Arsenic concentrations at well CFD-5 range from 21.3 µg/L in 2014 to 31 µg/L, in 2002. Groundwater conditions at CFD-5 (the most downgradient well at the CFD OU) are monitored to determine whether contaminants are potentially reaching the Little Patuxent River (EA, May 2015).

Arsenic, TCE, PCE, and breakdown product (cis- 1, 2-DCE) were not detected in WP-6, 2011 to 2015, demonstrating these groundwater chemicals of potential concern (COPCs) are not migrating to the southeast off the property.

The Little Patuxent River serves as a constant head discharge for the shallow groundwater and, therefore, controls the groundwater elevation near the site. To verify that contaminants are not migrating toward the Little Patuxent River, the Army installed a new well , CFD-6 (screened 60 to 70 feet above mean sea level), downgradient from CFD-3S to better track vertical migration (URS, September 2011). Monitoring well CFD-6 has not shown any VOC contamination above MCLs.

6.4.2 Groundwater Trends

Tables 6-6, 6-7, 6-8 and 6-9 are the CFD OU historical results (1991 to 2015), for PCE, TCE, DCE and arsenic, respectively. The monitoring wells chosen for the tables (CFD-3S, CFD-5, MWC-3, MWC-5, WP-2, WP-6), are the wells selected for LTGM. CFD-3S and MWC-3 are source area monitoring wells, the former screened in shallow groundwater (4.5 - 9.5 feet bgs) and the latter screened deeper (29 - 39 feet bgs), at the toe of the landfill. Monitoring well CFD-5 is the most downgradient monitoring well, near the Patuxent River. MWC-5 is an upgradient well. WP-2 is a mid-plume monitoring well. WP-6 is a deep well (screened 44 - 54 feet bgs), at the southeast boundary of the Uncontrolled Waste Site, placed to determine if contaminants are detected southeast of the property.

Figure 6-11 shows the graphical representation of the results from the previous tables (Tables 6-6, 6-7, 6-8), for PCE, TCE and DCE, for a source area well (CFD-3S), a mid-plume well (WP-2) and a downgradient well (CFD-5). Arsenic is not shown as a graph because its concentration has been relatively steady.

Considering the five year period of this review, 2011 through 2015, the PCE concentrations at CFD-3S (Figure 6-11) has decreased over time from the high in 2012 (24 ug/L) until the latest detection in2015 of 17.6 ug/L. The PCE concentrations are above the MCL (5.0 ug/L).

The TCE concentrations remain fairly consistent over time (between 5.1 and 6.9 µg/L). The TCE concentrations have been above the MCL of 5 µg/L. The cis-1,2-DCE concentrations also remain fairly consistent over time (between 8.46 and 12.4 µg/L), always remaining below its MCL of 70 µg/L.

The analytical graphical representation of PCE, TCE and DCE at CFD-3S (Figure 6-11) shows a PCE decreasing trend using the total time samples were taken, 1991 to 2015. This is confirmed by the Mann-Kendall analysis of PCE at CFD-3S, Figure 6-12. The Mann-Kendall analysis for TCE is probably decreasing (Figure 6-13), but that of DCE is increasing (Figure 6-14).

Mid-plume well WP-2 shows no definite trend between October 1996 and June 2015 (Figure 6-11), for PCE, TCE or DCE. The PCE concentrations at WP-2 (Figure 6-11) are consistently below detection limits and the MCL. The Mann-Kendall analysis for TCE (Figure 6-13) and DCE (Figure 6-14) confirm there is no definite trend for these analytes at WP-2. The TCE concentrations were near non-detect in 2012, 2013 and 2015, but increased to 23.3 ug/L in 2014. The cis-1,2-DCE concentrations were low and steady

The contaminant concentration values for PCE, TCE and DCE are shown for the furthest downgradient well CFD-5, in the last Figure 6-11 graph. The Mann-Kendall analysis for downgradient well CFD-5 calculates that TCE is probably decreasing (Figure 6-13) and also that DCE is probably decreasing (Figure 6-14). PCE concentrations in CFD-5 were consistently non-detect for 2012, 2013, 2014 and 2015. The TCE concentrations are all below the limit of

quantitation for 2012, 2013 and 2014. The cis-1,2-DCE concentrations are consistently low over time (between 1.7 and 2.5 μg/L), in 2012, 2013 and 2014. The cis-1,2-DCE concentration was below detection limits in 2015.

The historical and current LTGM results indicate VOCs are not migrating offsite to potential receptors.

The metal concentrations have remained consistent over time at the CFD OU and are likely attributed to background. However, groundwater background levels of metals has not yet been established for FGGM-BRAC. Chromium concentrations, noted as increasing in the Second Five-Year Review for the six LTM wells, is increasing only for CFD-3S (17.1 ug/L), and only in 2012. Arsenic concentrations (see Table 6-9), are mostly in the single digits throughout the site, except at CFD-5 where it exceeded its MCL (10 ug/L) in 2012 (25 ug/L), 2013 (24 ug/L), and 2014 (21.3 ug/L) and at CFD-1 (17 ug/L), in 2012. The Mann-Kendall analysis of arsenic at CFD-5 (Figure 6-15), shows a decreasing trend. Arsenic, iron, and lead were detected above the MCLs at CFD-5; therefore, metals are potentially migrating off site or are likely attributed to background levels.

6.5 Site Inspection

The Clean Fill Dump OU (SWMU 50) Site Inspection was conducted on May 8, 2015, by Mona Ponnapalli (USACE Project Engineer), Rich Braun, PhD (USACE Risk Assessor), Steve Cardon (BRAC Environmental Coordinator) and Sherry Krest and Dionne Briggs (both of USFWS). The Site Inspection is a required component of the Five-Year Review. Its purpose is to observe and document site conditions. The weather at the time of the site visit was warm (~85^{o}F) and mostly sunny.

Clean Fill Dump OU is a combination of the Clean Fill Dump site (13.6 acres) and the Uncontrolled Waste Site (18.2 acres), linked because the operable unit is groundwater. CFD is north of the UWS. The CFD OU has a locked gate near the Boundary Road, with an incomplete fence on either side. The gate has a "No Trespassing" sign. There is a dirt road inside the eastern edge of the CFD OU.

The CFD and UWS areas are large and undeveloped, so the visual evaluation of portions of the CFD OU was difficult because of heavy vegetation and terrain. Only portions of the CFD OU within approximately 0.25 miles of the Boundary Road gate were traversed. The terrain is rumpled grassy fields with weeds and clumps of brush and larger trees. There are depressions in the surface up to 3-feet deep. The CFD OU fill slope rises about 10-feet above the wetlands. The UWS part of the site has wetlands and lower elevation as it goes southwest of the CFD OU.

Overall the vegetation looks healthy, although some dead trees and brush were observed. The CFD OU soil cover had animal burrows throughout and non-vegetated areas where there were slopes to the wetlands. Surficial debris of man-made origin (pipes, building materials) was

observed. The most prominent debris were several pieces of concrete pipe near each other. There was no ponding evident at the time of the site visit.

Several of the monitoring wells at the CFD OU were observed. All of the observed MW had secure caps, but the identification was hard to discern and the well ID were not the same as in the LTGM report. Also, the MW wells' paint was peeling. No commercial or residential construction was observed near the CFD OU that would raise the possibility of offsite groundwater use. The Wildlife Loop road, a portion of which was noted in the Second CFD OU Five-Year Review as damaged by heavy rains, has been minimally repaired. It is a rough gravel road with ponding in various areas.

A report of the site inspection is contained in Appendix A and the EPA Five-Year Review Site Inspection Checklist is in Appendix B.

6.6 Interviews

Interviews of the U.S. Fish and Wildlife personnel were conducted after the site visit on May 8, 2015. They were: Dionne Briggs (Refuge Operations Specialist), Sherry Krest (Environmental Contaminants, Supervisor) and Brad Knudsen (PRR Refuge Manager). Ms. Briggs is based at PRR. Ms. Krest and Mr. Knudsen are familiar with the site but are based in Annapolis and Laurel, respectively. Ms. Briggs verified that hunters sometimes access the CFD OU and UWS areas, despite the gate.

All the USFWS personnel thought the site remedy was adequate but felt that the CFD OU should have a better (thicker, smoother) soil cover and that all surficial debris should be removed. They did not feel there were many trespassers on CFD OU, but Ms. Briggs felt that the partial fence and gate did not prevent determined hunters (trespassers). However, Ms. Briggs, the person most familiar with the CFD OU, has seen no evidence of groundwater use by trespassers.

Steve Cardon (BRAC Environmental Coordinator) was interviewed by telephone on July 16, 2015. Ms. Elisabeth Green's (MDE) telephone interview was on July 22, 2015. Mr. Robert Stroud (EPA) completed a written response to CERCLA interview questions on August 26, 2015.

Mr. Cardon and the two regulators felt that the site remedy was effective. Ms. Green and Mr. Stroud both felt that they are adequately informed about the site and stated that they had no issues with the management and operation at the CFD OU. The interview records are an attachment to the Site Inspection Checklist (Appendix B).

7.0 TECHNICAL ASSESSMENT

7.1 Question A: Is the Remedy Functioning As Intended By The Decision Documents?

Yes. The CFD OU remedy, no further action with groundwater monitoring, is functioning as intended. Groundwater is sampled annually and analyzed for metals and VOCs.

7.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels and, Remedial Action Objectives Used At The Time Of The Remedy Selection Still Valid?

Yes. As stated in the EPA Superfund Record of Decision (2000): "Because the human health and ecological risk assessments concluded that the site conditions do not pose an unacceptable risk to potential human and ecological receptors, no further action with monitoring is deemed appropriate to protect human health and the environment."

There is a TCE plume at CFD OU, but the soil and groundwater concentrations of VOCs are very low. There are no buildings (present or future buildings allowed), on CFD OU and the Little Patuxent River is directly downgradient of CFD OU. Thus vapor intrusion is not a concern at CFD OU.

Because the CFD OU is part of the 8,100-acre Patuxent Research Refuge, a National Wildlife Refuge administered by the U.S. Fish and Wildlife Service, there are no groundwater on-site human receptors.

7.3 Question C: Has Any Other Information Come To Light That Could Call Into Question The Protectiveness Of The Remedy?

No. No new information was identified that would lead to the conclusion that the current response actions are considered no longer protective. No new complete groundwater exposure pathways were identified for either human or ecological receptors. No weather-related events have affected the protectiveness of the remedy. Current and anticipated surrounding future land use will likely remain unchanged.

7.4 Technical Assessment Summary

The data review, the SI, and the interviews indicate the remedy is functioning as intended. No changes in the physical conditions of the CFD OU have occurred that would affect the protectiveness of the remedy. No new information calls into question the protectiveness of the remedy.

8.0 ISSUES

At this time, there are no issues which affects protectiveness.

Concerns that do not affect protectiveness are:

1) There is analysis of MNA parameters although the ROD does not require it and it is unlikely that analysis of the MNA parameters will show that it is an important degradation mechanism.

2) For analytes without MCLs, groundwater samples are compared to RSLs although the ROD does not require it. The ROD, based on the HHRA found that there were no unacceptable risks at CFD OU, based on its intended use as a wildlife refuge. More comparison standards make it harder to achieve a lessening and eventual cessation of sampling.

3) The groundwater concentrations of metals have remained consistent over time at the CFD OU and are likely attributed to background; the background groundwater metals concentrations were determined in the Inactive Landfills 1, 2, 3 and Clean Fill Dump RI in 1998 (ICF Kaiser, 1998). However, because of an absence of regulatory approval, FGGM-specific background levels have not been established.

9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Recommendations for the concerns at CFD OU that do not affect protectiveness are:

A two part optimization recommendation is an adherence to ROD standards: 1) develop risk-based PRGs for the analytes that commonly exceed RSLs and 2) stakeholders should agree upon FGGM-specific groundwater background levels. Taken together, these recommendations above will optimize groundwater sampling, and present a valid exit strategy.

10.0 PROTECTIVENESS STATEMENT

The remedy is protective because there are no unacceptable risks to human health and the environment from groundwater and because there is no groundwater use except authorized environmental sampling.

11.0 NEXT REVIEW

The next Five-Year review is due on September 22, 2021, approximately five years from the date of this review. The review will be combined with the 2021 Ordnance Demolition Area and Tipton Airfield Parcel Five-Year Reviews.

12.0 REFERENCES

(Army/EPA/DOI/USAOC, Effective October 9, 2009) United States Environmental Protection Agency Region III and the United States Department of the Army and the United States Department of the Interior and the United States Architect of the Capitol, Federal Facility Agreement under CERCLA Section 120, Administrative Docket No. CERC-03-2009-0207FF

(United States Army (Army), September 2000) *Final Record of Decision Clean Fill Dump (CFD) Operable Unit 07.* EPA/ROD/R03-00/058.

(Army, August 2000) *Final Proposed Plan for Clean-Fill Dump Operable Unit 07*

(Army, July 2000) *Action Memorandum: Safety Precautions to Be Taken at Clean-Fill Dump, Fort George G. Meade, Maryland. Final*

(Arthur D. Little, Inc., May 1997) *Remedial Investigation Addendum: Fort George G. Meade Feasibility Study and Remedial Investigation/Site Inspection, Final*

(Arthur D. Little, Inc. December 1995) *Fort George G. Meade Base Closure Parcel Site Inspection Study Addendum*

(EA Engineering (EA), September 2015) *Combined Groundwater Operable Units 2015 Long Term Monitoring Report, Internal Draft*

(EA, May 2015) *Combined Groundwater Operable Units 2014 Long Term Monitoring Report, Final*

(EA, December 1992) *Fort George G. Meade Active Sanitary Landfill and Clean Fill Dump Remedial Investigation Report, Final.*

(EA, 1992b) *Fort George G. Meade Base Closure Parcel Site Inspection Study, Vols. I and II, Final*

(U.S. Environmental Protection Agency (EPA), 2015.) *National Primary Drinking Water Regulations, List of Contaminants and their MCLs,* Website: http://water.epa.gov/drink/contaminats/index.cfm.

(EPA, May 2015) Regional Screening Level (RSL) Table Dated May 2015.)

http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.

(EPA 540-R-01-007, June 2001) *Comprehensive Five-Year Review Guidance*

(Environmental Research Division, October 1989) *Enhanced Preliminary Assessment Report: Fort George G. Meade, Maryland. Final*

(ICF Kaiser Engineers, Inc., August 1998) *Remedial Investigation Report for Inactive Landfills 1, 2, 3 and Clean Fill Dump*

(Maryland Department of Natural Resources (MDNR), 1990) 40 CFR 300, Vol. 64 No. 180. Friday, September 17, 1999.

(OHM Remediation Services Corporation, June 1995) *Explosive Safety Submission for Ordnance and Explosives Removal and Property Release Tipton Airfield, Fort Meade.* Prepared for the Army Environmental Center's Base Closure Division.

(Plexus Scientific Corporation, January2008) *Final Report for Debris Removal at the Uncontrolled Waste Site Patuxent Research Refuge-North Tract Laurel Maryland*.

(Rogers, Golden, & Halpern, Inc. (RGH) and CH2M Hill, January 1991) *Wetland Identification at Fort Meade, Maryland*

(RGH, January 1990) *Draft Environmental Impact Statement, Fort Meade and Fort Holabird, Base Closure/Realignment*

(URS, July 2014) *Combined Groundwater Operable Units (OUs) Long Term Monitoring (LTM) Report, 2013 Sampling Event, Final*

(URS, August 2013) *Combined Groundwater Operable Units (OUs) 2012 Long Term Monitoring (LTM) Report, Final*

(URS, March 2012) *Combined Groundwater Operable Units (OUs) Long Term Monitoring (LTM) Work Plan, Final*

(URS, September 2011) *Second Five-Year Review Report, Clean-Fill Dump Operable Unit, Fort George G. Meade, Legacy Base Realignment and Closure Program*

(USACE, February 11, 2011) *Draft 2010 Long-Term Monitoring Report, Clean Fill Dump Operable Unit, Patuxent Research Refuge-North Tract, Anne Arundel County, MD, September 2010 Sampling Event*

(USACE, September 2008) *Fort George G. Meade Legacy Base Realignment and Closure Program, Long-Term Monitoring Report, Groundwater Sampling June 2008, Clean Fill Dump Operable Unit, Patuxent Research Refuge-North Tract, Anne Arundel County, Maryland*

(USACE, 2008b) *Project Closeout Report, Fiscal Year 2008 for Fort Meade Uncontrolled Waste Site-Adjacent; Landfill, Patuxent Wildlife Refuge; Fort George G. Meade, Maryland.*

(USACE, October 2007) *Fort George G. Meade Legacy Base Realignment and Closure Program, Long- Term Monitoring Report, Groundwater Sampling September 2006, Clean-Fill Dump Operable Unit, Patuxent Research Refuge-North Tract, Anne Arundel County, Maryland*

(USACE, December 2005) *Final Five-Year Review for the Clean-Fill Dump Operable Unit Fort George G. Meade Anne Arundel County, Maryland*

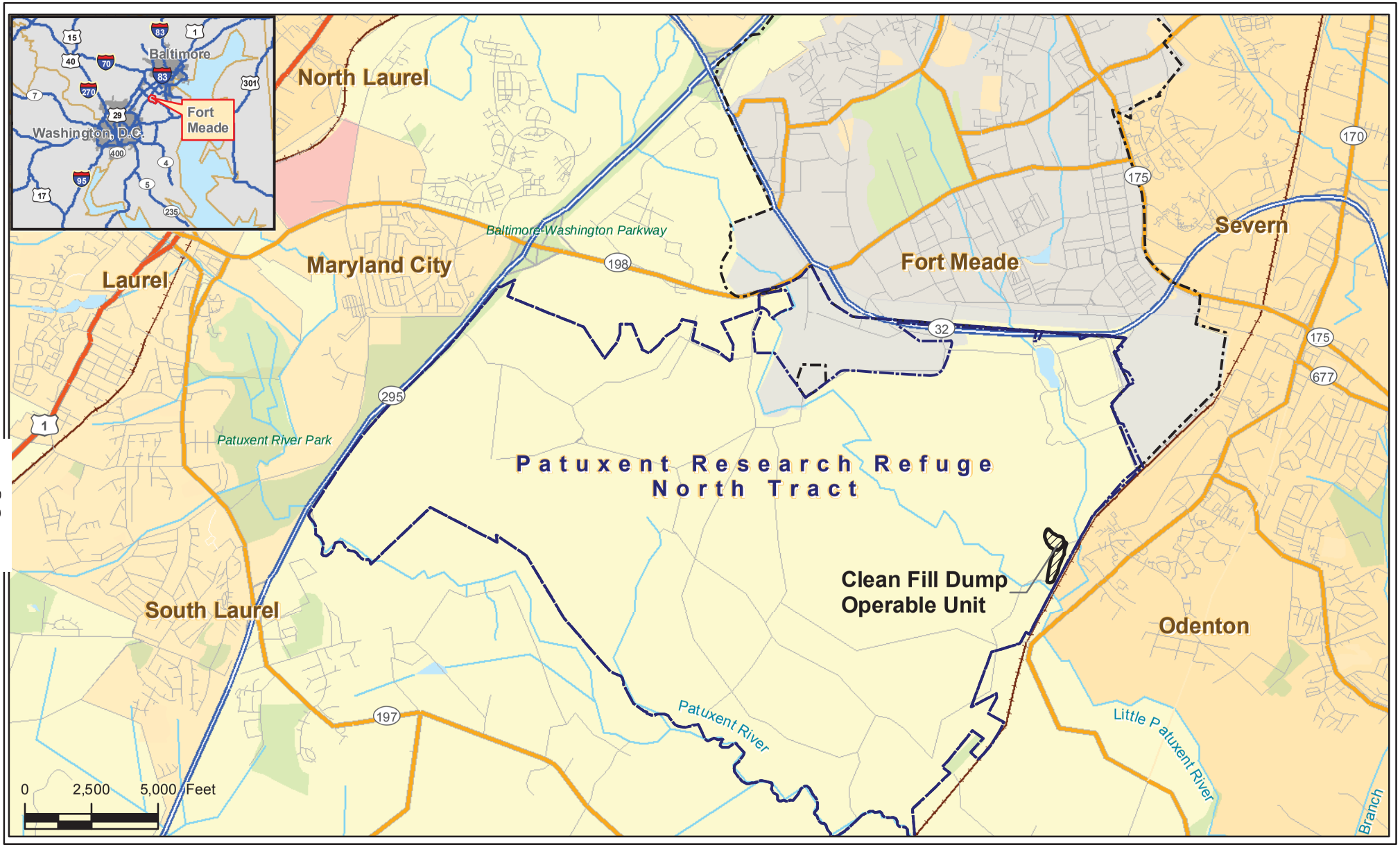
(USACE, June 2005) *Fort George G. Meade Long-Term Biennial Groundwater Monitoring Results, Clean Fill Dump Operable Unit, Spring 2004 Sampling Event, Final*

USACE, July 2003) *Fort George G. Meade Long-Term Biennial Groundwater Monitoring Results, Clean Fill Dump Operable Unit (OU), Spring 2002 Sampling Event, Final.* July 16, 2003.

(USACE, February 2002) *Fort George G. Meade Long-Term Groundwater Monitoring Plan for Clean Fill Dump (CFD) Operable Unit (OU), Final Document*

(USACE, August 1991) *Final Environmental Impact Statement, Comprehensive Base Realignment and Partial Closure for Fort George G. Meade and Fort Holabird*

Figures



3-2

CLIENT	U.S. Army Corps of Engineers, Baltimore District			
DATA SOURCE	ESRI Street Maps 9.2; CFD Long-Term Monitoring 2010 Sampling Event			
REVISION NO	0	GIS:	JK	02/03/11
SCALE	1:60,000	CHECKED:	GW	02/03/11
G:\Projects\Fort_Meade\Clean_Fill_Dump\2010\CFD_Figure1-1_locator.mxd		PROJ MGR	FM	-

N

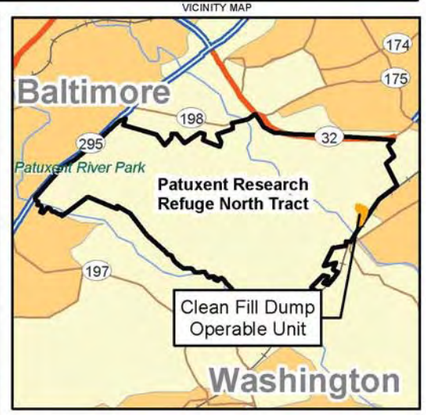
TITLE: Vicinity Map
Clean Fill Dump Operable Unit

URS
200 Orchard Ridge Drive
Gaithersburg, MD 20878

PROJ NO 15301259.00002

FIGURE 3-1

VICINITY MAP



Legend

- Monitoring Well Location
- Groundwater Contour
- Inferred Groundwater Contour
- Groundwater Flow
- Amtrak Right-of-Way
- Road
- Surface Water

WP-4
92.15
Monitoring Well ID
Groundwater Elevation, feet

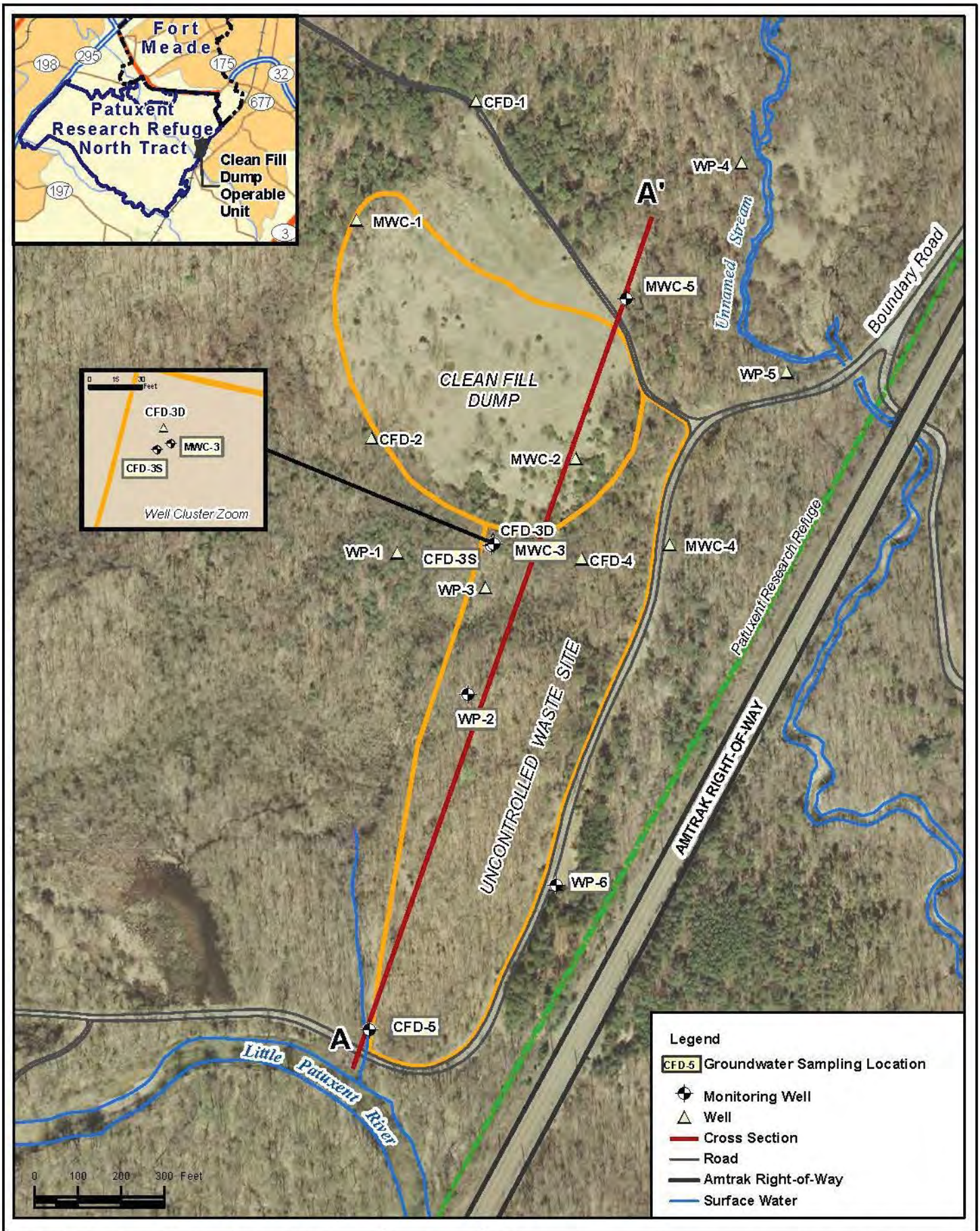
Map Date: April 2015
Data Sources: USACE 2010, ESRI 2011

N

0 200 400
Feet

FIGURE 3-2 2014 GROUNDWATER ELEVATION CONTOUR MAP, CLEAN FILL DUMP OPERABLE UNIT
Anne Arundel County, Maryland

L:\GIS\Data\Northeast\Maryland\Fort_Meade\Meade_LTM\MXD\2014 LTM Report\Figure 4-1 Groundwater Elevation Contour Map, Clean Fill Dump Operable Unit.mxd



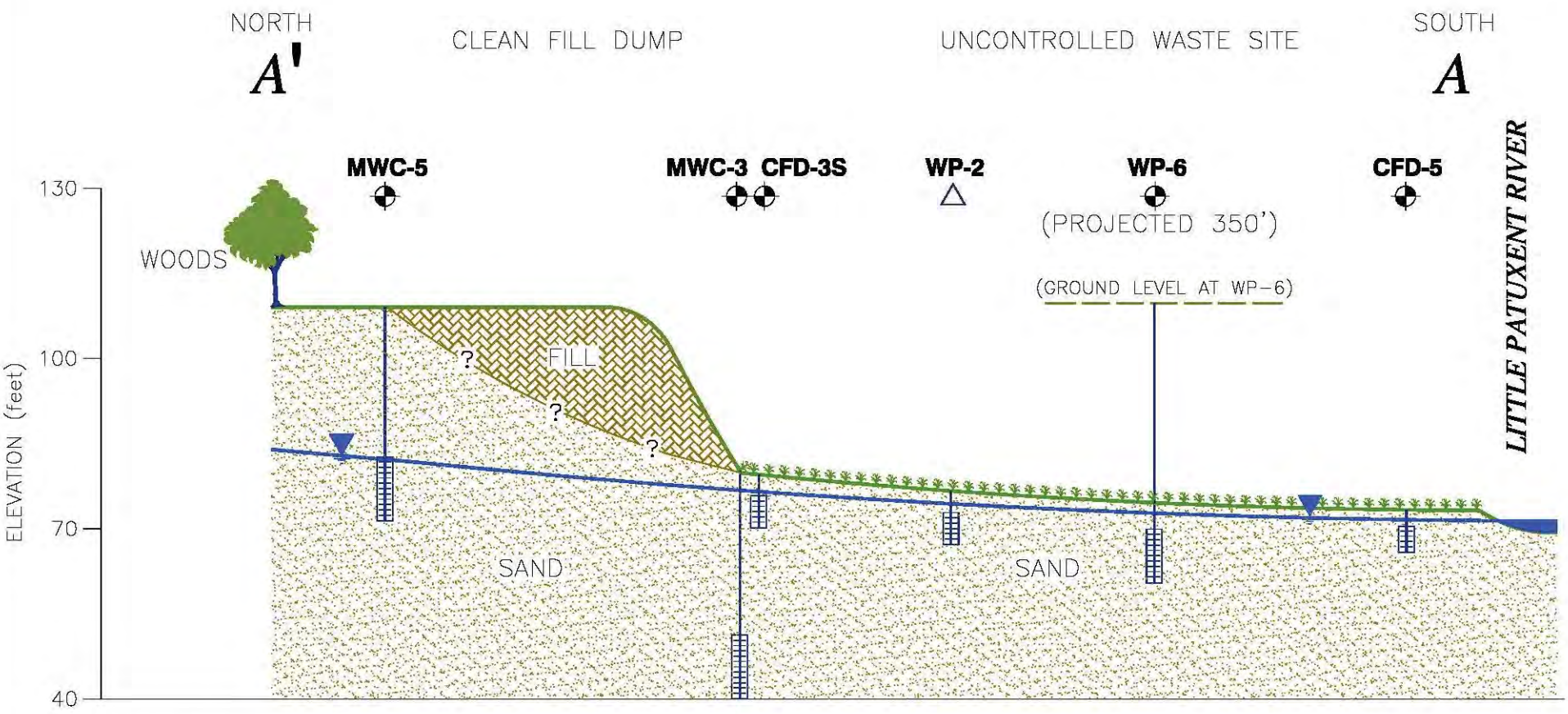
CLIENT	U.S. Army Corps of Engineers, Baltimore District			
PROJ	Clean Fill Dump Well Locations			
SOURCE	Base data: USACE, 2002; Aerial, 2003.			
REVISION NO	1	GIS:	AER	07/25/08
SCALE	1:3,600	CHK BY	FM	-
G:\Projects\Fort_Meade\Clean_Fill_Dump\2008 CFD_Figure3-1_WellLocations.mxd		PROJ MGR	FM	-

TITLE: Monitoring Well Locations and Cross Section
Clean Fill Dump Operable Unit

URS
12420 Milestone Center Drive
Germantown, MD 20876

PROJ NO 15301259.00002

Figure 3-3



LEGEND:

WELL SCREEN

WATER TABLE

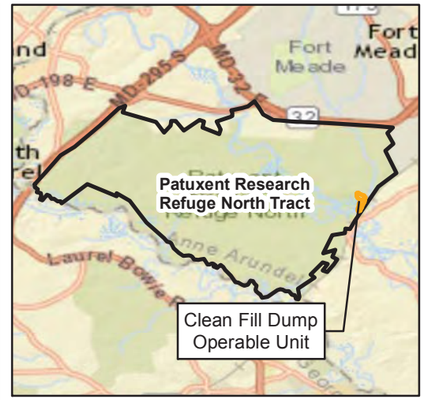
SCALE

VERTICAL	1" = 30'
HORIZONTAL	1" = 300'
EXAGGERATION	10 : 1

CLIENT: U.S. Army Corps of Engineers, Baltimore District	LOCATION:
DATE: 07/24/08	FILE:
DESIGN: AER CHECKED: FM SENIOR: SM	URS 200 Orchard Ridge Drive Gaithersberg, MD 20878

Figure 3-4
Geologic Cross Section A-A'
Clean-fill Dump Operable Unit
Patuxent Research Refuge-
North Tract

VICINITY MAP



Legend

- Monitoring Well Location
- Amtrak Right-of-Way
- Road
- Surface Water
- Patuxent Research Refuge - North Tract Boundary
- Clean Fill Dump Operable Unit Boundary

Analyte	MCL (µg/L)
Tetrachloroethene (PCE)	5
Trichloroethene (TCE)	5

Map Date: September 2015
Data Sources: USACE 2010, ESRI 2011

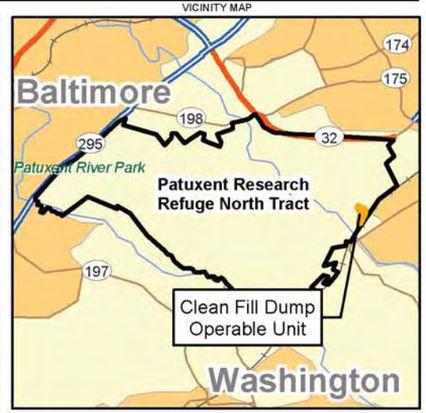
N

0 200 400
Feet

FIGURE **6-1**
2015 MCL EXCEEDANCES, CLEAN FILL DUMP OPERABLE UNIT Anne Arundel County, Maryland

\\lovetongis\GIS\data\Federal\Northeast\Maryland\FortMeade\Meade_LTM\MXD\2014 LTM Report\FigureRevisions\Figure 4-4 MCL Exceedances, Clean Fill Dump Operable Unit.mxd

VICINITY MAP



Legend

- Monitoring Well Location
- Surface Water Location
- Amtrak Right-of-Way
- Road
- Surface Water

Analyte	MCL (µg/L)
Arsenic	10
Lead	15
Tetrachloroethene (PCE)	5
Trichloroethene (TCE)	5

Note:
MCL for Lead = US EPA action level for public water treatment systems

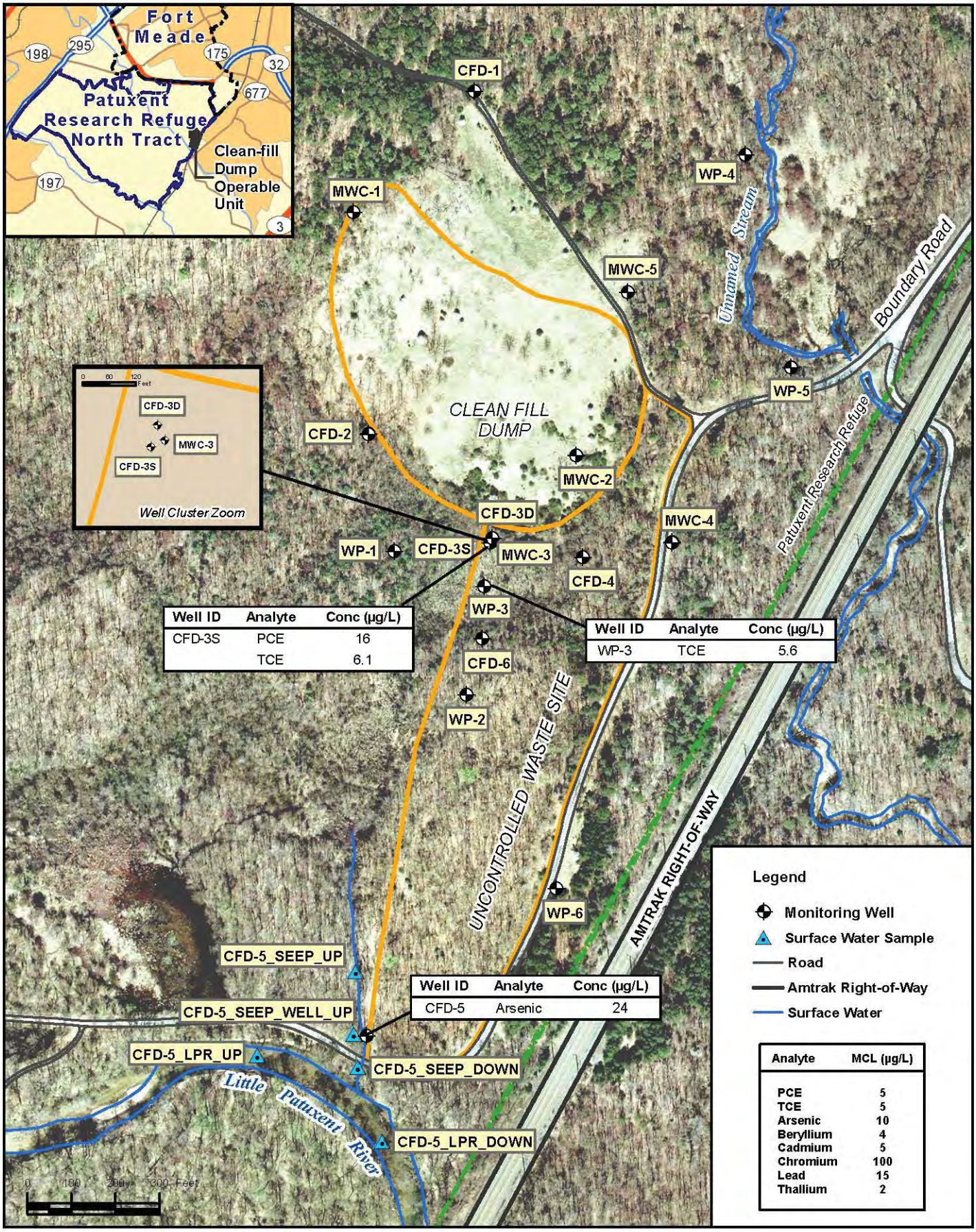
Map Date: April 2015
Data Sources: USACE 2010, ESRI 2011

N

0 200 400
Feet

FIGURE 6-2 2014 MCL EXCEEDANCES, CLEAN FILL DUMP OPERABLE UNIT
Anne Arundel County, Maryland

\\lovetonfederal\GISData\Northeast\Maryland\Fort_Meade\Meade_LTM\MXD\2014 LTM Report\Figure 4-4 MCL Exceedances, Clean Fill Dump Operable Unit.mxd



CLIENT	U.S. Army Corps of Engineers, Baltimore District			
PROJ	LTM Work Plan			
SOURCE	Base data: USACE, 2002; Aerial, 2003.			
REVISION NO	3	GIS:	HAB	11/01/2013
SCALE	1:3,600	CHK BY	KL	11/01/2013
G:\Projects\Fort_Meade\Clean_Fill_Dump\2013\CFD_Figure4-4_MCLexceed.mxd		PROJ MGR	BE	11/01/2013

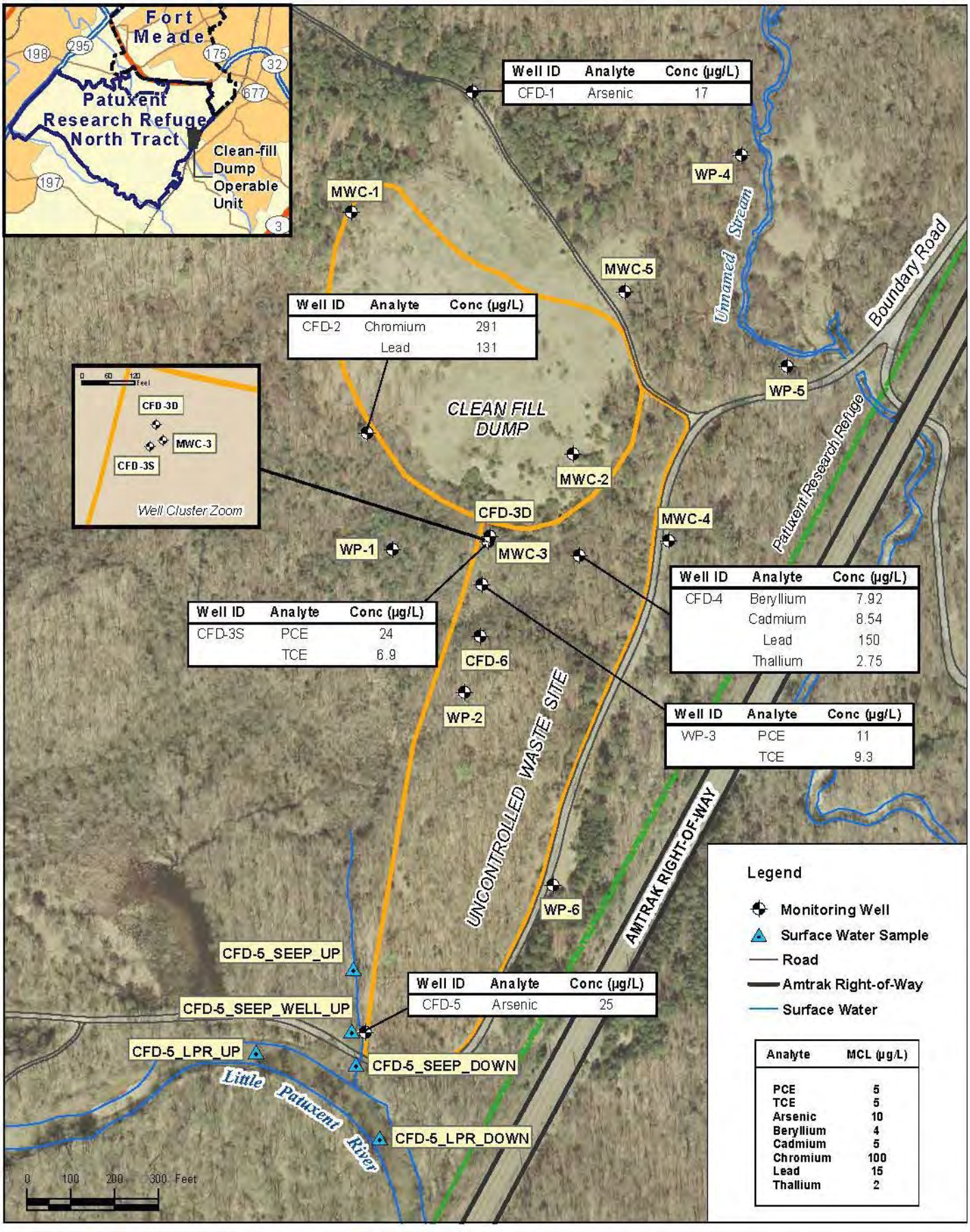
TITLE

2013 MCL Exceedances
Clean Fill Dump Operable Unit

URS
12420 Milestone Center Drive
Germantown, MD 20876

PROJ NO 15301259.00002

Figure 6-3



CLIENT	U.S. Army Corps of Engineers, Baltimore District			
PROJ	LTM Work Plan			
SOURCE	Base data: USACE, 2002; Aerial, 2003.			
REVISION NO	1	GIS:	JK	08/23/12
SCALE	1:3,600	CHKBY	CB	10/23/12
G:\Projects\Fort_Meade\Clean_Fill_Dump\2012\CFD_Figure6-4_MCLexceed.mxd		PROJ MGR	FM	-

TITLE: 2012 MCL Exceedances
Clean Fill Dump Operable Unit

URS
12420 Milestone Center Drive
Germantown, MD 20876

PROJ NO 15301259.00002

Figure 6-4

PCE Results
MCL = 5 µg/L

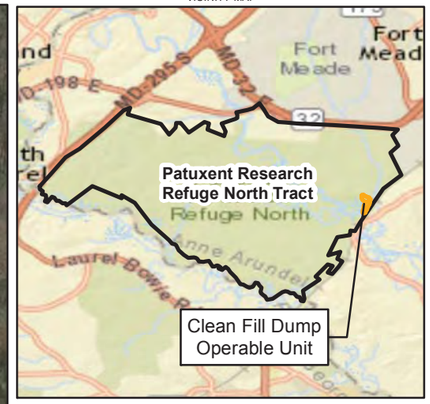
TCE Results
MCL = 5 µg/L

DCE Results
MCL = 70 µg/L

CFD-1 ND
WP-4 ND
MWC-1 ND
MWC-5 ND
WP-5 ND
CFD-2 ND
CFD-3D ND
MWC-2 ND
MWC-3 ND
WP-1 0.615 µg/L
WP-1 ND
WP-1 0.658 µg/L
CFD-4 ND
MWC-4 ND
CFD-35 17.6 µg/L
CFD-35 5.10 µg/L
CFD-35 12.4 µg/L
WP-3 1.61 µg/L
WP-3 4.46 µg/L
WP-3 8.92 µg/L
10
5
1
CFD-6 ND
WP-2 ND
WP-6 ND
CFD-5 ND

CLEAN FILL DUMP
UNCONTROLLED WASTE SITE
Patuxent Research Refuge
Amtrak Right-of-Way

VICINITY MAP



Legend

- Monitoring Well Location
- Amtrak Right-of-Way
- Road
- Surface Water
- PCE Concentration Contour
- TCE Concentration Contour
- DCE Concentration Contour
- Patuxent Research Refuge - North Tract Boundary
- Clean Fill Dump Operable Unit Boundary

Map Date: September 2015
Data Sources: USACE 2010, ESRI 2011

N

0 200 400
Feet

FIGURE **6-5**
2015 PCE, TCE, AND DCE CONCENTRATION CONTOURS, CLEAN FILL DUMP OPERABLE UNIT
Anne Arundel County, Maryland

\\lovetongis\GIS\data\Federal\Northeast\Maryland\FortMeade\Meade_LTM\MXD\2014 LTM Report\FigureRevisions\Figure 4-6 PCE, TCE, and DCE Concentration Map.mxd

VICINITY MAP

Legend

- Monitoring Well Location
- Amtrak Right-of-Way
- Road
- Surface Water
- PCE Concentration Contour
- TCE Concentration Contour
- DCE Concentration Contour

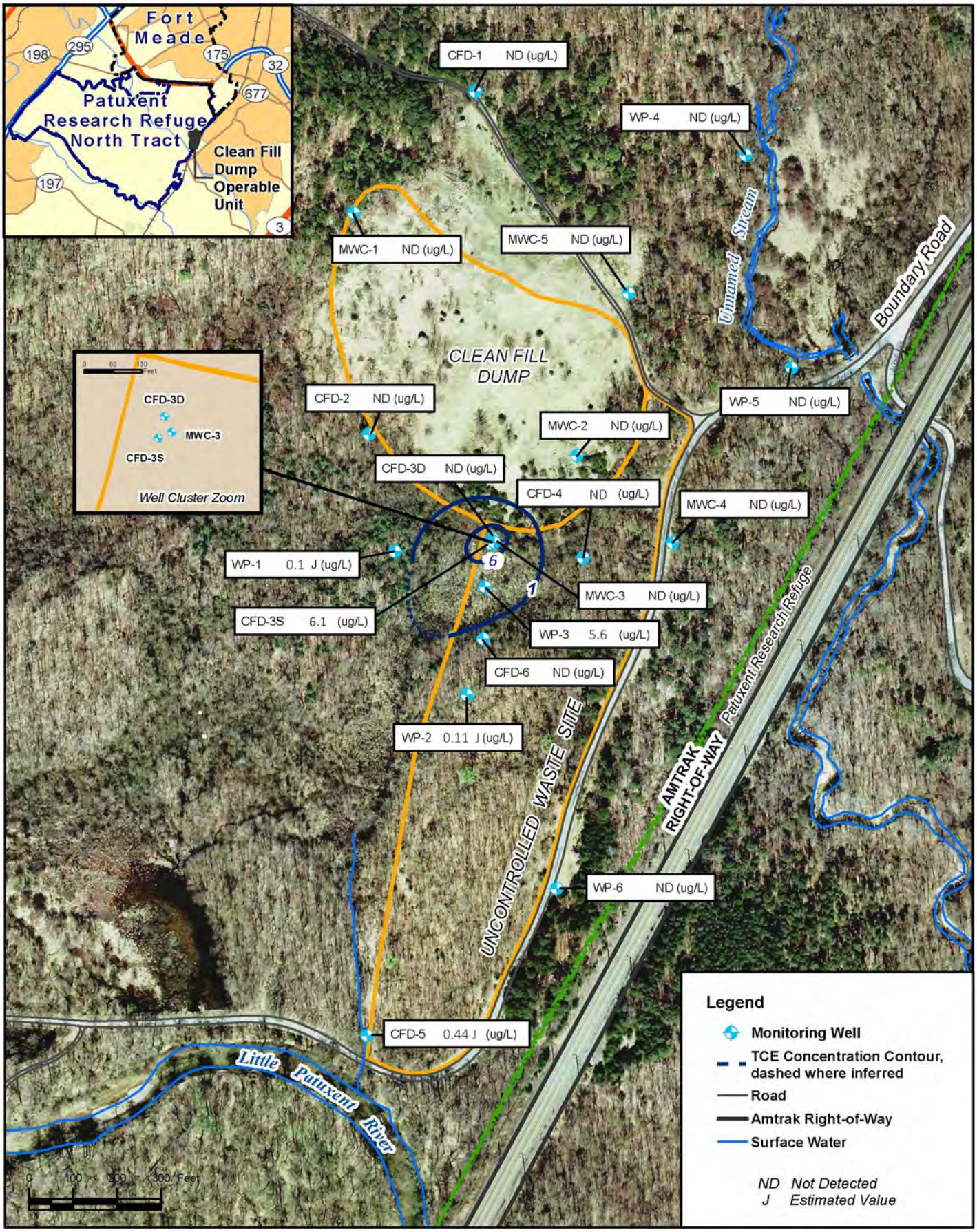
Map Date: April 2015
Data Sources: USACE 2010, ESRI 2011

N

0 200 400
Feet

FIGURE 6-6 2014
PCE, TCE, AND DCE CONCENTRATION CONTOURS, CLEAN FILL DUMP OPERABLE UNIT
Anne Arundel County, Maryland

L:\GIS\Data\Northeast\Maryland\Fort_Meade\Meade_LTM\MXD\2014 LTM Report\Figure 4-6 PCE_TCE_DCE Concentration Contours, Clean Fill Dump Operable Unit.mxd



CLIENT	U.S. Army Corps of Engineers, Baltimore District			
PROJ	Clean Fill Dump Well Locations			
SOURCE	Base data: USACE, 2002; Aerial, 2003.			
REVISION NO	1	GIS:	TB	11/15/2013
SCALE	1:3,600	CHK BY	HB	8/30/2013
G:\Projects\Fort_Meade\Clean_Fill_Dump\2013 CFD_Figure4-2_TCEShallowAq.mxd		PROJ MGR	BE	-

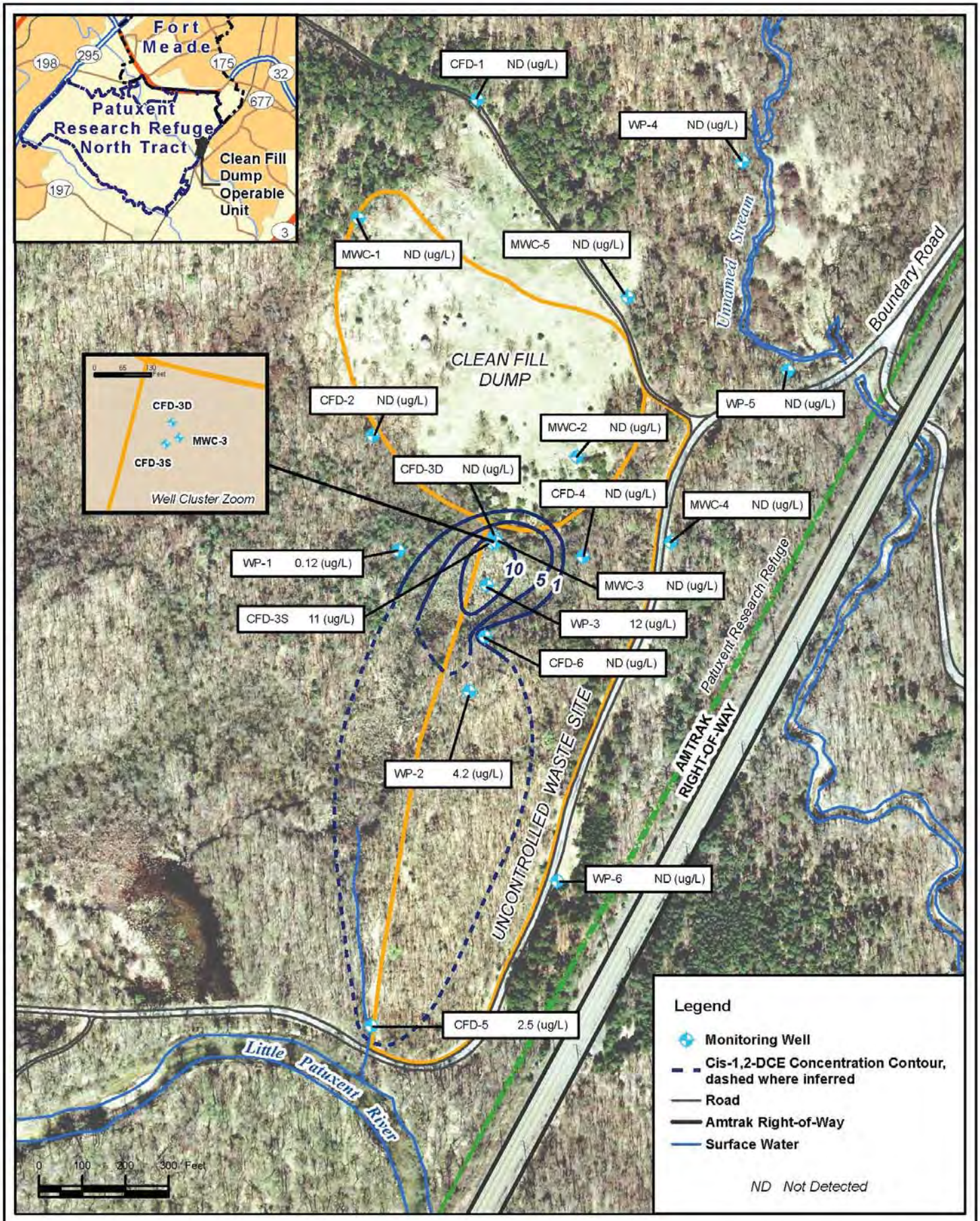
TITLE: TCE Concentration Contours, July 2013
Clean Fill Dump Operable Unit

Figure 4-7, 2013 LTGM Report, modified by USACE, 5/15/16.

URS
12420 Milestone Center Drive
Germantown, MD 20876

PROJ NO 15302780.00010

FIGURE 6-7



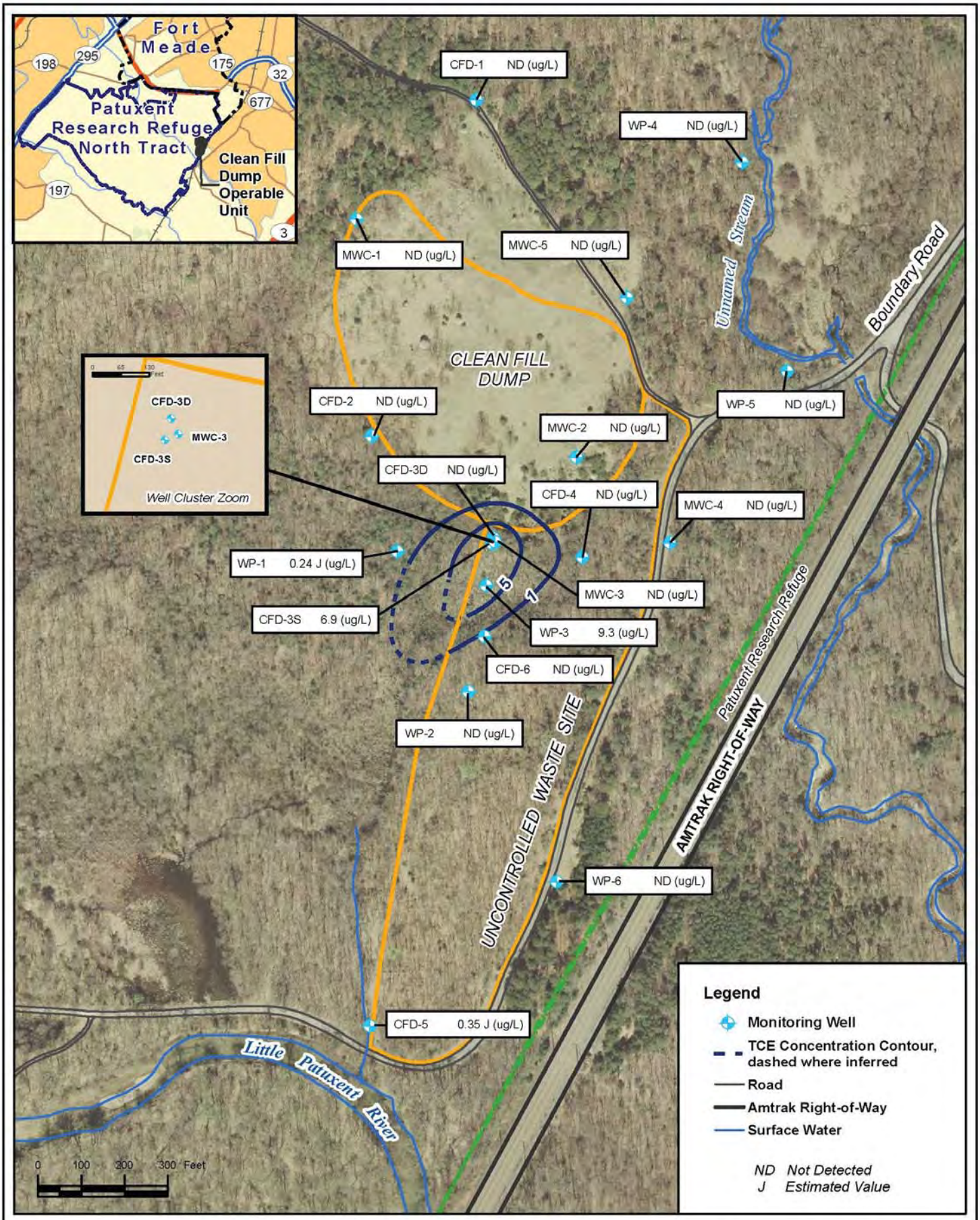
CLIENT	U.S. Army Corps of Engineers, Baltimore District			
PROJ	Clean Fill Dump Well Locations			
SOURCE	Base data: USACE, 2002; Aerial, 2003.			
REVISION NO	1	GIS:	JK	09/12/2013
SCALE	1:3,600	CHK BY	CB	09/12/2013
G:\Projects\Fort_Meade\Clean_Fill_Dump\2012 CFD_Figure4-3_cisDCE.mxd		PROJ MGR	FM	-

TITLE: Cis-1,2-DCE Concentration Contours, June 2013
Clean Fill Dump Operable Unit

URS
12420 Milestone Center Drive
Germantown, MD 20876

PROJ NO 15301259.00002

Figure 6-8



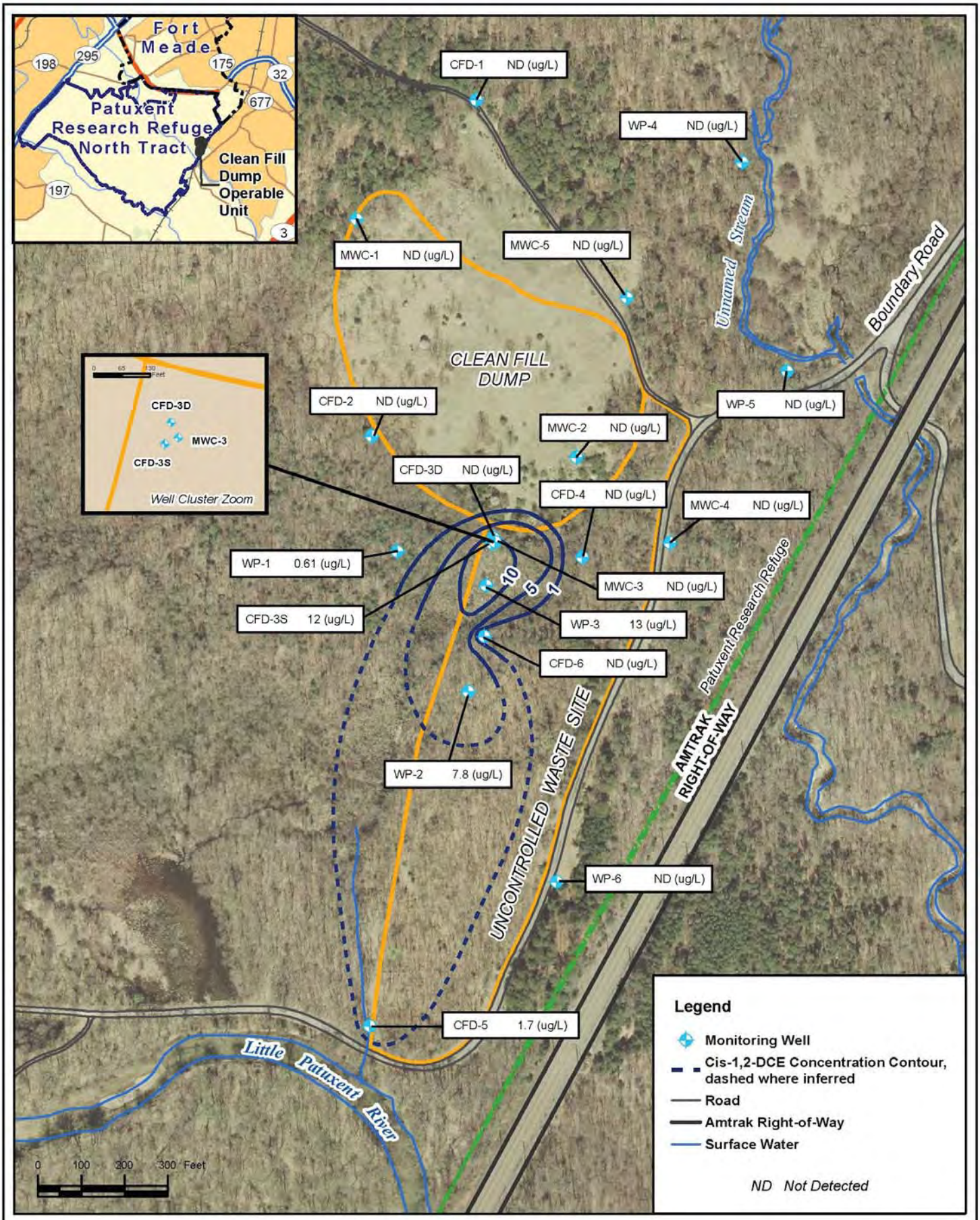
CLIENT	U.S. Army Corps of Engineers, Baltimore District			
PROJ	Clean Fill Dump Well Locations			
SOURCE	Base data: USACE, 2002; Aerial, 2003.			
REVISION NO	1	GIS:	JK	08/08/12
SCALE	1:3,600	CHK BY	CB	10/23/12
G:\Projects\Fort_Meade\Clean_Fill_Dump\2012 CFD_Figure4-2_TCEShallowAq.mxd		PROJ MGR	FM	-

TITLE: TCE Concentration Contours, June 2012
Clean Fill Dump Operable Unit

URS
12420 Milestone Center Drive
Germantown, MD 20876

PROJ NO 15301259.00002

Figure 6-9



CLIENT	U.S. Army Corps of Engineers, Baltimore District			
PROJ	Clean Fill Dump Well Locations			
SOURCE	Base data: USACE, 2002; Aerial, 2003.			
REVISION NO	1	GIS:	JK	08/08/12
SCALE	1:3,600	CHK BY	CB	10/23/12
G:\Projects\Fort_Meade\Clean_Fill_Dump\2012 CFD_Figure4-3_rsiDCE.mxd		PROJ MGR	FM	-

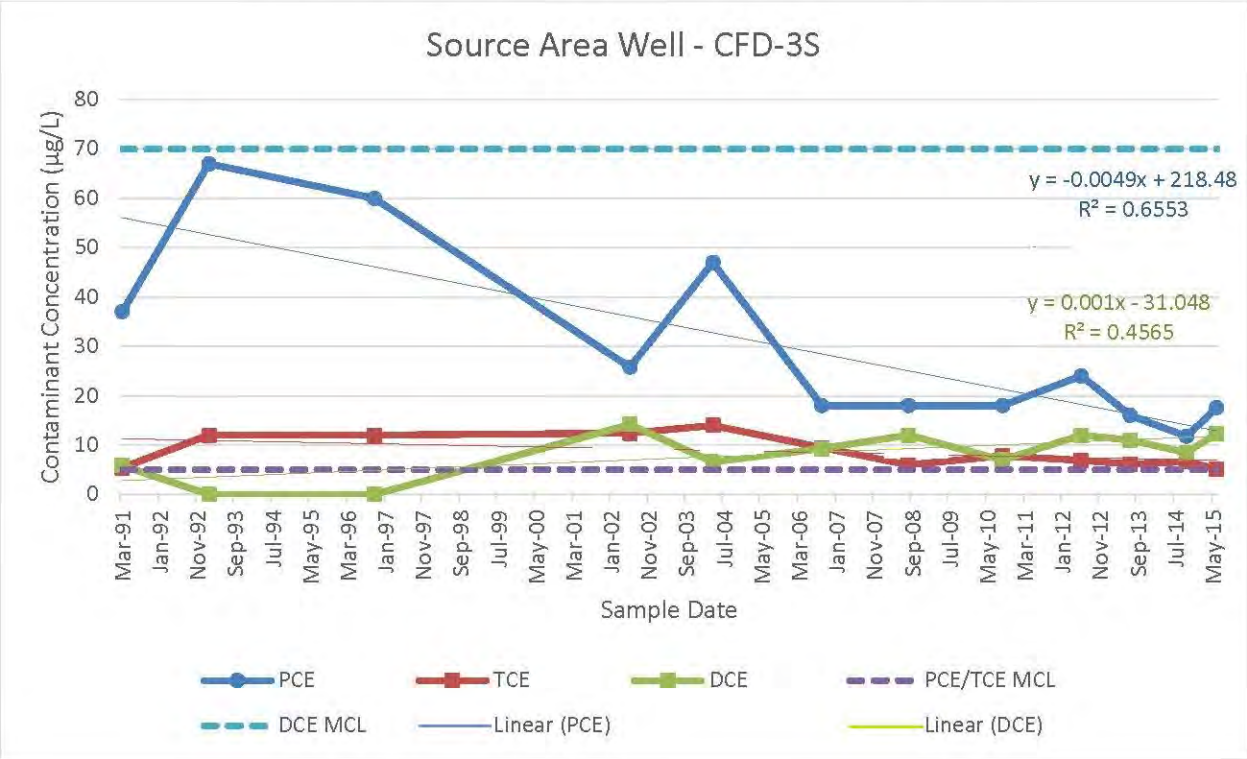
TITLE: Cis-1,2-DCE Concentration Contours, June 2012
Clean Fill Dump Operable Unit

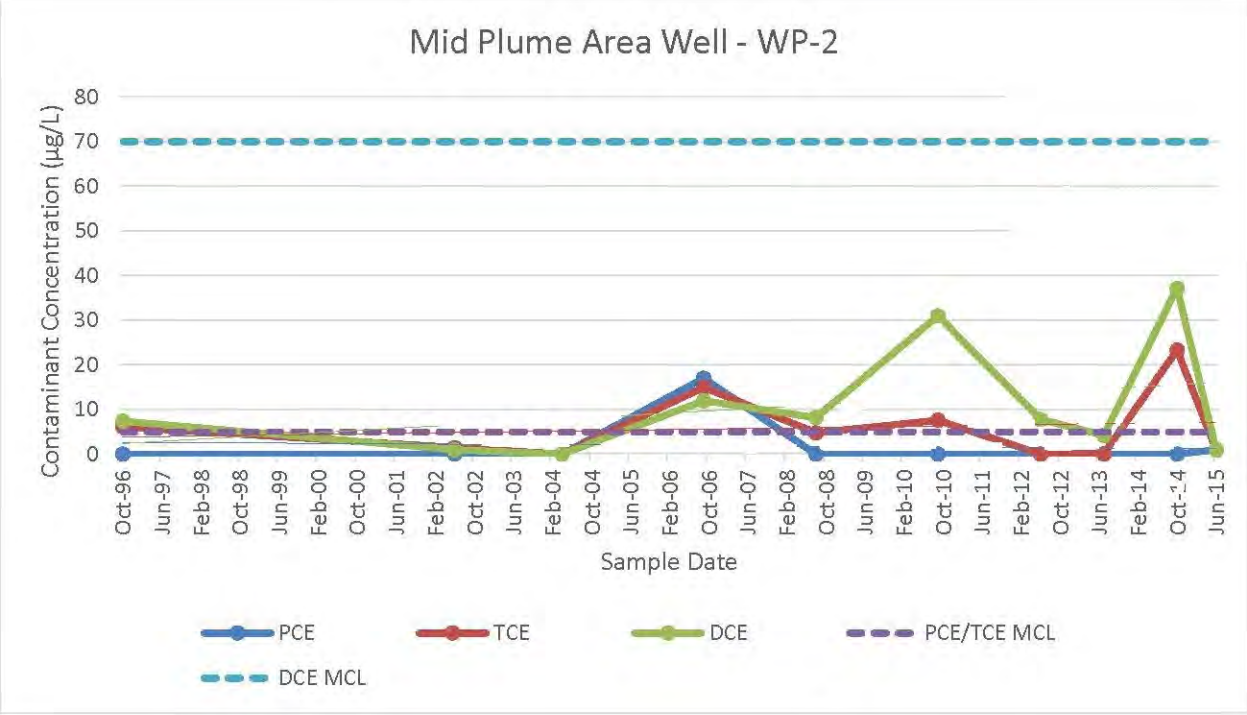
URS
12420 Milestone Center Drive
Germantown, MD 20876

PROJ NO 15301259.00002

Figure 6-10

Figure 6-11
Temporal CVOC Data from Representative CFD Well Locations





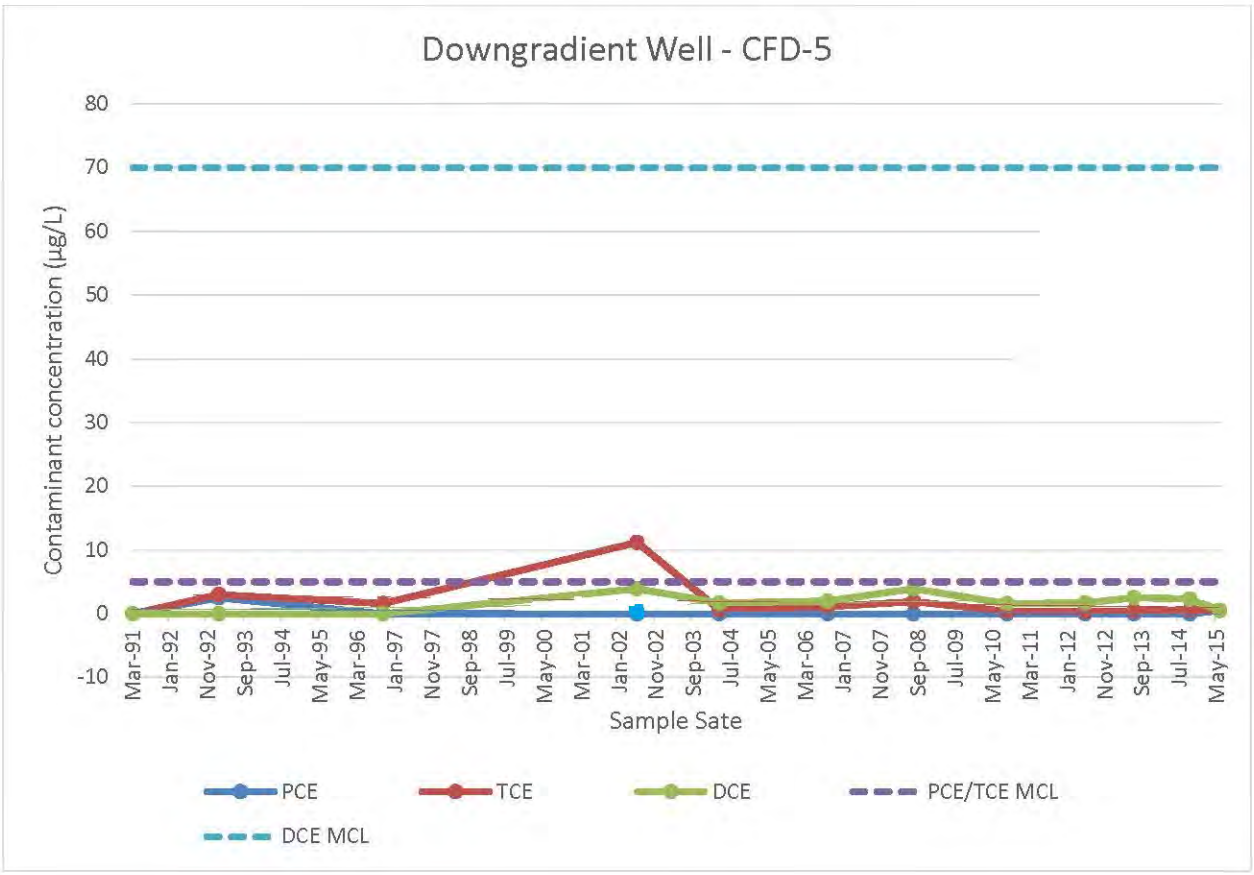

Downgradient Well - CFD-5
Contaminant concentration (µg/L)
80
70
60
50
40
30
20
10
0
-10
Mar-91
Jan-92
Nov-92
Sep-93
Jul-94
May-95
Mar-96
Jan-97
Nov-97
Sep-98
Jul-99
May-00
Mar-01
Jan-02
Nov-02
Sep-03
Jul-04
May-05
Mar-06
Jan-07
Nov-07
Sep-08
Jul-09
May-10
Mar-11
Jan-12
Nov-12
Sep-13
Jul-14
May-15
Sample Sate
PCE
TCE
DCE
PCE/TCE MCL
DCE MCL

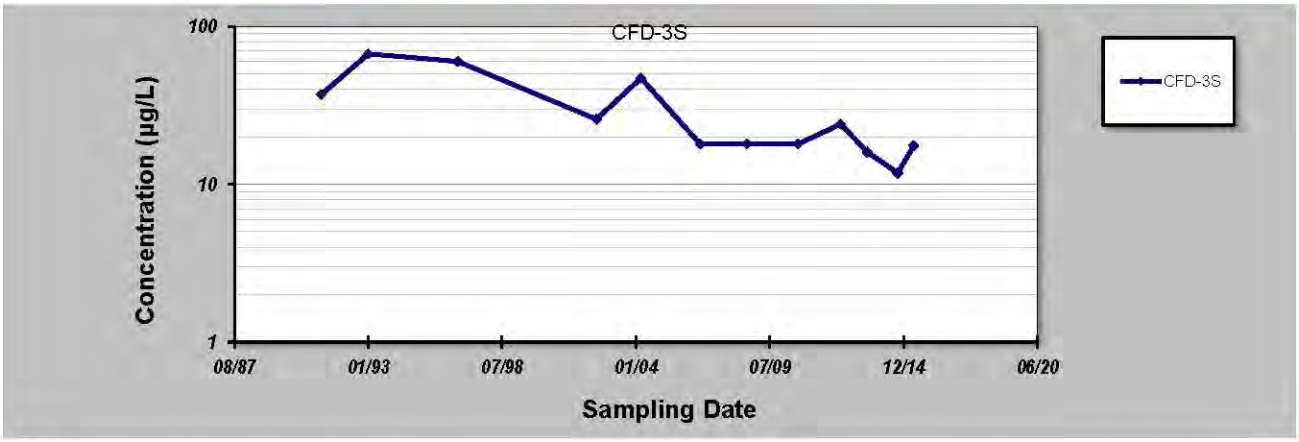
Figure 6-12 Mann-Kendall Trend Analysis for Tetrachloroethene (PCE) at CFD OU

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	12-Jan-16	Job ID:	
Facility Name:	Clean Fill Dump	Constituent:	Tetrachloroethene (PCE)
Conducted By:	Andrew Layman	Concentration Units:	µg/L

Sampling Point ID: CFD-3S

Sampling Event	Sampling Date	TETRACHLOROETHENE (PCE) CONCENTRATION (µg/L)
1	Mar-91	37
2	Feb-93	67
3	Oct-96	60
4	Jun-02	25.8
5	Apr-04	47
6	Sep-06	18
7	Aug-08	18
8	Sep-10	18
9	Jun-12	24
10	Jul-13	16
11	Oct-14	11.8
12	Jun-15	17.6
13		
14		
15		
16		
17		
18		
19		
20		
Coefficient of Variation:		0.62
Mann-Kendall Statistic (S):		-45
Confidence Factor:		100.0%
Concentration Trend:		Decreasing



Notes:

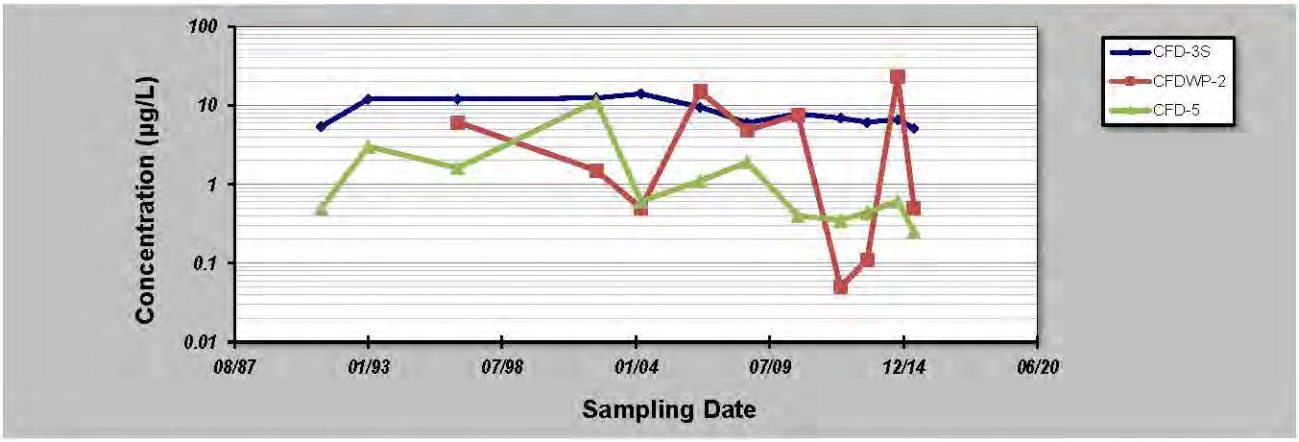
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

Figure 6-13 Mann-Kendall Trend Analysis for Trichloroethene (TCE) at CFD OU

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	12-Jan-16	Job ID:	
Facility Name:	Clean Fill Dump	Constituent:	Trichloroethene (TCE)
Conducted By:	Andrew Layman	Concentration Units:	µg/L

Sampling Point ID:	CFD-3S	CFDWP-2	CFD-5				
Sampling Event	Sampling Date	TRICHLOROETHENE (TCE) CONCENTRATION (µg/L)						
1	Mar-91	5.4		0.5				
2	Feb-93	12		3				
3	Oct-96	12	6.1	1.6				
4	Jun-02	12.4	1.5	11.2				
5	Apr-04	14	0.5	0.61				
6	Sep-06	9.5	15	1.1				
7	Aug-08	6	4.8	1.9				
8	Sep-10	7.8	7.6	0.4				
9	Jun-12	6.9	0.05	0.35				
10	Jul-13	6.1	0.11	0.44				
11	Oct-14	6.62	23.3	0.611				
12	Jun-15	5.1	0.5	0.25				
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.37	1.30	1.67				
Mann-Kendall Statistic (S):		-25	-4	-28				
Confidence Factor:		95.0%	60.3%	96.9%				
Concentration Trend:		Prob. Decreasing	No Trend	Decreasing				



Notes:

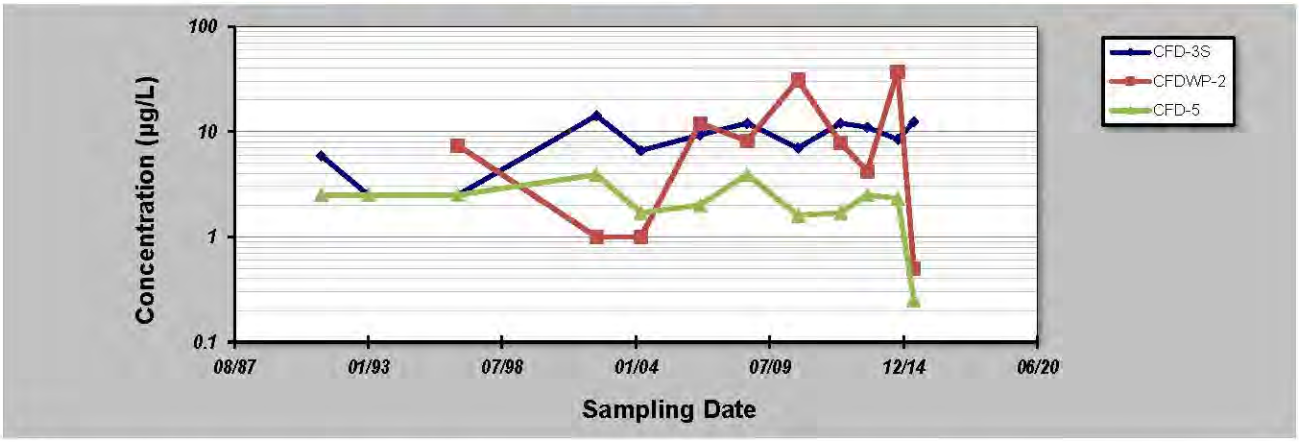
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

Figure 6-14 Mann-Kendall Trend Analysis for 1, 2-Dichloroethene (DCE) at CFD OU

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	12-Jan-16	Job ID:	
Facility Name:	Clean Fill Dump	Constituent:	1,2-Dichloroethene (DCE)
Conducted By:	Andrew Layman	Concentration Units:	µg/L

Sampling Point ID:	CFD-3S	CFDWP-2	CFD-5				
Sampling Event	Sampling Date	1,2-DICHLOROETHENE (DCE) CONCENTRATION (µg/L)						
1	Mar-91	5.9		2.5				
2	Feb-93	2.5		2.5				
3	Oct-96	2.5	7.4	2.5				
4	Jun-02	14.2	1	3.9				
5	Apr-04	6.6	1	1.7				
6	Sep-06	9.3	12	2				
7	Aug-08	12	8.2	3.92				
8	Sep-10	7	31	1.6				
9	Jun-12	12	7.8	1.7				
10	Jul-13	11	4.2	2.5				
11	Oct-14	8.46	37.2	2.32				
12	Jun-15	12.4	0.5	0.25				
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.45	1.16	0.43				
Mann-Kendall Statistic (S):		28	4	-21				
Confidence Factor:		96.9%	60.3%	91.3%				
Concentration Trend:		Increasing	No Trend	Prob. Decreasing				



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

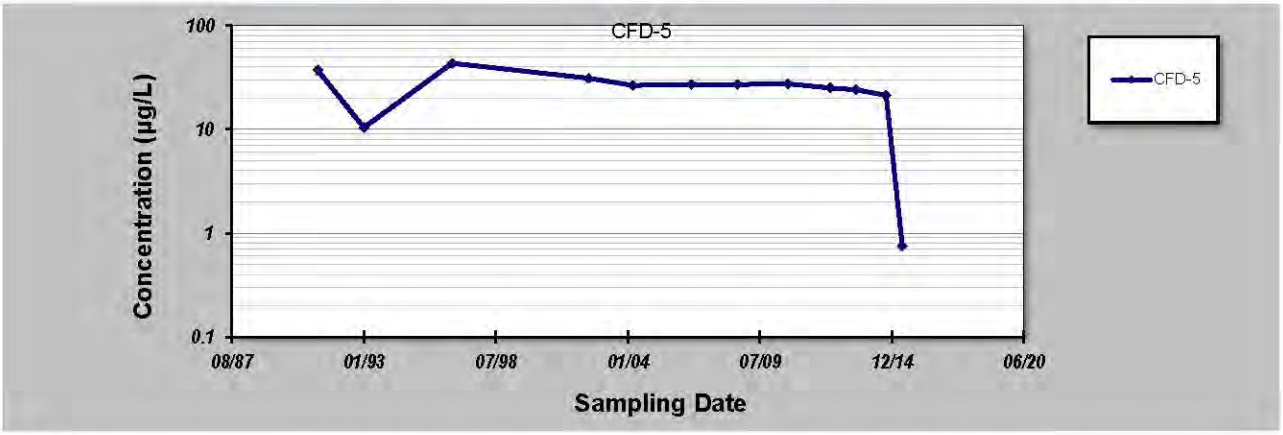
Figure 6-15 Mann-Kendall Trend Analysis for Arsenic at CFD OU

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	12-Jan-16	Job ID:	
Facility Name:	Clean Fill Dump	Constituent:	Arsenic
Conducted By:	Andrew Layman	Concentration Units:	µg/L

Sampling Point ID: CFD-5

Sampling Event	Sampling Date	ARSENIC CONCENTRATION (µg/L)
1	Mar-91	37.4
2	Feb-93	10.4
3	Oct-96	43.3
4	Jun-02	31
5	Apr-04	26.5
6	Sep-06	27
7	Aug-08	27
8	Sep-10	27.5
9	Jun-12	25
10	Jul-13	24
11	Oct-14	21.3
12	Jun-15	0.75
13		
14		
15		
16		
17		
18		
19		
20		
Coefficient of Variation:		0.44
Mann-Kendall Statistic (S):		-35
Confidence Factor:		99.2%
Concentration Trend:		Decreasing



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

Tables

Table 6-1 Maximum Values for Groundwater Constituents at CFD OU

Constituent	PRGs µg/L	Type of PRG	1998 RI Report Maximum Detection µg/L	2010 LTGM Maximum Detection µg/L	2012 LTGM Maximum Detection µg/L	2013 LTGM Maximum Detection µg/L	2014 LTGM Maximum Detection µg/L	2015 LTGM Maximum Detection µg/L
Volatile Organic Compounds								
CHLOROETHANE	2,100	RSL	--	(< 1.0) ND	(< 1.0) ND	(< 1.0) ND	(< 1.0) ND	(< 1.0) ND
CHLOROFORM	80 (0.19)	MCL (RSL)	**0.19**	(< 1.0) ND	0.23 J	0.23 J, B	(< 0.5) ND	0.306 J
CIS-1,2-DICHLOROETHENE	70 (36.0)	MCL (RSL)	7.4	31	13.0	12.0	**37.2**	12.4
1,1-DICHLOROETHENE	7 (34)	MCL (RSL)	0.081	NT	NT	NT	NT	NT
TETRACHLOROETHENE	5 (0.11)	MCL (RSL)	**60**	**20**	**24**	**16**	**11.8**	**17.6**
TOLUENE	1,000 (230)	MCL (RSL)	--	(< 1.0) ND	0.7 B , x	0.21 J, B	0.327 J	(< 0.500)
TRANS-1,2-	100 (11)	MCL (RSL)	--	(< 1.0) ND	0.28 J	0.33 J	(< 0.5) ND	(< 0.500)
TRICHLOROETHENE	5 (2)	MCL (RSL)	**12**	**7.8**	**9.3**	**6.1**	**23.3**	**5.10**
VINYL CHLORIDE	2 (0.016)	MCL (RSL)	--	(< 1.0)	0.09 J	0.14 J	**(< 0.58) J**	(< 0.500)

Table 6-1 Maximum Values for Groundwater Constituents at CFD OU

Constituent	PRGs µg/L	Type of PRG	1998 RI Report Maximum Detection µg/L	2010 LTGM Maximum Detection µg/L	2012 LTGM Maximum Detection µg/L	2013 LTGM Maximum Detection µg/L	2014 LTGM Maximum Detection µg/L	2015 LTGM Maximum Detection µg/L
Dissolved Metals								
ALUMINUM	21,000	RSL	2,380	160	7,170	911	1820	998
ANTIMONY	6 (1.5)	MCL (RSL)	--	0.093 B,	3.42	0.305	(< 2.0) ND	(< 2.0) ND
ARSENIC	10 (0.045)	MCL (RSL)	**43.3**	**27.5**	**25**	**24**	**21.3**	**4.04**
BARIUM	2,000 (730)	MCL (RSL)	142	71.8	74.0	77	68.8 K	81.0
BERYLLIUM	4 (7.3)	MCL (RSL)	**4.2**	0.73 B	**7.92**	2.56	2.06	2.01
CADMIUM	5 (1.8)	MCL (RSL)	2.72	0.21 B	**8.54**	0.672	1.34	0.742 J
CALCIUM	400,000	ADI Level	79,000	48,200	61,100	69,200	46300	28,300 J
CHROMIUM	100 (0.043)	MCL (RSL)	**19.2**	**6.7**	**291**	3.92	0.805 J	6.6 J
COBALT	6.0	RSL	**56.6**	**29**	**433**	**39.2**	**35.1**	**39.4**
COPPER	1300 (150)	MCL (RSL)	**150**	4.6	**985**	25.7	3.84	30.4
IRON	14,000	RSL	**20,100**	**10,700**	**71,300**	11,300	10,100	7,980
LEAD	15	MCL	**138**	0.29 B	**150**	0.515	**24.0**	1.13 J
MAGNESIUM	80,500	ADI Level	11,500	5,310	8,070	15,800	13,600	13,400
MANGANESE	430	RSL	**649**	**157**	**577**	**433**	**633**	**574 J**
MERCURY	2 (0.63)	MCL (RSL)	--	**0.076 B**	**(< 0.07) J,**	(< 0.2)	**0.115 J**	(< 0.160)
NICKEL	73	RSL	68.4	26	**739**	39.5	34.5	58.7
POTASSIUM	100,000	ADI Level	6,320	2,890	3,200	4260	2690	3430
SELENIUM	50 (18)	MCL (RSL)	3.3	1.6 B, J,	2 J, J (02),	1.6	1.44 J	1.5 J
SODIUM	100,000	ADI Level	30,000	10,700 J	44,000	39,000	56300 K	66,600
THALLIUM	2	MCL	0.611	0.087 B,	**2.75**	0.071	(< 1.0) ND	(< 1.0) ND
VANADIUM	18	RSL	10.1	NT	NT	NT	9.57	3.24
ZINC	1,100	RSL	**8,220**	51.5	13,000	54.2	65.9	54.0 J

Notes:

= Equals or Exceeds MCL

= Equals or Exceeds RSL

< = Indicates that no detection was above the laboratory reporting limit (value reported after the less than symbol).

( ) = Maximum detection presented in parenthesis is the reporting limit.

dp = Duplicate sample

-- = No data available

Data Validation Flags/Codes

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

D = The result is from a diluted sample.

E = Analyte is estimated above the range of the instrument.

J (02) = Analyte present. Reported value may not be accurate or precise.

J = Analyte is positively identified and the result is less than the Reporting Limit but greater than the Method Detection Limit.

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

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

ND = Non-detect at the Practical Quantitation Limit

NT = Not tested

m = MD/MSD recovery failure.

o = Calibration blank contamination.

w = CRDL standard failure

ADI = Allowable daily intake

Bkgd = Background Level

LTGM = Long-Term Groundwater Monitoring

MCL = Maximum Contaminant Level

PRG = Preliminary Remediation Goal

RI = Remedial Investigation

RSL = Regional Screening Level

Table 6-2

CFD OU Groundwater Chemical Results for the 2015 Sampling Event and Screening Criteria

Aquifer/Sample Location						Lower Patapsco															
Well ID						CFD-1	CFD-2	CFD-3D	CFD-3S	CFD-4	CFD-5	CFD-6	MWC-1	MWC-2	MWC-3	MWC-4	MWC-5	WP-1	CFD-GW-DUP2	WP-2	WP-3	WP-4	WP-5	WP-6
Sample Collection Date						6/23/2015	6/25/2015	6/22/2015	6/22/2015	6/25/2015	6/23/2015	6/25/2015	6/25/2015	6/23/2015	6/22/2015	6/23/2015	6/23/2015	6/25/2015	6/25/2015	6/25/2015	6/25/2015	6/23/2015	6/23/2015	6/23/2015
Screen Interval (ft bgs)						40.3-55.3	3-8	60-70	4.5-9.5	4.5-9.5	3-8	15-25	18.5-28.5	89-99	29-39	30-40	31-41	3-6	2.5-5.5	2.5-5.5	3-6	3-6	2.5-5.5	44-54
Parent Sample																			WP-2					
Upgradient/Downgradient						U	D	D	D	D	D	D	U	U	D	D	U	D	D	D	D	U	U	D
Analyte	MCL	MCLG	EPA Tap		Unit																			
Volatile Organic Compounds																								
Chloroethane	-	-	21000	n	µg/L	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 1.00 U	< 1.00 U
Chloroform	80	70	0.22	c	µg/L	< 0.500 U	< 0.500 U	0.306 J	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 0.500 U	< 0.500 U
cis-1,2-dichloroethene	70	70	36	n	µg/L	< 0.500 U	< 0.500 U	< 0.500 U	12.4	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	0.658 J	< 1.00 U	< 1.00 U	8.92	< 1.00 U	< 0.500 U	< 0.500 U
Tetrachloroethene	5	0	11	c	µg/L	< 0.500 U	< 0.500 U	< 0.500 U	**17.6**	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	0.615 J	< 1.00 U	< 1.00 U	1.61 J	< 1.00 U	0.474 J	< 0.500 U
Toluene	1000	1000	1100	n	µg/L	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 0.500 U	< 0.500 U
trans-1,2-dichloroethene	100	100	360	n	µg/L	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 0.500 U	< 0.500 U
Trichloroethene	5	0	0.49	c	µg/L	< 0.500 U	< 0.500 U	< 0.500 U	**5.10**	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 1.00 U	< 1.00 U	4.61	< 1.00 U	< 0.500 U	< 0.500 U
Vinyl chloride	2	0	0.019	c	µg/L	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 0.500 U	< 0.500 U
Dissolved Metals																								
Aluminum	-	-	20000	n	µg/L	43.5 J	23.6 J	< 25.0 U	< 25.0 U	171	104	99.4	87.1	27.1 J	14.0 J	998	142	42.2 J	228	222	76.4	87.5	46.2 J	96.1
Antimony	6	6	7.8	n	µg/L	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U
Arsenic	10	0	0.052	c	µg/L	0.751 J	< 1.50 U	< 1.50 U	1.01 J	2.09 J	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	1.98 J	4.04	< 1.50 U
Barium	2000	2000	3800	n	µg/L	18.1	20.5	4.78 J	27.9	73.1	69.3	44.9	33.4	6.48 J	21.3	68.6	81.0	14.6	27.9	27.8	73.0	28.5	50.9	8.59 J
Beryllium	4	4	25	n	µg/L	0.544 J	< 0.500 U	< 0.500 U	< 0.500 U	2.01	0.343 J	1.17 J	0.758 J	< 0.500 U	< 0.500 U	1.06 J	0.383 J	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	0.853 J
Cadmium	5	5	9.2	n	µg/L	< 0.500 U	< 0.500 U	0.330 J	< 0.500 U	< 0.500 U	0.387 J	0.341 J	< 0.500 U	< 0.500 U	< 0.500 U	0.724 J	0.457 J	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
Calcium	-	-	-		µg/L	2520 J	2960	964 J	3510	4180	3910 J	3240	1120 J	1440 J	3350	5390 J	3970 J	1870	33300	32600	57600	12800 J	28300 J	1610 J
Chromium	100	100	22000	n	µg/L	0.752 J	1.58 J	< 1.00 U	< 1.00 U	0.534 J	0.510 J	0.686 J	< 1.00 UJ	< 1.00 U	< 1.00 U	3.35	0.621 J	< 1.00 UJ	6.60 J	2.34 J	< 1.00 UJ	0.853 J	< 1.00 U	2.40 J
Cobalt	-	-	6	n	µg/L	20.5	2.68 J	< 2.50 U	13.1	37.1	25.7	12.5	22.1	< 2.50 U	4.84	39.4	27.4	5.16	2.03 J	1.96 J	5.68	< 2.50 U	< 2.50 U	7.43
Copper	1300	1300	800	n	µg/L	3.43	3.69	4.17	< 2.00 U	1.18 J	3.85	30.4	11.5	4.56	4.73	27.4	3.99	4.61	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	1.16 J	4.70
Iron	-	-	14000	n	µg/L	165 J	3960	8.57 J	7980	5250	< 15.0 U	< 15.0 U	11.5 J	35.0 J	< 15.0 U	52.0 J	< 15.0 U	28.1	764	672	1280	6010 J	1860 J	1450 J
Lead	15	0	15		µg/L	< 0.750 U	1.09 J	0.574 J	< 0.750 U	0.378 J	< 0.750 U	< 0.750 U	< 0.750 U	< 0.750 U	0.531 J	< 0.750 U	< 0.750 U	< 0.750 U	< 0.750 U	< 0.750 U	< 0.750 U	< 0.750 U	< 0.750 U	1.13 J
Magnesium	-	-	-		µg/L	1500 J	2180	341 J	2570	4350	4730 J	2800	1230 J	338 J	2190	2880 J	5180 J	1340	3890	3820	13400	2890 J	7550 J	1070 J
Manganese	-	-	430	n	µg/L	25.5 J	27.4	3.83	105	157	82.0 J	91.9	67.3	3.18 J	30.9	55.1 J	86.4 J	23.7	224	219	160	574 J	333 J	28.7 J
Mercury	2	2	0.63	n	µg/L	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U
Nickel	-	-	390	n	µg/L	26.2	16.6	1.41 J	28.6	58.7	21.9	13.0	27.9	1.15 J	5.77	43.2	24.9	7.73	3.42	3.06	7.97	< 1.50 U	< 1.50 U	14.1
Potassium	-	-	-		µg/L	830 J	1080 J	739 J	1240 J	1850	2850 J	1290	705 J	666 J	1280	1800 J	3030 J	1010 J	1640	1600	3430	1950 J	2400 J	1130 J
Selenium	50	50	100	n	µg/L	< 1.25 U	< 1.25 U	< 1.25 U	< 1.25 U	< 1.25 U	< 1.25 U	1.50 J	1.44 J	< 1.25 U	1.18 J	< 1.25 U	0.854 J	0.914 J	0.938 J	0.781 J	0.772 J	< 6.25 U	0.948 J	1.09 J
Silver	-	-	94	n	µg/L	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
Sodium	-	-	-		µg/L	3420	2300	1540	3740	12700	5450	9830	3850	1300	7460	6740	5940	2120	2730	2670	9460	57000	66600	4570
Thallium	2	0.5	0.2	n	µg/L	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U
Vanadium	-	-	86	n	µg/L	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U	1.89 J	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U	3.24	3.24	< 2.50 U	2.54 J	2.64 J	< 2.50 U
Zinc	-	-	6000	n	µg/L	21.8 J	19.7 J	40.7	34.2	52.7 J	41.1 J	23.8 J	42.8 J	11.9 J	6.92	52.5 J	54.0 J	23.7 J	5.11 J	3.72 J	6.33 J	3.31 J	3.13 J	31.1 J
General Chemistry Parameters																								
Alkalinity, total (as CaCO3)	-	-	-		mg/L	--	--	--	21.4 J	--	135	< 1.00 U	--	--	< 1.00 UJ	--	< 1.00 U	--	64.5	64.2	--	--	--	< 1.00 U
Chloride	-	-	-		mg/L	--	--	--	6.22	--	20.3	20.8	--	--	15.4	--	6.78	--	3.81	3.76	--	--	--	14.5
Dissolved Organic Carbon	-	-	-		mg/L	--	--	--	1.69 J	--	1.43 J	1.32 J	--	--	< 2.50 U	--	1.50 J	--	17.3	16.8	--	--	--	< 2.50 U
Nitrate	10	10	32	n	mg/L	--	--	--	< 0.100 U	--	< 0.100 U	0.0905 J	--	--	0.124 J	--	0.121 J	--	< 0.100 U	< 0.100 U	--	--	--	< 0.100 U
Nitrogen as nitrite	1	1	2	n	mg/L	--	--	--	< 0.100 U	--	< 0.100 U	0.0622 J	--	--	< 0.100 U	--	< 0.100 U	--	< 0.100 U	< 0.100 U	--	--	--	< 0.100 U
Sulfate	-	-	-		mg/L	--	--	--	8.71	--	53.2	15.9	--	--	13.3	--	36.8	--	35.4	35.3	--	--	--	4.08
Total Carbon	-	-	-		mg/L	--	--	--	< 2.50 U	--	1.44 J	< 2.50 U	--	--	< 2.50 U	--	1.42 J	--	17.1	16.8	--	--	--	< 2.50 U
Ethane	-	-	-		µg/L	--	--	--	< 2.00 U	--	< 2.00 U	< 2.00 U	--	--	< 2.00 U	--	< 2.00 U	--	< 2.00 U	< 2.00 U	--	--	--	< 2.00 U
Ethene	-	-	-		µg/L	--	--	--	< 2.00 U	--	< 2.00 U	< 2.00 U	--	--	< 2.00 U	--	< 2.00 U	--	< 2.00 U	< 2.00 U	--	--	--	< 2.00 U

NOTES:

Bolded and highlighted results exceed the MCL

Gray shaded results exceed the Tap water RSL in the absence of MCLs

MCL for Lead = EPA action level for public water treatment systems.

- = Data not available.

-- = Sample not tested for.

ft = Foot (feet).

bgs = Below ground surface.

mg/L = Milligram per liter.

µg/L = Microgram per liter.

MCL = EPA Maximum Contaminant Level, June 2015.

MCLG = EPA Maximum Contaminant Level Goal, June 2015.

EPA Tap Water = EPA Regional Screening Levels, June 2015.

c = Cancer.

n = Non-cancer.

J = Estimated.

U = Not detected above Practical Quantitation Limit

Table 6-3 (page 1 of 2)

CFD OU Groundwater Chemical Results for the 2014 Sampling Event and Screening Criteria

			Aquifer/Sample Location			Lower Patapsco												
			Well ID			CFD-1	CFD-2	CFD-3D	CFD-3S	CFD-4	CFD-5	CFD-6	MWC-1	MWC-2 Dup	MWC-2	MWC-3	MWC-4	MWC-5 Dup	MWC-5
			Sample Collection Date			10/31/2014	11/3/2014	11/3/2014	11/3/2014	11/3/2014	11/4/2014	11/3/2014	10/31/2014	11/4/2014	11/4/2014	11/3/2014	10/31/2014	10/31/2014	10/31/2014
			Screen Interval (ft bgs)			40.3-55.3	3-8	60-70	4.5-9.5	4.5-9.5	3-8	15-25	18.5-28.5	89-99	89-99	29-39	30-40	31-41	31-41
			Upgradient/Downgradient			U	D	D	D	D	D	D	U	U	D	D	D	U	U
Analyte	**MCL**	**MCLG**	**EPA Tap Water RSL**		**Unit**														
General Chemistry Parameters																			
Alkalinity, total (as CaCO3)	-	-	-		mg/l	--	--	--	16.2	--	125	< 1.00 U	--	--	--	< 1.00 U	--	1.22	< 1.00 U
Chloride	-	-	-		mg/l	--	--	--	6.37 M	--	19.7	18.2 M	--	--	--	15.3 M	--	7.39	7.46
Dissolved Organic Carbon	-	-	-		mg/l	--	--	--	3.15	--	3.13	< 2.50 U	--	--	--	< 2.50 U	--	1.59 J	3.05
Iron, Ferric	-	-	-		mg/l	--	--	--	0.358	--	2.22	< 0.0150 U	--	--	--	< 0.0150 U	--	< 0.0150 U	< 0.0150 U
Iron, Ferrous	-	-	-		mg/l	--	--	--	7.12	--	7.85	0.0327 J	--	--	--	< 0.0400 U	--	0.0266 J	0.0205 J
Nitrate	10	10	32	n	mg/l	--	--	--	< 0.100 U	--	< 0.100 U	0.109 J	--	--	--	0.191 J	--	0.439	0.449
Nitrogen as nitrite	1	1	2	n	mg/l	--	--	--	< 0.100 U	--	< 0.100 U	< 0.100 U	--	--	--	< 0.100 U	--	< 0.100 U	< 0.100 U
Sulfate	-	-	-		mg/l	--	--	--	8.31	--	33.7	15.1	--	--	--	14.6	--	36.9	37.3
Total Organic Carbon	-	-	-		mg/l	--	--	--	< 2.50 U	--	3.12	< 2.50 U	--	--	--	< 2.50 U	--	1.43 J	1.35 J
Ethane	-	-	-		ug/l	--	--	--	< 2.00 U	--	< 2.00 U	< 2.00 U	--	--	--	< 2.00 U	--	< 2.00 U	< 2.00 U
Ethene	-	-	-		ug/l	--	--	--	< 2.00 U	--	< 2.00 U	< 2.00 U	--	--	--	< 2.00 U	--	< 2.00 U	< 2.00 U
Volatile Organic Compounds																			
Chloroethane	-	-	21000	n	ug/l	< 1.00 UJ	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 UJ	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 UJ	< 1.00 U	< 1.00 UJ
Chloroform	80	70	0.22	c	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
cis-1,2-dichloroethene	70	70	36	n	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	8.46	< 0.500 U	2.32	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
Tetrachloroethene	5	0	11	c	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	**11.8**	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
Toluene	1000	1000	1100	n	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	0.327 J	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
trans-1,2-dichloroethene	100	100	360	n	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
Trichloroethene	5	0	0.49	c	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	**6.62**	< 0.500 U	0.611 J	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
Vinyl chloride	2	0	0.019	c	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	0.580 J	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
Dissolved Metals																			
Aluminum	-	-	20000	n	ug/l	< 25.0 UB	14.8 J	< 25.0 U	21.1 J	139	27.6 J	75.2	< 25.0 UB	< 25.0 U	< 25.0 U	< 25.0 U	860	83.6 J+	86.6 J+
Antimony	6	6	7.8	n	ug/l	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U
Arsenic	10	0	0.052	c	ug/l	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	0.847 J	**21.3**	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U	< 1.50 U
Barium	2000	2000	3800	n	ug/l	14.4 J+	16.4	4.16 J	24.1	56.4	20.8	29.8	29.6 J+	4.23 J	4.19 J	17.9	52.4 J+	68.8 J+	66.9 J+
Beryllium	4	4	25	n	ug/l	0.385 J	< 0.500 U	< 0.500 U	< 0.500 U	2.06	< 0.500 U	0.986 J	0.627 J	< 0.500 U	< 0.500 U	< 0.500 U	0.962 J	0.316 J	0.296 J
Cadmium	5	5	9.2	n	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	0.285 J	< 0.500 U	1.34	0.513 J	0.337 J	0.320 J	< 0.500 UJ	< 0.500 U	0.753 J	0.505 J	0.527 J
Calcium	-	-	-		ug/l	2360 J+	3080	908 J	4290	4400	46300	2880	< 500 UB	1320	1120 J	2870	5060 J+	3720 J+	3640 J+
Chromium	100	100	22000	n	ug/l	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	0.524 J	0.805 J	0.693 J	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	0.540 J	< 1.00 U	< 1.00 U
Cobalt	-	-	6	n	ug/l	17.3	2.82 J	< 2.50 U	6.99	20.1	3.59	9.81	22.3	< 2.50 U	< 2.50 U	4.44	35.1	22.3	22.0
Copper	1300	1300	800	n	ug/l	1.07 J	< 2.00 U	1.08 J	< 2.00 U	< 2.00 U	< 2.00 U	27.0	7.61	1.10 J	< 2.00 UJ	2.49 J	25.7	2.89	2.92
Iron	-	-	14000	n	ug/l	314	1520	< 15.0 U	7480	5790	10100	21.2 J	17.9 J	< 15.0 U	< 15.0 U	< 15.0 U	55.8	< 15.0 U	< 15.0 U
Lead	15	0	15		ug/l	< 0.750 U	< 0.750 U	< 0.750 U	3.58	< 0.750 U	**15.8**	4.02	3.31	3.61	3.65	3.02	3.90 J+	3.59 J+	3.89 J+
Magnesium	-	-	-		ug/l	< 750 UB	1850	317 J	2580	3900	5350	2330	< 750 UB	284 J	315 J	1950	2490 J+	4560 J+	4380 J+
Manganese	-	-	430	n	ug/l	22.1 J+	20.1	3.29 J	100	159	134	81.4	73.6	2.43 J	2.85 J	29.4	49.0	85.2	82.6
Mercury	2	2	0.63	n	ug/l	0.0910 J	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	0.0808 J	< 0.160 U	< 0.160 U	0.0801 J	< 0.160 U	< 0.160 U	< 0.160 U
Nickel	-	-	390	n	ug/l	20.4 J+	14.6	1.03 J	8.90	27.9	1.98 J	10.2	27.9	0.984 J	1.01 J	5.32	34.5	18.7 J+	18.7 J+
Potassium	-	-	-		ug/l	< 750 UB	976 J	575 J	1120 J	1750	2690	1110 J	< 750 UB	866 J	840 J	1150 J	1610 J+	2220	2010 J+
Selenium	50	50	100	n	ug/l	< 1.25 U	< 1.25 U	< 1.25 U	< 1.25 U	< 1.25 U	< 1.25 U	1.09 J	0.914 J	< 1.25 U	< 1.25 U	1.44 J	< 1.25 U	0.778 J	< 1.25 U
Silver	-	-	94	n	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
Sodium	-	-	-		ug/l	3100 J+	2130	1340	3680	13000	12100	8720	3820 J+	1350	1330	8500	6150 J+	7250 J+	6570 J+
Thallium	2	0.5	0.2	n	ug/l	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U
Vanadium	-	-	86	n	ug/l	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U	1.88 J	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U
Zinc	-	-	6000	n	ug/l	15.7	17.1	5.79	21.7	30.3	2.41 J	17.8	32.9	6.72 J	4.35 J	6.13	43.0	33.8	34.2

Notes:

Bolded, highlighted results exceed the MCL

Gray shaded results exceed the Tap water RSL in the absence of MCLs

MCL for Lead = US EPA action level for public water treatment systems

- = data not available

-- = sample not tested for

ft = feet

bgs = below ground surface

mg/l = milligrams per liter

ug/l = micrograms per liter

MCL = US EPA Maximum Contaminant Level, Nov 2014

MCLG = US EPA Maximum Contaminant Level Goal, Nov 2014

RSL = US EPA Regional Screening Levels, Nov 2014

c = cancer

n = non-cancer

B = blank contamination

J+ = estimated; biased high

J = estimated

M = sample matrix interference

U = not detected above Practical Quantitation Limit

Table6-3, continued (page 2 of 2)

CFD OU Groundwater Chemical Results for the 2014 Sampling Event and Screening Criteria

Aquifer/Sample Location						Lower Patapsco					
Well ID						WP-1	WP-2	WP-3	WP-4	WP-5	WP-6
Sample Collection Date						11/3/2014	11/3/2014	11/3/2014	10/31/2014	10/31/2014	10/31/2014
Screen Interval (ft bgs)						3-6	2.5-5.5	3-6	3-6	2.5-5.5	44-54
Upgradient/Downgradient						D	D	D	U	U	D
Analyte	**MCL**	**MCLG**	**EPA Tap Water RSL**		**Unit**						
General Chemistry Parameters											
Alkalinity, total (as CaCO3)	-	-	-		mg/l	--	34.5	--	--	--	< 1.00 U
Chloride	-	-	-		mg/l	--	11.3 M	--	--	--	14.6
Dissolved Organic Carbon	-	-	-		mg/l	--	5.05	--	--	--	< 2.50 U
Iron, Ferric	-	-	-		mg/l	--	0.437	--	--	--	0.136
Iron, Ferrous	-	-	-		mg/l	--	0.362 U	--	--	--	1.22 U
Nitrate	10	10	32	n	mg/l	--	< 0.100 U	--	--	--	< 0.100 U
Nitrogen as nitrite	1	1	2	n	mg/l	--	< 0.100 U	--	--	--	< 0.100 U
Sulfate	-	-	-		mg/l	--	17.1	--	--	--	3.64
Total Organic Carbon	-	-	-		mg/l	--	4.75	--	--	--	< 2.50 U
Ethane	-	-	-		ug/l	--	< 2.00 U	--	--	--	< 2.00 U
Ethene	-	-	-		ug/l	--	< 2.00 U	--	--	--	< 2.00 U
Volatile Organic Compounds											
Chloroethane	-	-	21000	n	ug/l	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 UJ	< 1.00 UJ	< 1.00 UJ
Chloroform	80	70	0.22	c	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
cis-1,2-dichloroethene	70	70	36	n	ug/l	0.319 J	37.2	9.91	< 0.500 U	< 0.500 U	< 0.500 U
Tetrachloroethene	5	0	11	c	ug/l	0.628 J	< 0.500 U	0.603 J	< 0.500 U	< 0.500 U	< 0.500 U
Toluene	1000	1000	1100	n	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
trans-1,2-dichloroethene	100	100	360	n	ug/l	< 0.500 U	< 0.500 U	0.265 J	< 0.500 U	< 0.500 U	< 0.500 U
Trichloroethene	5	0	0.49	c	ug/l	< 0.500 U	**23.3**	2.92	< 0.500 U	< 0.500 U	< 0.500 U
Vinyl chloride	2	0	0.019	c	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
Dissolved Metals											
Aluminum	-	-	20000	n	ug/l	40.7 J	213	83.7	59.1 J+	1820	< 25.0 UB
Antimony	6	6	7.8	n	ug/l	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U
Arsenic	10	0	0.052	c	ug/l	< 1.50 U	0.957 J	< 1.50 U	< 1.50 UB	3.43 J+	< 1.50 U
Barium	2000	2000	3800	n	ug/l	11.7	12.4	62.9	26.9 J+	57.7 J+	< 2.50 UB
Beryllium	4	4	25	n	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	0.749 J
Cadmium	5	5	9.2	n	ug/l	< 0.500 U	< 0.500 U	1.91	< 0.500 U	< 0.500 U	< 0.500 U
Calcium	-	-	-		ug/l	1850	18300	63000	17900 J+	28800 J+	1770 J+
Chromium	100	100	22000	n	ug/l	< 1.00 U	3.54	< 1.00 U	< 1.00 U	4.37	< 1.00 U
Cobalt	-	-	6	n	ug/l	4.76	1.61 J	7.21	< 2.50 U	1.40 J	6.50
Copper	1300	1300	800	n	ug/l	1.54 J	1.00 J	< 2.00 U	< 2.00 U	3.84	1.16 J
Iron	-	-	14000	n	ug/l	16.6 J	799	991	7300	2440	1360
Lead	15	0	15		ug/l	2.76	2.78	**24.0**	3.65 J+	4.95 J+	3.17 J+
Magnesium	-	-	-		ug/l	1210 J	2280	13600	4140 J+	6830 J+	< 750 UB
Manganese	-	-	430	n	ug/l	25.2	228	190	633	152	25.8 J+
Mercury	2	2	0.63	n	ug/l	< 0.160 U	< 0.160 U	< 0.160 U	< 0.160 U	0.115 J	< 0.160 U
Nickel	-	-	390	n	ug/l	7.48	1.34 J	7.52	< 1.50 U	< 1.50 UB	10.3 J+
Potassium	-	-	-		ug/l	915 J	1460	2800	1820 J+	3180 J+	< 750 UB
Selenium	50	50	100	n	ug/l	< 1.25 U	< 1.25 U	< 1.25 U	< 1.25 U	< 1.25 U	< 1.25 U
Silver	-	-	94	n	ug/l	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
Sodium	-	-	-		ug/l	2100	6140	9780	48100 J+	56300 J+	4470 J+
Thallium	2	0.5	0.2	n	ug/l	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U
Vanadium	-	-	86	n	ug/l	< 2.50 U	3.93	< 2.50 U	2.86 J	9.57	< 2.50 U
Zinc	-	-	6000	n	ug/l	10.1	< 2.50 U	1.36 J	< 2.50 U	65.9	39.1

Notes:

Bolded, highlighted results exceed the MCL

Gray shaded results exceed the Tap water RSL in the absence of MCLs

MCL for Lead = US EPA action level for public water treatment systems

- = data not available

-- = sample not tested for

ft = feet

bgs = below ground surface

mg/l = milligrams per liter

ug/l = micrograms per liter

MCL = US EPA Maximum Contaminant Level, Nov 2014

MCLG = US EPA Maximum Contaminant Level Goal, Nov 2014

RSL = US EPA Regional Screening Levels, Nov 2014

c = cancer

n = non-cancer

B = blank contamination

J+ = estimated; biased high

J = estimated

M = sample matrix interference

U = not detected above Practical Quantitation Limit

Table 6-4

Clean Fill Dump

Groundwater Chemical Results for 2013 Sampling Event and Screening Criteria

Aquifer/Sample Location	Lower Patapsco																			
Well ID	CFD-1				CFD-2				CFD-3D				CFD-3S				CFD-4			
Sample Collection Date	7/16/2013				7/17/2013				7/16/2013				7/16/2013				7/17/2013			
Screen Interval (ft bgs)	40.3-55.3				3-8				60-70				4.5 - 9.5				4.5-9.5			
Upgradient/Dowgradient (U/D)	U				D				D				D				D			
		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC
General Chemistry Parameters																				
Alkalinity, total as CaCO3 (mg/L)	--				--				--				19.8				--			
Chloride (mg/L)	--				--				--				5.5				--			
Dissolved Organic Carbon (mg/L)	--				--				--				0.74				--			
Ferric Iron (µg/l)	--				--				--				--				--			
Ferrous Iron (µg/l)	--				--				--				--				--			
Nitrate+Nitrite as Nitrogen (mg/L)	--				--				--				0.052				--			
Sulfate (mg/L)	--				--				--				7.77				--			
Sulfite (µg/l)	--				--				--				--				--			
Total Organic Carbon (mg/L)	--				--				--				0.51				--			
Volatile Organic Compounds (µg/l)																				
CHLOROETHANE	ND				ND				ND				ND				ND			
CHLOROFORM	ND				ND				0.23	J	B	x	ND				ND			
CIS-1,2-DICHLOROETHENE	ND				ND				ND				11				ND			
TETRACHLOROETHENE (PCE)	ND				ND				ND				16				0.18	J		
TOLUENE	0.18	J	B	x	0.1	J	B	x	0.18	J	B	x	0.07	J	B	x	0.09	J	B	x
TRANS-1,2-DICHLOROETHENE	ND				ND				ND				ND				ND			
TRICHLOROETHENE (TCE)	ND				ND				ND				6.1				ND			
VINYL CHLORIDE	ND		UJ	c	ND		UJ	c	ND				0.09	J			ND		UJ	c
Dissolved Metals (µg/l)																				
ALUMINUM	12.4				15.6				2.4				20.7				264			
ANTIMONY	0.036	J			0.043	J			ND				0.039	J			0.006	J		
ARSENIC	1.3				0.62				ND				0.22	J			0.74			
BARIUM	18				16				4.62				27				69			
BERYLLIUM	0.459				0.155				0.028	J			0.185				2.56			
CADMIUM	0.046				0.076				0.016	J			0.146				0.049			
CALCIUM	2,000				2,870				911				3,130				4,670			
CHROMIUM	0.24				0.22				0.07	J			0.28				0.77			
COBALT	16.3				5.51				0.622				9.35				30			
COPPER	0.715				0.48				0.387				0.634				0.138			
IRON	252				1120				9.2	J			5,280				3,120			
LEAD	0.006	J			0.285				0.196				0.149				0.03			
MAGNESIUM	1,390				1,920				329				2,350				4,610			
MANGANESE	22.6				16.5				3.15				88.4				136			
MERCURY	ND				ND				ND				ND				ND			
NICKEL	19.7				29.7				1.11				14.8				39.1			
POTASSIUM	837				870				534				1,260				1,970			
SELENIUM	0.5	J			0.5	J			ND				ND				0.4	J		
SODIUM	3,280				2,180				1,440				3,870				14,200			
THALLIUM	0.028	J			0.016	J			0.005	J			0.016	J			0.014	J		
ZINC	12.1				24.1				2.13				24.9				54.2			

Aquifer/Sample Location	Lower Patapsco																			
Well ID	CFD-5				CFD-6				MWC-1				MWC-2				MWC-3			
Sample Collection Date	7/18/2013				7/17/2012				7/17/2013				7/17/2013				7/16/2013			
Screen Interval (ft bgs)	3 - 8				15-25				18.5-28.5				89-99				29 - 39			
Upgradient/Dowgradient (U/D)	D				D (New Well)				U				U				D			
		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC
General Chemistry Parameters																				
Alkalinity, total as CaCO3 (mg/L)	141				ND				--				--				2		B	z
Chloride (mg/L)	18.8				11.8				--				--				12			
Dissolved Organic Carbon (mg/L)	4.04				0.75				--				--				0.53			
Ferric Iron (µg/l)	--				--				--				--				--			
Ferrous Iron (µg/l)	--				--				--				--				--			
Nitrate+Nitrite as Nitrogen (mg/L)	0.014	J			0.162				--				--				0.208			
Sulfate (mg/L)	33.7				13				--				--				15.4			
Sulfite (µg/l)	--				--				--				--				--			
Total Organic Carbon (mg/L)	4.05				0.65		J	b	--				--				0.47	J		
Volatile Organic Compounds (µg/l)																				
CHLOROETHANE	ND				ND				ND				ND				ND			
CHLOROFORM	ND				ND				0.18	J	B	x	0.2	J	B	x	ND			
CIS-1,2-DICHLOROETHENE	2.5				ND				ND				ND				ND			
TETRACHLOROETHENE (PCE)	ND				ND				ND				ND				ND			
TOLUENE	0.12	J	B	x	0.09	J	B	x	0.09	J	B	x	0.11	J	B	x	0.11	J	B	x
TRANS-1,2-DICHLOROETHENE	0.2	J			ND				ND				ND				ND			
TRICHLOROETHENE (TCE)	0.44	J			ND				ND				ND				ND			
VINYL CHLORIDE	ND				ND		UJ	c	ND		UJ	c	ND				ND			
Dissolved Metals (µg/l)																				
ALUMINUM	3.9				69.3				75.8				3.4				7.4			
ANTIMONY	0.053				ND				ND				ND				ND			
ARSENIC	24				0.12	J			ND				ND				ND			
BARIUM	23				25				30				4.8				20			
BERYLLIUM	0.009	J			1.02				0.751				0.016	J			0.077			
CADMIUM	ND				0.219				0.161				0.029	J			0.084			
CALCIUM	53,700				2,580				1,170				1,020				2,970			
CHROMIUM	0.91				0.68				0.09	J			0.1	J			0.11	J		
COBALT	3.7				8.52				20.4				0.693				4.48			
COPPER	0.146				25.7				7.29				0.501				2.19			
IRON	11,300				4.7	J			20.7				4.1	J			4.3	J		
LEAD	0.007	J			0.133				0.09				0.042				0.021	J		
MAGNESIUM	6,330				2,120				1,180				312				2,030			
MANGANESE	155				70.6				70				2.99				25.2			
MERCURY	ND				ND				ND				ND				ND			
NICKEL	2.61				9.05				25.7				1.49				5.53			
POTASSIUM	2,930				1,070				622				649				1,180			
SELENIUM	ND				1.3	J			1	J			ND				1.2	J		
SODIUM	12,100				8,000				3,870				1,330				8,080			
THALLIUM	0.007	J			0.027	J			0.025	J			0.006	J			0.025	J		
ZINC	1.54				15.3				30.5				4.35				5.58			

Aquifer/Sample Location	Lower Patapsco																			
Well ID	MWC-3 Dup				MWC-4				MWC-5				WP-1				WP-2			
Sample Collection Date	7/16/2013				7/16/2013				7/16/2013				7/17/2013				7/17/2013			
Screen Interval (ft bgs)	29 - 39				30-40				31 - 41				3-6				2.5 - 5.5			
Upgradient/Dowgradient (U/D)	D				D				U				D				D			
		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC
General Chemistry Parameters																				
Alkalinity, total as CaCO3 (mg/L)	2		B	z	--				1.6	J	B	z	--				97			
Chloride (mg/L)	12.1				--				6.4				--				3			
Dissolved Organic Carbon (mg/L)	0.53				--				1.73				--				19			
Ferric Iron (µg/l)	--				--				--				--				--			
Ferrous Iron (µg/l)	--				--				--				--				--			
Nitrate+Nitrite as Nitrogen (mg/L)	0.209				--				0.13				--				ND			
Sulfate (mg/L)	13.7				--				29.2				--				4.5			
Sulfite (µg/l)	--				--				--				--				--			
Total Organic Carbon (mg/L)	0.48	J			--				1.46				--				19.4			
Volatile Organic Compounds (µg/l)																				
CHLOROETHANE	ND				ND				ND				ND				ND			
CHLOROFORM	ND				ND				0.21	J	B	x	0.08	J	B	x	ND			
CIS-1,2-DICHLOROETHENE	ND				ND				ND				0.12	J			4.2			
TETRACHLOROETHENE (PCE)	ND				ND				ND				0.45	J			ND			
TOLUENE	0.1	J	B	x	0.08	J	B	x	0.06	J	B	x	0.16	J	B	x	0.06	J	B	x
TRANS-1,2-DICHLOROETHENE	ND				ND				ND				ND				ND			
TRICHLOROETHENE (TCE)	ND				ND				ND				0.1	J			0.11	J		
VINYL CHLORIDE	ND				ND		UJ	c	ND	UJ	c		ND		UJ	c	ND		UJ	c
Dissolved Metals (µg/l)																				
ALUMINUM	5.9				911				72.3				30.9				265			
ANTIMONY	0.042	J			0.01	J			0.017	J			ND				0.133			
ARSENIC	0.19	J			ND				ND				ND				0.98			
BARIUM	20				63				77				13				22			
BERYLLIUM	0.083				1.02				0.307				0.12				0.067			
CADMIUM	0.096				0.672				0.412				0.073				ND			
CALCIUM	2,930				5,180				3,610				2,590				34,400			
CHROMIUM	0.12	J			0.53				0.28				0.32				3.88			
COBALT	4.37				39.2				23				4.79				2.93			
COPPER	2.19				25.7				2.48				1.84				0.288			
IRON	5.8	J			13.7	J			9	J			10.2	J			1,230			
LEAD	0.025	J			0.515				0.076				0.048				0.051			
MAGNESIUM	2,030				2,860				4,550				1,500				3,720			
MANGANESE	25.2				50.2				81.9				24.7				409			
MERCURY	ND				ND				ND				ND				ND			
NICKEL	5.4				39.5				19.9				7.87				3.94			
POTASSIUM	1,200				1,990				2,320				1,040				2,350			
SELENIUM	1.6				0.5	J			0.8	J			0.6	J			0.5	J		
SODIUM	8,100				6,860				5,220				2,190				3,590			
THALLIUM	0.031				0.062				0.071				0.034				ND			
ZINC	5.48				43.3				35.8				6.53				0.59	J		

Aquifer/Sample Location	Lower Patapsco																									Screening Criteria (µg/L)			
Well ID	WP-2Dup				WP-3				WP-4				WP-5				WP-6				Historical Concentration Range	Laboratory Method Detection Limit	National Drinking Water Regulations		EPA Tap Water	
Sample Collection Date	7/17/2013				7/17/2013				7/17/2013				7/16/2013				7/16/2013									
Screen Interval (ft bgs)	2.5 - 5.5				3-6				3-6				2.5-5.5				44-54									
Upgradient/Dowgradient (U/D)	D				D				U				U				D				(µg/L)	Limit	MCL	MCLG	RSL	
		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC						
General Chemistry Parameters																										
Alkalinity, total as CaCO3 (mg/L)	--				--				--				--				ND				-	1	-	-	-	-
Chloride (mg/L)	--				--				--				--				12.8				-	0.2	-	-	-	-
Dissolved Organic Carbon (mg/L)	--				--				--				--				0.53				-	0.07	-	-	-	-
Ferric Iron (µg/l)	--				--				--				--				--				-	-	-	-	-	-
Ferrous Iron (µg/l)	--				--				--				--				--				-	-	-	-	-	-
Nitrate+Nitrite as Nitrogen (mg/L)	--				--				--				--				0.019	J			-	0.009	-	-	-	-
Sulfate (mg/L)	--				--				--				--				3.77				-	0.05	-	-	-	-
Sulfite (µg/l)	--				--				--				--				--				-	-	-	-	-	-
Total Organic Carbon (mg/L)	--				--				--				--				0.3	J	J	b	-	0.07	-	-	-	-
Volatile Organic Compounds (µg/l)																										
CHLOROETHANE	ND				ND				ND				ND				ND				ND - 0.2	0.16	-	-	21,000	n
CHLOROFORM	ND				ND				ND				ND				ND				ND - 0.33	0.072	80*	70	0.19	ca
CIS-1,2-DICHLOROETHENE	4.6				12				ND				ND				ND				ND - 31	0.067	70	70	28	n
TETRACHLOROETHENE (PCE)	ND				1.4				ND				ND				ND				ND - 60	0.099	5	0	9.7	ca
TOLUENE	0.11	J	B	x	0.21	J	B	x	0.13	J	B	x	0.14	J	B	x	0.14	J	B	x	ND - 3.9	0.054	1000	1000	860	n
TRANS-1,2-DICHLOROETHENE	ND				0.33	J			ND				ND				ND				ND - 14	0.1	100	100	86	ca
TRICHLOROETHENE (TCE)	0.11	J			5.6				ND				ND				ND				ND - 0.52	0.072	5	0	0.44	n
VINYL CHLORIDE	ND		UJ	c	0.14	J			ND		UJ	c	ND				ND				ND	0.075	2	0	0.015	ca
Dissolved Metals (µg/l)																										
ALUMINUM	266				68.8				56.2				18.2				32.7				3 - 2380	0.3	-	-	16,000	n
ANTIMONY	0.129				0.175				0.02	J			0.305				ND				ND - 2.3	0.005	6	6	6	n
ARSENIC	1.1				0.77				2.4				3				ND				ND - 43.3	0.1	10	0	0.045	ca
BARIUM	22				76				21				38				7.83				ND - 142	0.02	2000	2000	2900	n
BERYLLIUM	0.066				0.071				0.019	J			0.009	J			0.856				ND - 4.2	0.006	4	4	16	n
CADMIUM	ND				ND				ND				0.014	J			0.116				ND - 2.72	0.005	5	5	6.9	n
CALCIUM	34,800				69,200				11,200				21,700				1,580				1,660 - 117,000	6	-	-	-	-
CHROMIUM	3.92				0.4				0.87				0.48				0.11	J			ND - 19.2	0.02	100	100	0.031	ca
COBALT	2.9				8.1				0.662				0.764				6.94				ND - 56.6	0.006	--	-	4.7	n
COPPER	0.278				0.267				0.096	J			0.59				1.02				ND - 150	0.02	1300	1300	620	n
IRON	1,190				1470				4,750				1,290				882				19.2 - 20,100	3	-	-	11,000	n
LEAD	0.035				0.008	J			0.052				0.082				0.211				ND - 138	0.005	15	0	-	l
MAGNESIUM	3,760				15,800				2,590				6,280				1,010				897 - 11,500	2	-	-	-	-
MANGANESE	405				198				297				433				25.9				26.6 - 649	0.2	-	-	320	n
MERCURY	ND				ND				ND				ND	ND			ND				ND - 0.09	0.02	2	2	0.63	n
NICKEL	3.96				10.8				0.35				0.76				11				ND - 68.4	0.02	-	-	300	n
POTASSIUM	2,310				4,260				1,790				2,360				1,230				ND - 6,320	50	-	-	-	-
SELENIUM	0.8	J			0.5	J			0.3	J			0.4	J			1	J			ND - 3.3	0.3	50	50	78	n
SODIUM	3,560				10,600				38,000				39,000				4,760				3,780 - 30,000	20	-	-	-	-
THALLIUM	ND				ND				ND				0.007	J			0.047				ND - 0.611	0.005	2	0.5	0.16	n
ZINC	0.49	J			1.23				0.36	J			1.62				18.8				1 - 8,220	0.2	-	-	4,700	n

Notes:

Shaded results indicate exceedance of MCLs

Shaded results indicate exceedance of RSLs in the absence of MCLs/MCLGs

- = Data not available

-- = Sample not tested for component

* = Sum of the concentrations of all four trihalomethanes, as an annual average

ft = feet

bgs = below ground surface

mg/L = millimgrams per liter

µg/L = micrograms per liter

ND = Non Detect, Sample concentration below laboratory method detection limit (MDL)

CFD = Clean Fill Dump

Dup = Duplicate

EPA = U.S. Environmental Protection Agenc

MCL = National Primary Drinking Water Regulations, Maximum Contaminant Level, EPA, June 2013.

MCLG = National Primary Drinking Water Regulations, Maximum Contaminant Level Goal, EPA, June 2013.

RSL = EPA Regional Screening Levels, June 2013.

ca = Cancer

l = EPA has no consensus on toxicity values for inorganic lead, so it is not possible to calculate RSLs.

n = Non-cancer

J = Analyte present, reported value is estimated, concentration is greater than the method detection limit (MDL) but less than the limit of quantification.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

LQ = Laboratory Qualifier

RC = Reason Code

VF = Validation Flag

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

L = Analyte present. Reportted value may not be accurate or precise.

b = Laboratory duplicate imprecission.

c = Calibration failure; poor or unstable response

x = Field blank contamination

z = Method blank contamination

Table 6-5

Clean Fill Dump

Groundwater Chemical Results for 2012 Sampling Event and Screening Criteria

Well ID	CFD-1	LQ	VF	RC	CFD-2	LQ	VF	RC	CFD-3D	LQ	VF	RC	CFD-3S	LQ	VF	RC	CFD-4	LQ	VF	RC	CFD-4Dup	LQ	VF	RC	CFD-5	LQ	VF	RC
Aquifer/Sample Location	Lower Patapsco																											
Sample Collection Date	6/5/2012				6/6/2012				6/6/2012				6/6/2012				6/7/2012				6/7/2012				6/7/2012			
Screen Interval (ft bgs)	40.3-55.3				3-8				60-70				4.5 - 9.5				4.5-9.5				4.5-9.5				3 - 8			
Upgradient/Dowgradient (U/D)	U				D				D				D				D				D				D			
General Chemistry Parameters																												
Alkalinity, total as CaCO3 (mg/L)	--				--				--				9		L	h	--				--				165		B	z
Chloride (mg/L)	--				--				--				4.8				--				--				19.8			
Dissolved Organic Carbon (mg/L)	--				--				--				1.63				--				--				5.51			
Ferric Iron (µg/l)	--				--				--				7,205				--				--				11,388			
Ferrous Iron (µg/l)	--				--				--				5.5				--				--				12			
Nitrate+Nitrite as Nitrogen (mg/L)	--				--				--				0.077				--				--				0.021	J		
Sulfate (mg/L)	--				--				--				8				--				--				44			
Sulfite (µg/l)	--				--				--				< 2				--				--				< 2			
Total Organic Carbon (mg/L)	--				--				--				0.96		J	b	--				--				5.07			
Volatile Organic Compounds (µg/l)																												
CHLOROETHANE	ND				ND				ND				ND				ND				ND				ND			
CHLOROFORM	ND				0.08	J	B	z	0.23	J	B	z	ND				ND				ND				ND			
CIS-1,2-DICHLOROETHENE	ND				ND				ND				12				ND				ND				1.7			
TETRACHLOROETHENE (PCE)	ND				ND				ND				**24**				0.19	J			0.17	J			ND			
TOLUENE	ND				ND				ND				ND				0.7		B	x	0.2	J	B	x	ND			
TRICHLOROETHENE (TCE)	ND				ND				ND				**6.9**				ND				ND				0.35	J		
TRANS-1,2-DICHLOROETHENE	ND				ND				ND				ND				ND				ND				0.14	J		
VINYL CHLORIDE	ND				ND				ND				ND				ND				ND				ND			
Total Metals (µg/l)																												
ALUMINUM	154				531				12.3				59.2				7030				7170				6.4	J		
ANTIMONY	0.023	J			3.42				0.017	J			0.427				0.592				0.582				0.029	J		
ARSENIC	**17**				2.8				0.1	J			1.3				4.3				5.2				**25**			
BARIUM	20				19				5.17				29				67				66				24			
BERYLLIUM	0.53				0.388				0.027	J			0.253				**7.28**				**7.92**				0.048	J		
CADMIUM	0.068				0.427				0.024	J			0.476				**8.54**				**8.38**				ND			
CALCIUM	1,980				2,860				925				3,180				4,650				4,710				61,100			
CHROMIUM	3.96				**291**				0.09	J			17.1				20.7				23.4				1.21			
COBALT	15.1				33.9				0.684				18				391				433				4.61			
COPPER	1.76				985				0.37				49.3				159				182				0.64			
IRON	4910				71,300				36.1				7,210				24,000				24,800				11,400			
LEAD	1.19				**131**				0.397				8.24				**141**				**150**				0.126			
MAGNESIUM	1,410				1,980				341				2,520				4,710				4,700				7,020			
MANGANESE	21.7				309				4.5	J			94.9				141				140				146			
MERCURY	ND		U, L	o	ND				ND				ND				0.03	J	B	z	ND				0.07	J	B	z
NICKEL	18.4				249				1.14				35				739				739				3.91			
POTASSIUM	1,060				977				611				1,220				2,020				1,980				3,200			
SELENIUM	ND		R	m	0.5	J	L	m	0.4	J	L	m	0.5	J	L	m	0.6	J	L	m	2	J	L	m	ND	J	R	m
SODIUM	3,030				2,080				1,310				3,690				14,200				14,300				13,600			
THALLIUM	0.049				0.101				0.015	J			0.039				**2.66**				**2.75**				0.016	J		
ZINC	14.6				1200				2.1				182				12100				13000				63			

Well ID	CFD-6	LQ	VF	RC	MWC-1	LQ	VF	RC	MWC-2	LQ	VF	RC	MWC-3	LQ	VF	RC	MWC-4	LQ	VF	RC	MWC-5	LQ	VF	RC	WP-1	LQ	VF	RC
Aquifer/Sample Location	Lower Patapsco																											
Sample Collection Date	6/7/2012				6/7/2012				6/6/2012				6/6/2012				6/6/2012				6/6/2012				6/6/2012			
Screen Interval (ft bgs)	15-25				18.5-28.5				89-99				29 - 39				30-40				31 - 41				3-6			
Upgradient/Dowgradient (U/D)	D (New Well)				U				U				D				D				U				D			
General Chemistry Parameters																												
Alkalinity, total as CaCO3 (mg/L)	2		L	h	--				--				1.5	J	L	h	--				1.8	J	L	h	--			
Chloride (mg/L)	12.7				--				--				11.7				--				6.2				--			
Dissolved Organic Carbon (mg/L)	2.35				--				--				0.87				--				2.49				--			
Ferric Iron (µg/l)	--				1319.9				3,590				107				--				298				--			
Ferrous Iron (µg/l)	--				< 0.1				< 0.1				< 0.1				--				< 0.1				--			
Nitrate+Nitrite as Nitrogen (mg/L)	0.171				--				--				0.222				--				0.445				--			
Sulfate (mg/L)	11.4				--				--				13.2				--				35.8				--			
Sulfite (µg/l)	< 2				--				--				< 2				--				< 2				--			
Total Organic Carbon (mg/L)	0.64				--				--				0.58				--				1.76				--			
Volatile Organic Compounds (µg/l)																												
CHLOROETHANE	ND				ND				ND				ND				ND				ND				ND			
CHLOROFORM	ND				0.23	J			0.15	J	B	z	ND				ND				0.21	J	B	z	0.13	J	B	z
CIS-1,2-DICHLOROETHENE	ND				ND				ND				ND				ND				ND				0.61			
TETRACHLOROETHENE (PCE)	ND				ND				ND				ND				ND				ND				0.72			
TOLUENE	ND				ND				ND				ND				ND				ND				ND			
TRICHLOROETHENE (TCE)	ND				ND				ND				ND				ND				ND				0.24	J		
TRANS-1,2-DICHLOROETHENE	ND				ND				ND				ND				ND				ND				ND			
VINYL CHLORIDE	ND				ND				ND				ND				ND				ND				ND			
Total Metals (µg/l)																												
ALUMINUM	63.2				172				627				13.2				1070				101				42.2			
ANTIMONY	0.022	J			0.015	J			0.039	J			0.012	J			0.041	J			0.018	J			0.007	J		
ARSENIC	0.1	J			0.1	J			0.4	J			0.1	J			0.2	J			0.1	J			0.1	J		
BARIUM	23				31				15				22				57				74				11			
BERYLLIUM	1.05				0.769				0.203				0.093				1				0.334				0.108			
CADMIUM	0.202				0.174				0.08				0.118				0.474				0.416				0.074			
CALCIUM	2,460				1,210				2,300				2,990				5,540				3,850				1,890			
CHROMIUM	0.8				0.94				4.67				0.27				0.64				0.51				0.44			
COBALT	7.96				21.2				2.71				5.4				24.9				25.5				4.57			
COPPER	27.6				8.07				3.67				2.63				22.8				2.61				0.99			
IRON	137				1,320				3,590				107				479				298				64.3			
LEAD	0.206				0.331				3.67				0.041				0.743				0.217				0.068			
MAGNESIUM	2,020				1,190				663				2,190				2,180				5,200				1,280			
MANGANESE	55.6				66.3				33.4				29.1				61.8				89.4				22.7			
MERCURY	ND				ND				ND				ND				ND		U, L	o	ND				ND			
NICKEL	8.43				27.2				3.22				6.72				19.3				21.7				7.17			
POTASSIUM	1,170				749				3,010				1,210				1,350				2,460				899			
SELENIUM	1.9	J	L	m	1	J	L	m	ND	J	U, L	m	1	J	L	m	0.5	J	R	m	0.7	J	L	m	0.7	J	L	m
SODIUM	7,980				3,720				1,540				8,350				7,150				7,970				2,000			
THALLIUM	0.049				0.042				0.033				0.034				0.101				0.084				0.024	J		
ZINC	16.5				34.9				11.5				6.9				33.8				40.3				7			

Well ID	WP-2	LQ	VF	RC	WP-2Dup	LQ	VF	RC	WP-3	LQ	VF	RC	WP-4	LQ	VF	RC	WP-5	LQ	VF	RC	WP-6	LQ	VF	RC	Historical Concentration Range (µg/L)	Laboratory Method Detection Limit	Screening Criteria (µg/L): National Drinking Water Regulations MCL	MCLG	EPA Tap Water RSL	
Aquifer/Sample Location	Lower Patapsco																													
Sample Collection Date	6/7/2012				6/7/2012				6/6/2012				6/6/2012				6/5/2012				6/6/2012									
Screen Interval (ft bgs)	2.5 - 5.5				2.5 - 5.5				3-6				3-6				2.5-5.5				44-54									
Upgradient/Dowgradient (U/D)	D				D				D				U				U				D									
General Chemistry Parameters																														
Alkalinity, total as CaCO3 (mg/L)	174		B	z	--				--				--				--				ND		R	h	-	1	-	-	-	-
Chloride (mg/L)	4.6				4.5				--				--				--				13.1				-	0.2	-	-	-	-
Dissolved Organic Carbon (mg/L)	22.3				23.5				--				--				--				0.46	J			-	0.07	-	-	-	-
Ferric Iron (µg/l)	1,588				1,608				--				--				--				1,099				-	-	-	-	-	-
Ferrous Iron (µg/l)	2				2				--				--				--				1.5				-	-	-	-	-	-
Nitrate+Nitrite as Nitrogen (mg/L)	ND				ND				--				--				--				0.014	J			-	0.009	-	-	-	-
Sulfate (mg/L)	2.9				2.9				--				--				--				8		L	m	-	0.05	-	-	-	-
Sulfite (µg/l)	2.4				2.4				--				--				--				< 2				-	-	-	-	-	-
Total Organic Carbon (mg/L)	22.3				19.4		J	b	--				--				--				0.32	J	J	b	-	0.07	-	-	-	-
Volatile Organic Compounds (µg/l)																														
CHLOROETHANE	ND				ND				ND				ND				ND				ND				ND - 0.2	0.16	-	-	21,000	n
CHLOROFORM	ND				ND				ND				ND				ND				ND				ND - 0.33	0.072	80*	70	0.19	c
CIS-1,2-DICHLOROETHENE	7.8				7.6				13				ND				ND				ND				ND - 31	0.067	70	70	28	n
TETRACHLOROETHENE (PCE)	ND				ND				**11**				ND				ND				ND				ND - 60	0.099	5	0	9.7	c
TOLUENE	ND				ND				ND				ND				ND				ND				ND - 3.9	0.054	1000	1000	860	n
TRICHLOROETHENE (TCE)	ND				ND				**9.3**				ND				ND				ND				ND - 14	0.1	5	0	0.44	c
TRANS-1,2-DICHLOROETHENE	ND				ND				0.28	J			ND				ND				ND				ND - 0.52	0.072	100	100	86	n
VINYL CHLORIDE	0.08	J			0.09	J			ND				ND				ND				ND				ND	0.075	2	0	0.015	c
Total Metals (µg/l)																														
ALUMINUM	186				190				136				84.9				120				60.9				3 - 2380	0.3	-	-	16,000	n
ANTIMONY	0.178				0.171				0.074				0.043	J			0.514				0.01	J			ND - 2.3	0.005	6	6	6	n
ARSENIC	1				0.9				0.5	J			3.2				7.3				ND				ND - 43.3	0.1	10	0	0.045	c
BARIUM	27				26				41				22				36				7.79				ND - 142	0.02	2000	2000	2900	n
BERYLLIUM	0.042				0.051				0.087				0.023	J			0.013	J			0.884				ND - 4.2	0.006	4	4	16	n
CADMIUM	0.007	J			0.012	J			0.014	J			ND				0.011	J			0.129				ND - 2.72	0.005	5	5	6.9	n
CALCIUM	51,500				51,000				30,800				12,700				29,300				1,640				1,660 - 117,000	6	-	-	-	-
CHROMIUM	3.25				3.27				0.56				0.89				0.99				0.15	J			ND - 19.2	0.02	100	100	0.031	c
COBALT	3.93				4.08				7.02				0.991				0.755				7.01				ND - 56.6	0.006	--	-	4.7	n
COPPER	0.36				0.37				0.68				0.19				0.59				0.89				ND - 150	0.02	1300	1300	620	n
IRON	1,590				1,610				662				7,070				2,670				1,100				19.2 - 20,100	3	-	-	11,000	n
LEAD	0.069				0.084				0.125				0.13				0.228				0.337				ND - 138	0.005	15	0	-	l
MAGNESIUM	6,220				6,110				8,070				3,200				6,200				1,020				897 - 11,500	2	-	-	-	-
MANGANESE	567				577				93.3				341				340				25.9				26.6 - 649	0.2	-	-	320	n
MERCURY	0.05	J	B	z	ND				ND				ND				ND		U, L	o	ND		U, L	o	ND - 0.09	0.02	2	2	0.63	n
NICKEL	4.48				4.83				7.55				0.38				0.66				11.3				ND - 68.4	0.02	-	-	300	n
POTASSIUM	2,450				2,390				2,860				1,550				1,990				1,140				ND - 6,320	50	-	-	-	-
SELENIUM	0.7	J	L	m	0.8	J	L	m	0.6	J	L	m	0.3	J	L	m	ND		R	m	0.9	J	R	m	ND - 3.3	0.3	50	50	78	n
SODIUM	3,440				3,380				7,450				35,000				44,000				4,580				3,780 - 30,000	20	-	-	-	-
THALLIUM	0.016	J			0.017	J			0.009	J			0.01	J			0.014	J			0.063				ND - 0.611	0.005	2	0.5	0.16	n
ZINC	0.4	J			0.4	J			2.5				1.3				5.7				21.7				1 - 8,220	0.2	-	-	4,700	n

Notes:

- Shaded results indicate exceedance of MCLs
- Shaded results indicate exceedance of RSLs in the absence of MCLs/MCLGs
- Screening values = MCLs/MCLGs, and RSLs as stated in the 2012 CFD Workplan (URS, 2012).
- \- = Data not available
- -- = Sample not tested for component
- * = Sum of the concentrations of all four trihalomethanes, as an annual average
- ft = feet
- bgs = below ground surface
- mg/L = milligrams per liter
- µg/L = micrograms per liter
- ND = Non Detect, Sample concentration below laboratory method detection limit (MDL)
- CFD = Clean Fill Dump
- Dup = Duplicate
- EPA = U.S. Environmental Protection Agency
- MCL = National Primary Drinking Water Regulations, Maximum Contaminant Level, EPA, June 2012.
- MCLG = National Primary Drinking Water Regulations, Maximum Contaminant Level Goal, EPA, June 2012.
- RSL = EPA Regional Screening Levels, May 2012.
- c = Cancer
- l = EPA has no consensus on toxicity values for inorganic lead, so it is not possible to calculate RSLs.
- n = Non-cancer

Laboratory Qualifiers/Data Validation:

- J = Analyte present, reported value is estimated, concentration is greater than the method detection limit (MDL) but less than the limit of quantification.
- U = The analyte was analyzed for, but was not detected at or above the MDL.
- LQ = Laboratory Qualifier
- RC = Reason Code
- VF = Validation Flag
- B = Not detected substantially above the level reported in laboratory or field blanks.
- L = Analyte present. Reported value may not be accurate or precise.
- R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
- b = Laboratory duplicate imprecision.
- h = Holding Time Violation
- m = MD/MSD recovery failure
- o = Calibration blank contamination
- x = Field blank contamination
- z = Method blank contamination

Tables 6-6 - 6-9: Clean Fill Dump
Summary of Historical Chemical Results for Selected Analytes

PCE[2]												
Sampling Event Date	**Mar-91**	**Feb-93**	**Oct-96**	**Jun-02**	**Apr-04**	**Sep-06**	**Aug-08**	**Sep-10**	**Jun-12**	**Jul-13**	**Oct-Nov-14**	**Jun-15**
CFD-3S	37	67	60	25.8	47 D	18	18	18	24	16	11.8	17.6
CFD-5	ND	2.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 0.500 U
MWC-3	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 0.500 U
MWC-5	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 0.500 U
WP-2	-	-	ND	ND	ND	17	ND	ND	ND	ND	ND	< 1.00 U
WP-6	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 0.500 U

TCE[3]												
Sampling Event Date	**Mar-91**	**Feb-93**	**Oct-96**	**Jun-02**	**Apr-04**	**Sep-06**	**Aug-08**	**Sep-10**	**Jun-12**	**Jul-13**	**Oct-Nov-14**	**Jun-15**
CFD-3S	5.4	12	12	12.4	14	9.5	6	7.8	6.9	6.1	6.62	5.1
CFD-5	ND	3	1.6	11.2	0.61 J	1.1	1.9	0.40	0.35 J	0.44 J	0.611 J	< 0.500 U
MWC-3	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 0.500 U
MWC-5	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 0.500 U
WP-2	-	-	6.1	1.5 J	ND	15	4.8	7.6	ND	0.11 J	23.3	< 1.00 U
WP-6	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 0.500 U

DCE[1]												
Sampling Event Date	**Mar-91**	**Feb-93**	**Oct-96**	**Jun-02**	**Apr-04**	**Sep-06**	**Aug-08**	**Sep-10**	**Jun-12**	**Jul-13**	**Oct-Nov-14**	**Jun-15**
CFD-3S	5.9	ND	ND	14.2	6.6	9.3	12	7	12	11	8.46	12.4
CFD-5	ND	ND	ND	3.9	1.7	2	3.92	1.6	1.7	2.5	2.32	< 0.500 U
MWC-3	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 0.500 U
MWC-5	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 0.500 U
WP-2	-	-	7.4	1 J	ND	12	8.2	31	7.8	4.2	37.2	< 1.00 U
WP-6	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 0.500 U

Arsenic												
Sampling Event Date	**Mar-91**	**Feb-93**	**Oct-96**	**Jun-02**	**Apr-04**	**Sep-06**	**Aug-08**	**Sep-10**	**Jun-12**	**Jul-13**	**Oct-Nov-14**	**Jun-15**
CFD-3S	ND	ND	ND	ND	5.43 J	ND	1 J	ND	1.3	0.22 J	ND	1.01 J
CFD-5	37.4	10.4	43.3	31	26.5	27	27	27.5	25	24	21.3	< 1.50 U
MWC-3	-	-	ND	ND	ND	ND	0.5 J	ND	0.1 J	ND	ND	< 1.50 U
MWC-5	-	-	ND	ND	ND	ND	0.3 J	ND	0.1 J	ND	ND	< 1.50 U
WP-2	-	-	7.81	ND	ND	ND	1 J	ND	1	0.98	0.957 J	< 1.50 U
WP-6	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 1.50 U

Notes:

All concentrations in micrograms per liter (parts per billion).

[1] = 1 1,2-Dichloroethene (from 1991 and 1993 sampling events) and cis-1,2-Dichloroethene (from subsequent sampling events) have been combined as "DCE".

[2] = Tetrachloroethene (PCE).

[3] = Trichloroethene (TCE).

D = Dilution.

ND = Analyte was not detected.

- = Not analyzed in this sampling event.

J = Analyte present. Reported value may not be accurate or precise and is an estimated value.

U = Indicates the analyte was analyzed for but not detected.

Appendix A

Memo for Record, USACE Site Inspection, May 8, 2015

CENAB-EN-HT (200-1C) 12 May 2015

STAFF OFFICIAL: Mona D. Ponnapalli, Project Engineer, CENAB-EN-HT, (410) 962-3548, Richard Braun, Risk Assessor, CENAE-EN-HT 410-962-2842

PROJECT VISITED: Clean Fill Dump Operable Unit (CFD OU) Fort Meade, BRAC Property, Odenton, Maryland

DATE OF VISIT: 8 May 2015, 0830 to 1100

PRINCIPAL CONTACTS for CFD OU Site Visit:
Dionne Briggs, Refuge Operations Specialist, Patuxent Research Refuge (301-776-3090),
Sherry Krest, Environmental Contaminants, Supervisor USFWS, Chesapeake Bay Field (410-573-4525),
Brad Knudsen, Refuge Manager, Patuxent Research Refuge (301-497-5582)
Steven C. Cardon, BRAC Environmental Coordinator (301-677-9178)

PURPOSE OF VISIT: To perform a site visit for Five Year Review of CFD OU (a Fort George G. Meade BRAC site). The two sub-areas are: (1) Clean Fill Dump, (2) Uncontrolled Waste Site (UWS).

FINDINGS:

Met Dionne Briggs, Sherry Krest, Brad Knudsen and Steve Cardon at the Fish and Wildlife Service Visitor Center of the Patuxent Research Refuge, North, Bald Eagle Drive. The weather at the time of the site visit was warm (~85^{o}F) and mostly sunny.

No sampling was performed during the site visit. After discussing Clean Fill Dump, and the other Department of the Interior site, Ordnance Demolition Area, we started the site visit. The U.S. Fish and Wildlife Service provided a 4-wheel drive SUV, which carried the group. We drove counter-clockwise along the Wildlife Loop Road, to reach CFD OU. Wildlife Loop Road was damaged (washed out) by heavy rains in 2010. It has since been minimally repaired. It is a rough gravel road with ponding in various areas.

Clean Fill Dump OU is a combination of two sites, the Clean Fill Dump proper (13.6 acres) and the Uncontrolled Waste Site (18.2 acres), linked because the operable unit is groundwater. CFD is north of the UWS. The CFD OU has a locked gate near the Boundary Road, with an incomplete fence on either side. The gate has a "No Trespassing" sign. There is a dirt road inside the eastern edge of the CFD.

Ms. Briggs and Krest first conducted the group northward along the Boundary Road inside the CFD gate. We walked and used the dirt/gravel road that the monitoring well samplers used. We saw well MWC-5. The well cover was locked and in good condition. The soil cover here is termed a "MEC cover", not a formal soil cover with specified and graded depths of soil. There were roughly

20 pieces of concrete pipe 18 to 36-inches in diameter and 6 to 10 feet long, tumbled on the ground north of MWC-5.

Then the group returned to the car and Ms. Briggs and Krest led us southwest into the CFD and UWS areas. The CFD and UWS areas are large and undeveloped, so the visual evaluation of portions of the CFD OU was difficult because of heavy vegetation and terrain. Only portions of the CFD OU within approximately 0.25 miles of the Boundary Road gate were traversed. The terrain is rumpled grassy fields with weeds and clumps of brush and larger trees. There are depressions in the surface up to 3-feet deep. The CFD fill slope rises about 10-feet above the wetlands. The UWS part of the site has wetlands and lower elevation as it goes southwest of the CFD.

Overall the vegetation looks healthy, although some dead trees and brush were observed. Surficial debris of man-made origin (pipes, building materials) was observed. The most prominent debris were several pieces of concrete pipe near each other. There was no ponding evident at the time of the site visit.

No major depressions, erosion, cracks, seeps or ponding was observed. No fill or unexploded ordnance was observed. One animal burrow was observed. This landfill does not have benches or venting.

Several of the monitoring wells at the CFD OU were observed. In the interior of the CFD area we saw a MW that isn't listed as one of the typically sampled wells. The well cover was locked and in good condition. It was difficult finding the wells, at CFD OU. All of the observed MW had secure caps. However, at the time of the site visit, the MW wells' paint was peeling.

No commercial or residential construction was observed near the CFD OU that would raise the possibility of offsite groundwater use.

The fence surrounding CFD OU is incomplete. There is a locked gate for the CFD, at the Boundary Road. There are warning signs on the CFD gate. We returned, walking, back to the FWS 4-wheel drive SUV, which carried the group.

CONTACT INFORMATION: If there are any questions concerning this Resume of Staff Visit, please contact the undersigned at (410) 962-3548.

Mona D. Ponnapalli
Chemical Engineer
RID Section, EMDC Branch

Figure 1. Continuation of Boundary Road, inside CFD, looking northwest.

Figure 2. Clean Fill Dump, looking southwest.

Figure 3. Clean Fill Dump, MWC-5.

Figure 4. Concrete pipe north of MWC-5, along dirt/gravel road inside CFD.

Figure 5. Interior of CFD, looking northeast towards car.

Figure 6. Clean Fill Dump interior – fields and trees, looking southwest.

Figure 7. Clean Fill Dump interior – Bradford Pear sapling, in front of concrete chunks. Bradford Pear is a non-native, invasive species.

Figure 8. Ms. Krest (USFWS) Ventures Deeper into the CFD forest.

Figure 9. Chunks of concrete near western border of CFD.

Figure 10. Monitoring Well in Uncontrolled Waste Site area.

Figure 11. Observing stressed Vegetation

Figure 12. Bailey's Marsh, a wetland south of Uncontrolled Waste Site.

Appendix B

Five-Year Review, Site Inspection Checklist and Interview Record, USACE Site Inspection, May 8, 2015

5 Year Review, Site Inspection Checklist

I. SITE INFORMATION	
Site name: Clean Fill Dump Operable Unit 33 (CFD OU)	**Date of inspection: May 8, 2015**
Location and Region: Patuxent Research Refuge, North Tract, FGGM-BRAC, Odenton, MD	**EPA ID/CERCLIS No.: MD9210020567**
Agency, office, or company leading the five-year review: US Army Corps of Engineers (USACE)	**Weather/temperature: Sunny, Warm, 80s F**

Remedy Includes: Check all that apply

[X] Access controls
[X] Institutional controls
[ ] Landfill cover/containment
[ ] Monitored natural attenuation
[ ] Groundwater containment
[ ] Vertical barrier walls
[ ] Groundwater pump and treatment
[ ] Surface water collection and treatment
[ ] Groundwater Monitoring of VOCs
_X_Other _The site remedy is No Further Action with groundwater monitoring._____
_____

Inspection team roster: Mona D. Ponnapalli, Chemical Engineer, Steve Cardon, BRAC Environmental Coordinator, Dionne Briggs, USFWS, Refuge Operations Specialist, Patuxent Research Refuge (PRR), Sherry Krest, USFWS, Environmental Contaminants Supervisor, Brad Knudsen, USFWS, Refuge Manager, PRR.

II. INTERVIEWS (Check all that apply)

1. **USFWS, PRR, Refuge Operations Specialist**

___Dionne Briggs____Refuge Operations Specialist_____May 8, 2015_____301-497-5770
Name Title Date Phone no.
Problems, suggestions: _____Interview record at end of Site Inspection Checklist._____

2. **USFWS, PRR, Environmental Contaminants Supervisor, Chesapeake Bay Field Office**

___Sherry Krest____Environmental Contaminants Supervisor_____May 8, 2015_____410-573-4525
Name Title Date Phone no.
Problems, suggestions: _____Interview record at end of Site Inspection Checklist._____

3. **USFWS, PRR, Refuge Manager**

___Brad Knudsen_____Refuge Manage,PRR_____May 8, 2015_____301-497-5582
Name Title Date Phone no.
Problems, suggestions: _____Interview record at end of Site Inspection Checklist._____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency Maryland Department of the Environment

Contact: Elisabeth Green MDE Remedial Project Manager July 22, 2015 410-537-3346

Name Title Date Phone no.

1800 Washington Blvd., Suite 625, Baltimore, MD 21230-1719

Problems/Suggestions: Interview record at end of Site Inspection Checklist.

Agency Fort Meade DPW, Environmental Division

Contact Steven Cardon BRAC Environmental Coordinator July 16, 2015 301-677-9178

Name Title Date Phone no.

Problems/Suggestions: Interview record at end of Site Inspection Checklist.

Agency EPA Region III

Contact Robert Stroud EPA Regonal Project Manager August 26, 2015 410-305-2748

Name Title Date Phone no.

Problems/Suggestions: Interview record at end of Site Inspection Checklist.

4. **Other interviews** (optional)

Name, Agency & Title:
Date & Phone No

Name, Agency & Title:
Date & Phone No

Name, Agency & Title:
Date & Phone No

Name, Agency & Title:
Date & Phone No

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

O&M manual	Readily available	Up to date	X N/A
As-built drawings	Readily available	Up to date	X N/A
Maintenance logs	Readily available	Up to date	X N/A

Remarks. There is no O & M at the Clean Fill Dump (CFD) and Uncontrolled Waste Site (UWS). There is only annual groundwater sampling.

2. **Site-Specific Health and Safety Plan (SSHP)** Readily available Up to date X N/A
   Contingency plan/emergency response plan Readily available Up to date X N/A

Remarks. The Fort Meade-BRAC sites: CFD and UWS, don't require SSHP or contingency or emergency response plans.

3. **O&M and OSHA Training Records** Readily available Up to date X N/A
Remarks_____
_____

4. **Permits and Service Agreements**

Air discharge permit	Readily available	Up to date	[X] N/A
Effluent discharge	Readily available	Up to date	[X] N/A
Waste disposal	Readily available	Up to date	[X] N/A
Other permits_____	Readily available	Up to date	[X] N/A

Remarks._____

5. **Gas Generation Records** N/A

6. **Settlement Monument Records** Readily available Up to date X N/A
Remarks_____
_____

7. **Groundwater Monitoring Records** **X** Readily available X Up to date N/A
Remarks_____
_____

8. **Leachate Extraction Records** Readily available Up to date X N/A
Remarks_____
_____

9. **Discharge Compliance Records**

Air	Readily available	Up to date	X N/A
Water (effluent)	Readily available	Up to date	X N/A

Remarks_____
_____

10. **Daily Access/Security Logs** Readily available Up to date X N/A
Remarks_____
_____

IV. O&M COSTS

1. **O&M Organization**

State in-house — Contractor for State
PRP in-house — Contractor for PRP
Federal Facility in-house — X Contractor for Federal Facility
Other_____

2. **O&M Cost Records**

X Readily available X Up to date
X Funding mechanism/agreement in place
Original O&M cost estimate_____ Breakdown attached

Total annual cost by year for review period if available

From___October 1, 2009___	To___September 30, 2010__	____$ 35,362_____
Date	Date	Total cost
From___October 1, 2010___	To___September 30, 2011__	____$ 73,444_____
Date	Date	Total cost
From___October 1, 2011___	To___September 30, 2012__	____$ 44,425_____
Date	Date	Total cost
From___October 1, 2012___	To___September 30, 2013__	____$ 44,325_____
Date	Date	Total cost
From___October 1, 2013___	To___September 30, 2014__	____$ 27,996_____
Date	Date	Total cost
From___October 1, 2014___	To___September 30, 2015__	____$ 27,119_____
Date	Date	Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _ Boundary Road to CFD OU was washed out in heavy rains in 2010. Road repair in 2011, increased the O & M costs._____

V. ACCESS AND INSTITUTIONAL CONTROLS X Applicable N/A

A. **Fencing, CFD OU:** The CFD OU has a locked gate at its entrance at Boundary Road. However, the fence, on either side of the gate only extends 20-feet or so past each end of the gate.

1. **Fencing damaged** Location shown on site map X Gates secured N/A

Remarks__The fence, on either side of the gate only extends 20-feet or so past each end of the gate, on each side._____

B. Other Access Restrictions

1. **Signs and other security measures** There is a precautionary sign at the Gate.

Remarks__ The CFD OU property is enclosed in a partial fence. PRR-NT is mostly, but not completely enclosed and FWS controls access to the PRR-NT_____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented Yes X No N/A
Site conditions imply ICs not being fully enforced Yes X No N/A

Type of monitoring (*e.g.*, self-reporting, drive by) __Self-reporting by Ft. George G. Meade (FGGM) BRAC Environmental Coordinator (BEC), Mr. Steve Cardon, approximately annually. Also USFWS Refuge Specialist, Dionne Briggs, drives by the area, approximately monthly.

Frequency __See above._____
Responsible party/agency __ FGGM BRAC._____
Contact ___Mr. Steve Cardon, FGGM BEC, Ft. Meade DPW___May 8, 2015 _301-677-9178_
Name Title Date Phone no.

Reporting is up-to-date X Yes No N/A
Reports are verified by the lead agency X Yes No N/A

Specific requirements in deed or decision documents have been met X Yes No N/A
Violations have been reported Yes No X N/A
Other problems or suggestions:
__No violations of Institutional Controls at FGGM BRAC sites at Patuxent Research Refuge, North Tract: Clean Fill Dump and Uncontrolled Waste Site._____
_____

2. **Adequacy** X ICs are adequate ICs are inadequate N/A
Remarks_____

D. General

1. **Vandalism/trespassing** Location shown on site map X No vandalism evident
Remarks_____

2. **Land use changes on site** N/A
Remarks_____

3. **Land use changes off site** N/A
Remarks_____

VI. GENERAL SITE CONDITIONS

A. Roads [X] Applicable

1. **Roads damaged** Roads adequate X
Remarks__Unpaved road inside the CFD only (no road in the UWS). Road is single-lane, dirt and gravel. Road outside CFD and UWS is called "Boundary Road". Boundary Road is along the east side of the CFD and UWS and it is a 2-lane dirt and gravel road with pot holes filled with water.
_____

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS Not Applicable

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map Settlement not evident
Areal extent_____ Depth_____
Remarks___CFD may have a soil cover. (It is not an engineered landfill cover.)____However, ___information on its areal extent and depth was not available. (BEC, May 2015).__On the site ___visit, the terrain was rolling – several small depressions, approximately 2-feet deep and covered with vegetation, scattered throughout the site walk on the CFD._____ __
2. **Cracks** Location shown on site map [X] Cracking not evident
Lengths_____ Widths_____ Depths_____
Remarks_____
3. **Erosion** Location shown on site map Erosion not evident
Areal extent_____ Depth_____
Remarks_Minor erosion near drop-off face to wetlands in the south-west part of the CFD._____
4. **Holes** Location shown on site map Holes not evident
Areal extent_____ Depth_____
Remarks___One animal burrow, approximately 4-inches in diameter, was observed. Its depth was not measured._____
5. **Vegetative Cover** [X] Grass [X] Cover properly established [X] No signs of stress [X] Trees/Shrubs
Remarks__Grass cover over the CFD, with scattered trees and bushes, throughout. (See photos.) The CFD and UWS were open dump sites, not properly landfills._____

6. **Alternative Cover (armored rock, concrete, etc.)** N/A
Remarks_____
7. **Bulges** Location shown on site map [X] Bulges not evident
Areal extent_____ Height_____
Remarks_____
8. **Wet Areas/Water Damage** Wet areas/ [X] water damage not evident
Wet areas Location shown on site map Areal extent_____
Ponding Location shown on site map Areal extent_____
Seeps Location shown on site map Areal extent_____
Soft subgrade Location shown on site map Areal extent_____
Remarks_____

9. **Slope Instability** Slides Location shown on site map [X] No slope instability was observed.
Areal extent_____
Remarks_____

B. Benches Not Applicable
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** Location shown on site map [X] N/A or okay
Remarks_____

2. **Bench Breached** Location shown on site map [X] N/A or okay
Remarks_____

3. **Bench Overtopped** Location shown on site map [X] N/A or okay
Remarks_____

C. Letdown Channels Applicable Not Applicable

1. **Settlement** Location shown on site map No evidence of settlement [X] Not Applicable
Areal extent_____ Depth_____
Remarks_____
_____
2. **Material Degradation** Location shown on site map No evidence of degradation [X] Not Applicable
Material type_____ Areal extent_____
Remarks_____
_____
3. **Erosion** Location shown on site map No evidence of erosion [X] Not Applicable
Areal extent_____ Depth_____
Remarks_____
_____

4. **Undercutting** Location shown on site map No evidence of undercutting [X] Not Applicable
Areal extent_____ Depth_____
Remarks_____
_____
5. **Obstructions** Type_____ No obstructions [X] Not Applicable
Location shown on site map Areal extent_____
Size_____
Remarks_____
_____
6. **Excessive Vegetative Growth** Type_____ [X] Not Applicable
No evidence of excessive growth
Vegetation in channels does not obstruct flow
Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations Applicable
1. **Gas Vents** Active Passive [X] N/A
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance
Remarks_____

2. **Gas Monitoring Probes** Active Passive [X] N/A
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____
_____

3. **Monitoring Wells** (within surface area of landfill)
[X] Properly secured/locked [X] Functioning [X] Routinely sampled [ ] Good condition
[ ] Evidence of leakage at penetration [X] Needs Maintenance
Remarks_ CFD OU site visit was on May 8, 2015, a few months before annual sampling and well maintenance. The paint on the MW had peeled and faded. _Reportedly, well maintenance occurred after groundwater sampling, September 2015, but there was only one site visit and the maintenance has not been verified._____

4. **Leachate Extraction Wells** Active Passive [X] N/A
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____
_____

5. **Settlement Monuments** Located Routinely surveyed [X] N/A
Remarks_____
_____

E. Gas Collection and Treatment Not Applicable
1. **Gas Treatment Facilities** [X] N/A
Flaring Thermal destruction Collection for reuse
Good condition Needs Maintenance
Remarks_____
_____

2. **Gas Collection Wells, Manifolds and Piping** [X] N/A
Good condition Needs Maintenance
Remarks_____
_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings) [X] N/A
Good condition Needs Maintenance N/A
Remarks_____
_____

F. Cover Drainage Layer Not Applicable
1. **Outlet Pipes Inspected** Functioning [X] N/A
Remarks_____
_____

2. **Outlet Rock Inspected** Functioning [X] N/A
Remarks_____
_____

G. Detention/Sedimentation Ponds Not Applicable

1. **Siltation** Areal extent_____ Depth_____ [X] N/A
Siltation not evident
Remarks_____
_____

2. **Erosion** Areal extent_____ Depth_____ [X] N/A
Erosion not evident
Remarks_____
_____

3. **Outlet Works** Functioning [X] N/A
Remarks_____
_____

4. **Dam** Functioning [X] N/A
Remarks_____
_____

H. Retaining Walls Not Applicable

1. **Deformations** Location shown on site map Deformation not evident [X] N/A
Horizontal displacement_____ Vertical displacement_____
Rotational displacement_____
Remarks_____

2. **Degradation** Location shown on site map Degradation not evident [X] N/A
Remarks_____
_____

I. Perimeter Ditches/Off-Site Discharge Not Applicable
1. **Siltation** Location shown on site map Siltation not evident [X] N/A
Areal extent_____ Depth_____
Remarks_____
_____

2. **Vegetative Growth** Location shown on site map [X] N/A
Vegetation does not impede flow
Areal extent_____ Type_____
Remarks_____
_____

3. **Erosion** Location shown on site map Erosion not evident [X] N/A
Areal extent_____ Depth_____
Remarks_____
_____

4. **Discharge Structure** Functioning [X] N/A
Remarks_____
_____

VIII. VERTICAL BARRIER WALLS Not Applicable

1. **Settlement** Location shown on site map Settlement not evident [X] N/A
Areal extent_____ Depth_____
Remarks_____
_____

2. **Performance Monitoring** Type of monitoring_____ Performance not monitored [X] N/A
Frequency_____ Evidence of breaching
Head differential_____
Remarks_____
_____

IX. GROUNDWATER/SURFACE WATER REMEDIES Not Applicable

A. Groundwater Extraction Wells, Pumps, and Pipelines Applicable [X] N/A
1. **Pumps, Wellhead Plumbing, and Electrical**
Good condition All required wells properly operating Needs Maintenance N/A
Remarks_____
_____
_____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** [X] N/A
Good condition Needs Maintenance
Remarks_____
_____

3. **Spare Parts and Equipment** [X] N/A
Readily available Good condition Requires upgrade Needs to be provided
Remarks_____

B. Surface Water Collection Structures, Pumps, and Pipelines Not Applicable

1. **Collection Structures, Pumps, and Electrical** [X] N/A
Good condition Needs Maintenance
Remarks_____
_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
Good condition Needs Maintenance [X] N/A
Remarks_____
_____

3. **Spare Parts and Equipment** [X] N/A
Readily available Good condition Requires upgrade Needs to be provided
Remarks_____
_____

C. Treatment System Not Applicable

1. **Treatment Train** (Check components that apply) [X] N/A
Metals removal Oil/water separation Bioremediation
Air stripping Carbon adsorbers
Filters_____
Additive (*e.g.*, chelation agent, flocculent)_____
Others_____
Good condition Needs Maintenance
Sampling ports properly marked and functional
Sampling/maintenance log displayed and up to date
Equipment properly identified
Quantity of groundwater treated annually_____
Quantity of surface water treated annually_____
Remarks_____
_____

2. **Electrical Enclosures and Panels** (properly rated and functional) [X] N/A
N/A Good condition Needs Maintenance
Remarks_____
_____

3. **Tanks, Vaults, Storage Vessels** [X] N/A
N/A Good condition Proper secondary containment Needs Maintenance
Remarks_____
_____

4. **Discharge Structure and Appurtenances** [X] N/A
N/A Good condition Needs Maintenance
Remarks_____
_____

5. **Treatment Building(s)** [X] N/A
N/A Good condition (esp. roof and doorways) Needs repair
Chemicals and equipment properly stored
Remarks_____
_____

6. **Monitoring Wells** (pump and treatment remedy) [X] N/A
Properly secured/locked Functioning Routinely sampled Good condition
All required wells located Needs Maintenance N/A
Remarks_____
_____

D. Monitoring Data

1. Monitoring Data
[X] Is routinely submitted on time [X] Is of acceptable quality
Remarks__Clean Fill Dump OU 33 does not have a groundwater clean up remedy. However there is routine (annual) groundwater sampling._____ _____
_____

2. Monitoring data suggests:
Remarks__Groundwater plume is effectively contained Contaminant concentrations are declining.

E. Monitored Natural Attenuation Not Applicable

1. **Monitoring Wells** (natural attenuation remedy) [X] N/A
Properly secured/locked Functioning Routinely sampled Good condition
All required wells located Needs Maintenance N/A
Remarks_____
_____

X. OTHER REMEDIES
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction. __None._____

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

__The ROD for Clean Fill Dump OU 33 is No Further Action, with groundwater monitoring. There are also Institutional Controls to prevent groundwater use except for environmental sampling. The IC are being successfully implemented and annual groundwater monitoring is performed._____

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.
____Not Applicable._____
_____
_____

C. Early Indicators of Potential Remedy Problems

_____
_____None. _____
_____

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

___A two part optimization recommendation is an adherence to ROD standards: 1) cease sampling for Monitored Natural Attenuation (MNA) parameters and 2) cease screening groundwater levels to Regional Screening Levels (RSLs).

___Another recommendation is to reach a consensus among EPA, Army and MDE about background groundwater levels for various organics and inorganics so that metals at background levels can be eliminated from the sampling program.

Taken together, these recommendations above will optimize groundwater sampling, and present a valid exit strategy.

See interviews following this page, with:

1) USFWS personnel: Dionne Briggs, Sherry Krest and Brad Knudsen
2) Elisabeth Green, Remedial Project Manager, Maryland Department of the Environment
3) Robert Stroud, Remedial Project Manager, EPA Region III
4) Steve Cardon, BRAC Environmental Coordinator

Dionne Briggs, Refuge Operations Specialist, Patuxent Research Refuge (301-776-3090),
Sherry Krest, Environmental Contaminants, Supervisor USFWS, Chesapeake Bay Field (410-573-4525),
Brad Knudsen, Refuge Manager, Patuxent Research Refuge (301-497-5582)

Post-Site Visit Interview at PRR-NT, Visitors Center
Date/Time: Friday, May 8, 2015 @ 1200 to 1215
Participants: Mona D. Ponnapalli, Brad Knudsen, Sherry Krest and Dionne Briggs

Ms. Ponnapalli reviewed the remedy of the FGGM BRAC site Clean Fill Dump Operable Unit 33 (CFD OU 33): No Further Action (NFA) with groundwater monitoring. All three U.S. Fish and Wildlife Service (FWS) personnel agreed with Ponnapalli's description. Their overall impression of the project was that the NFA with groundwater monitoring remedy was functioning as expected. The groundwater LUC is functioning as intended – no one is extracting the groundwater except the contractor for the annual groundwater investigation as part of the Long Term Groundwater Monitoring Plan (LTGM). Specific questions below.

1. What is your overall impression of the remedial action and long-term monitoring activities at CFD OU? (General sentiment)

The FWS personnel all feel the soil cover for CFD in particular, is minimal. [By this they mean the Clean Fill Dump area (where objects were dumped), rather than the CFD groundwater OU, a larger area which includes both the CFD and the Uncontrolled Waste Site (UWS).] The FWS personnel state that there are various fill components (concrete pieces and metal pipes and rods) penetrate the soil cover and that they think the CFD should have additional soil cover. The FWS personnel state, and the site visit confirmed, that since the soil cover installation, parts of the CFD have sunk unevenly two or three feet, leaving a rolling surface to the area. The FWS personnel also state that there should be surface soil samples taken from the seep area (near monitoring well CFD-5); that has never occurred. The FWS personnel feel that "various heavy metals" at CFD OU exceed the "safe limit" (the MCLs).

2. Do you feel that the land-use controls at the CFD OU are adequately communicated to the public?

The FWS personnel feel that the land-use controls at the CFD OU are adequately communicated to the public. Dionne Briggs, the person most familiar with the site states that she has seen no evidence of groundwater use.

3. There isn't a continuous on-Site presence for remedial activities and/or O & M. Please describe staff and frequency of Site inspections and activities.

Monitoring well sampling and general soil cover inspection, annually, by the contractor, usually occurs in the summer. The samplers are a two-person team. The FWS maintain the roads at PRR-NT.

4. What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

Dionne Briggs and Sherry Krest mentioned that arsenic, iron and manganese concentrations fluctuate. They feel that because of the change from biennial to annual sampling, any trends in those metals will become more apparent (because of more frequent data points).

5. Are you aware of any problems or concerns associated with on-going monitoring and maintenance activities? Do you feel well informed about activities associated with the remedy for the CFD OU?

Brad Knudsen has concerns about the adequacy of the cap. Dionne Briggs noted that there are a few woody shrubs penetrating the CFD soil cover. Sherry Krest mentioned that there is good communication as to when the contractor is coming to sample.

6. Is the remedy functioning as expected? How well is the remedy performing?

See answer to Question 1.

7. Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

Brad Knudsen said that there was an ordnance sweep which must have raised costs for that year (but he didn't state what year). Sherry Krest mentioned that a pile of telephone poles were removed around 2010. Dionne Briggs noted that there has been an increase in the number of monitoring wells sampled (incorrect) and in the frequency of sampling from biennial to annual (correct), which must have increased costs.

8. Have there been any complaints, violations (state or federal), vandalism/emergency response/trespassing incidents or other activities related to the site, requiring a response by your office since the last Five Year Review of the Site? If so, please give details of the events and results of the responses.

Brad Knudsen and Sherry Krest: No.

9. Are you aware of any community concerns regarding the CFD OU, its administration, or its remedy (No Further Action with groundwater monitoring)? If so, please give details.

Brad Knudsen: There may be community concerns about Magnolia Bog, in the southern part of CFD OU. Sherry Krest: No one from the community has contacted her about any concerns.

10. Do you have any comments, suggestions, or recommendations regarding the Site's management or operation?

All three FWS personnel stated that they thought more soil cover should be applied to the CFD area. (See answer to Question 1.)

CERCLA Questionnaire
FGGM-BRAC, Clean Fill Dump OU
Third Five-Year Review

The U.S. Army Corps of Engineers, Baltimore District is doing a Five Year Review of the Clean Fill Dump OU (CFD), a Fort Meade BRAC site. The remedy for the site is LUCs and long term groundwater monitoring (LTGM). Part of the Five Year Review process is to seek information from interested parties, hence this questionnaire. Please answer the questions below, for the period of this Five Year Review (2011 to 2014), for us. You may send us your responses by e-mail (Mona.D.Ponnapalli@usace.army.mil) or phone (410-962-3548 – office/cell 443-255-0602). Thank you.

<<Interview: Wednesday, July 22, 2015 @ 1000 (duration: 10 minutes)>>
<<Participants: Lis Green, MDE and Mona D. Ponnapalli, USACE-NAB>>

1. What is your overall impression of the remedial action and long-term monitoring activities at CFD? (General sentiment)

Lis Green (MDE) feels that the CFD's remedy is effective. She states that the VOCs are decreasing. Ms. Green also states that she receives "timely reports" on CFD regarding monitoring and other matters, from the FGGM-BRAC.

2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the CFD? If so, please give purpose and results.

No, MDE has not undertaken any activities (site visits, inspections, sampling, etc.), at the CFD. MDE relies on the U.S. Army to handle the LTGM sampling and reporting, and feel that it is being done efficiently.

3. Are you aware of any problems or concerns associated with on-going monitoring and maintenance activities? Do you feel well informed about activities associated with the remedy for the CFD?

Lis Green (MDE) is not aware of any problems or concerns associated with on-going monitoring and maintenance activities. Ms. Green feels well informed about activities associated with the remedy for the CFD.

4. Have there been any complaints, violations, or other incidents related to the CFD requiring a response by your office? If so, please give details of the events and results of the responses.

MDE has had no complaints, violations, or other incidents related to the CFD, which required a response by them.

5. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

Ms. Green (MDE) is not aware of events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities.

6. What effects have site operations at CFD, had on the surrounding community?

Ms. Green knows of no effect from CFD site operations, on the surrounding community.

7. Are you aware of any community concerns regarding the CFD, its administration, or its remedy (No Further Action with groundwater monitoring)? If so, please give details.

Ms. Green (MDE) is not aware of any community concerns regarding the CFD, its administration, or its remedy (NFA and groundwater monitoring).

8. Do you feel that the land-use controls at the CFD are adequately communicated to the public?

Ms. Green (MDE) feels that the land-use controls at the CFD are adequately communicated to the public.

9. Do you feel well informed about CFD site activities and progress?

Ms. Green (MDE) feels well informed about CFD site activities and progress.

10. Do you have any comments, suggestions, or recommendations regarding the CFD management?

Ms. Green (MDE) has no comments, suggestions, or recommendations regarding the CFD management. Ms. Green feels that the CFD is a “mature” site. The remedy is working effectively and that the monitoring plan (LTGM), has been refined sufficiently.

Name: Elisabeth Green, Ph.D.,

Title: Remedial Project Manager, Maryland Department of the Environment, Federal Facilities Division, Land Restoration Program

Office Address: 1800 Washington Blvd., Ste. 625, Baltimore, MD 21230-1719

Contact Information (E-mail and Phone number):
Phone: 410-537-3346 EGreen@mde.state.md.us]

CERCLA Questionnaire
FGGM-BRAC, Clean Fill Dump OU
Third Five-Year Review

The U.S. Army Corps of Engineers, Baltimore District is doing a Five Year Review of the Clean Fill Dump OU 33 (CFD OU), a Fort Meade BRAC site. The remedy for the site is LUCs and groundwater monitoring. Part of the Five Year Review process is to seek information from interested parties, hence this questionnaire. Please answer the questions below, for the period of this Five Year Review (2011 to 2014), for us. You may send us your responses by e-mail (Mona.D.Ponnapalli@usace.army.mil) or phone (410-962-3548 – office/cell 443-255-0602). Thank you.

1. What is your overall impression of the remedial action and long-term monitoring activities at CFD OU? (General sentiment)

I concur with the change from NFA with monitoring to LUCs with monitoring and changing the sample schedule from bi-annual to annual.

2. Are you aware of any community concerns regarding the CFD OU, its administration, or its remedy [LUCs and Long Term Groundwater Monitoring (LTGM)]? If so, please give details.

I am not aware of any community concerns. The Army has an active RAB that meets bi-monthly.

3. What effects have site operations at CFD OU, had on the surrounding community?

None that I am aware of.

4. Do you feel that the land-use controls at the CFD OU are adequately communicated to the public? **Yes any member of the public can attend a RAB meetings. The meetings are advertised in local papers.**

5. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details

I am not aware of any of these types of incidents.

6. Do you feel well informed about CFD OU site activities and progress?

Yes the army does a great job with that.

7. Do you have any comments, suggestions, or recommendations regarding the CFD OU management or operation? **I have no issues with the management and operation at the CFD.**

Name: **Robert Stroud**

Title: **Remedial Project Manager**

Contact Information (Office address, E-mail and Phone number): **701 Mapes Rd. Ft. Meade, MD 20755 stroud.robert@epa.gov 410-305-2748**

Steve Cardon, CHMM
BRAC Environmental Coordinator
Fort Meade DPW - Environmental Division
(IMND-MEA-PWE)
4215 Taylor Ave; Suite 5115
Fort George G. Meade, MD 20755-7058
(o) 301.677.9178
(f) 301.677.9001
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Steve Cardon, CHMM, BRAC Environmental Coordinator, Fort Meade DPW - Environmental Division (IMND-MEA-PWE)
INTERVIEW
Phone Interview, Thursday, July 16, 2015 @ 1000 to ~ 1025
Participants: Mona D. Ponnapalli and Steve Cardon

Ms. Ponnapalli reviewed the remedy of the FGGM-BRAC site: Clean Fill Dump OU. The remedy is NFA, with Institutional Controls (IC) and groundwater monitoring. Mr. Cardon agreed with Ponnapalli's description. Mr. Cardon's overall impression of the project was that the IC remedy was functioning as expected. The LUCs are functioning as intended – no one is using groundwater from the FGGM-BRAC CFD OU area, except for environmental monitoring by the government appointed contractor. Specific questions below.

1. What is your overall impression of the project?

Steve Cardon (BEC) feels that the CFD OU's remedy continues to be protective of human health and the environment.

2. Is the remedy functioning as expected? How well is the remedy performing?

Steve Cardon believes that the VOCs are slowly decreasing in the source wells. He feels that trend will be more apparent with more data points due to the change from biennial to annual sampling.

3. What effects have Site operations had on the surrounding community?

Steve Cardon is not aware of any problems or concerns associated with on-going monitoring and maintenance activities.

4. Are you aware of any community concerns regarding the Site or its operation and administration? If so, please give details.

Steve Cardon is not aware of any community concerns. He stated that the Army has an active RAB that meets bi-monthly.

5. Are you aware of any events, incidents, or activities at the Site such as vandalism, trespassing or emergency responses from local authorities, since the last Five Year Review of the Site? If so, please give details.

S**teve Cardon is not aware of any of these types of incidents at CFD OU.**

6. Have there been any complaints, violations, or other incidents related to the Site requiring a response by your office since the last Five Year Review of the Site? If so, please give details of the events and results of the responses.

Steve Cardon is not aware of any complaints or violations, at CFD OU.

7. What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

Steve Cardon states that the VOCs are slowly decreasing. He feels that trend will be more apparent with more data points due to the change from biennial to annual sampling. (Same as answer to Question 2.)

8. Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines in the last five years? Please describe changes and impacts, if there are any.

There was road repair for the PRR-NT Boundary Road, in 2011. (The road had washed out from heavy rains.) A change to O & M is that the sampling frequency was changed from biennial to annual, since 2011.

9. Have there been unexpected O&M difficulties or costs at the Site in the last five years? If so, please give details.

No unexpected O & M difficulties or costs at the Site, other than what is discussed in question 8.

10. There isn't a continuous on-Site presence for remedial activities and/or O & M. Please describe staff and frequency of Site inspections and activities.

Monitoring well sampling and general soil cover inspection, annually, by the contractor, usually occurs in the summer. The samplers are a two-person team.

11. Have there been opportunities to optimize O&M, or sampling efforts?

No.

12. Do you feel well informed about the Site's activities and progress?

Yes.

13. Do you have any comments, suggestions, or recommendations regarding the Site's management or operation?

The Army, MDE and the EPA should agree on the details of a background level for contaminants, especially metals, in Fort Meade and Fort Meade, BRAC, and perform the survey. Perhaps that will enable the Army to show that the occasional metals concentration fluctuations are background concentrations.

Appendix C
Groundwater Data and Trends

Groundwater Data and Trends

1.1.1 MCL Exceedances

Although concentrations have decreased for PCE and TCE during the course of the 2011-2015 LTGM program; both were detected above their respective MCLs in all LTGM events at well CFD-3S. CFD-3S is a source area monitoring well screened in shallow groundwater 4.5—9.5 feet below ground surface (bgs) (URS, September 2011).

However, another monitoring well in the source area, MWC-3 (screened, 29 – 39 feet bgs), at the toe of the landfill, has not shown any arsenic, PCE or TCE contamination above MCLs. This leads to the conclusion that VOC groundwater contamination is present in the shallow aquifer.

PCE, TCE and DCE isoconcentration maps are shown for 2015 and 2014 in Figures 6-5 and 6-6, respectively. TCE and cis 1, 2-DCE isoconcentration maps are given for 2013 in Figures 6-7 and 6-8, respectively. Figures 6-9 and 6-10 present the TCE and cis 1, 2-DCE isoconcentration maps, respectively, for 2012.

At well WP-2, a mid-plume monitoring well, the only exceedance for any VOC above the MCL from 2011 to 2015 was one detection of TCE (23.3 ug/L) in 2014.

Downgradient monitoring well CFD-5 showed no detections of any VOC above any MCL, 2011 to 2015. At well CFD-5, arsenic was detected above the MCL in all LTGM events, 2002 to 2014, but not in 2015. Arsenic concentrations at well CFD-5 range from 21.3 µg/L in 2014 to 31 µg/L, in 2002. Groundwater conditions at CFD-5 (the most downgradient well at the CFD OU) are monitored to determine whether contaminants are potentially reaching the Little Patuxent River (EA, May 2015).

Arsenic, TCE, PCE, and breakdown products—cis- 1, 2-DCE—were not detected in WP-6, 2011 to 2015, demonstrating these groundwater chemicals of potential concern (COPCs) are not migrating to the southeast off the property.

The Little Patuxent River serves as a constant head discharge for the shallow groundwater and, therefore, controls the groundwater elevation near the site. To verify that contaminants are not migrating toward the Little Patuxent River, the Army installed a new well , CFD-6 (screened 60 to 70 feet above mean sea level), downgradient from CFD-3S to better track vertical migration (URS, September 2011). Monitoring well CFD-6 has not shown any VOC contamination above MCLs.

1.1.2 Groundwater Trends

Tables 6-6, 6-7, 6-8 and 6-9 are the CFD OU historical results (1991 to 2015), for PCE, TCE, DCE and arsenic, respectively. The monitoring wells chosen for the tables (CFD-3S, CFD-5, MWC-3, MWC-5, WP-2, WP-6), are the wells selected for LTGM. CFD-3S and MWC-3 are source area monitoring wells, the former screened in shallow groundwater (4.5—9.5 feet bgs) and the latter screened deeper (29 – 39 feet bgs), at the toe of the landfill. Monitoring well CFD-5 is the most downgradient monitoring well, near the Patuxent River. MWC-5 is an upgradient well. WP-2, is a mid-plume monitoring well. WP-6 is a deep well (screened 44—54 feet bgs), at the southeast boundary of the Uncontrolled Waste Site, placed to determine if contaminants are detected southeast of the property.

Figure 6-11 shows the graphical representation of the results from the previous tables (Tables 6-6, 6-7, 6-8), for PCE, TCE and DCE, for a source area well (CFD-3S), a mid-plume well (WP-2) and a downgradient well (CFD-5). Arsenic is not shown as a graph because its concentration has been relatively steady.

Considering the five year period of this review, 2011 through 2015, the PCE concentrations at CFD-3S (Figure 6-11) has decreased over time from the high in 2012 (24 ug/L) until the latest detection in2015 of 17.6 ug/L. The PCE concentrations are above the MCL (5.0 ug/L).

The TCE concentrations remain fairly consistent over time (between 5.1 and 6.9 µg/L). The TCE concentrations have been above the MCL of 5 µg/L. The cis-1,2-DCE concentrations also remain fairly consistent over time (between 8.46 and 12.4 µg/L), always remaining below its MCL of 70 µg/L.

The analytical graphical representation of PCE, TCE and DCE at CFD-3S (Figure 6-11) shows a PCE decreasing trend using the total time samples were taken, 1991 to 2015. This is confirmed by the Mann-Kendall analysis of PCE at CFD-3S, Figure 6-12. The Mann-Kendall analysis for TCE is probably decreasing (Figure 6-13), but that of DCE is increasing (Figure 6-14).

Mid-plume well WP-2 shows no definite trend between October 1996 and June 2015 (Figure 6-11), for PCE, TCE or DCE. The PCE concentrations at WP-2 (Figure 6-11) are consistently below detection limits and the MCL. The Mann-Kendall analysis for TCE (Figure 6-13) and DCE (Figure 6-14) confirm there is no definite trend for these analytes at WP-2. The TCE concentrations were near non-detect in 2012, 2013 and 2015, but increased to 23.3 ug/L in 2014. The cis-1,2-DCE concentrations were fairly low and steady

The contaminant concentration values for PCE, TCE and DCE are shown for the furthest downgradient well CFD-5, in the last Figure 6-11 graph. The Mann-Kendall analysis for downgradient well CFD-5 calculates that TCE is probably decreasing (Figure 6-13) and also that DCE is probably decreasing (Figure 6-14). PCE concentrations in CFD-5 were consistently non-detect for 2012, 2013, 2014 and 2015. The TCE concentrations are all below the limit of

quantitation for 2012, 2013 and 2014. The cis-1,2-DCE concentrations are consistently low over time (between 1.7 and 2.5 µg/L), in 2012, 2013 and 2014. The cis-1,2-DCE concentration was below detection limits in 2015.

The historical and current LTGM results indicate VOCs are not migrating offsite to potential receptors.

The metal concentrations have remained consistent over time at the CFD OU and are likely attributed to background. However, groundwater background levels of metals has not yet been established for FGGM-BRAC. Chromium concentrations, noted as increasing in the Second Five-Year Review for the six LTM wells, is increasing only for CFD-3S (17.1 ug/L), and only in 2012. Arsenic concentrations (see Table 6-9), are mostly in the single digits throughout the site, except at CFD-5 where it exceeded its MCL (10 ug/L) in 2012 (25 ug/L), 2013 (24 ug/L), and 2014 (21.3 ug/L) and at CFD-1 (17 ug/L), in 2012. The Mann-Kendall analysis of arsenic at CFD-5 (Figure 6-15), shows a decreasing trend. Arsenic, iron, and lead were detected above the MCLs at CFD-5; therefore, metals are potentially migrating off site or are attributed to background levels.

Appendix D
Newspaper Notice of Five-year Review

CEMETERY LOTS & CRYPTS

CEMETERY LOTS (2) side by side. Meadow Ridge. Paid $6K, asking $3800. 443-250-6697

GLEN HAVEN MEMORIAL lot 795, sp 1 & 2, sec 4 hrs, $5000 for both, 410-647-4724

LOTS 2 lots, Cedar Hill, Garden of meditations, lot 14 site 3 & 4, $6000, 443-618-1592

FIREWOOD

STEEL POT BELLY STOVE
3 foot high. Completely refinished. Black & chrome. $650. Call Bob: 410-360-2451

FURNITURE

FURNITURE Leather sofa $400, love seat $250, chair w/ottoman $125, 410-255-2165

GARAGE/ YARD SALES

BOWIE
MOVING SALE FURN, TOOLS, HSHD GOODS, XMAS, EVEN FREE STUFF!!! MUST SEE!! ALMOST EVERYTHING GOES!! NO REASONABLE OFFER REFUSED. FRI 4/15 & SAT 4/16! FROM 9A - 2P! FOLLOW SIGNS! FREE GIFTS FOR THE KIDS!!! COME SEE AT 13305 LITTLEPAGE PL 20715!

FAMILY ESTATE SALE Saturday/Sunday 4/16 and 4/17 8-2. No early birds. Selling contents of home indoor/outdoor. Furniture, house hold, linens, and tools. All sold as is. Cash only. 8476 Kenton road Pasadena.

GARAGE/YARD SALE- 4/16/16 - 7:00AM
5101 Landons Bequest Lane, Bowie. MOVING!!! Bedroom suite, Livingroom Set, Futon, Tables and Chairs. Brand New Snow Blower, Never Used- Still in the Box 10' Compound Miter saw - Miter Saw Utility Vehicle - Cordless Combo Kit, Tools, Paint, paint, and more Paint, Electronics and Cables, Ethnic Artwork, Luggage, Linens, Shelving, Crafting Materials, Office Supplies, Clothing and More

MOVING SALE 1736 Shore Drive, Edgewater. Apr 15, 16, 17 from 8-2. Lots of furniture, baseball cards, cast iron carousel horse, handmade porcelain dolls, tools, tires.

RED APRON ESTATE SALE
Saturday, April 16 and Sunday, April 17, 9:00am - 1:00pm
2219 Dairy Farm Road, Gambrills, MD 21054, Watch for Estate Sale signs! Many collectibles, Fenton & Depression glass, Quality furniture, Curio cabinets, Slate Pool table, garden decor, antique toys, mixing bowl/terrine/teacup/teapots, sports memorabilia, Dept. 56, Hollister/AE clothing and more!

MERCHANDISE

GAS GENERATORS
Power Stroke 6000 / 7500 watt. $575, Used Once. Briggs & Stratton 5000 / 7350 watt $150. 301-467-3243

MISCELLANEOUS

KILL BED BUGS & THEIR EGGS! Buy Harris Bed Bug Killers / KIT Complete Treatment System. Available: Hardware Stores, The Home Depot, homedepot.com

MATTRESS
Mattress and box spring set,Twins $95, Full $125, Queen $175, King $250, Serta and Sealy delivery available, accept all major credit cards, call Beth 410-800-6307

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2br/2ba, w/d, pool priv, sec sys, heat incl, $1350. 443-871-2679

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ANNAP - ARNOLD
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GLEN BURNIE
Room for rent. Share house $150/wk. + $150 dep. No drugs, no alcohol. 443-962-3716 443-257-1267

BOWIE BLADE - NEWS

LINTHICUM
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SEVERN 410-551-9787. House to share, room in basement, $600/mo inc util and cable TV service 1 mo sec dep

ROOM FOR RENT

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REAL ESTATE SERVICES

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Notice is hereby given, pursuant to Chapter 14-15 of the Bowie City Code that the City of Bowie has taken into custody a 2008 FORD F150 vehicle identification number 1FTRF122288KB30179. The owner and anyone having a secured interest in this vehicle may reclaim it within 21 days of the date of notice of impoundment, which its time period will expire on May 5, 2016, at 5:00 p.m., **To reclaim your vehicle**, you must bring proof of ownership and proper identification to the City of Bowie Police Department, located at 15901 Excalibur Road, Bowie, MD 20716. Upon payment of any delinquent parking citations and a $50.00 administrative fee, a release will be issued. Payment must be in cash, money order, or certified check. This administrative office is open from 7:00 am to 6:00 pm Monday through Friday, holidays excluded. If you need directions, please call 240-544-5700. Additional costs to reclaim your vehicle are to be paid directly to the towing company. The impoundment fee is a minimum of $100.00 plus a daily storage fee. Under Title 25-206 of Maryland Motor Vehicle Law, failure to reclaim the vehicle within 21 days may cause confiscation and abandonment procedures to be invoked. After 30 days, the City maintains the right to dispose of the vehicle at the discretion of the Police Department. A vehicle or any contents therein may not be removed from the impound lot until all towing, storage, citations, and any other expenses are paid. Failure to reclaim this vehicle within 21 days shall be deemed a waiver of all rights, title and interest in the vehicle, which will then be disposed of in accordance with Maryland motor vehicle laws, by conversion to Police Department use, by auction, or scrapping as junk.

David J. Deutsch
City Manager
BB 16/037 Apr. 14 4105449

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David J. Deutsch
City Manager
BB 16/053 Apr. 14 4105452

LEGAL NOTICES

FORT GEORGE G. MEADE
BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY
NOTIFICATION OF FIVE-YEAR REVIEW

US Army Corps of Engineers

This Public Notice is to inform the community of the U. S. Army Corps of Engineers' (USACE) intent to conduct the 2016 Five Year Review (5YR) for Clean Fill Dump (CFD), Ordnance Demolition Area (ODA) and Tipton Airfield Parcel (TAP), all of which are Fort George G. Meade (Fort Meade) 1998 Base Realignment and Closure (BRAC) properties. CFD and ODA are located on the Patuxent Research Refuge-North Tract (PRR-NT), administered by the U.S. Fish and Wildlife Service (USFWS). TAP is located south of Fort Meade and MD Route 32 and east of MD Route 198. The purpose of the 5YR is to determine if the remedy implemented when the Record of Decision (ROD) was signed for each site remains protective of human health and the environment.

Constituents of Potential Concern (COPCs): COPCs at the sites include various metals (arsenic, barium, cadmium, cobalt, lead), volatile organic compounds [VOCs: benzene, tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (DCE)], and Munitions and Explosives of Concern compounds [MEC: royal demolition explosive (RDX), 2,4,6-trinitrotoluene (TNT), 2-amino-4,6-dinitrotoluene (DNT), and 4-amino-2,6-DNT]. Some of these COPC are present in soils and groundwater at CFD, ODA and TAP, though no site contains all the COPCs. The COPC groundwater concentrations were slightly above the U.S Environmental Protection Agency (EPA) safe drinking water Maximum Contaminant Levels (MCLs).

Selected Remedies: The selected remedies for CFD and TAP are No Further Action (NFA) except groundwater monitoring with land use controls (LUCs). The selected remedy for ODA is Monitored Natural Attenuation (MNA) with LUCs. The implemented LUCs prohibit: unauthorized extraction or use of the groundwater, unauthorized use of the sites and soil disturbance without prior Army approval.

Comment Period: The Army welcomes the public's comments on the sites. The 30-day public comment period is: April 18 to May 17, 2016. The Army will review the public comments. For further information, please contact:

Steve Cardon
Fort Meade BRAC Environmental Coordinator
Phone #: (301) 677-9178
Steven.C.Cardon.ctr@Mail.mil

or

Mona D. Ponnapalli
U.S. Army Corps of Engineers
Phone #: (410) 962-3548
Mona.D.Ponnapalli@Usace.Army.mil

Scheduled date of completion of the Final 5YRs is anticipated to be September 30, 2016. The public is invited to examine the previous Five Year Reviews online at: http://www.ftmeade.army.mil/directorates/dpw/environment/bracLegacy/index.html and at the Information Repository located at:

Fort Meade DPW - Environmental Management Division
(IMND-MEA-PWE)
85th Medical Battalion Ave., Building 32460
Fort George G. Meade, MD 20755
301-677-9648
Hours: 7:30 am to 4:30 pm; Monday through Friday
BB/CW 16/043B Apr. 14 4105440

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RED APRON ESTATE SALE
Saturday, April 16 and Sunday, April 17, 9:00am - 1:00pm
2219 Dairy Farm Road, Gambrills, MD 21054, Watch for Estate Sale signs! Many collectibles, Fenton & Depression glass, Quality furniture, Curio cabinets, Slate Pool table, garden decor, antique toys, mixing bowl/terrine/teacup/teapots, sports memorabilia, Dept. 56, Hollister/AE clothing and more!

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REAL ESTATE SERVICES

VACATION PROPERTY

LINTHICUM 1 bedroom cottage, screened porch, private driveway. $775 a month + utilities. No smoking, no pets. 410-859-0298

COMMERCIAL PROPERTIES

BUSINESS OPPORTUNITIES

THE CITY OF WESTMINISTER IS SEEKING DEVELOPMENT OF THE FORMER WAKEFIELD VALLEY GOLF COURSE. Letters of interest received until April 15. Contact mwolf@westgov.com or visit www.westministermd.gov/wakefield-valleyproperty.

EQUAL HOUSING OPPORTUNITY

All real estate advertising in this newspaper is subject to the Federal Fair Housing Act, which makes it illegal to advertise "any preference, limitation or discrimination based on race, color, religion, sex, handicap or familial status or national origin, or an intention to make any such preference, limitation or discrimination."

It is the policy of Capital-Gazette Newspapers that advertising for any type of housing or financing of housing comply with the Federal Fair Housing Act. Capital-Gazette Newspapers may refuse to accept advertising that does not comply with this policy or may make changes to that advertising, to bring it within compliance.

LEGAL NOTICES

US Army Corps of Engineers

FORT GEORGE G. MEADE
BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY
NOTIFICATION OF FIVE-YEAR REVIEW

This Public Notice is to inform the community of the U. S. Army Corps of Engineers' (USACE) intent to conduct the 2016 Five Year Review (5YR) for Clean Fill Dump (CFD), Ordnance Demolition Area (ODA) and Tipton Airfield Parcel (TAP), all of which are Fort George G. Meade (Fort Meade) 1998 Base Realignment and Closure (BRAC) properties. CFD and ODA are located on the Patuxent Research Refuge-North Tract (PRR-NT), administered by the U.S. Fish and Wildlife Service (USFWS). TAP is located south of Fort Meade and MD Route 32 and east of MD Route 198. The purpose of the 5YR is to determine if the remedy implemented when the Record of Decision (ROD) was signed for each site remains protective of human health and the environment.

Constituents of Potential Concern (COPCs): COPCs at the sites include various metals (arsenic, barium, cadmium, cobalt, lead), volatile organic compounds [VOCs: benzene, tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (DCE)], and Munitions and Explosives of Concern compounds [MEC: royal demolition explosive (RDX), 2,4,6-trinitrotoluene (TNT), 2-amino-4,6-dinitrotoluene (DNT), and 4-amino-2,6-DNT]. Some of these COPC are present in soils and groundwater at CFD, ODA and TAP, though no site contains all the COPCs. The COPC groundwater concentrations were slightly above the U.S Environmental Protection Agency (EPA) safe drinking water Maximum Contaminant Levels (MCLs).

Selected Remedies: The selected remedies for CFD and TAP are No Further Action (NFA) except groundwater monitoring with land use controls (LUCs). The selected remedy for ODA is Monitored Natural Attenuation (MNA) with LUCs. The implemented LUCs prohibit: unauthorized extraction or use of the groundwater, unauthorized use of the sites and soil disturbance without prior Army approval.

Comment Period: The Army welcomes the public's comments on the sites. The 30-day public comment period is: April 18 to May 17, 2016. The Army will review the public comments. For further information, please contact:

Steve Cardon
Fort Meade BRAC Environmental Coordinator
Phone #: (301) 677-9178
Steven.C.Cardon.ctr@Mail.mil

or

Mona D. Ponnapalli
U.S. Army Corps of Engineers
Phone #: (410) 962-3548
Mona.D.Ponnapalli@Usace.Army.mil

Scheduled date of completion of the Final 5YRs is anticipated to be September 30, 2016. The public is invited to examine the previous Five Year Reviews online at:
http://www.ftmeade.army.mil/directorates/dpw/environment/bracLegacy/index.html
and at the Information Repository located at:

Fort Meade DPW - Environmental Management Division
(IMND-MEA-PWE)
85th Medical Battalion Ave., Building 32460
Fort George G. Meade, MD 20755
301-677-9648
Hours: 7:30 am to 4:30 pm; Monday through Friday
BB/CW 16/043B Apr. 14 4105440

RENTALS

APARTMENTS & CONDOS

ANNAP/FAIRWINDS
2br/2ba, w/d, pool priv, sec sys, heat incl, $1350. 443-871-2679

ROOMMATES

2 ROOMS FOR RENT
Whispering Woods Community. $350/mo available now, $500/mo available May 1st. One month rent security. Utilities shared. On street parking. Call 443-603-2634.

55+ LUXURY CONDO IN ANNAPOLIS
2Bdrm/2Bth 1550 sq ft condo. Secure building, indoor/outdoor pool, gym, club house, golf, $1900, John 301-793-8085.

ANNAP - ARNOLD
Lge BR Furn or Unfurn in upscale pvt comm on Severn River. Fios, util incl. 410-544-0020

GLEN BURNIE
Room for rent. Share house $150/wk. + $150 dep. No drugs, no alcohol. 443-962-3716 443-257-1267

LINTHICUM
1 br 2nd floor apt. Private entrance w/deck. Off street parking. Quiet safe neighborhood. $850 month/deposit. 443-250-6982

SEVERN 410-551-9787. House to share, room in basement, $600/mo inc util and cable TV service 1 mo sec dep

ROOM FOR RENT

BOWIE furnished room, private bath, utilities & cable included $850, no sec. dep, 240-381-1001

GLEN BURNIE clean, furn. room, many amenities, $155/wk, $155 sec dep a person, drug/alcoh free, over 50 environment, 410-768-6085

VACATION RENTAL

OCEAN CITY, MARYLAND Best selection of affordable rentals. Full / partial weeks. Call for FREE brochures. Open daily. Holiday Resort Services. 1-800-638-2102. Online reservations: www.holidayoc.com.

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85th Medical Battalion Ave., Building 32460
Fort George G. Meade, MD 20755
301-677–9648
Hours: 7:30 am to 4:30 pm; Monday through Friday
MD 16/043A Apr. 16 4105438

ROBERT E RICHARDS
11253-B LOCKWOOD DRIVE
SILVER SPRING, MD 20901

NOTICE

OF APPOINTMENT NOTICE TO CREDITORS
NOTICE TO UNKNOWN HEIRS TO ALL PERSONS INTERESTED IN THE ESTATE OF
WAYNE T WALLACE II

Notice is given that: **KATHLEEN MARIE WALLACE** whose address is 324 PECAN COURT MILLERSVILLE, MD 21108 was on March 29th, 2016 appointed personal representative(s) of the estate of **WAYNE T WALLACE II** who died on March 19th, 2016 with a will.

Further information can be obtained by reviewing the estate file in the office of the Register of Wills or by contacting the personal representative or the attorney.
All persons having any objection to the appointment (or to the probate of the decedent's will) shall file their objections with the Register of Wills on or before September 29th, 2016

All persons having claims against the decedent must serve their claims on the undersigned personal representative or file them with the Register of Wills with a copy to the undersigned on or before the earlier of the following dates:
(1) Six months from the date of the decedent's death, except if the decedent died before October 1, 1992, nine months from the date of the decedent's death; or
(2) Two months after the personal representative mails or otherwise delivers to the creditor a copy of this published notice or other written notice, notifying the creditor that the claim will be barred unless the creditor presents the claims within two months from the mailing or other delivery of the notice. A claim not presented or filed on or before that date, or any extension provided by law, is unenforceable thereafter. Claim forms may be obtained from the Register of Wills.

KATHLEEN MARIE WALLACE, Personal Representative, Estate # 89162
True Test Copy
LAUREN M. PARKER, Register of Wills for Anne Arundel County Circuit Courthouse - Church Circle P.O. Box 2368 Annapolis, MD 21404-2368
MARYLAND GAZETTE, Date of First Publication: April 9th, 2016
4095605

SMALL ESTATE

NOTICE

OF APPOINTMENT NOTICE TO CREDITORS
NOTICE TO UNKNOWN HEIRS TO ALL PERSONS INTERESTED IN THE ESTATE OF
WINIFRED HOPE NELSON

Notice is given that: **MILTON L NELSON** whose address is 8238 WATERFORD ROAD PASADENA, MD 21122 was on October 11th, 2000 appointed personal representative(s) of the small estate of **WINIFRED HOPE NELSON** who died on September 4th, 2000 without a will.

Further information can be obtained by reviewing the estate file in the office of the Register of Wills or by contacting the personal representative or the attorney.

All persons having any objection to the appointment shall file their objections with the Register of Wills within 30 days after the date of publication of this Notice.

All persons having claims against the decedent must serve their claims on the undersigned personal representative or file them with the Register of Wills with a copy to the undersigned on or before the earlier of the following dates:
(1) Six months from the date of the decedent's death, except if the decedent died before October 1, 1992, nine months from the date of the decedent's death; or
(2) Thirty days after the personal representative mails or otherwise delivers to the creditor a copy of this published notice or other written notice, notifying the creditor that the claims will be barred unless the creditor presents the claim within thirty days from the mailing or other delivery of the notice. Any claim not served or filed within that time, or any extension provided by law, is unenforceable thereafter.

MILTON L NELSON
Personal Representative Estate # 46739
True Test Copy
LAUREN M. PARKER, Register of Wills for Anne Arundel County Circuit Courthouse - Church Circle P.O. Box 2368 Annapolis, MD 21404-2368
MARYLAND GAZETTE, Date of Publication: April 16th, 2016
4112658

NOTICE

OF APPOINTMENT NOTICE TO CREDITORS
NOTICE TO UNKNOWN HEIRS TO ALL PERSONS INTERESTED IN THE ESTATE OF
IRMGARD ELLIOTT

Notice is given that: **RANDY SUE JOHNSON** whose address is 8351 FOREST DR PASADENA, MD 21122 was on March 24th, 2016 appointed personal representative(s) of the estate of **IRMGARD ELLIOTT** who died on February 16th, 2016 without a will.

Further information can be obtained by reviewing the estate file in the office of the Register of Wills or by contacting the personal representative.
All persons having any objection to the appointment shall file their objections with the Register of Wills on or before September 24th, 2016

All persons having claims against the decedent must serve their claims on the undersigned personal representative or file them with the Register of Wills with a copy to the undersigned on or before the earlier of the following dates:
(1) Six months from the date of the decedent's death, except if the decedent died before October 1, 1992, nine months from the date of the decedent's death; or
(2) Two months after the personal representative mails or otherwise delivers to the creditor a copy of this published notice or other written notice, notifying the creditor that the claim will be barred unless the creditor presents the claims within two months from the mailing or other delivery of the notice. A claim not presented or filed on or before that date, or any extension provided by law, is unenforceable thereafter. Claim forms may be obtained from the Register of Wills.

RANDY SUE JOHNSON, Personal Representative, Estate # 89129
True Test Copy
LAUREN M. PARKER, Register of Wills for Anne Arundel County Circuit Courthouse - Church Circle P.O. Box 2368 Annapolis, MD 21404-2368
MARYLAND GAZETTE, Date of First Publication: April 9th, 2016
4095670

NOTICE

OF APPOINTMENT NOTICE TO CREDITORS
NOTICE TO UNKNOWN HEIRS TO ALL PERSONS INTERESTED IN THE ESTATE OF
WILLIAM C LONG

Notice is given that: **GLYNIS D LONG** whose address is 1129 CECIL AVE S MILLERSVILLE, MD 21108 was on March 28th, 2016 appointed personal representative(s) of the estate of **WILLIAM C LONG** who died on January 8th, 2016 with a will.

Further information can be obtained by reviewing the estate file in the office of the Register of Wills or by contacting the personal representative.
All persons having any objection to the appointment (or to the probate of the decedent's will) shall file their objections with the Register of Wills on or before September 28th, 2016

All persons having claims against the decedent must serve their claims on the undersigned personal representative or file them with the Register of Wills with a copy to the undersigned on or before the earlier of the following dates:
(1) Six months from the date of the decedent's death, except if the decedent died before October 1, 1992, nine months from the date of the decedent's death; or
(2) Two months after the personal representative mails or otherwise delivers to the creditor a copy of this published notice or other written notice, notifying the creditor that the claim will be barred unless the creditor presents the claims within two months from the mailing or other delivery of the notice. A claim not presented or filed on or before that date, or any extension provided by law, is unenforceable thereafter. Claim forms may be obtained from the Register of Wills.

GLYNIS D LONG, Personal Representative, Estate # 89150
True Test Copy
LAUREN M. PARKER, Register of Wills for Anne Arundel County Circuit Courthouse - Church Circle P.O. Box 2368 Annapolis, MD 21404-2368
MARYLAND GAZETTE, Date of First Publication: April 9th, 2016
4095625

MEETING NOTICE
Olde Mill Condominium III Inc.
CONDO RESIDENTS

In accordance with The Maryland Non-Stock Corporations Act, Section 5-206, the annual meeting for the election of the Board of Directors has been rescheduled to
Tuesday, May 17, 2016
at ProCom located at 400 Serendipity Drive Millersville, MD 21108 at 7:00 p.m. As stated in Section 5-206 of the Maryland Non-Stock Corporation Act, Section C, at this meeting, the number of members present in person or by proxy will constitute a quorum. A majority of the members present in person or by proxy may approve or authorize the proposed action at the additional meeting and may take any other action which could have been taken at the original meeting if a sufficient number of members had been present.
MD 16/064 Apr. 16 4112318

SMALL ESTATE

NOTICE

OF APPOINTMENT NOTICE TO CREDITORS
NOTICE TO UNKNOWN HEIRS TO ALL PERSONS INTERESTED IN THE ESTATE OF
CONNIE GAIL KISER

Notice is given that: **KRISTEN KISER** whose address is 3420 SENECA STREET BALTIMORE, MD 21211 was on April 7th, 2016 appointed personal representative(s) of the small estate of **CONNIE GAIL KISER** who died on May 24th, 2015 without a will.

Further information can be obtained by reviewing the estate file in the office of the Register of Wills or by contacting the personal representative.

All persons having any objection to the appointment shall file their objections with the Register of Wills within 30 days after the date of publication of this Notice.

All persons having claims against the decedent must serve their claims on the undersigned personal representative or file them with the Register of Wills with a copy to the undersigned on or before the earlier of the following dates:
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(2) Thirty days after the personal representative mails or otherwise delivers to the creditor a copy of this published notice or other written notice, notifying the creditor that the claims will be barred unless the creditor presents the claim within thirty days from the mailing or other delivery of the notice. Any claim not served or filed within that time, or any extension provided by law, is unenforceable thereafter.

KRISTEN KISER
Personal Representative Estate # 89245
True Test Copy
LAUREN M. PARKER, Register of Wills for Anne Arundel County Circuit Courthouse - Church Circle P.O. Box 2368 Annapolis, MD 21404-2368
MARYLAND GAZETTE, Date of Publication: April 16th, 2016
4112768

NOTICE

The ***Annual Meeting*** of Elizabeth's Landing Community Association will be held on Monday, May 9, 2016 at 7:00 p.m. at the Sunset Elementary School, 8572 Ft. Smallwood Rd., Pasadena; cafeteria. Registration will begin at 6:00 p.m. The purpose of the meeting is to elect board members and consider any topic(s) on the agenda specified in the mailing which was sent to all members.

If quorum is not met (by presence & proxy) the meeting will be adjourned and the Annual Meeting will be re-scheduled for Monday, June 6, 2016, at 7:00 p.m. This meeting will be held in the Community Farmhouse. The membership present shall constitute a quorum.
MD 16/040 Apr. 16, 20, 23 4105481

ANNE ARUNDEL COUNTY COUNCIL
FINAL LEGISLATION

BILL NO. 17-16 **(As Amended) –** AN ORDINANCE concerning: Subdivision and Development – Public Works Agreements - FOR the purpose of requiring a public works agreement to be ~~completed within six months of a plat being recorded~~ executed and delivered simultaneously with the approval of a plat or no later than twelve months after a plat has been recorded; and generally relating to subdivision and development.

BILL NO. 18-16 **(As Amended) –** AN ORDINANCE concerning: Licensing – Swimming Pools and Spas – Lifeguards and Signs - FOR the purpose of modifying the requirement for lifeguards at certain public pools; modifying the requirements for signs at certain pools and spas; and generally relating to swimming pools and ~~licensing~~ spas.

Approved and Enacted: April 8, 2016
CAP/MD 16/058 Apr. 16 4107110

PUBLIC AUCTION

Notification of the following owner(s) of properties stored at Ritchie Mini Storage, 20 Ertel Rd., Glen Burnie, MD 21060 (410-768-7944).

Your property will be sold at public auction on APRIL 27, 2016 AT 1:00 P.M. on the premises for delinquent rent and storage charges.

STACEY CROTTI B54/HOWARD PRINCE F20

MT. ROYAL MANAGEMENT CO.
MD 16/056 Apr. 16 4105494

THE BALTIMORE SUN MEDIA GROUP

501 N. Calvert St., P.O. Box 1377
Baltimore, Maryland 21278-0001
tel: 410/332-6000
800/829-8000

WE HEREBY CERTIFY, that the annexed advertisement of Order No 4105440

Sold To:
Dept. of the Army - CU00529790
10 S Howard St
Baltimore District Corps of Engineers
Baltimore,MD 21201-2526

Bill To:
Dept. of the Army - CU00529790
10 S Howard St
Baltimore District Corps of Engineers
Baltimore,MD 21201-2526

Was published in "CroftonWestCountyGazette", "Weekly", a newspaper printed and published in Anne Arundel County on the following dates:

Apr 14, 2016

The Baltimore Sun Media Group

By S. Wilkinson

US Army Corps of Engineers

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BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY
NOTIFICATION OF FIVE-YEAR REVIEW

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Hours: 7:30 am to 4:30 pm; Monday through Friday
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tel: 410/332-6000
800/829-8000

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Was published in "The Bowie Blade", "Weekly", a newspaper printed and published in Prince Georges County on the following dates:

Apr 14, 2016

The Baltimore Sun Media Group

By S. Williamson

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US Army Corps of Engineers

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501 N. Calvert St., P.O. Box 1377
Baltimore, Maryland 21278-0001
tel: 410/332-6000
800/829-8000

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Baltimore,MD 21201-2526

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Apr 16, 2016

The Baltimore Sun Media Group

By S. Wilkinson

Legal Advertising

US Army Corps of Engineers

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NOTIFICATION OF FIVE-YEAR REVIEW

This Public Notice is to inform the community of the U. S. Army Corps of Engineers' (USACE) intent to conduct the 2016 Five Year Review (5YR) for Clean Fill Dump (CFD), Ordnance Demolition Area (ODA) and Tipton Airfield Parcel (TAP), all of which are Fort George G. Meade (Fort Meade) 1998 Base Realignment and Closure (BRAC) properties. CFD and ODA are located on the Patuxent Research Refuge-North Tract (PRR-NT), administered by the U.S. Fish and Wildlife Service (USFWS). TAP is located south of Fort Meade and MD Route 32 and east of MD Route 198. The purpose of the 5YR is to determine if the remedy implemented when the Record of Decision (ROD) was signed for each site remains protective of human health and the environment.

Constituents of Potential Concern (COPCs): COPCs at the sites include various metals (arsenic, barium, cadmium, cobalt, lead), volatile organic compounds [VOCs: benzene, tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (DCE)], and Munitions and Explosives of Concern compounds [MEC: royal demolition explosive (RDX), 2,4,6-trinitrotoluene (TNT), 2-amino-4,6-dinitrotoluene (DNT), and 4-amino-2,6-DNT]. Some of these COPC are present in soils and groundwater at CFD, ODA and TAP, though no site contains all the COPCs. The COPC groundwater concentrations were slightly above the U.S Environmental Protection Agency (EPA) safe drinking water Maximum Contaminant Levels (MCLs).

Selected Remedies: The selected remedies for CFD and TAP are No Further Action (NFA) except groundwater monitoring with land use controls (LUCs). The selected remedy for ODA is Monitored Natural Attenuation (MNA) with LUCs. The implemented LUCs prohibit: unauthorized extraction or use of the groundwater, unauthorized use of the sites and soil disturbance without prior Army approval.

Comment Period: The Army welcomes the public's comments on the sites. The 30-day public comment period is: April 18 to May 17, 2016. The Army will review the public comments. For further information, please contact:

Steve Cardon	or	Mona D. Ponnapalli
Fort Meade BRAC Environmental Coordinator		U.S. Army Corps of Engineers
Phone #: (301) 677-9178		Phone #: (410) 962-3548
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Scheduled date of completion of the Final 5YRs is anticipated to be September 30, 2016. The public is invited to examine the previous Five Year Reviews online at: http://www.ftmeade.army.mil/directorates/dpw/environment/bracLegacy/index.html and at the Information Repository located at:

Fort Meade DPW - Environmental Management Division
(IMND-MEA-PWE)
85th Medical Battalion Ave., Building 32460
Fort George G. Meade, MD 20755
301-677-9648
Hours: 7:30 am to 4:30 pm, Monday through Friday
MD 16/043A Apr. 16 4105438

Appendix E
RTC to Regulatory Comments, Table

First Five Year Review

Ordnance Demolition Area Operable Unit 15

Base Realignment and Closure Property Remedy
Patuxent Research Refuge-North Tract
Odenton, Maryland

Draft Document

US Army Corps of Engineers
BALTIMORE DISTRICT
June 2016

Prepared for:
Office of the Assistant Chief of Staff for Installation Management; Base Realignment and Closure Division

FIRST FIVE YEAR REVIEW, DRAFT
ORDNANCE DEMOLITION AREA OPERABLE UNIT 15
FORT MEADE, BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY
PATUXENT RESEARCH REFUGE-NORTH TRACT, ODENTON, MARYLAND

Prepared by:
US Army Corps of Engineers
North Atlantic Division, Baltimore District
Baltimore, Maryland

Prepared for:
Office of Assistant Chief of Staff for
Installation Management
Base Realignment and Closure Division
(DAIM-ODB)

William J. O'Donnell, II
Chief, Operational and Army and Medical Branch
Assistant Chief of Staff for Installation
Management: BRAC Division (DAIM-ODB)

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Ordnance Demolition Area OU 15		
EPA ID: 0910020567		
Region: 3	**State:** MD	**City/County:** Odenton/Anne Arundel County

SITE STATUS	
NPL Status: Deleted	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: Other Federal Agency **If "Other Federal Agency" was selected above, enter Agency name:** IMCOM and BRAC
Author name (Federal or State Project Manager): USACE, NAB
Author affiliation: U.S. Army Corps of Engineers
Review period: May 2015 – October 2015
Date of site inspection: May 8, 2015
Type of review: Statutory
Review number: 1
Triggering action date: September 30, 2011
Due date *(five years after triggering action date)*: September 30, 2016

Five-Year Review Summary Form (continued)

The table below is for the purpose of the summary form and associated data entry and does not replace the two tables required in Section VIII and IX by the FYR guidance. Instead, data entry in this section should match information in Section VII and IX of the FYR report.

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
Ordnance Demolition Area OU 15

Protectiveness Statement(s)

Include each individual OU protectiveness determination and statement. If you need to add more protectiveness determinations and statements for additional OUs, copy and paste the table below as many times as necessary to complete for each OU evaluated in the FYR report.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
Ordnance Demolition Area OU 15	Protective	Click here to enter date.

Protectiveness Statement:
The remedy at Ordnance Demolition Area OU 15, is protective of human health and the environment. All impacts at the Site posed by contaminated groundwater have been addressed by the remedy: LTM, MNA and maintenance of LUCs.

FIRST FIVE-YEAR REVIEW, DRAFT
ORDNANCE DEMOLITION AREA OPERABLE UNIT (OU 15)
FORT MEADE, BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY
PATUXENT RESEARCH REFUGE-NORTH TRACT, ODENTON, MARYLAND

EXECUTIVE SUMMARY

This Five-Year review evaluates the remedy selected by the Army and the U. S. Environmental Protection Agency (EPA) for Ordnance Demolition Area (ODA), Groundwater Operable Unit(OU) 15. The Record of Decision (ROD) selected remedy for the Groundwater OU at ODA is a Monitored Natural Attenuation (MNA) program with Land Use Controls (LUCs) to evaluate the progress of natural attenuation in reducing groundwater contamination (URS, September 2011).

The LUCs will continue until Preliminary Remedial Goals (PRGs) and Remedial Action Objectives (RAOs) are achieved. The Army is responsible for implementing and maintaining the LUCs at the ODA OU (URS September 2011). The signing of the ROD, September 30, 2011, triggered this first Five-Year Review.

The ODA is located within the Patuxent Research Refuge-North Tract (PRR-NT) in Anne Arundel County, Maryland (Figure 3-1). The PRR-NT is 8,100 acres of former range and maneuver land that was transferred from Fort George G. Meade (FGGM) to the Department of the Interior (DOI) U.S. Fish and Wildlife Service (FWS) as part of the 1988 Base Realignment and Closure (BRAC) mandate.

The ODA is in the southern portion of the PRR-NT parcel off Wildlife Loop Road. The ODA occupies a very small portion (approximately 2.5 acres) of the 8,100-acre PRR-NT in a remote, heavily wooded area. Access to the ODA is limited because the FWS controls access to the PRR-NT; a wooden gate is present on the access road from Wildlife Loop Road. Figure 3-2 shows the site features and topographic contours (URS, June 2013).

The ODA is an inactive site, formerly used for the demolition of Munitions and Explosives of Concern (MEC) encountered at FGGM and the PRR-NT. No documentation on the historical activities at the ODA other than ordnance demolition has been discovered; the years of operation are unknown. Waste solvents may have been used as fuel to ignite or burn explosive materials being demolished at the ODA (URS, July 2014a).

The topography of the ODA generally slopes with a mild gradient to the southwest. The site features surrounding the area where the demolition activities actually took place include an inner

and outer earthen berm, surrounding a demolition pit. Ordnance demolition occurred within the demolition pit which is approximately 40 feet × 80 feet in area and predominantly filled with sand. The explosive limit on ordnance was 5 pounds of explosives, including the amount of donor explosives necessary to detonate the rounds (URS, June 2013).

The groundwater chemicals of concern (COC) at the ODA OU are: cadmium, perchloroethene (PCE), trichloroethene (TCE), chloroform, royal demolition explosive (RDX), 2,4,6-trinitrotoluene (2,4,6-TNT), 2-amino-4,6-dinitrotoluene (DNT), and 4-amino-2,6-DNT (URS, June 2013).

The remedy at ODA OU is protective of human health and the environment. The effective implementation of LUCs has prevented extraction of groundwater except for environmental sampling. There is no residential development at ODA OU. There has been no excavation at the site without proper MEC support. There have been no activities that would interfere with the site remedy.

In general, the overall site conditions may not be conducive to *in situ* biodegradation of chlorinated volatile organic compounds (CVOCs) under reducing conditions. Low groundwater concentrations for the CVOCs at these sites indicate that it may not be technically practicable to identify decreasing trends or subsurface conditions attributable to specific MNA mechanisms. Accordingly, natural groundwater flushing/dispersion will likely be the dominant MNA mechanisms versus anaerobic, aerobic, and cometabolic biodegradation for the CFD OU, ODA OU, and TAP (EA, September 2015).

Groundwater contaminant concentrations are decreasing through natural attenuation and only low concentrations remain in the groundwater. LUCs are used to restrict groundwater use until the contaminant concentrations are below PRGs and the remedial action objectives of the 2011 ROD are met (URS, September 2011).

MNA is proceeding at ODA OU – the explosives COCs have been below PRGs for six consecutive sampling periods. Other COC are also approaching or below the PRGs for several consecutive sampling periods for many of the ODA OU monitoring wells. It is recommended that an exit strategy be established.

FIRST FIVE-YEAR REVIEW, DRAFT
ORDNANCE DEMOLITION AREA OPERABLE UNIT 15
FORT MEADE, BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY
PATUXENT RESEARCH REFUGE-NORTH TRACT, ODENTON, MARYLAND

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LIST OF ACRONYMS AND ABBREVIATIONS

ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
BRAC	Base Realignment and Closure
BG & E	Baltimore Gas and Electric
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFD	Clean Fill Dump
CFR	Code of Federal Regulations
COC	Contaminants of Concern
COPC	Contaminants of Potential Concern
CVOC	Chlorinated Volatile Organic Compounds
DCE	Dichloroethene
DD	Decision Document
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DDTr	parent DDT compounds (p, p'-DDT and o, p'-DDT) and their degradation products
DNT	Dinitrotoluene
DO	Dissolved Oxygen
DOI	U.S. Department of the Interior
DOD	U.S. Department of Defense
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
FFS	Focused Feasibility Study
FGGM	Fort George G. Meade
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
ID	identification, usually the identification number of a monitoring well
LTM	Long-Term Monitoring
LTGM	Long-Term Groundwater Monitoring
LUC	Land Use Controls
LUCRD	Land Use Control Remedial Design
µg/g	Micrograms per gram
µg/L	Micrograms per liter
MCL	Maximum contaminant level

LIST OF ACRONYMS AND ABBREVIATIONS, CONTINUED

MCLG	Maximum contaminant level goal
MD	Maryland
MDE	Maryland Department of the Environment
MEC	Munitions and Explosives of Concern
MNA	Monitored natural attenuation
mV	millivolt
NAPL	Nonaqueous Phase Liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
ODA	Ordnance Demolition Area
OU	Operable Unit
PCE	Tetrachloroethene (or perchloroethene)
ppm	Parts per million
PRG	Preliminary Remediation Goal
PRR	Patuxent Research Refuge
PRR-NT	Patuxent Research Refuge-North Tract
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RDX	Royal Demolition Explosive
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RSL	Regional Screening Level
SI	Site Inspection
SIA	Site Inspection Addendum
SLERA	Screening Level Ecological Risk Assessment
TAP	Tipton Airfield Parcel
TCE	Trichloroethene
TNT	Trinitro toluene
TOC	Total organic carbon
URS	URS Group, Inc.
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
UU/UE	Unlimited Use/Unrestricted Exposure
UXO	Unexploded ordnance
VOC	Volatile organic compound

FIRST FIVE-YEAR REVIEW, DRAFT
ORDNANCE DEMOLITION AREA OPERABLE UNIT 15
FORT MEADE, BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY
PATUXENT RESEARCH REFUGE-NORTH TRACT, ODENTON, MARYLAND

1.0 INTRODUCTION

This Five-Year Review evaluates the remedy selected by the Army and U. S. Environmental Protection Agency (EPA) for Ordnance Demolition Area (ODA), Groundwater Operable Unit (OU) 15. The U.S. Army, as the lead agency and the EPA in the Record of Decision (ROD) selected Monitored Natural Attenuation (MNA) program with Land Use Controls (LUCs) as the remedy to evaluate the progress of natural attenuation in reducing groundwater contamination (URS, September 2011). The Maryland Department of the Environment (MDE) concurred with the selection of MNA with LUCs as the remedy for the site.

MNA is achieved through a long-term groundwater monitoring (LTGM) program. The Army is responsible for implementing and maintaining the LTGM and LUCs at the ODA OU (URS September 2011).MNA and LUCs will continue until Preliminary Remedial Goals (PRGs) and Remedial Action Objectives (RAOs) are achieved.

The ODA site is located within the Patuxent Research Refuge-North Tract (PRR-NT) in Anne Arundel County, Maryland. The PRR-NT is 8,100 acres of former range and maneuver land that was transferred from Fort George G. Meade (FGGM) to the Department of the Interior (DOI) U.S. Fish and Wildlife Service (USFWS) as part of the 1988 Base Realignment and Closure (BRAC) mandate. The Army retains responsibility for environmental issues on the PRR-NT that predate the land transfer to the USFWS. The ODA groundwater OU (Army Site FGGM 20) is one of the areas on the PRR-NT where the Army is leading environmental restoration activities (URS, September 2011).

This remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The purpose of Five-Year Reviews is to determine whether the remedy at a site is protective of human health and the environment.

The U.S. Army is the lead Agency for this Five-Year Review of the remedial actions implemented at the ODA OU. Five-Year Reviews are required for the ODA OU because the remedial action results in hazardous substances, pollutants, or contaminants remaining at the site above levels allowing for unlimited use and unrestricted exposure (UU/UE). The triggering action for this statutory review is the signing of the ROD on September 30, 2011.

This Five-Year Review is prepared pursuant to CERCLA §121 and NCP. CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR §300.430(f) (4) (ii) which states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

In compliance with the requirements above, USACE-Baltimore performed a Five-Year Review to evaluate the implementation and performance of the remedies applied at ODA OU, in order to determine if they remain protective of human health and the environment. USACE-Baltimore has reviewed pertinent documents, conducted interviews with individuals knowledgeable of the site and remedy, and conducted a site visit.

The methods, findings, and conclusions of the review are documented in this Five-Year Review report. In addition, Five-Year Review reports identify issues found during the review, if any, and make recommendations to address them. This first Five-Year Review of the ODA OU was conducted from May 2015 through September 2015.

2.0 SITE CHRONOLOGY

Table 2-1, Site Chronology, provides a chronology of the investigations and cleanup activities that have occurred at ODA OU.

Table 2-1 Site Chronology	
Event	**Date**
Demolition of MEC at ODA OU, from FGGM and PRR-NT.	Unknown
BRAC mandated the closure and/or realignment of approximately 9,000 acres of FGGM property.	1988
ODA OU demolition activities ceased.	Date unknown
Military Construction Appropriations Act directed the transfer of 7,600 of the 9,000 acres to the DOI for inclusion in the PRR-NT. Included in this portion of the parcel is the inactive ODA OU.	October 1991
Site Inspection (SI) and Site Inspection Addendum (SIA) (Arthur Little Corp., 1995)	1995
Ordnance Survey of 7,600-acre of PRR-NT Parcel, including ODA OU (USACE, 1995)	1995
Remedial Investigation Data Report (Analysas Corp.)	1996
FGGM proposed for placement on National Priorities List (NPL)	April 1, 1997
Final NPL Listing for FGGM	July 28, 1998
Remedial Investigation (IT Group)	1999 -- 2000
Action Memorandum Establishing LUCs for ODA OU (Army, April 2001)	April 2001
Focused Feasibility Study (URS, 2002)	2002
Draft Proposed Plan (USACE, 2003)	2003
Long-term Monitoring (LTM) Plan (USACE, 2003)	2003
Final Decision Document (USACE, December 2005)	December 2005
Federal Facility Agreement between Army, DOI, EPA and MDE	2009
Revised Draft Proposed Plan submitted	2009
Long-Term Groundwater Monitoring (LTGM) Plan for Combined OU (USACE, February 2011)	February 2011
Proposed Plan, Final (USACE, 2011)	May 2011
Final Record of Decision (USACE and EPA, September 2011)	September, 2011
Land Use Controls Remedial Design, Final (USACE and EPA, 2013) (USACE and EPA, June 2013)	June 27, 2013
Interim Remedial Action Completion Report for Groundwater at the Ordnance Demolition Area, Final (URS, July 2014a)	July 10, 2014
Sources: Interim Remedial Action Completion Report, Final (URS, July 2014a) and Land Use Control Remedial Design, Final (URS, June 2013)	

3.0 BACKGROUND

3.1 Physical Characteristics

FGGM formerly occupied 13,596 acres of land in the northwest corner of Anne Arundel County, Maryland, approximately halfway between Washington DC, and Baltimore, MD. Figure 3-1

illustrates the regional location of FGGM with respect to the State of Maryland and the Baltimore-Washington metropolitan area. It also shows the BRAC parcel, also known as PRR-NT.

Figure 3-2 illustrates the site layout of the ODA. Surrounding features are the Baltimore Gas and Electric (BG& E) power line approximately 700-feet southwest and the Patuxent River approximately 2000-feet to the southwest (Figure 3-3). No areas of archaeological or historical importance were identified at the ODA (URS, June 2013).

The ODA site is in the southern portion of the PRR-NT parcel off Wildlife Loop Road. The ODA site occupies a very small portion (approximately 2.5 acres) of the 8,100-acre PRR-NT in a remote, heavily wooded area. Access to the ODA is limited because the USFWS controls access to the PRR-NT; a wooden gate is present on the access road from Wildlife Loop Road. Figure 3-2 shows the site features and topographic contours (URS, June 2013).

The topography of the ODA area generally slopes with a mild gradient to the southwest. The site features surrounding the area where the demolition activities actually took place include an inner and outer earthen berm. The inner and outer berms were constructed as safety features to reduce the hazard from ejected debris. Ordnance demolition occurred within the demolition pit. The explosive limit on ordnance was 5 pounds of explosives, including the amount of donor explosives necessary to detonate the rounds (URS, June 2013).

The inner berm surrounds the former ordnance demolition pit, which is approximately a 40 feet × 80 feet ellipse, predominantly filled with sand. The inner berm is approximately 8 feet high and constructed of rubble and earthen material. Beyond the inner berm is a similarly constructed outer berm. The area between the inner and outer berms is typified by flat grass cover. Beyond the outer berm, the area is heavily forested and locally contains wetlands to the east and south (URS, June 2013).

3.2 Site Geology

The PRR-NT (including the ODA) are located just within the western boundary of the Coastal Plain physiographic province (Coastal Plain). The Coastal Plain geology is characterized by a wedge of unconsolidated Cretaceous and Quaternary alluvial sediments (unconsolidated sands, silts, and clays) that dip and thicken toward the Atlantic Ocean. Underlying the Coastal Plain deposits is Precambrian crystalline bedrock composed predominately of gabbro, gneiss, and schist (USACE, August 1998).

Figure 3-3 shows the location of the groundwater monitoring wells at ODA OU. The diagonal, parallel lines at the bottom left corner of Figure 3-3 are the BG & E power lines. Figure 3-4 locates the monitoring wells and marks out a conceptual cross-section line (A-A'), which is further shown in Figure 3-5.

3.3 Regional Hydrogeology

The ODA OU is located on the unconsolidated sands, clays, and silts of the Coastal Plain physiographic province. Groundwater availability in Coastal Plain sediments is generally good, with three separate and distinct aquifers (from youngest to oldest): the Quaternary Terrace/Upper Patapsco, the Lower Patapsco, and the Patuxent, all of which comprise the Potomac Group. There are two confining layers. Between Quaternary Terrace/Upper Patapsco and the Lower Patapsco is the Middle Patapsco, the confining layer that is closer to the ground surface. The Arundel Formation, is a deeper confining layer that occurs between the Lower Patapsco Formation and the Patuxent Formation (URS, June 2013). The aquifers are confined on a regional scale, but they act as unconfined aquifers within the respective outcrop areas (EA, May 2015).

The regional groundwater flow is to the southeast, generally following the eastward structural dip. Groundwater flow in the water table aquifer often mirrors the topography; however, it can sometimes deviate significantly from the surface configuration. Some seasonal fluctuations locally influence flow direction, but the general flow is controlled by the Patuxent River, the Little Patuxent River, and the perennial streams that serve as "constant head" hydraulic boundaries (EA, May 2015).

3.3.1 Ordnance Demolition Area Operable Unit Local Hydrogeology

Quaternary river terrace sand is present in this area and forms the water table aquifer at the ODA groundwater OU. The Quaternary terrace/Upper Patapsco deposits cover the Middle Patapsco confining layer and Lower Patapsco sediments, which crop out on much of the PRR and which underlie the terrace deposits at the ODA OU. Earlier investigations that supported the remedial action for the water table aquifer also demonstrated that the Lower Patapsco aquifer is hydraulically isolated from the water table aquifer (EA, May 2015).

Three hydrostratigraphic units of the Cretaceous Potomac Formation are present at the ODA OU:

- The uppermost hydrostratigraphic unit consists of the locally preserved Quaternary terrace/Upper Patapsco alluvial and terrace deposits, which is the water table aquifer. This unit is composed of surficial sandy soils and reddish and reddish-yellow, well sorted, medium-grained, quartz sands. The Quaternary terrace/Upper Patapsco terrace deposits are of similar lithology and difficult to distinguish in boring cuttings from the underlying Patapsco. Groundwater is encountered at depths between the ground surface (at the seep) and about 10 feet below ground surface (bgs). The thickness of this unit ranges up to 40 feet at the ODA OU (EA, May 2015).

- The Lower Patapsco sand is a confined aquifer in this area and consists of approximately 190 to 230 feet of yellowish-orange to brown sand and lesser amounts of sandy gravel. This unit crops out a short distance west of the PRR where it is in recharge as the water table aquifer, however at the ODA OU, the Lower Patapsco is confined. Because

previous investigations demonstrated this aquifer is isolated from the water table aquifer, the ODA OU LTM program does not include monitoring this interval any longer (URS, July 2003).

- The Patuxent Formation is the lowest Cretaceous unit represented in the vicinity of FGGM and the PRR. This confined aquifer is a water supply for nearby municipal systems, including FGGM, and for facilities on the PRR-NT with production coming from screens as deep as 800 feet bgs (EA, May 2015).

Two clay intervals separate the Potomac Group aquifers:

- The Middle Patapsco Formation in this area consists of low-permeability silty and sandy clays and sand-silt-clay mixtures, with local zones of silts and sand. This interval, which is approximately 70 feet thick at the ODA OU, acts as a confining unit. The three deep monitoring wells (which are no longer sampled) at the ODA OU are screened in sand intervals within the Middle Patapsco (EA, May 2015).

- The Arundel Clay is a regional confining unit. Although the Arundel Clay was not encountered in the drilling at the ODA OU, the top of the Arundel Clay is estimated to be encountered at approximately 300 feet bgs in this area. Deep well logs indicate that the Arundel Clay consists of stiff, reddish-brown clays with a thickness of 200 to 250 feet (EA, May 2015).

Groundwater contamination at the ODA OU is confined to the Quaternary Terrace/Upper Patapsco aquifer because the clay-rich Middle Patapsco Formation acts as a local confining unit (URS, September 2011). Past sampling shows that the deep wells, screened in the middle Patapsco confining layer, are not impacted by site-related activities. Based on the current understanding of the hydrogeology of the area, potential shallow groundwater contamination from the ODA OU would not threaten any existing drinking water wells at the PRR which are located at least 2 miles away from the site (URS, September 2011).

3.4 Surface Water at Ordnance Demolition Area

Two surface water bodies were identified at the ODA OU (Figures 3-3 and 3-4). One of the surface water bodies is an intermittent seep that flows from the area south of the ordnance demolition pit inside the outer earthen berm. The other surface water body is an intermittent drainage east of the ODA OU that flows toward the south. During wet seasons, the seep discharges sufficient flow to reach the intermittent drainage. At other times, the water collects in surface depressions. The intermittent drainage along the ODA OU is in a confined channel with a width of about 20 inches. South of the ODA OU, the drainage becomes a perennial stream fed by bordering wetlands and ultimately discharging to the Patuxent River; no wetlands have been identified on-site. The ODA OU is above the 100- and 500-year floodplain areas of the PRR-NT (URS, September 2011).

3.5 Land and Resource Use

The ODA site is currently an undeveloped area of fields and the earth berms. There are surrounding forests and also wetlands to the south and west. It is part of the 8,100-acre PRR-NT, a wildlife refuge where hunting is allowed part of the year.

The PRR-NT presently offers hunting, fishing, wildlife observation, trails, and many interpretive programs to the public. Future land use at the ODA site is projected to remain as a wildlife refuge. No trails run through or next to the ODA site ; however, hunting is allowed at the ODA site (URS, July 2014a).

3.6 History of Contamination

ODA is a site formerly used by the U.S. Army located in PRR-NT, in Anne Arundel County, Maryland. The PRR-NT is 8,100 acres of former range and maneuver land that was transferred from FGGM to the DOI, USFWS as part of the 1988 BRAC mandate. (The actual transfer was in 1991, as part of the Military Construction Appropriations Act.) The USFWS manages the PRR-NT, which includes the ODA site as a wildlife refuge (URS, July 2014a).

The ODA is an inactive site of approximately 2.5 acres; it was used for the demolition of MEC encountered at FGGM and the PRR-NT. No documentation on the historical activities at the ODA site other than ordnance demolition has been discovered; the years of operation are unknown. Waste solvents may have been used as fuel to ignite or burn explosive materials being demolished at the ODA(URS, July 2014a).

A recent LTGM event (June 2015) determined that groundwater PRG exceedances remain proximate to the bermed area and that groundwater contamination is not migrating off site or into the deeper Patuxent Formation aquifer which is a water supply for FGGM and nearby municipal systems (URS, July 2014a).

The LTGM sampling results indicate that the PCE groundwater plume extends from the ordnance demolition pit to about 200 feet south, and that RDX was detected in four wells (ODAMW-1, ODAMW-2, ODAMW-4 and ODAMW-12S), above its EPA tap water regional screening level (RSL) of 0.7 micrograms/liter (ug/L) in June 2015 and June 2014. (EA, September and May 2015).

The Lower Patapsco aquifer exists under confined conditions below the Middle Patapsco confining unit. No COPCs have been detected in deep monitoring wells, and no adverse health effects are associated with the UU/UE of deep groundwater at the site (URS, July 2014a).

3.7 Initial Response

A 1994 Site Inspection was conducted to assess the potential for soil contamination within the active demolition area. Two soil samples were collected from a depth of approximately 0.5 feet

bgs and analyzed for explosives and nitrate/nitrite. RDX was detected in one sample (SS-28) at 1.71 micrograms/gram (ug/g) and additional sampling was recommended (URS, July 2014a).

The ODA OU is the EPA Operable Unit 15 of FGGM [EPA identification number MD0910020567].

Two Remedial Investigations (RI) were conducted in 1996 (U.S. Army Environmental Center) and 2002 (U.S. Army Corps of Engineers), to characterize and document the nature and extent of contamination in the surface soil, subsurface soil, surface water, sediment, and groundwater at the ODA OU (URS, July 2014a).

The RIs identified no source areas in the soils or elevated risks from the human health risk assessment (HHRA) conducted as part of the RI that were associated with the soils, surface water, and sediment media, and no remedial action for these media was recommended (IT, June 2002).

Volatile Organic Compounds (VOCs), explosives, arsenic and cadmium were detected in the shallow groundwater (Quaternary terrace/Upper Patapsco aquifer). The source area for the VOCs and explosives appears to extend beyond the confines of the demolition pit, but is still contained within the ODA site outer berm. Arsenic was detected above its MCL in both site and upgradient wells. The RIs did not identify any nonaqueous phase liquid (NAPL) source areas at the ODA OU. Since 2003, the Army has implemented an annual LTGM program that monitors the shallow groundwater chemicals of potential concern (COPCs) (URS, July 2014a).

Cadmium, was identified as a groundwater COPC at the site, though its link to ordnance demolition is uncertain. The presence of cadmium may reflect the elevated turbidity levels of groundwater at this site and may not represent accurate dissolved concentrations. Validation of cadmium results also indicated that many of the reported values were estimated (J-flagged) and possibly attributable to background (URS, September 2011).

A qualitative MNA evaluation conducted for the ODA OU as part of the 2002 RI/FS report concluded that the occurrence of daughter products (cis-1,2-dichloroethene [cis-1,2-DCE] and TCE) in the downgradient groundwater suggests that natural attenuation is occurring; however, MNA parameter data collected suggests that reductive dechlorination of VOCs in site groundwater is diminished by the extremely low groundwater VOC concentrations. The groundwater trend analyses indicate that RDX and cadmium concentrations are decreasing. Potential remedial alternatives for the ODA OU were evaluated in an FFS conducted in 2002 (URS, July 2014a).

The alternatives evaluation and the preferred alternative of MNA were presented in the 2003 Draft Proposed Plan. The 2003 LTGM Plan was submitted to EPA to implement this preferred remedy. The MNA alternative was then recommended in the Decision Document (DD) (2005) in conjunction with LUCs that limit the use of groundwater at the ODA OU until the RAOs have

been met (see Section 4.1) and groundwater contaminant concentrations remain below PRGs (URS, July 2014a).

The Army, EPA, DOI, and the Architect of the Capitol signed a Federal Facility Agreement (FFA) in June 2009 to direct the comprehensive remediation of FGGM. The Maryland Department of the Environment is the support agency (EPA/Army/DOI/USAOC, Effective October 9, 2009).

In response to the 2009 Fort Meade FFA the Army withdrew the December 2005 DD and submitted a the Final ROD in September 2011 (URS, July 2014a).

The September 2011 ROD presented the selected remedy for the ODA OU which includes a MNA program with the implementation of LUCs. The Army implements the annual MNA program, which addresses the following groundwater chemicals of concern (COC) at the ODA OU: cadmium, perchloroethene (PCE), trichloroethene (TCE), chloroform, royal demolition explosive (RDX), 2,4,6- trinitrotoluene (TNT), 2-amino-4,6-dinitrotoluene (2-4,6 DNT), and 4-amino-2,6-DNT (URS, September 2011).

3.8 Basis for Taking Action

The USACE combined the 1996 and 2002 RI results to conduct a baseline HHRA and Screening Level Ecological Risk Assessment (SLERA) to evaluate current and anticipated future risks associated with exposure to chemicals at the site. The HHRA focused on potential exposure to surface water, sediment, and soil by current and future recreational users of the site, consistent with the ODA site's incorporation within a national wildlife refuge managed by the USFWS (IT, June 2002).

EPA's acceptable cancer risk range is $1x10^{-6}$ to $1x10^{-4}$, which would mean that there could be from one in one million to one in ten thousand additional cases of cancer as a result of exposure to site-related contaminants as compared to the normal cancer rate. Anticipated non-cancer effects are expressed as a Hazard Index (HI). The HI is the sum of the Hazard Quotients (HQs), which compare the dose to site receptors of individual contaminants to a reference dose at which no adverse effects are anticipated to occur. An HI of less than or equal to a value of 1 indicates that no adverse effects are anticipated (IT, June 2002).

The HHRA identified no unacceptable risks associated with the soils, surface water, and sediment media and no further remedial action was recommended for those matrices (IT, June 2002).

The USACE HHRA did not evaluate exposure to groundwater because the groundwater exposure pathway was considered to be incomplete. There is no expectation for future development of the site or the use of shallow groundwater based on existing safety restrictions;

however, EPA interprets the NCP at 40 CFR Section 300.430 to require that the groundwater should be restored to its beneficial use (URS, June 2013).

Therefore, EPA provided risk calculations for hypothetical residential exposure to shallow groundwater at the ODA OU. The lifetime cancer risk was estimated to be 8 $x10^{-4}$, and the non-cancer hazard indexes for the adult and child resident were 11 and 21, respectively. Although this future use of shallow groundwater appears unlikely in light of the PRR-NT's current land use as a wildlife refuge, EPA's assessment established a baseline risk that would be posed if a future resident occupied the site or in the unlikely event that contaminated groundwater migrated off the property and on to residential property at the observed contaminant concentrations (URS, June 2013).

In 2008, EPA re-evaluated the hypothetical residential land use scenario using current toxicity data and 2006 LTM groundwater data. The lifetime cancer risk estimate dropped to 2×10^{-4}. The 2008 cancer risk estimates for the resident still exceed the upper end of the EPA acceptable cancer risk range of 1×10^{-6} to 1×10^{-4}. However, the 2008 non-cancer hazard results for the child and adult receptors would be 0.9 and 0.4, respectively, and would be within (less than) the acceptable HI of 1 (URS, June 2013).

In 2011, EPA asked the Army to evaluate the scenario of a teenage trespasser exposed to soils, surface water, and sediment at the ODA OU. The cumulative cancer risk estimate (3×10^{-7}) is less than 1×10^{-6} and the HI (0.006) is less than 1 for the teenage trespasser (URS, June 2013).

The EPA HHRA identified the following groundwater COPCs: arsenic, cadmium, PCE, TCE, chloroform, RDX, 2,4,6-Trinito toluene, 2-amino-4,6-Dinitro toluene and 4-amino-2,6-dinitro toluene. A subsequent evaluation of the arsenic data revealed that this metal is within the background levels, so it was eliminated as a groundwater COPC (URS, June 2013).

Table 3-1 presents quantitative PRGs that were developed in the HHRA to address groundwater in the ODA OU. The PRGs are the level of COPCs that would not present a risk based on a hypothetical residential land use scenario. PRGs are Federal MCLs for constituents that have federal MCLs. In the absence of an MCL, a groundwater PRG was developed based on the 2002 HHRA (URS, July 2014a).

Table 3-1 PRGs for ODA Groundwater OU	**PRG(µg/l)**	**MCL**
Cadmium	5	5
Trichloroethene (TCE)	5	5
Tetrachloroethene (PCE)	5	5
2,4,6- Trinitrotoluene (TNT)	3.4	--
2-amino-4,6 –Dinitrotoluene (DNT)	0.8	--

4-amino-2,6 –Dinitrotoluene (DNT)	0.8	--
Royal Demolition Explosive (RDX)	20	--
Chloroform	80	80

(a) PRGs for 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; and RDX were derived from the 2002 HHRA (i.e., back-calculated goals that are protective of the hypothetical resident

A SLERA was conducted for the ODA OU evaluating the potential for COPCs to have adverse effects on terrestrial plants, soil invertebrates, terrestrial wildlife, herbivores/granivores, vermivorous birds, vermivorous mammals, amphibians, aquatic organisms, and benthic organisms. The SLERA concluded that there were minor risks associated with several metals and pesticides (DDTr, dieldrin, and heptachlor epoxide), but that the risks were not enough to require remediation measures from the standpoint of ecological impact. [The term DDTr refers to the family of parent DDT compounds (p, p'-DDT and o, p'-DDT) and their degradation products (p, p'-DDE, o, p'-DDE, p, p'-DDD, and o, p'-DDD).] No metals or pesticide compounds were identified as constituents of concern for the SLERA. In addition, the potential exposure to CVOCs and explosive compounds at the levels entering surface water with discharging groundwater are not adversely affecting ecological receptors ((IT, June 2002).

4.0 REMEDIAL ACTION

4.1 Remedy Selection

"An MNA program to evaluate the progress of natural attenuation in reducing groundwater contamination at the ODA, with LUCs is the selected remedy. The LUCs consist of the following restrictions:

- Prohibit any extraction and use of shallow groundwater above the Arundel Clay for any purpose other than for use in conducting environmental analyses until PRGs are achieved;
- Prohibit any excavation or other disturbance of surface or subsurface soils without appropriate MEC support;
- Prohibit residential development of the site; and
- Prohibit any activity that would interfere with the proper functioning of remedial components at the site, including monitoring wells" (URS, September 2011).

The ROD states, "The LUCs will continue until PRGs and remedial action objectives RAOs are achieved. The Army will be responsible for implementing and maintaining the LUCs at the ODA" (URS, September 2011).

RAOs consist of goals to achieve adequate protection of human health and the environment. Based on the results of the RI and risk assessment, identified Applicable or Relevant and

Appropriate Requirements (ARARs), and PRG comparisons, the following RAOs were developed for the ODA OU (URS, September 2011):

- To prevent human exposure to groundwater COPCs that exceed remedial goals established at levels that satisfy the NCP requirements for the protection of human health and the environment;
- To clean up the groundwater at the ODA site above the Arundel Clay to numerical PRGs defined as maximum contaminant levels (MCL) and non-zero maximum contaminant level goals (MCLGs) and to meet site specific, risk-based remedial goals;
- Prevent groundwater migration of contaminants beyond the current monitoring network;
- To mitigate risks associated with the disturbance of buried MEC.

Quantitative PRGs have been developed (Table 3-1) for the remediation of groundwater to establish the acceptable level of COPCs that would not present a risk to human receptors at the site under a residential land use scenario. The PRGs are federal MCLs where they exist. In the absence of an MCL, a groundwater PRG was developed in with reference to the HHRA (URS, September 2011).

The remedy, MNA, is expected to achieve cleanup goals in a reasonable period of time, is easily implemented, involves no operations other than groundwater monitoring, and is relatively cost effective.

The MNA remedy includes three components –1) LUCs, 2) groundwater monitoring and 3) MNA. This remedy was chosen because it was expected to meet the RAOs and because it provides adequate protection of human health and the environment and attains the identified ARARs in a cost- effective manner.

The subsections of Section 4.2 summarize implementation actions for each of the three remedy components (URS, July 2014a).

4.2 Remedy Implementation

The Army has finalized a Land Use Control Remedial Design (LUCRD), Final was approved by EPA on 27 June 2013. The LUCRD formally documents and enforces the LUCs within the CERCLA process that are provided in the Land Transfer Assembly documents and the 2001 *Action Memorandum* (URS, June 2013).

The LUCRD identifies and implements LUCs mandated in the September 2011 ODA OU ROD and provides a process apart from the Five-Year Review process to ensure implemented LUCs continue to adequately protect human health and the environment (URS, June 2013).

The LUCRD addresses LUC documentation, performance objectives, inspections, enforcement, modifications and institutional and engineering controls (signage, fencing, education, and notice requirements).

4.2.1 Land Use Controls

The LUC performance objective for the ODA OU groundwater remedy is to prevent human exposure to groundwater COPCs that exceed remedial goals established at levels that satisfy the NCP requirements for the protection of human health and the environment.

For groundwater, the LUCs will continue until groundwater PRGs are achieved. The PRGs are the level of COPCs that would not present a risk based on a hypothetical residential land use scenario. PRGs are Federal MCLs for constituents that have federal MCLs. In the absence of an MCL, a groundwater PRG was developed based on the 2002 HHRA (URS, June 2013).

The LUC performance objectives for the ODA OU MEC remedy are:

- Mitigate risk associated with the disturbance of potential MEC with signs, roadway controls, etc.
- Implement UXO safety education program for visitors, hunters, and refuge personnel to increase awareness of UXO hazards, provide examples of how UXO may appear, and teach people what to do if suspected UXO or MEC is encountered

For MEC, LUCs shall be maintained on all land within the ODA OU land use boundaries, as shown in Figure 3-6, until the possibility of people encountering MEC is negligible and allows for UU/UE. The Army will be responsible for implementing and maintaining the groundwater and MEC LUCs at the ODA OU. Figure 3-6 identifies the groundwater and MEC LUC boundaries at the ODA OU (URS, June 2013).

4.2.2 Groundwater Monitoring

The ROD states, "Reductions in contaminant concentrations will be documented and evaluated through a groundwater monitoring program. Annual groundwater monitoring will be conducted to document the plume configuration and concentration. The samples will be analyzed for royal demolition explosive (RDX), trinitrotoluene (TNT), 2-amino-4,6-dinitrotoluene (2-amino-4,6-DNT), 4-amino-2,6-DNT, select chlorinated volatile organic compounds (VOCs) [perchloroethene (PCE), trichloroethene (TCE), chloroform, cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride], metals (cadmium, calcium, magnesium, and manganese), and a suite of MNA parameters identified in EPA's Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water, EPA/600/R-98/128, dated September 1998. (URS, September 2011).

Annual groundwater monitoring is performed to document the plume configuration and concentrations. The results of the annual sampling data are used to evaluate the natural

attenuation processes and describe contaminant reductions due to natural attenuation. An annual report presents the data results and describes the plume configuration, migration, and change in contaminant levels. Groundwater monitoring results indicate progress toward achieving the PRGs (URS, July 2014a).

4.2.3 Monitored Natural Attenuation

The MNA program will evaluate the progress of natural attenuation in reducing groundwater contamination at the ODA OU. LUCs will be enforced to prevent unauthorized exposure to groundwater. Natural attenuation is defined as the combination of physical, chemical, and biological processes that result in reasonably predictable reductions in contaminant concentrations over time through destructive transformations and transport phenomena. These processes can effectively reduce contaminant toxicity, mobility, or volume to levels that are protective of human health and the environment. MNA refers to the process of documenting the progress of natural attenuation through a defined monitoring program (URS, July 2014a).

The long-term monitoring data trends will be statistically assessed to demonstrate a negative or stable concentration trend in constituent concentrations at each well. The monitoring will continue until the average well concentrations decrease below PRG concentrations with an acceptable level of confidence. The annual LTGM reports should plot contaminant concentrations versus time and do a simple regression analysis, which should be included in the annual LTGM reports. The regression analysis will be used to make qualitative assessments of the progress of natural attenuation (URS, July 2014a). (This Five Year Review performs regression analysis of results, discussed in Section 6.4, since none could be found in the post-ROD LTGM reports.)

4.2.4 MEC Remedy Implementation Actions

The BRAC portion of FGGM was previously used as a firing range and maneuvers area. As a result of this use, the potential exists for MEC to be present. Activities that will disturb surface and/or subsurface soil will require the proper ordnance avoidance or UXO support at the ODA OU. The Army, in cooperation with DOI and USFWS, has taken the following actions to reduce the likelihood of people encountering MEC while entering the PRR-NT (URS, June 2013):

- An ordnance survey was completed in 1995 to assess more than 7,600 acres of land in the PRR-NT, which included portions of the ODA OU. The ordnance survey was to a depth of 6 inches bgs. However the ordnance survey did not include inaccessible areas such as wetlands and water courses (e.g., streams). The 1995 survey/clearance for the entire PRR-NT resulted in the retrieval of over 14,000 UXO items, over 18,000 munitions debris items, and identification of 1,388 magnetometer anomalies where the item was not retrieved because it was below 6 inches bgs.
- The USFWS has been implementing an education program since 2002 for visitors, hunters, and refuge personnel; the program is designed to increase awareness of the MEC hazard, provide examples of how MEC may appear, and teach people what to do if suspected MEC is encountered.

- An Action Memorandum was signed by the Army in April 2001 establishing LUCs for the PRR-NT so that its future use is compatible with its MEC history. The Army has incorporated these LUCs into a LUCRD (URS, June 2013).

4.3 Remedy, Operation and Maintenance

Since EPA approval of the LUCRD the Army has performed annual physical inspections of the ODA OU to confirm continued compliance with all LUC objectives. The results of the inspections are documented in an annual report, submitted to EPA and DOI/USFWS (URS, July 2014a).

Twelve rounds of annual groundwater LTM monitoring has been completed and the data has been used to evaluate concentration trends over time, to verify that natural attenuation processes are active at the site, and to verify the stability of the contaminant plume associated with the former ordnance demolition activities (URS, July 2014a).

MNA parameter data collected at the ODA OU are used to identify evidence of the reductive dechlorination of VOCs, such as PCE and TCE. MNA parameters show that the overall site conditions may not be conducive to *in situ* biodegradation of CVOC under reducing conditions. Accordingly, natural groundwater flushing/dispersion will likely be the dominant MNA mechanisms versus anaerobic, aerobic, and cometabolic biodegradation for the CFD OU, ODA OU, and TAP (EA, September 2015).

Low groundwater concentrations for the CVOCs at these sites indicate that it may not be technically practicable to identify decreasing trends or subsurface conditions attributable to specific MNA mechanisms. However, the groundwater trend analyses for RDX and cadmium indicate that their concentrations are decreasing (URS, July 2014a).

The monitoring wells are inspected for general condition and structural integrity prior to each annual LTGM sampling round. The following items are visually inspected and maintained, each round (URS, September 2011):

- Outer protective casing or flush-mount cover to assess its structural integrity
- Well caps and locks to ensure both are in place and functioning properly
- Concrete pad for the presence of cracks and settlement
- The inner cap and riser pipe to ensure these items are intact and functioning properly

EPA expressed concern during its review of the September 2011 ODA OU ROD whether contamination has migrated to the Middle Patapsco Confining Clay, and to assess potential shallow eastward contaminant migration toward the unnamed intermittent drainage (URS, July 2014a).

In response, in 2012, the Army collected seep surface water samples and installed two nested monitoring wells (ODAMW-12S and ODAMW-12D) located directly northwest of where the seep and intermittent drainage intersect downgradient from the source area drainage (URS, July 2014a).

Monitoring wells ODAMW-12S/D) were installed in 2012; one shallow (screened at the same depth as ODAMW-4) and one deep monitoring well (screened above the clay) proximate to where the seep and intermittent drainage intersect. ODAMW-12D confirmed that contamination was not detected in the downgradient deeper screened interval (32 to 42 bgs) and has not penetrated the surficial sands and penetrated to the top of the Middle Patapsco Confining Clay (URS, July 2014a).

The LTM requirements are detailed in the LTM work plans; the most recent final version is the 2014 LTGM (sampling in October/November 2014) (EA, May 2015). In response to EPA comments on the 2013 LTM Report, an additional monitoring well (ODAMW-13) was installed downgradient of ODAMW-12S and ODAMW-12D and upgradient of ODAMW-11 in 2014 to further assess the horizontal and vertical extent of groundwater contamination in support of the selected remedy of MNA (EA, May 2015).

The annual cost for the LTGM program is shown in Table 4-1.

Table 4-1: Long-Term Groundwater Monitoring Costs at ODA OU

LTGM Year	Total Cost Rounded to the Nearest $1000
2010	$37,000
2011	$72,000
2012	$51,000
2013	$51,000
2014	$29,000
2015	$22,000

Notes: The costs shown for the LTGM program do not include Army supervision and administrative costs.
Source: USACE, PM, March 2016

5.0 PROGRESS SINCE LAST REVIEW

This is the first Five-Year Review for the Ordnance Demolition Area, Operable Unit 15. Therefore, no recommendations and follow-up actions exist from previous reviews.

6.0 FIVE-YEAR REVIEW PROCESS

6.1 Administrative Components

This first Five-Year Review is performed for FGGM BRAC site Ordnance Demolition Area, Groundwater Operable Unit 15 by the USACE. Interested parties in the ODA OU Five-Year Review include representatives of the Department of Defense (DOD), FGGM, EPA, MDE, DOI, and the surrounding community.

The EPA is providing lead regulatory oversight in consultation with the MDE. The BRAC environmental office has maintained ongoing discussions with the regulatory agencies overseeing FGGM BRAC site Ordnance Demolition Area's environmental restoration program. The EPA and MDE have been notified of the Army's intent to perform the Five-Year Review for the ODA OU. Copies of the document will be provided to EPA and MDE for their review and comment.

USACE-Baltimore established the review schedule whose components included:

- Community Involvement;
- Document Review;
- Data Review;
- Site Inspection;
- Local Interviews; and
- Five-Year Review Development and review.

The schedule extends through September 2016.

6.2 Community Involvement

Fort Meade has an active Restoration Advisory Board (RAB) that meets periodically to discuss ongoing environmental restoration activities. Initial notice of this Third Five-Year Review is in Appendix D. The initial notice was published in the Bowie Blade News and Crofton West County Gazette on April 14, 2016 and in the Maryland Gazette on April 16, 2016. No comments were received. Also, a Five-Year Review public notice will be placed in local area newspapers, when the document has been finalized. A copy of that 'conclusion' newspaper notice will be placed in this report's Appendix D.

6.3 Document Review

This Five-Year Review consisted of a review of relevant documents, which included:

- United States Environmental Protection Agency Region III and the United States Department of the Army and the United States Department of the Interior and the United

States Architect of the Capitol, Federal Facility Agreement under CERCLA Section 120, Administrative Docket No. CERC-03-2009-0207FF (EPA/Army/DOI/USAOC, Effective October 9, 2009)

- Final Record of Decision Ordnance Demolition Area (URS, September 2011) Land Use Control Remedial Design, Final (URS, June 2013)
- Combined Groundwater Operable Units (OUs) Long Term Monitoring (LTM) Report, Final (URS, August 2013)
- Interim Remedial Action Completion Report, Final (URS, July 2014a)
- Combined Groundwater Operable Units (OUs) Long Term Monitoring (LTM) Report, 2013 Sampling Event, Final (URS, July 2014b)
- Combined Groundwater Operable Units 2014 Long Term Monitoring Report, 2014 Sampling Event, Final (EA Engineering, May 2015)
- Combined Groundwater Operable Units 2015 Long Term Monitoring Report, 2015 Sampling Event, Internal Draft (EA Engineering, September 2015)

6.4 Data Review and Trends

The objective of the groundwater data review is to analyze the data for the ODA OU selected remedy (MNA with LUCs) and to ensure the remedy is meeting the requirements established in the 2011 ROD (URS, September 2011). Based on environmental samples from soil, sediment, surface water and groundwater, the HHRA concluded that the risks posed by the ODA OU to construction workers, recreational users of the site and trespassers, are within the EPA's acceptable risk range of 10^{-4} to 10^{-6} (IT, June 2002).

The ROD required that groundwater be sampled for certain metals (cadmium, calcium, magnesium, manganese), certain explosive compounds (RDX, TNT, 2-amino-4, 6-DNT, 4-amino-2, 6-DNT) and certain VOCs (PCE, TCE, chloroform, cis-1, 2-DCE, vinyl chloride) and MNA parameters, annually until sampling results indicate concentrations are below the PRGs. Table 6-1 gives the list of constituents being monitored in groundwater.

Because the remedy selected in the ROD allows hazardous substances remain at the ODA OU above UU/UE levels, this Five-Year Review is conducted to evaluate the frequency and need for continued monitoring to the comparison criteria (PRGs) (URS, September 2011). Currently, the LTGM reports compare groundwater to RSLs, if there are no established MCLs, but that is not required in the ROD. This review documents the groundwater data trends reported to date (2011–2015), against ROD requirements for the ODA OU. The ROD also requires evaluation of MNA, for the groundwater samples.

Tables 6-2, 6-3, 6-4 and 6-5 are the ODA OU LTGM results for 2015 (draft results), 2014, 2013 and 2012, respectively. Figures 6-1, 6-2 and 6-3 show the location and value of exceedances of

the MCLs or PRGs at ODA OU, for 2015 (EA, September 2015), 2013 and 2012, respectively (URS, July 2014b, August 2013).

6.4.1 MCL Exceedances

Examination of Tables 6-2, 6-3, 6-4 and 6-5, show that PCE and TCE are the only groundwater constituents with several detections above the MCL/PRGs in the LTGM program. Two new wells, ODAMW-12S and ODAMW-12D, were installed in May 2012 at the ODA OU to better delineate vertical migration. PCE was detected above the MCL in 2012, 2013 and 2015 at well ODAMW-12S. The PCE concentrations decreased in ODAMW-12S in 2012, 2013 and 2014. The presence of PCE, TCE, and cis-1,2-DCE in the new downgradient well, ODAMW-12S, indicates site contamination has migrated outside the confines of the demolition pit but is within the boundaries of the groundwater OU. PCE, TCE and RDX concentrations at ODAMW-12S are graphed in Figure 6-4.

Another monitoring well nested with ODAMW-12S is ODAMW-12D (screened 32 –42 feet bgs). Monitoring well ODAMW-12D has only shown low levels of chloroform contamination (2012 and 2013), which was always "J" flagged. Note that chloroform is a common laboratory contaminant. Also, three deep screened monitoring wells, ODAMW-6D, ODAMW-8D and ODAMW-9D, had non-detect for all compounds so often that they were eventually dropped from the annual LTGM program. This leads to the conclusion that VOC groundwater contamination is shallow.

The monitoring wells with the most consistent detections of PCE, TCE and RDX in previous years were ODAMW-3, ODAMW-1, ODAMW-4 and ODAMW-12S. Monitoring wells ODAMW-3, ODAMW-1, ODAMW-4 and ODAMW-12S are graphed for PCE, TCE and RDX in Figures 6-5, 6-6, 6-7 and 6-4, respectively.

ODAMW-3, a source area monitoring well, is located in the outer bermed area of the demolition pit. ODAMW-3 contains the highest concentration of VOCs. The MCL for PCE and TCE (5 ug/L) was exceeded in 2012 and 2013 at ODAMW-3, but not exceeded in 2014 and 2015

The Mann-Kendall trend analysis of PCE (Figure 6-12) and TCE (Figure 6-13) at ODAMW-3 shows that PCE and TCE concentrations are neither increasing nor decreasing

ODAMW-1 is a well located between the inner and outer berms. The trend graph for ODAMW-1 (Figure 6-6), shows that RDX and PCE concentrations show a definite decreasing trend between 2002 and 2015. TCE for the same period shows a small downward slope of concentrations. Since 2010, PCE, TCE and RDX have been below their PRG at ODAMW-1, except for the PCE detection of 5.1 ug/L in 2013.

ODAMW-4 is a well located between the inner and outer berms. The trend graph for ODAMW-4 (Figure 6-7), shows that RDX and PCE concentrations show a definite decreasing trend between 2002 and 2015. The Mann-Kendall analysis (Figure 6-13) of TCE for the same period shows a decreasing trend. For the four sampling events covered in this Five-Year Review (2012, 2013, 2014, 2015), PCE, TCE and RDX have been below their PRG at ODAMW-4.

Monitoring well ODAMW-13 was installed in 2013, down gradient of ODAMW-12S and ODAMW-12S (nested pair) and upgradient of ODAMW-10 and ODAMW-11, to further assess the horizontal and vertical extent of groundwater contamination in support of the selected remedy of MNA. No explosives or VOC have been detected at ODAMW-13, above practical quantitation limits save for two estimated detections of TCE (0.952 J; 2014 sampling and 0.570 J; 2015 sampling) and one estimated detection of chloroform (0.631 J; 2015 sampling).

Cis-1,2-DCE was not detected above PRGs in 2012, 2013, 2014 or 2015, at any ODA OU monitoring well. There are not enough data points to create PCE, or TCE isoconcentration maps for ODA OU. The groundwater trends are discussed in more detail in Appendix C.

6.4.2 Explosives COC Values at ODA OU

The concentrations for the explosives RDX, TNT, 2-amino 4,6-DNT and 4-amino 2,6-DNT, are graphed in Figures 6-8, 6-9, 6-10 and 6-11, respectively (URS August 2013, July 2014b, EA May 2015, EA September 2015).

At monitoring well ODAMW-2, Mann-Kendall analysis of RDX shows a stable (no trend) situation over the course of the LTGM sampling program, in Figure 6-14. There are not enough detections of TNT between 2011 and 2015 to determine a trend.

Mann-Kendall analysis of 2-amino 4,6-DNT (Figure 6-15), shows a decreasing trend for ODAMW-1 and ODAMW-4, but a stable (no trend) situation for ODAMW-2. Similarly the Mann-Kendall analysis of 4-amino 2,6-DNT (Figure 6-16), shows a decreasing trend for ODAMW-1 and ODAMW-4, but a stable (no trend) situation for ODAMW-2. Figure 6-5 shows that there is a slight decreasing trend for RDX.

Because groundwater explosives analytes have not exceeded the PRGs (RDX: 20 ug/L, TNT: 3.4 ug/L, DNT (both types): 0.8 ug/L), for six consecutive sampling periods (June 2009 sampling), it is recommended that there be no further analysis for the four explosives.

6.4.3 Monitored Natural Attenuation

MNA parameter data collected at the ODA OU are used to identify any evidence of the reductive dechlorination of VOCs, such as PCE and TCE. However, the likelihood of any biochemical

reactions in the site groundwater at the ODA OU is diminished by the extremely low groundwater VOC concentrations (URS, July 2014b).

In general, the overall site conditions may not be conducive to *in situ* biodegradation of CVOC under reducing conditions. However, other natural attenuation mechanisms, including cometabolic bioremediation, can further degrade the CVOCs, albeit it at reduced rates when compared to anaerobic biodegradation (EA, September 2015).

Low groundwater concentrations for the CVOCs at these sites indicate that it may not be technically practicable to identify decreasing trends or subsurface conditions attributable to specific MNA mechanisms. Accordingly, natural groundwater flushing/dispersion will likely be the dominant MNA mechanisms versus anaerobic, aerobic, and cometabolic biodegradation for the CFD OU, ODA OU, and TAP (EA, September 2015).

Groundwater contaminant concentrations are decreasing through natural attenuation and only low concentrations remain in the groundwater. LUCs are used to restrict groundwater use until the contaminant concentrations are below PRGs and the remedial action objectives of the 2011 ROD are met (URS, September 2011).

6.5 Site Inspection

The Ordnance Demolition Area OU 15 Site Inspection was conducted on May 8, 2015, by Mona Ponnapalli (USACE Project Engineer), Rich Braun, PhD (USACE Risk Assessor), Steve Cardon (BRAC Environmental Coordinator) and Sherry Krest and Dionne Briggs (both of USFWS). The Site Inspection is a required component of the Five-Year Review. Its purpose is to observe and document site conditions. The weather at the time of the site visit was warm (~85^{o}F) and mostly sunny.

The ODA site is in the southern portion of the PRR-NT. It is located off the Wildlife Loop Road, a rough gravel road with ponding in various areas. The ODA Site has a locked gate near the Wildlife Loop Road, with an incomplete fence on either side. The gate has a "No Trespassing" sign. Lemon Bridge Road, a dirt and gravel road which goes south towards the BG & E power lines, provides access to ODA site from the Wildlife Loop Road. There is a separate dirt road going into the outside of the outer berm area.

The ODA site is a small site, approximately 2.5 acres. The terrain is rumpled grassy fields with weeds. There is an outer berm approximately 8-feet high and 3 or 4-feet wide, mid-way up. The outer berm is roughly ring-shaped with two gaps in its circumference. Clumps of brush and larger trees are found outside the outer berm.

There is an inner berm inside the outer berm. The inner berm is about the same height and it, too, had gaps in its roughly elliptical circumference. The area between the inner and outer berms is covered with grass and weeds. The demolition pit, inside the inner berm, is an elliptical area that is covered with grass.

The inner and outer berms were constructed as safety features to reduce the hazard from ejected debris. Ordnance demolition occurred within the demolition pit. Both the inner and outer berm had pieces of concrete either in the berm or near it. Both berms are covered with grass and small weeds. No water was observed within the perimeter of the bermed area.

The site visit continued down Lemon Bridge Road as far as the BG & E power lines. Monitoring well ODAMW-10, beside the road had only three (instead of four) protective bollards. There was standing water on both sides of Lemon Bridge Road. The power lines were in a slightly drier area.

Overall the vegetation within the ODA OU looks healthy. Surficial debris of man-made origin (pipes, building materials) was observed. The most prominent debris were several pieces of concrete. No commercial or residential construction was observed at or near the ODA OU that would raise the possibility of groundwater use.

Several of the ODA OU monitoring wells were observed. All of the observed monitoring wells had secure caps, but at the time of the site visit, the monitoring wells' paint was peeling. The 2015 LTGM sampling, which occurred after the site visit, reportedly resolved these monitoring well maintenance issues.

A report of the site inspection is contained in Appendix A and the EPA Periodic Review Site Inspection Checklist is in Appendix B.

6.6 Interviews

Interviews of the U.S. Fish and Wildlife personnel were conducted after the site visit on May 8, 2015. They were: Dionne Briggs (Refuge Operations Specialist), Sherry Krest (Environmental Contaminants, Supervisor) and Brad Knudsen (PRR Refuge Manager). Ms. Briggs is based at PRR. Ms. Krest and Mr. Knudsen are familiar with the site but are based in Annapolis and Laurel, respectively. Ms. Briggs verified that hunters sometimes access the ODA OU, despite the gate.

All the USFWS personnel thought the site remedy was adequate but felt that the wooden shack between the ODA OU outer berm and Lemon Bridge Road should be removed. They had not seen many trespassers on ODA OU, but Ms. Briggs felt that the partial fence and gate did not

prevent determined hunters (trespassers). However, Ms. Briggs, the person most familiar with the ODA OU has seen no evidence of groundwater use by trespassers.

Steve Cardon (BRAC Environmental Coordinator) was interviewed by telephone on July 16, 2015. Ms. Elisabeth Green's (MDE) telephone interview was on October 7, 2015. Mr. Robert Stroud (EPA) completed a written response to CERCLA interview questions on October 23, 2015.

Mr. Cardon and the two regulators felt that the site remedy was effective. Ms. Green and Mr. Stroud both felt that they are adequately informed about the site and stated that they had no issues with the management and operation at the ODA OU. The interview records are an attachment to the Site Inspection Checklist (Appendix B).

7.0 TECHNICAL ASSESSMENT

7.1 Question A: Is the Remedy Functioning As Intended By The Decision Documents?

Yes. The following ODA OU response actions are functioning as intended: groundwater monitoring, LUCs (e.g., deed restrictions), physical controls (e.g., warning signs and limited site access to prevent MEC exposure) and MNA.

The effective implementation of LUCs has prevented extraction of groundwater except for environmental sampling. There is no residential development at ODA OU. Reportedly, there has been no excavation at the site without proper MEC support. There have been no activities that would interfere with the site remedy. The LUCs are stated in the ROD.

The effective implementation of LUCs has prevented exposure to or ingestion of contaminated groundwater. The ODA OU was undisturbed, and no use of groundwater was observed other than monitoring wells for environmental sampling. Signs are posted to warn that the area is not to be accessed, though USFWS personnel report hunters on foot sometimes access the area by circumventing the gate. The site inspection indicated that the access road gate was securely locked and in good repair. Since the ODA OU was an MEC demolition area, the hunters may be exposed to potential MEC at the ODA OU.

7.2 Question B: Are the Exposure Assumptions, Toxicity Data, Clean-up Levels and, Remedial Action Objectives Used At the Time of the Remedy Selection Still Valid?

Yes. As stated in the ROD (September 2011): "The selected remedy for the ODA is Alternative 3, MNA with LUCs. With this remedy, annual groundwater monitoring will be conducted to document the plume configuration and concentration." The ROD further states: "The selected remedy, MNA with LUCs, will protect human health and the environment through reliance on natural process to reduce groundwater contaminant concentrations to below PRG concentrations." The selected remedy RAOs and PRGs (defined as federal MCLs, where they

exist) remain unchanged. Changes in EPA Toxicity Values (TCE, PCE) have occurred since the September 2011 ROD, however these compounds have MCLs that will remain unchanged by changes in toxicity value.

There is a TCE plume at ODA OU, but the soil and groundwater concentrations of VOCs are very low. There are no inhabited buildings (present or future buildings allowed), on ODA OU and the Patuxent River is directly downgradient of ODA OU. Thus Vapor intrusion is not a concern at ODA OU.

UXO avoidance procedure LUCs consist of prohibiting any excavation or other disturbance of surface or subsurface soils without appropriate MEC support. Residential development of the site is prohibited. There is no expectation for future development of the ODA OU based on existing safety restrictions due to the presence of UXO.

The exposure assumptions remain the same because the ODA OU is part of the 8,100-acre Patuxent Research Refuge, a National Wildlife Refuge (and Sanctuary), administered by the U.S. Fish and Wildlife Service, and there are no on-site human groundwater receptors.

7.3 Question C: Has Any Other Information Come To Light That Could Call Into Question The Protectiveness Of The Remedy?

No. No new information was identified that would lead to the conclusion that the current response actions are considered no longer protective. No new complete groundwater exposure pathways were identified for either human or ecological receptors. No weather-related events have affected the protectiveness of the remedy. Current and anticipated surrounding future land use will likely remain unchanged.

7.4 Technical Assessment Summary

The data review, the Site Inspection, and the interviews indicate the remedy is functioning as intended. No changes in the physical conditions of the ODA OU have occurred that would affect the protectiveness of the remedy.

8.0 ISSUES

At this time, there are no issues at ODA OU that affect protectiveness.

Concerns that do not affect protectiveness are:

1) The groundwater concentrations of metals have remained consistent over time at the ODA OU and are likely attributed to background; this observation cannot be supported without regulatory approval of FGGM-specific background levels.

2) Groundwater concentrations of the COC are near the PRG values. For example, all detections of the ODA OU explosives (TNT, 2-amino 4,6-DNT, 4-amino 2,6-DNT, RDX) have been below their respective PRGs, since the June 2009 sampling. (There have been detections of PCE and TCE above PRGs in 2015, 2013 and 2012.) Continued analyses of the explosives contaminants seems unnecessary.

9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Recommendations for the concerns at ODA OU that do not affect protectiveness are:

1) The Army, EPA, and MDE should establish FGGM-specific groundwater background levels

The Army and EPA should determine an exit strategy for the ODA OU since COCs at the majority of monitoring wells are at or below PRGs.

10.0 PROTECTIVENESS STATEMENT

The remedy at Ordnance Demolition Area OU is protective of human health and the environment. All potential human health and environmental impacts at the Ordnance Demolition Area groundwater OU are being addressed by the remedies: (1) LUCs, (2) groundwater monitoring and 3) monitored natural attenuation.

11.0 NEXT REVIEW

The next Five-Year Review is due on September 30, 2021, approximately five years from the date of this review. The review will be combined with the next Fort Meade BRAC Clean Fill Dump and Tipton Airfield Parcel Five-Year Reviews.

12.0 REFERENCES

(Army/EPA/DOI/USAOC, Effective October 9, 2009) United States Environmental Protection Agency Region III and the United States Department of the Army and the United States Department of the Interior and the United States Architect of the Capitol, Federal Facility Agreement under CERCLA Section 120, Administrative Docket No. CERC-03-2009-0207FF

(Army, April 2001) *Action Memorandum: Safety Precautions to Be Taken at Ordnance Demolition Area, Fort George G. Meade, Maryland, Final*

(Arthur D. Little, Inc. May 1997) *Remedial Investigation Addendum: Fort George G. Meade Feasibility Study and Remedial Investigation/Site Inspection, Final.* Prepared for USAEC.

(Arthur D. Little, Inc. December 1995) *Fort George G. Meade Base Closure Parcel Site Inspection Study Addendum and Vol 2, Final.* Prepared for USAEC.

(EA Engineering, Science, and Technology, Inc. (EA), September 2015) *Combined Groundwater Operable Units 2015 Long Term Monitoring Report, Internal Draft*

(EA, May 2015) *Combined Groundwater Operable Units 2014 Long Term Monitoring Report, Final*

(EA, 1992) *Fort George G. Meade Base Closure Parcel Site Inspection Study, Vols. I and II, Final*

(U.S. Environmental Protection Agency (EPA), 2015.) *National Primary Drinking Water Regulations, List of Contaminants and their MCLs,* Website: http://water.epa.gov/drink/contaminats/index.cfm.

(EPA, May 2015) Regional Screening Level (RSL) Table Dated May 2015.) http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.

(EPA, June 2001) *Comprehensive Five-Year Review Guidance.* EPA 540-R-01-007.

(Environmental Research Division, October 1989) *Enhanced Preliminary Assessment Report: Fort George G. Meade, Maryland. Final*

(IT Corporation, June 2002) Fort George G. Meade, *Remedial Investigation Report, Ordnance Demolition Area, Volume 1 – Text, Final.* Document prepared for USACE, Baltimore District, Baltimore, Maryland

(Rogers, Golden, & Halpern, Inc. (RGH) and CH2M Hill, January 1991) *Wetland Identification at Fort Meade, Maryland*

(URS, July 2014a) *Interim Remedial Action Completion Report, Final*

(URS, July 2014b) *Combined Groundwater Operable Units (OUs) Long Term Monitoring (LTM) Report, 2013 Sampling Event, Final*

(URS, August 2013) *2012 Combined Groundwater Operable Units (OUs) Long Term Monitoring (LTM) Report, Final*

(URS, June 2013) *Land Use Control Remedial Design, Final, Ordnance Demolition Area, Patuxent Research Refuge – North Tract, Anne Arundel County, MD.* Fort George G. Meade Legacy Base Realignment and Closure Program.

(URS, March 2012) *Combined Groundwater Operable Units (OUs) Long Term Monitoring (LTM) Work Plan, Final, Anne Arundel County, MD, Tipton Airfield Parcel, Clean Fill Dump, and Ordnance Demolition Area*, Fort George G. Meade Legacy Base Realignment and Closure Program.

(URS, September 2011) *Final Record of Decision, Ordnance Demolition Area, Patuxent Research Refuge– North Tract, Anne Arundel County, MD,* Fort George G. Meade Legacy Base Realignment and Closure Program

(URS, March 2005) *Preliminary Assessment/Site Investigation of Suspect Sites, Fort George G. Meade, Anne Arundel County, Maryland, Draft*

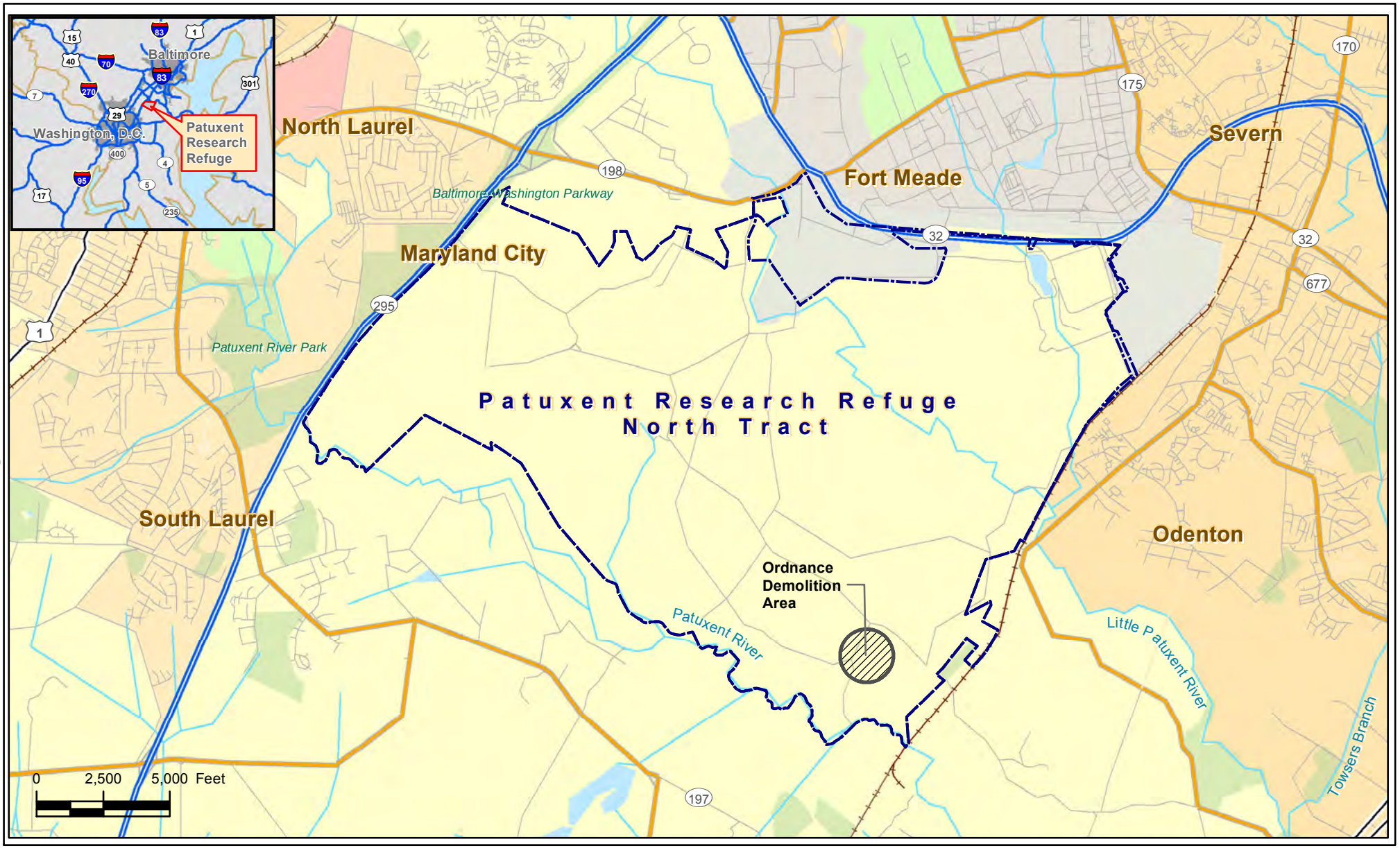
(URS, July 2003) *Fort George G. Meade, Long-Term Monitoring Plan, Ordnance Demolition Area, Patuxent Research Refuge, Anne Arundel County, Maryland, Final.* Document prepared for USACE, Baltimore District, Maryland.

(URS, November 2002) *Fort George G. Meade, Focused Feasibility Study, Ordnance Demolition Area, Final*, Document prepared for USACE, Baltimore District, Baltimore, Maryland

(United States Army Corps of Engineers (USACE), August1998) *Fort George G. Meade, Inactive Landfills 1, 2, 3, and Clean Fill Dump Remedial Investigation Report, Final*

(USACE, August 1991) *Final Environmental Impact Statement, Comprehensive Base Realignment and Partial Closure for Fort George G. Meade and Fort Holabird*

Figures



3

CLIENT	U.S. Army Corps of Engineers, Baltimore District			
DATA SOURCE	ESRI Street Maps 9.2; ODA Long-Term Monitoring 2010 Sampling Event			
REVISION NO	0	GIS:	RP	08/25/09
SCALE	1:60,000	CHECKED:	FM	07/29/08
G:\Projects\Fort_Meade\ODA\Projects\ODAinsetandFigure2-1_2009.mxd		PROJ MGR	FM	-

TITLE

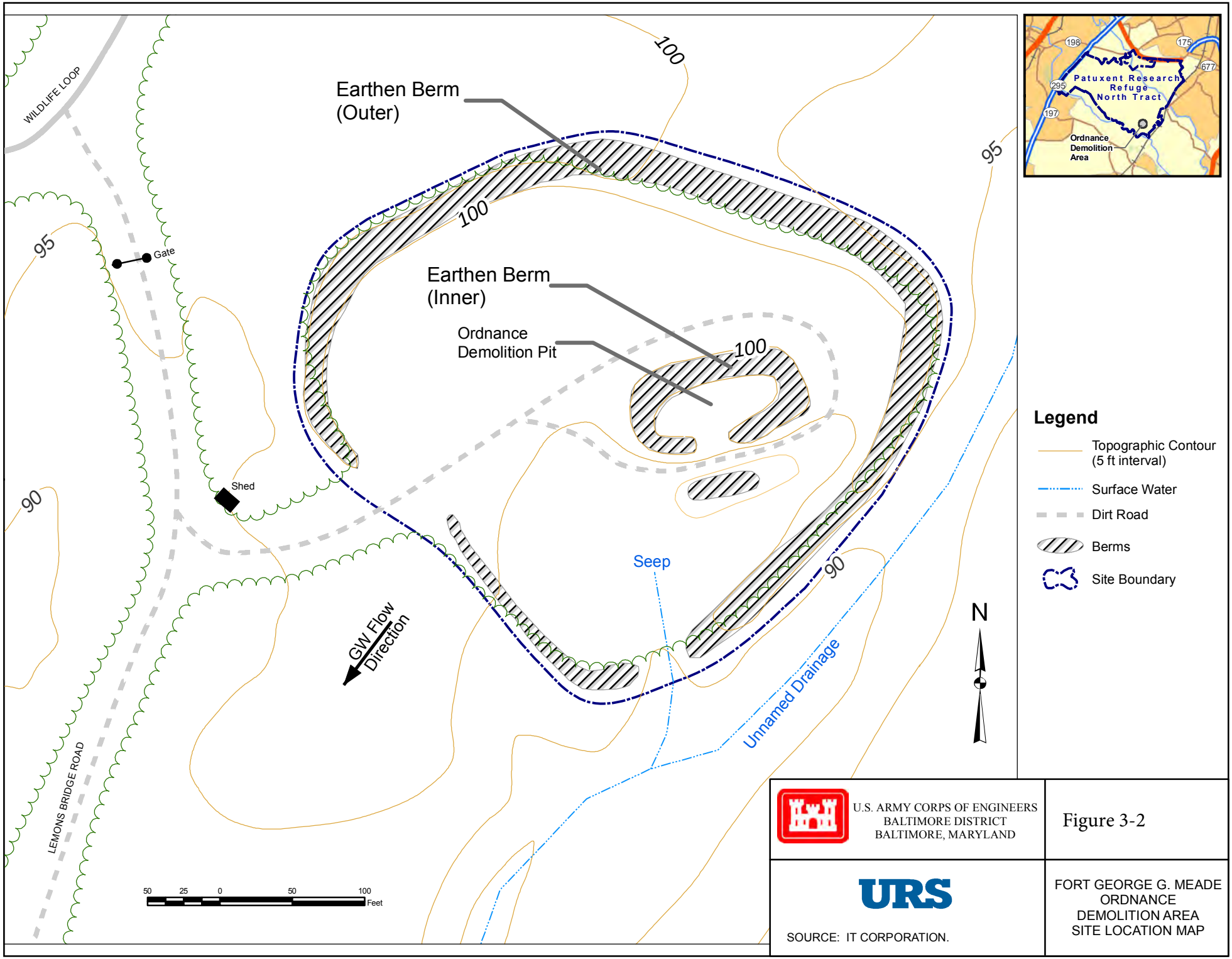
Vicinity Map
Patuxent Research Refuge - North Tract

URS

12420 Milestone Center Drive
Germantown, MD 20876

PROJ NO 15301259.00004

FIGURE 3-1



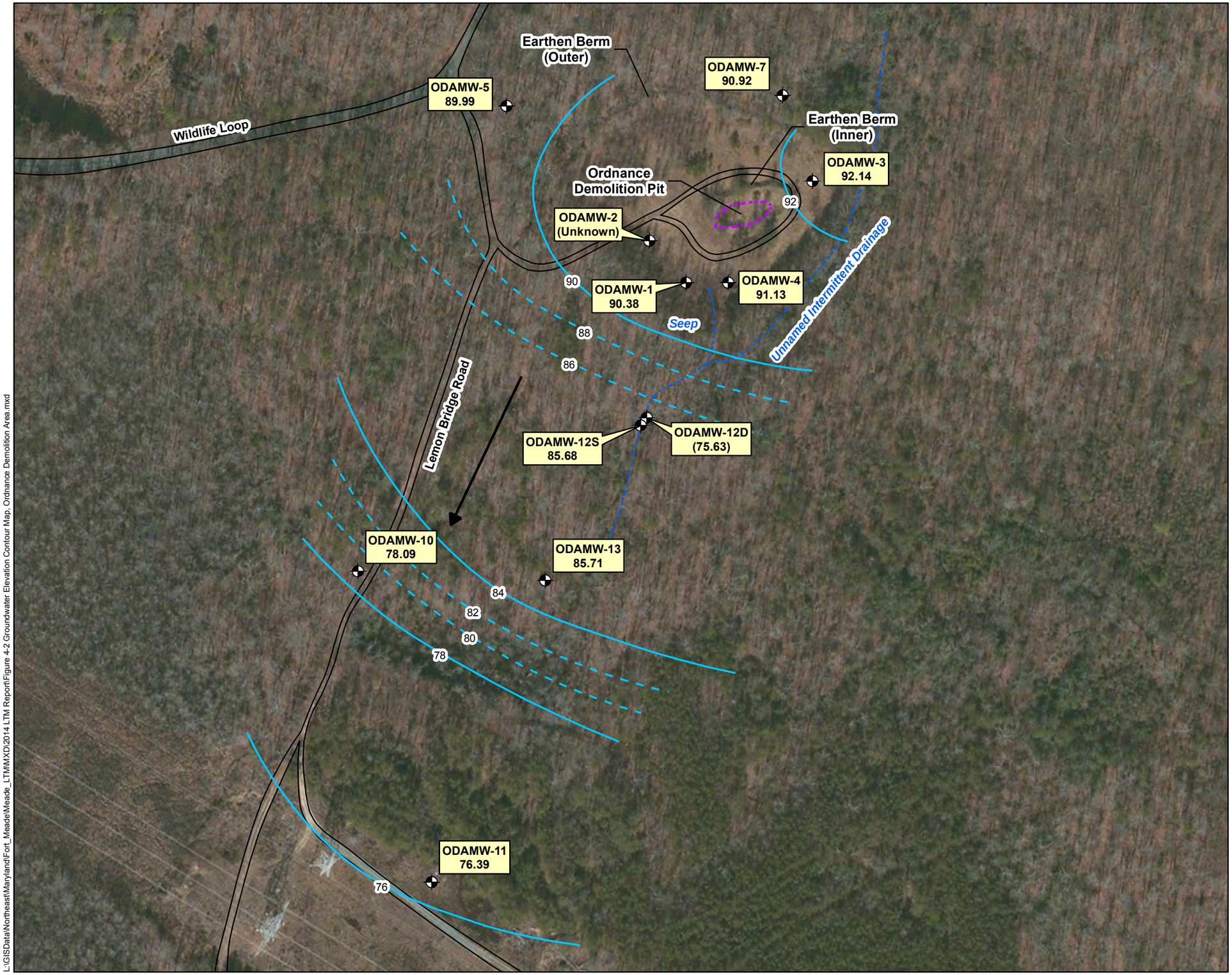
U.S. ARMY CORPS OF ENGINEERS
BALTIMORE DISTRICT
BALTIMORE, MARYLAND

Figure 3-2

URS

SOURCE: IT CORPORATION.

FORT GEORGE G. MEADE
ORDNANCE
DEMOLITION AREA
SITE LOCATION MAP



VICINITY MAP

Legend

- Monitoring Well Location
- Groundwater Contour
- Inferred Groundwater Contour
- Groundwater Flow
- Drainage
- Road
- Demolition Pit

ODAMW-7
92.14
(75.63)

Monitoring Well ID
Groundwater Elevation, feet
Elevation Not Contoured

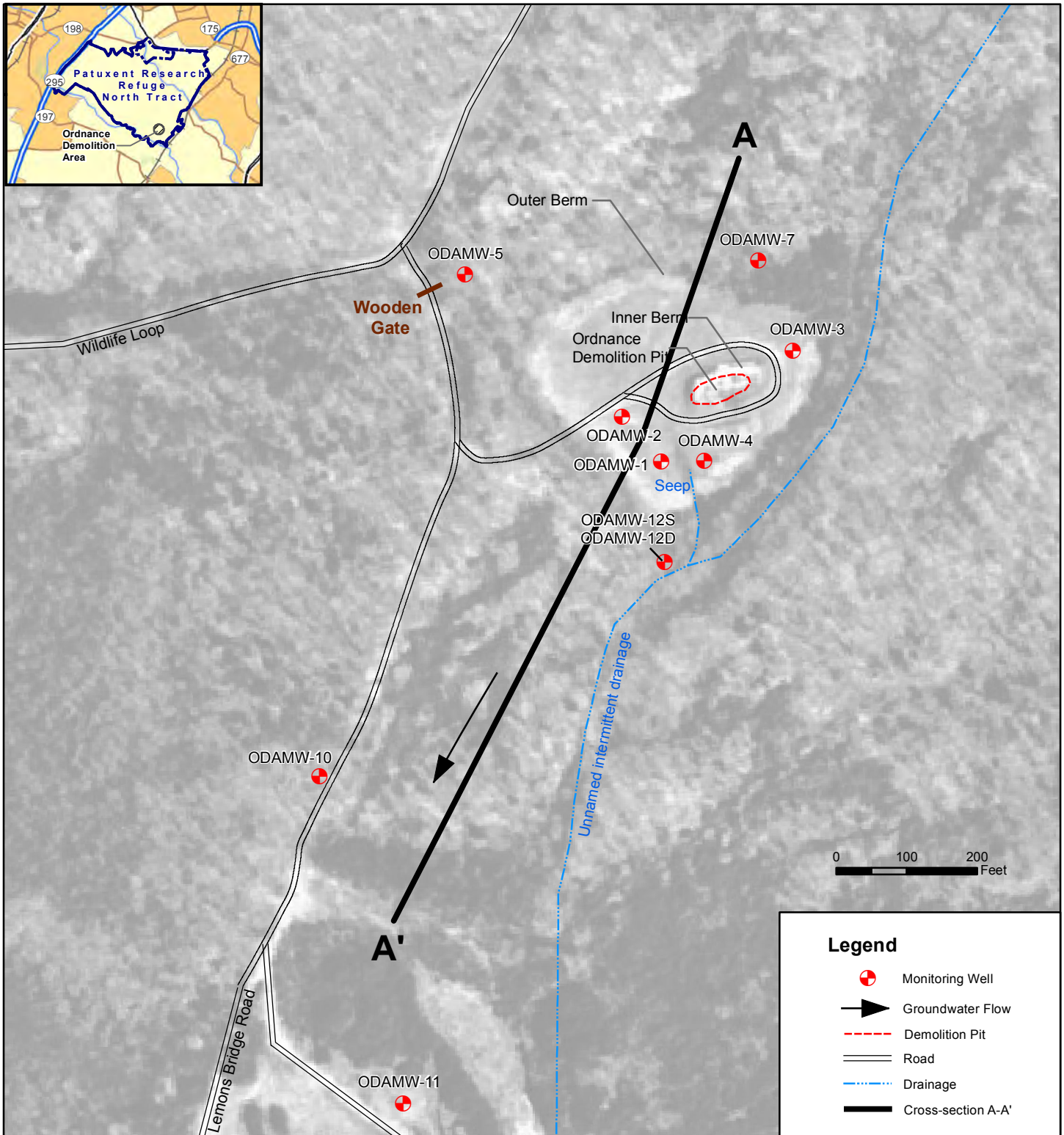
Map Date: April 2015
Data Sources: USACE 2010, ESRI 2011

N

0 100 200
Feet

FIGURE **3-3**
GROUNDWATER ELEVATION CONTOUR MAP, **OCTOBER 2014**
ORDNANCE DEMOLITION AREA
OPERABLE UNIT Anne Arundel County, Maryland

L:\GIS\Data\Northeast\Maryland\Fort_Meade\Meade_LTM\MXD\2014 LTM Report\Figure 4-2 Groundwater Elevation Contour Map, Ordnance Demolition Area.mxd



CLIENT	U.S. Army Corps of Engineers, Baltimore District			
PROJ	LTM Work Plan			
SOURCE	Location data: USACE, 2002b; DOQ, TerraServer, na.			
REVISION NO	0	GIS:	JK	07/09/2012
SCALE	1:2,400	CHECKED:	GW	07/09/2012
G:\Projects\Fort_Meade\ODA\Projects\2011 ODA-1andinset_portrait2011.mxd		PROJ MGR	FM	-

N

TITLE

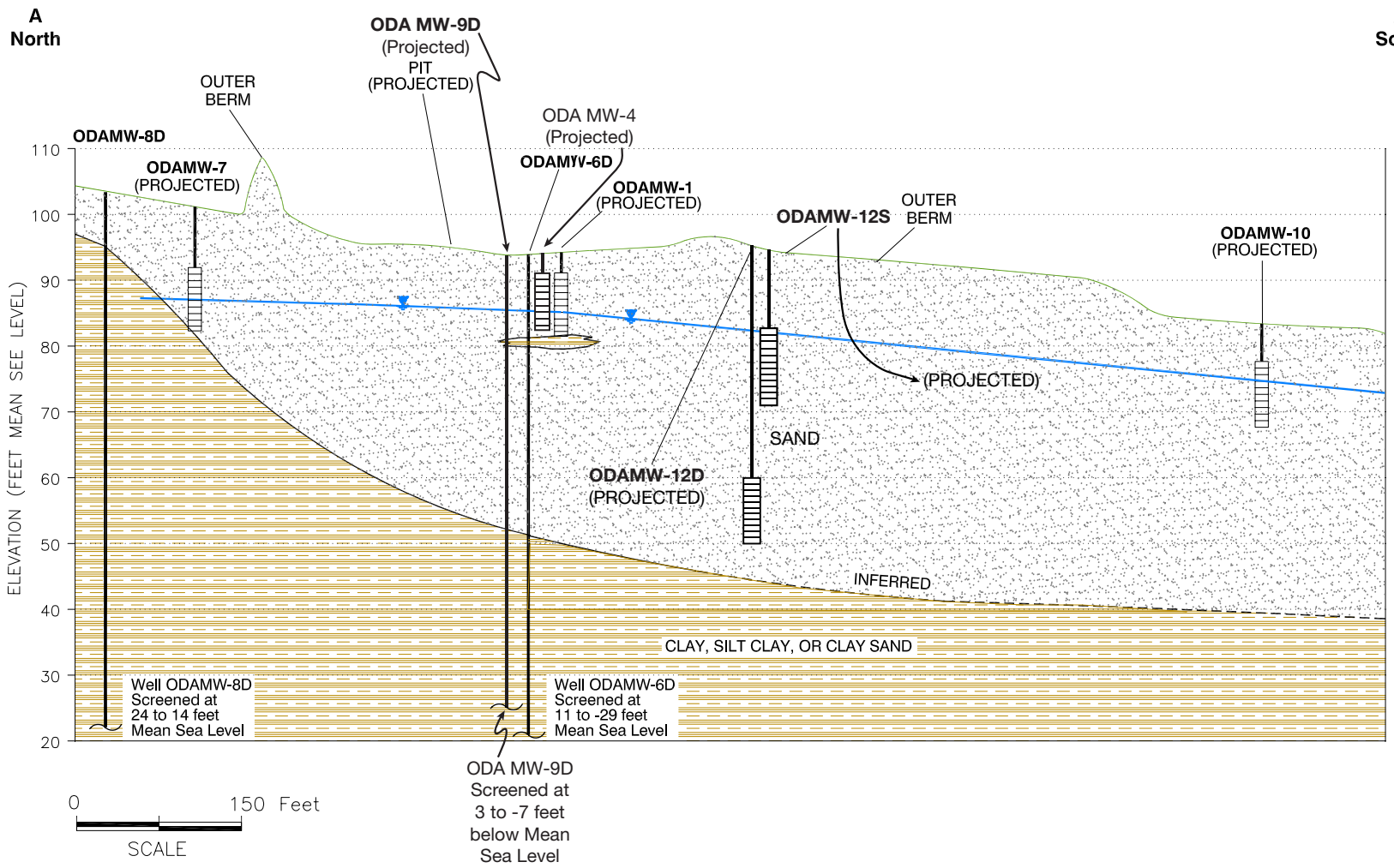
Monitoring Well Location Map and
Geologic Cross-Section Line A-A'
Ordnance Demolition Area,
Patuxent Research Refuge - North Tract

URS

12420 Milestone Center Drive
Germantown, MD 20876

PROJ NO
15302389.30000

FIGURE
3-4



LEGEND:

ODAMW-6D WELL NAME

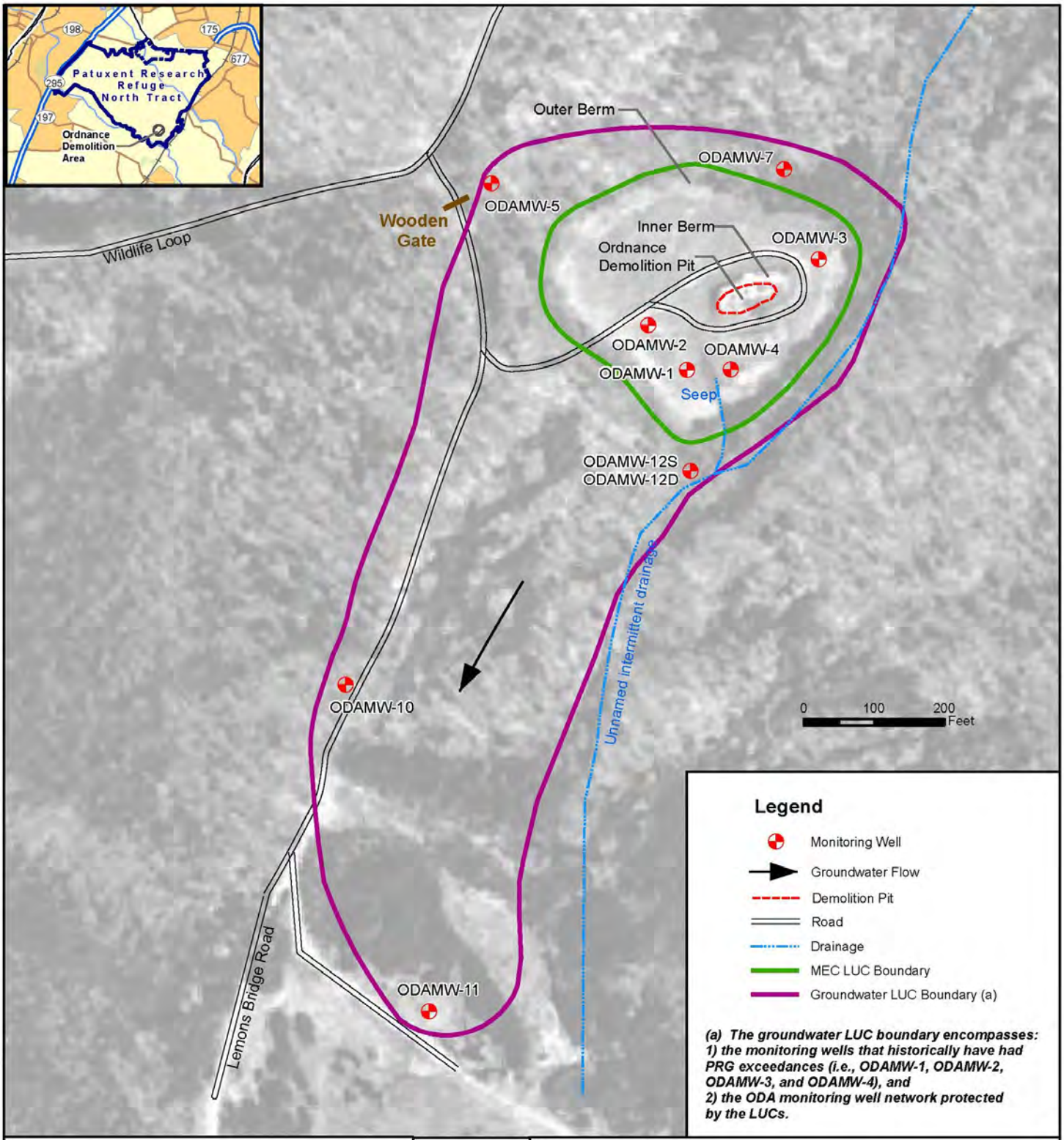
WELL SCREEN

GROUNDWATER SURFACE

CLIENT: U.S. Army Corps of Engineers, Baltimore District	LOCATION: U.S. Army Corps of Engineers, Baltimore District
DATE: 10/08/07	FILE: G:\FtMeade\Projects\demolition_area 2-3inset.mxd
DESIGN: AER CHECKED: FM SENIOR: SM	URS 12420 Milestone Center Drive, Suite 150 Germantown, MD 20876

Figure 3-5

Geologic Cross Section A-A' Showing Subset of ODA Monitoring Wells, Patuxent Research Refuge-North Tract



CLIENT	U.S. Army Corps of Engineers, Baltimore District		
PROJ	LTM Work Plan		
SOURCE	Location data: USACE, 2002b; DOQ, TerraServer, na.		
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SCALE 1:2,400	CHECKED:	GW	05/17/2012
G:\Projects\Fort_Meade\ODA\Projects\2011 ODA-1_LUC_areas.mxd	PROJ MGR	FM	-

N

TITLE

Land Use Control (LUC) Areas
Ordnance Demolition Area,
Patuxent Research Refuge - North Tract

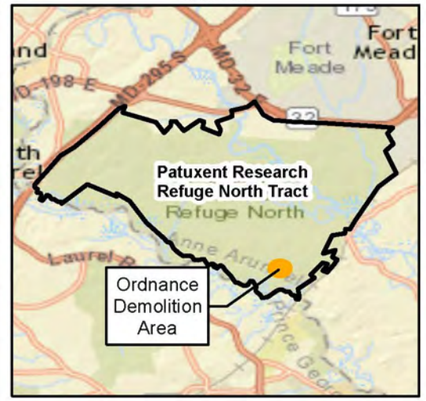
URS
12420 Milestone Center Drive
Germantown, MD 20876

PROJ NO 15302389.30000

FIGURE 3-6

Well ID	Analyte	Concentration (ug/L)
ODAMW-12S	PCE	5.94

VICINITY MAP



Legend

- Monitoring Well Location
- Drainage
- Road
- Demolition Pit

Analyte	MCL (µg/L)
Tetrachloroethene (PCE)	5

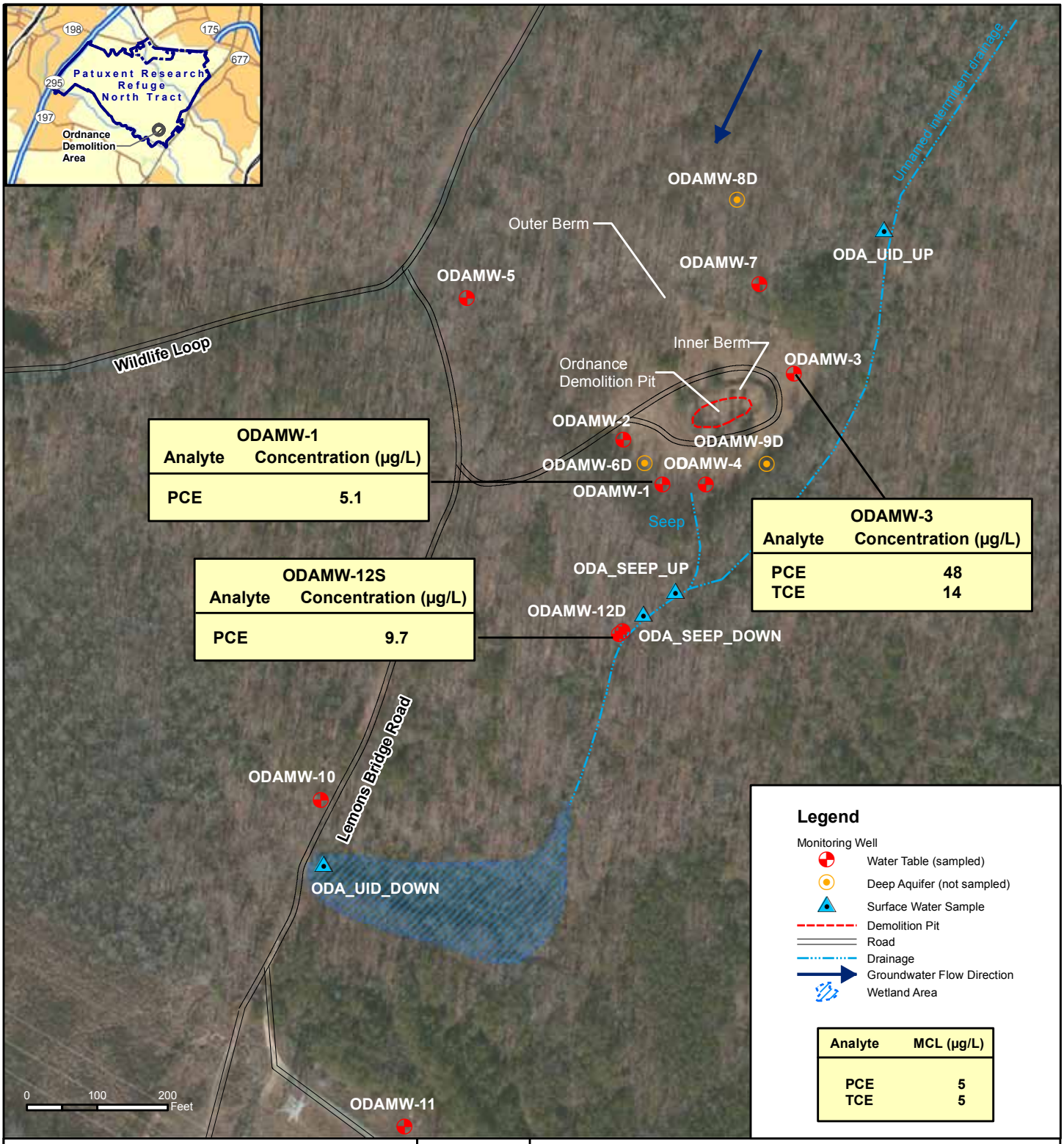
Map Date: September 2015
Data Sources: USACE 2010, ESRI 2011

N

0 100 200
Feet

FIGURE 6-1 (DRAFT)
2015 MCL EXCEEDANCES, ORDNANCE DEMOLITION AREA OPERABLE UNIT
Anne Arundel County, Maryland

\\lovetongis\GIS\data\Federal\Northeast\Maryland\FortMeade\Meade_LTMMXD\2014 LTM Report\FigureRevisions\Figure 4-5 MCL Exceedances, Ordance Demolition Area.mxd



CLIENT	U.S. Army Corps of Engineers, Baltimore District
PROJ	ODA Long-Term Monitoring 2013 Sampling Event
SOURCE	Location data: USACE, 2002b; DOQ, TerraServer, na.

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G:\Projects\Fort_Meade\ODA\Projects\2013 ODAFigure4-5_portrait2013.mxd		PROJ MGR	BE	11/01/2013

N

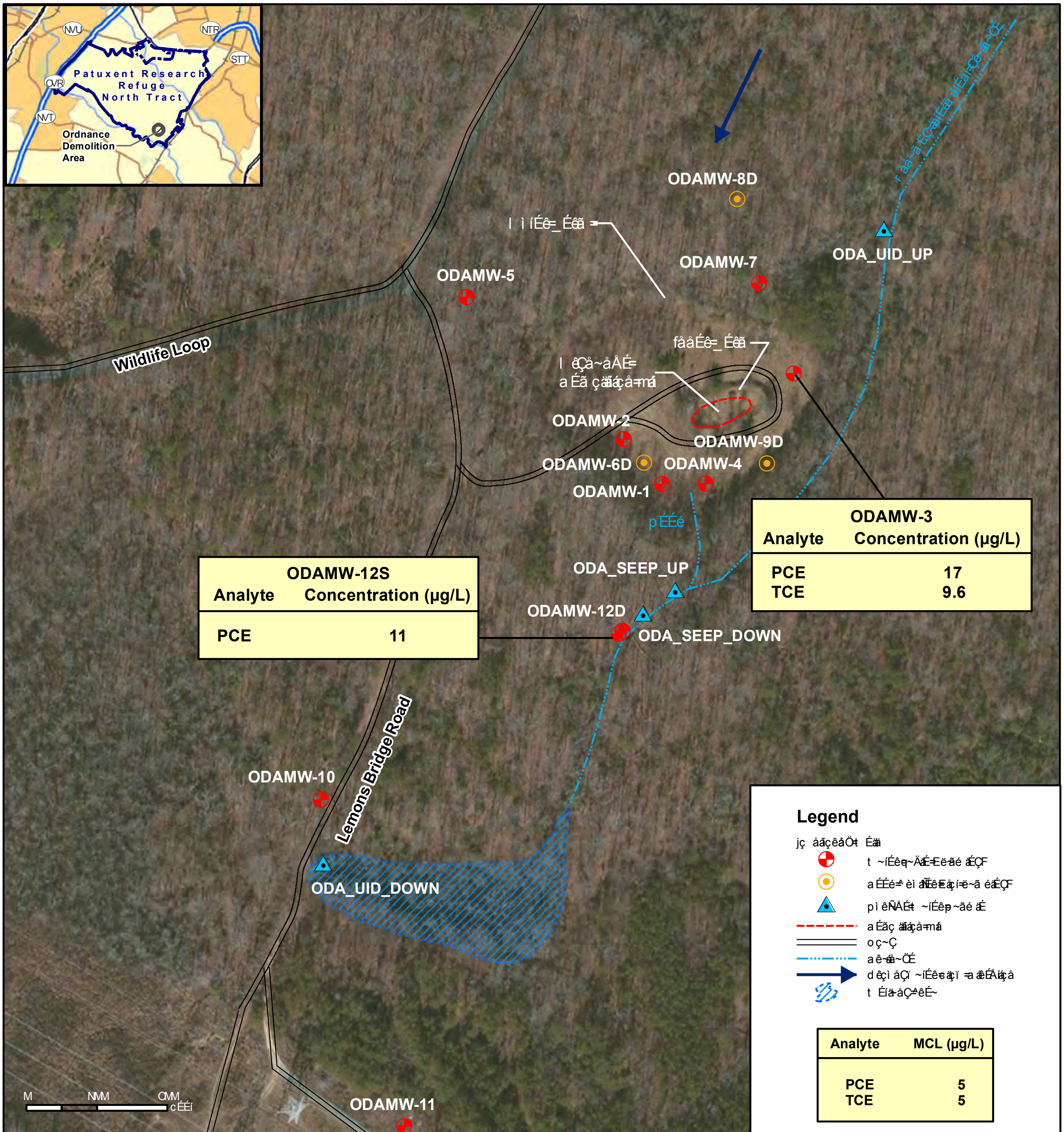
TITLE

2013 PRG Exceedances
Ordnance Demolition Area Operable Unit
Patuxent Research Refuge – North Tract

URS
12420 Milestone Center Drive
Germantown, MD 20876

PROJ NO 15302389.30000

FIGURE 6-2



URS

G:\Projects\Fort_Meade\ODA\Projects\2012 ODAFigure4-5_portrait2012.mxd

2012

FIGURE 6-3

Figure 6-4 ODAMW-12S Contaminant Graph

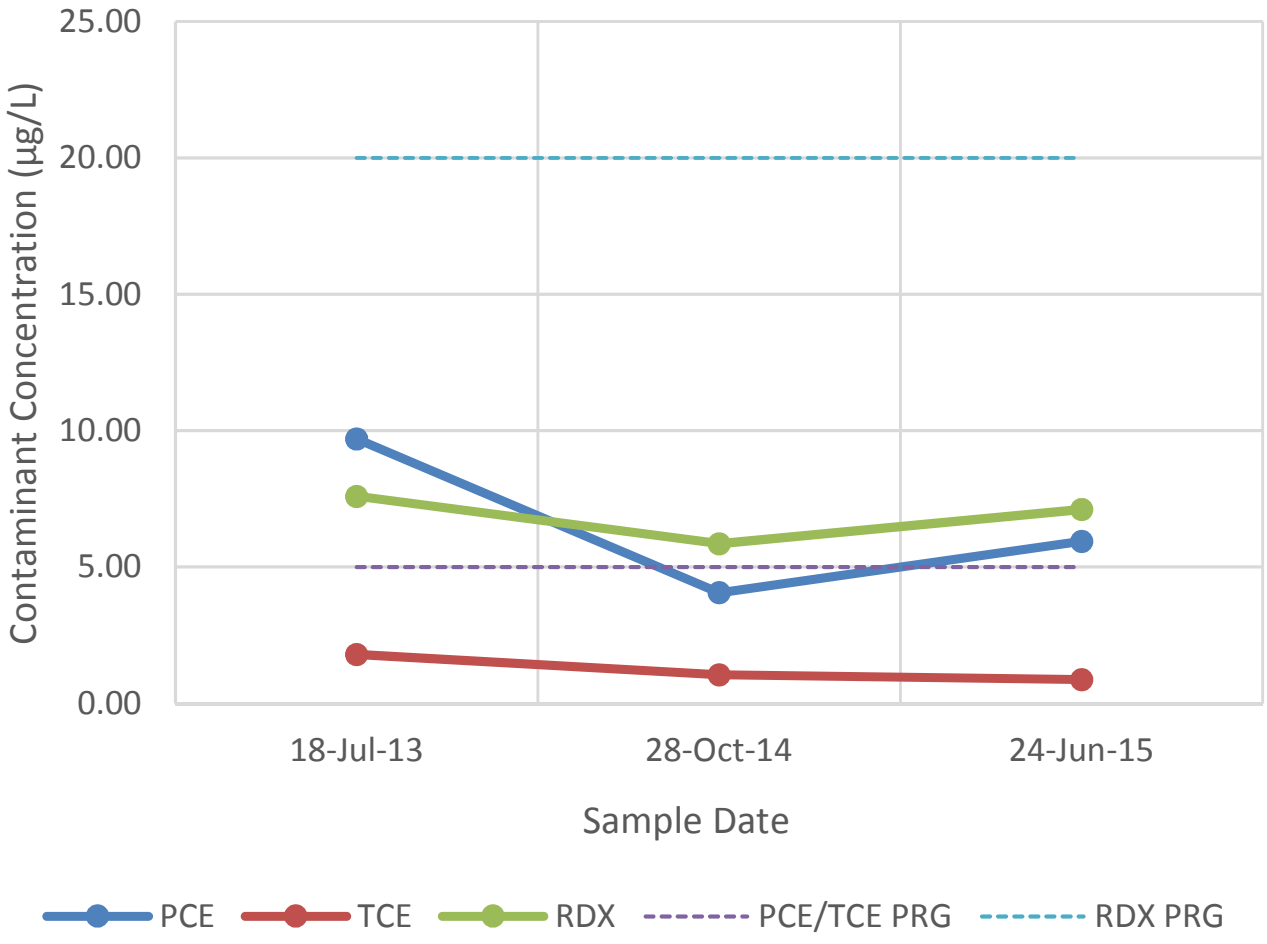
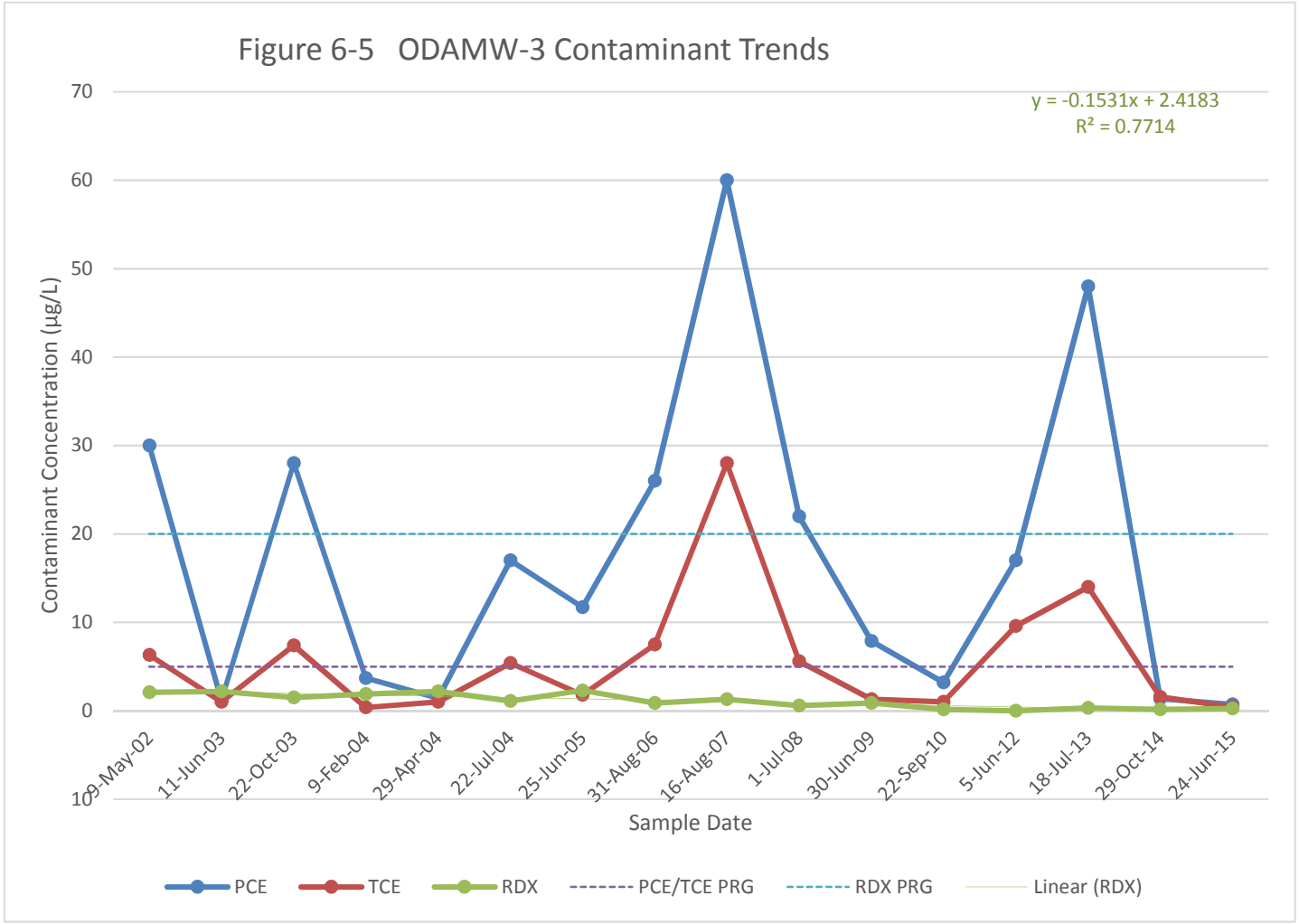


Figure 6-5 ODAMW-3 Contaminant Trends



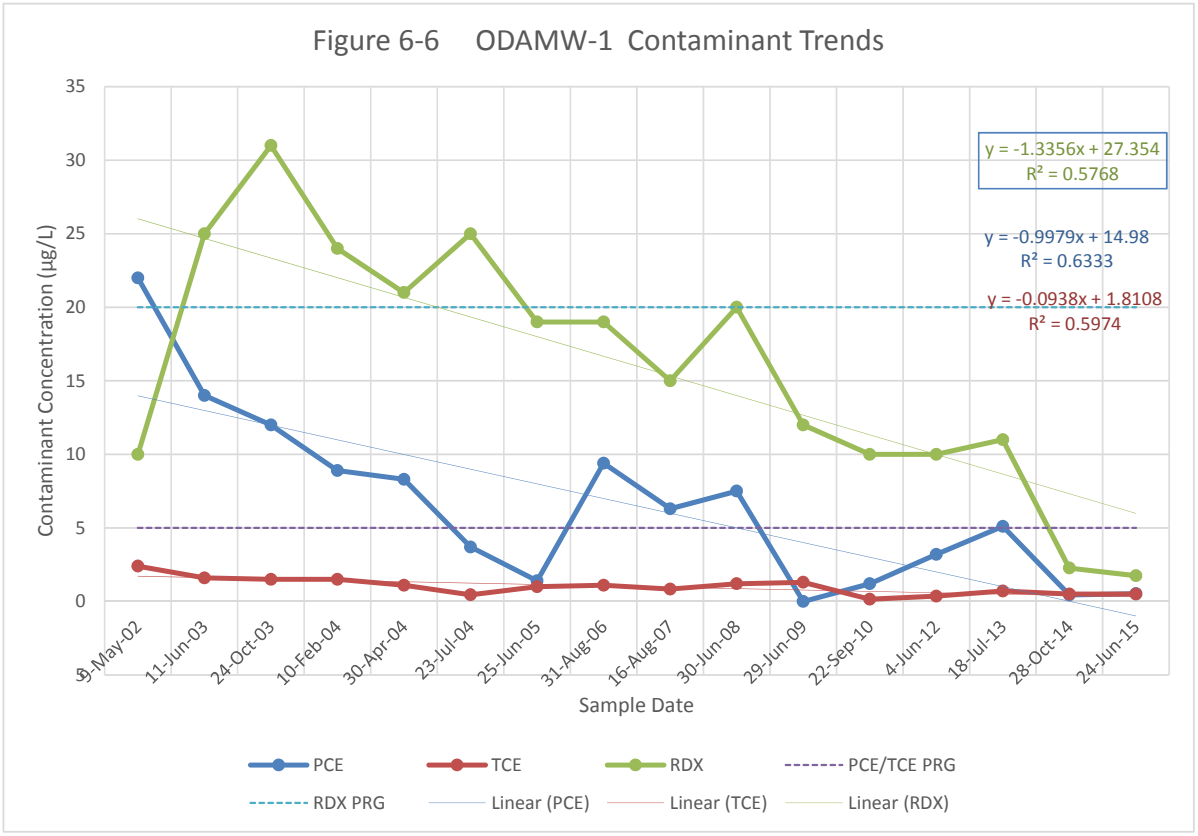


Figure 6-6 ODAMW-1 Contaminant Trends
Contaminant Concentration (µg/L)
35
30
25
20
15
10
5
0
9-May-02
11-Jun-03
24-Oct-03
10-Feb-04
30-Apr-04
23-Jul-04
25-Jun-05
31-Aug-06
16-Aug-07
30-Jun-08
29-Jun-09
22-Sep-10
4-Jun-12
18-Jul-13
28-Oct-14
24-Jun-15
Sample Date
y = -1.3356x + 27.354
R² = 0.5768
y = -0.9979x + 14.98
R² = 0.6333
y = -0.0938x + 1.8108
R² = 0.5974
PCE
TCE
RDX
PCE/TCE PRG
RDX PRG
Linear (PCE)
Linear (TCE)
Linear (RDX)

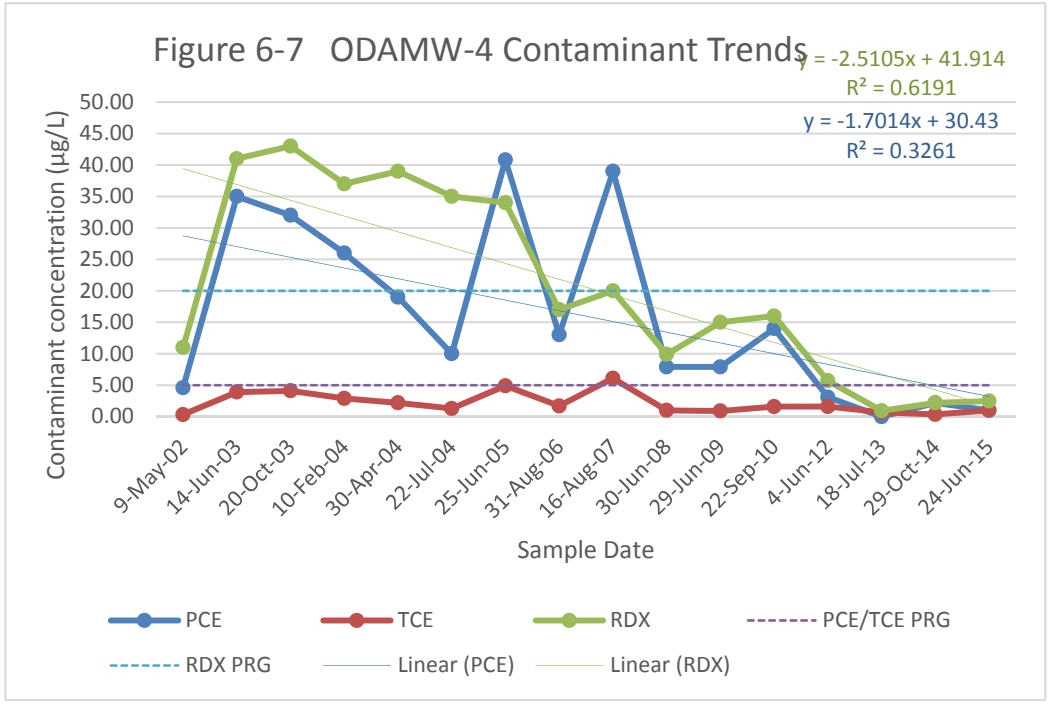
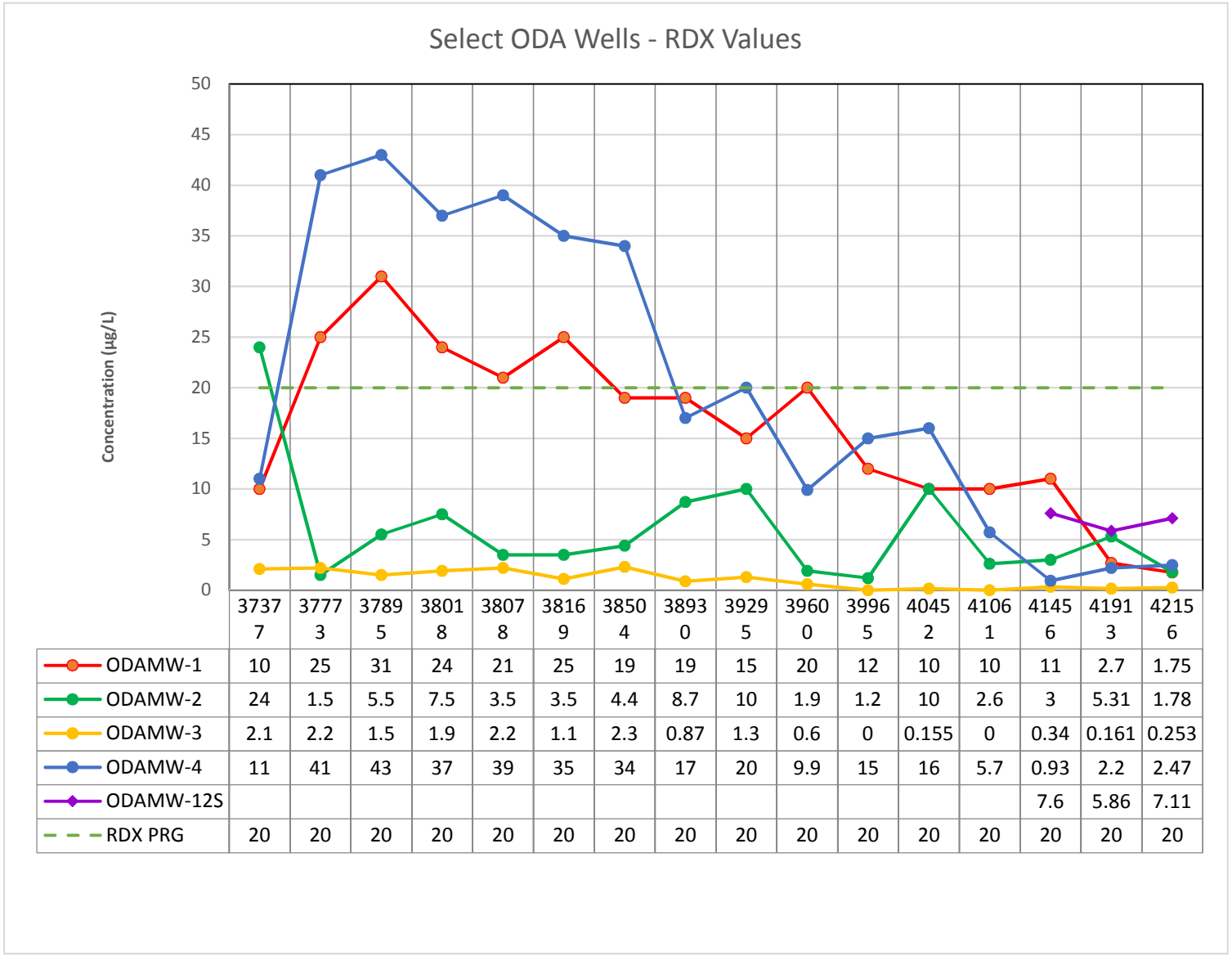


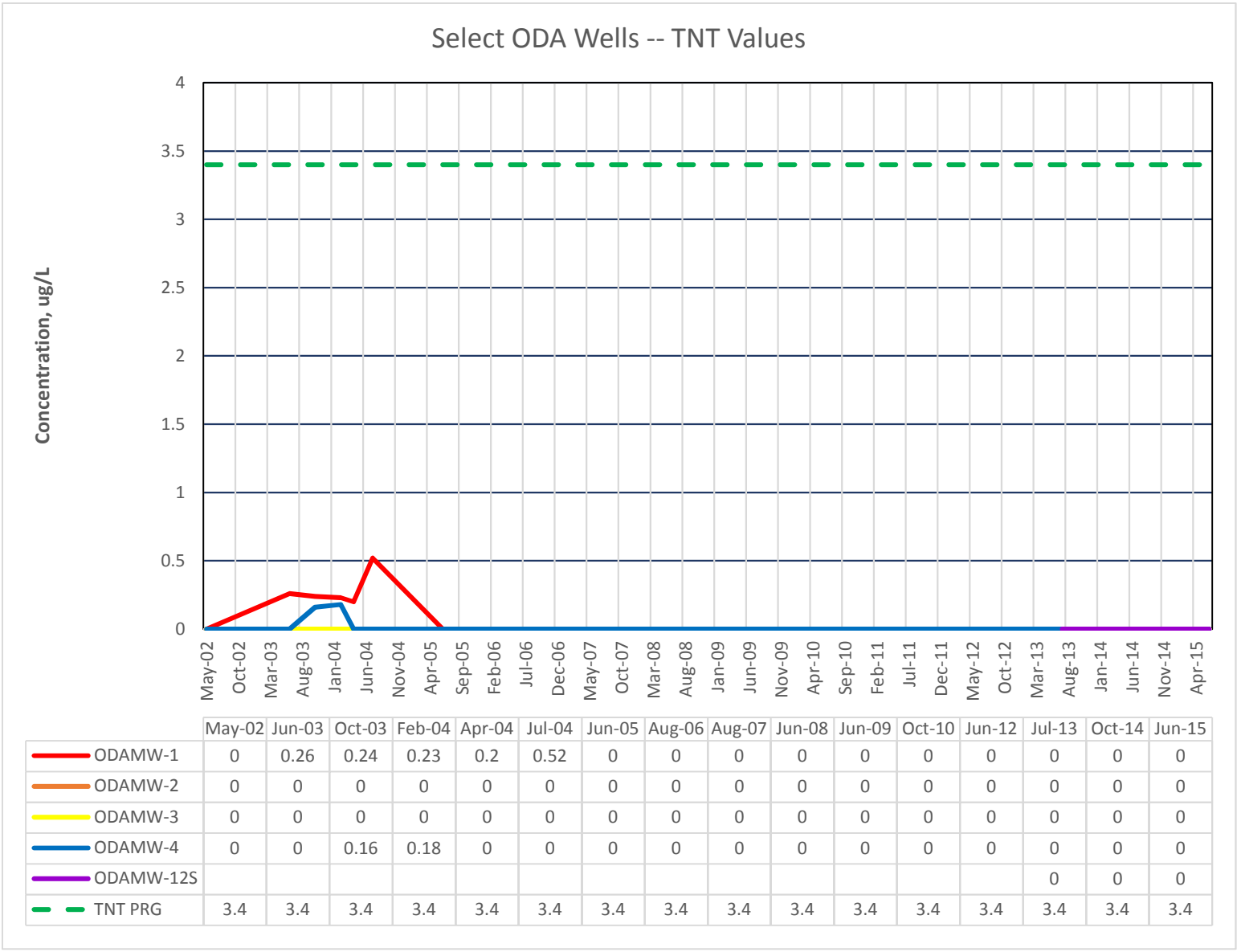
Figure 6-7 ODAMW-4 Contaminant Trends
y = -2.5105x + 41.914
R² = 0.6191
y = -1.7014x + 30.43
R² = 0.3261
Contaminant concentration (µg/L)
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
9-May-02
14-Jun-03
20-Oct-03
10-Feb-04
30-Apr-04
22-Jul-04
25-Jun-05
31-Aug-06
16-Aug-07
30-Jun-08
29-Jun-09
22-Sep-10
4-Jun-12
18-Jul-13
29-Oct-14
24-Jun-15
Sample Date
PCE
TCE
RDX
PCE/TCE PRG
RDX PRG
Linear (PCE)
Linear (RDX)

Figure 6-8 ODA Monitoring Wells, RDX Values, Temporal Trends



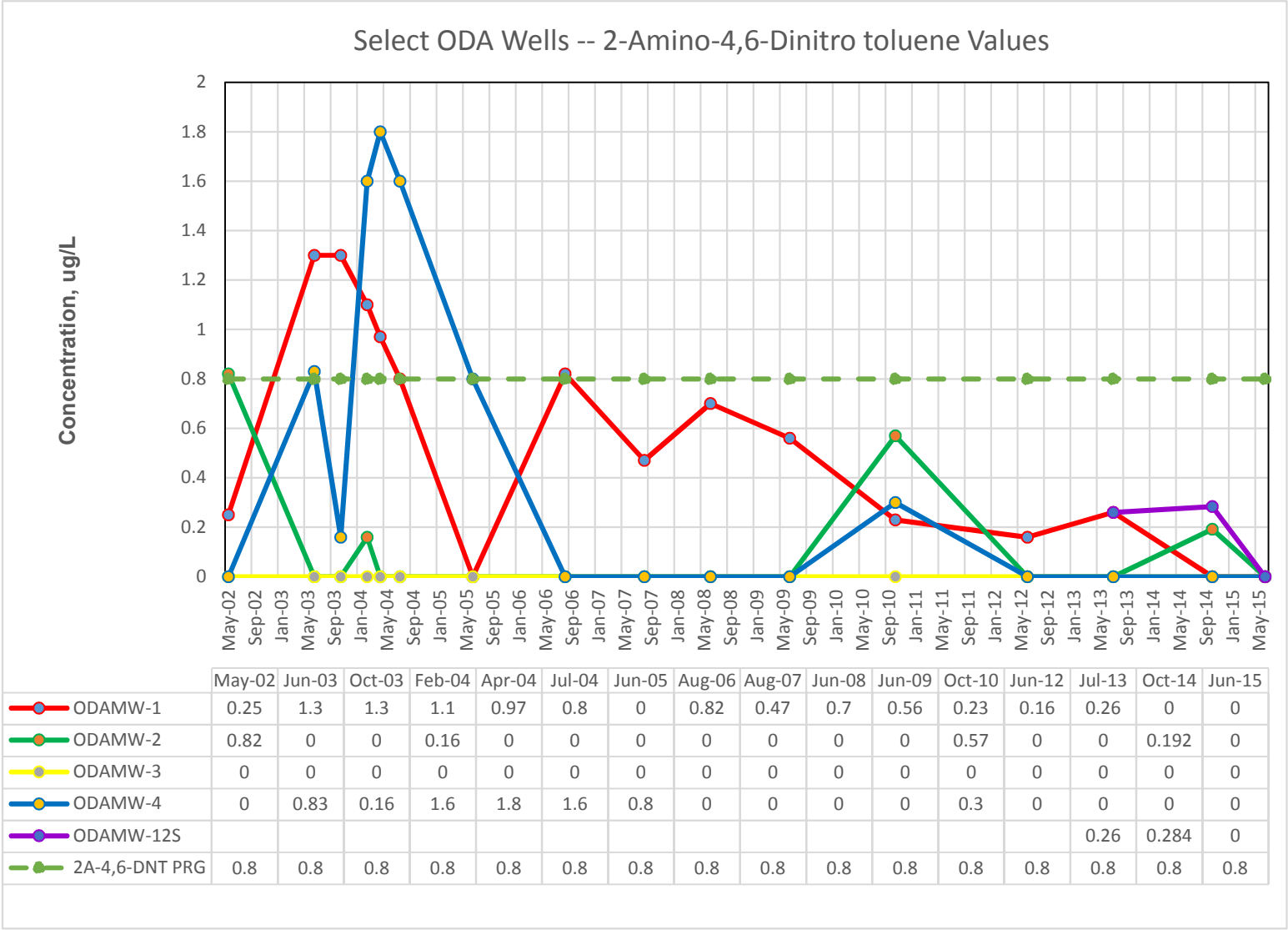
	37377	37773	37895	38018	38078	38169	38504	38930	39295	39600	39965	40452	41061	41456	41913	42156
ODAMW-1	10	25	31	24	21	25	19	19	15	20	12	10	10	11	2.7	1.75
ODAMW-2	24	1.5	5.5	7.5	3.5	3.5	4.4	8.7	10	1.9	1.2	10	2.6	3	5.31	1.78
ODAMW-3	2.1	2.2	1.5	1.9	2.2	1.1	2.3	0.87	1.3	0.6	0	0.155	0	0.34	0.161	0.253
ODAMW-4	11	41	43	37	39	35	34	17	20	9.9	15	16	5.7	0.93	2.2	2.47
ODAMW-12S														7.6	5.86	7.11
RDX PRG	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

Figure 6-9 ODA Monitoring Wells, TNT Values



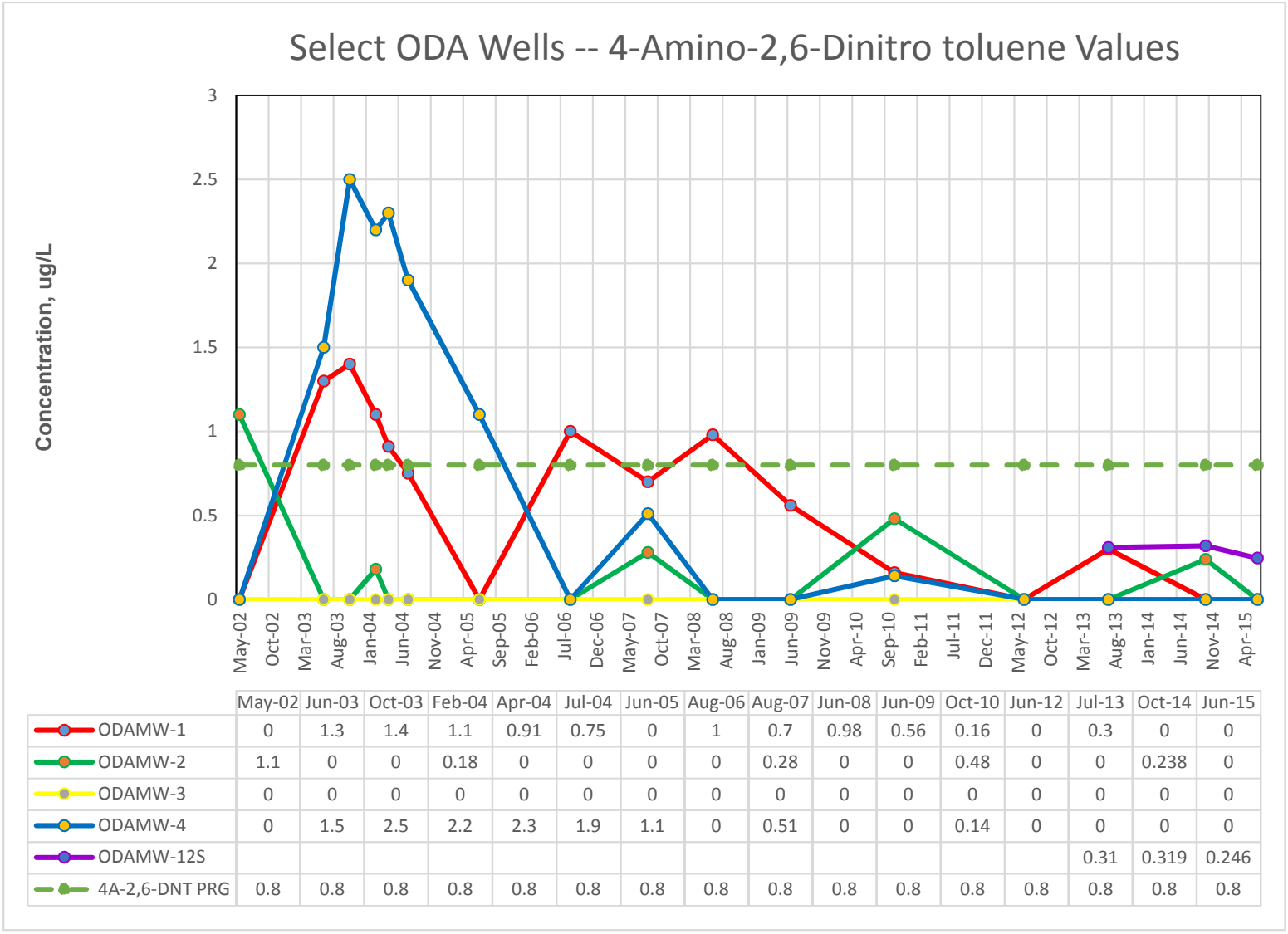
	May-02	Jun-03	Oct-03	Feb-04	Apr-04	Jul-04	Jun-05	Aug-06	Aug-07	Jun-08	Jun-09	Oct-10	Jun-12	Jul-13	Oct-14	Jun-15
ODAMW-1	0	0.26	0.24	0.23	0.2	0.52	0	0	0	0	0	0	0	0	0	0
ODAMW-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ODAMW-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ODAMW-4	0	0	0.16	0.18	0	0	0	0	0	0	0	0	0	0	0	0
ODAMW-12S														0	0	0
TNT PRG	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4

Figure 6-10 ODA Monitoring Wells, 2-Amino-4,6-Dinitro Toluene (2A-4,6-DNT) Values



	May-02	Jun-03	Oct-03	Feb-04	Apr-04	Jul-04	Jun-05	Aug-06	Aug-07	Jun-08	Jun-09	Oct-10	Jun-12	Jul-13	Oct-14	Jun-15
ODAMW-1	0.25	1.3	1.3	1.1	0.97	0.8	0	0.82	0.47	0.7	0.56	0.23	0.16	0.26	0	0
ODAMW-2	0.82	0	0	0.16	0	0	0	0	0	0	0	0.57	0	0	0.192	0
ODAMW-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ODAMW-4	0	0.83	0.16	1.6	1.8	1.6	0.8	0	0	0	0	0.3	0	0	0	0
ODAMW-12S														0.26	0.284	0
2A-4,6-DNT PRG	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8

Figure 6-11 ODA Monitoring Wells, 4-Amino 2,6-Dinitro Toluene (4A-2,6-DNT) Values



	May-02	Jun-03	Oct-03	Feb-04	Apr-04	Jul-04	Jun-05	Aug-06	Aug-07	Jun-08	Jun-09	Oct-10	Jun-12	Jul-13	Oct-14	Jun-15
ODAMW-1	0	1.3	1.4	1.1	0.91	0.75	0	1	0.7	0.98	0.56	0.16	0	0.3	0	0
ODAMW-2	1.1	0	0	0.18	0	0	0	0	0.28	0	0	0.48	0	0	0.238	0
ODAMW-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ODAMW-4	0	1.5	2.5	2.2	2.3	1.9	1.1	0	0.51	0	0	0.14	0	0	0	0
ODAMW-12S														0.31	0.319	0.246
4A-2,6-DNT PRG	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8

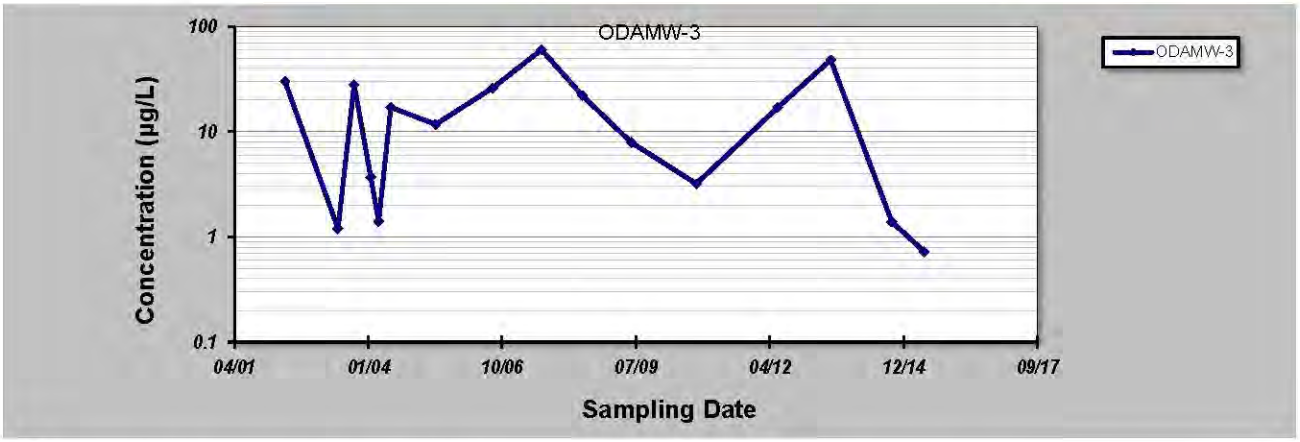
Figure 6-12 Mann-Kendall Trend Analysis of Tetrachloroethene (PCE) at ODA OU

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	12-Jan-16	Job ID:	
Facility Name:	Ordnance Demolition Area	Constituent:	Tetrachloroethene (PCE)
Conducted By:	Andrew Layman	Concentration Units:	µg/L

Sampling Point ID: ODAMW-3

Sampling Event	Sampling Date	TETRACHLOROETHENE (PCE) CONCENTRATION (µg/L)
1	May-02	30
2	Jun-03	1.2
3	Oct-03	28
4	Feb-04	3.7
5	Apr-04	1.4
6	Jul-04	17
7	Jun-05	11.7
8	Aug-06	26
9	Aug-07	60
10	Jun-08	22
11	Jun-09	7.9
12	Oct-10	3.2
13	Jun-12	17
14	Jul-13	48
15	Oct-14	1.39
16	Jun-15	0.722
17		
18		
19		
20		
Coefficient of Variation:		1.01
Mann-Kendall Statistic (S):		-17
Confidence Factor:		76.1%
Concentration Trend:		No Trend



Notes:

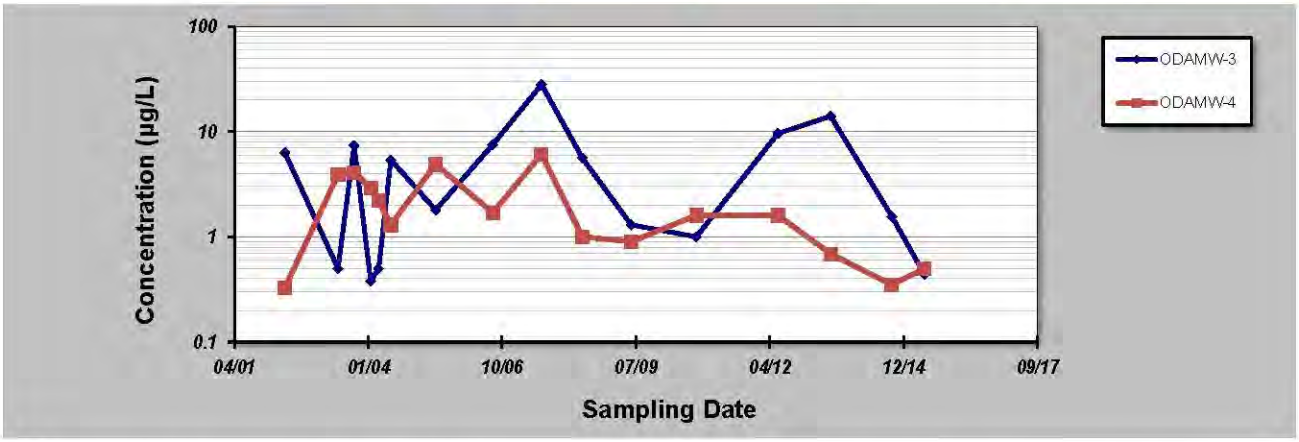
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

Figure 6-13 Mann-Kendall Trend Analysis for Trichloroethene (TCE) at ODA OU

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	12-Jan-16	Job ID:	
Facility Name:	Ordnance Demolition Area	Constituent:	Tricholroethene (TCE)
Conducted By:	Andrew Layman	Concentration Units:	µg/L

Sampling Point ID:	ODAMW-3	ODAMW-4					
Sampling Event	Sampling Date	TRICHOLROETHENE (TCE) CONCENTRATION (µg/L)						
1	May-02	6.30	0.33					
2	Jun-03	0.5	3.90					
3	Oct-03	7.40	4.10					
4	Feb-04	0.38	2.90					
5	Apr-04	0.5	2.20					
6	Jul-04	5.40	1.30					
7	Jun-05	1.80	4.90					
8	Aug-06	7.50	1.70					
9	Aug-07	28	6.1					
10	Jun-08	5.60	1.00					
11	Jun-09	1.3	0.90					
12	Oct-10	1	1.60					
13	Jun-12	9.60	1.60					
14	Jul-13	14	0.69					
15	Oct-14	1.56	0.351					
16	Jun-15	0.439	0.5					
17								
18								
19								
20								
Coefficient of Variation:		1.26	0.83					
Mann-Kendall Statistic (S):		9	-47					
Confidence Factor:		63.9%	98.2%					
Concentration Trend:		No Trend	Decreasing					



Notes:

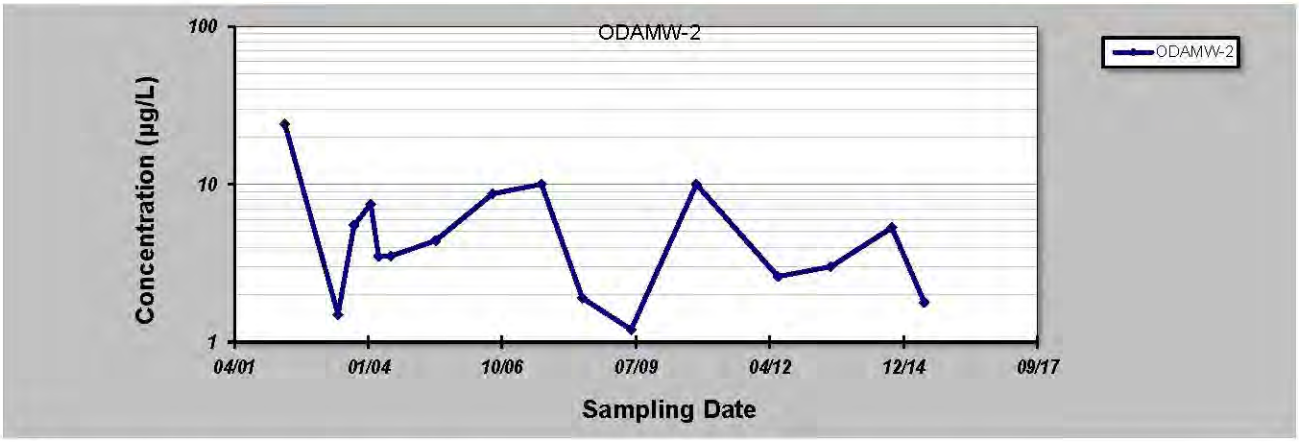
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

Figure 6-14 Mann-Kendall Trend Analysis for Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) at ODA OU

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	12-Jan-16	Job ID:	
Facility Name:	Ordnance Demolition Area	Constituent:	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE (RI
Conducted By:	Andrew Layman	Concentration Units:	µg/L
Sampling Point ID:	ODAMW-2		

Sampling Event	Sampling Date	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE (RDX) CONCENTRATION (µg/L)
1	May-02	24
2	Jun-03	1.5
3	Oct-03	5.5
4	Feb-04	7.5
5	Apr-04	3.5
6	Jul-04	3.5
7	Jun-05	4.4
8	Aug-06	8.7
9	Aug-07	10
10	Jun-08	1.9
11	Jun-09	1.2
12	Oct-10	10
13	Jun-12	2.6
14	Jul-13	3
15	Oct-14	5.31
16	Jun-15	1.78
17		
18		
19		
20		
Coefficient of Variation:		0.96
Mann-Kendall Statistic (S):		-22
Confidence Factor:		82.5%
Concentration Trend:		Stable



Notes:

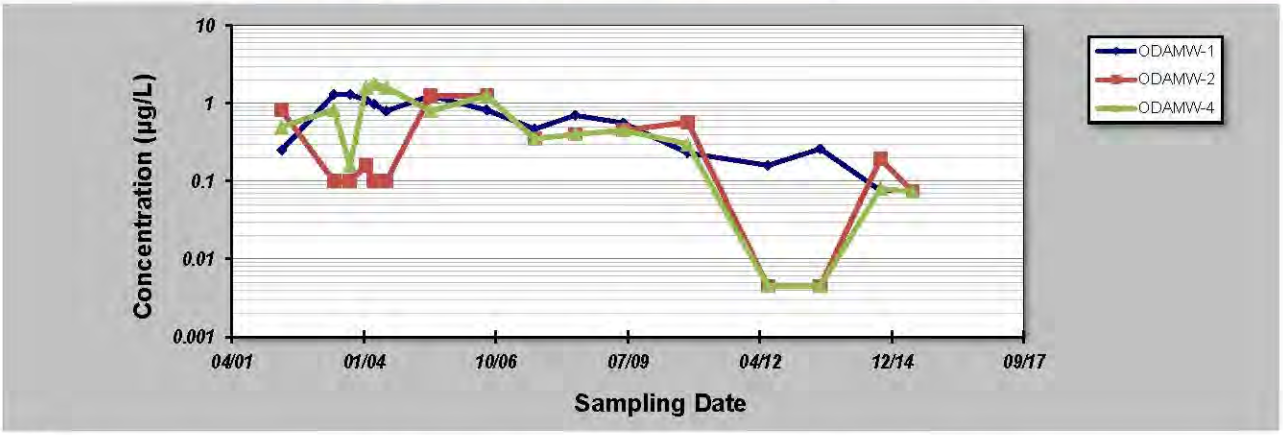
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

Figure 6-15 Mann-Kendall Trend Analysis for 2-Amino-4,6-dinitrotoluene (2A-4,6-DNT) at ODA OU

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	12-Jan-16	Job ID:	
Facility Name:	Ordnance Demolition Area	Constituent:	2-AMINO-4,6-DINITROTOLUENE (2A-4,6-DNT)
Conducted By:	Andrew Layman, USACE, NAB	Concentration Units:	µg/L

Sampling Point ID:	ODAMW-1	ODAMW-2	ODAMW-4				
Sampling Event	Sampling Date	2-AMINO-4,6-DINITROTOLUENE (2A-4,6-DNT) CONCENTRATION (µg/L)						
1	May-02	0.25	0.82	0.5				
2	Jun-03	1.3	0.1	0.83				
3	Oct-03	1.3	0.1	0.16				
4	Feb-04	1.1	0.16	1.6				
5	Apr-04	0.97	0.1	1.8				
6	Jul-04	0.8	0.1	1.6				
7	Jun-05	1.25	1.25	0.8				
8	Aug-06	0.82	1.25	1.25				
9	Aug-07	0.47	0.35	0.35				
10	Jun-08	0.7	0.4	0.4				
11	Jun-09	0.56	0.45	0.45				
12	Oct-10	0.23	0.57	0.3				
13	Jun-12	0.16	0.0045	0.0045				
14	Jul-13	0.26	0.0045	0.0045				
15	Oct-14	0.076	0.192	0.08				
16	Jun-15	0.077	0.074	0.074				
17								
18								
19								
20								
Coefficient of Variation:		0.69	1.11	0.96				
Mann-Kendall Statistic (S):		-79	-14	-62				
Confidence Factor:		>99.9%	71.8%	99.8%				
Concentration Trend:		Decreasing	No Trend	Decreasing				



Notes:

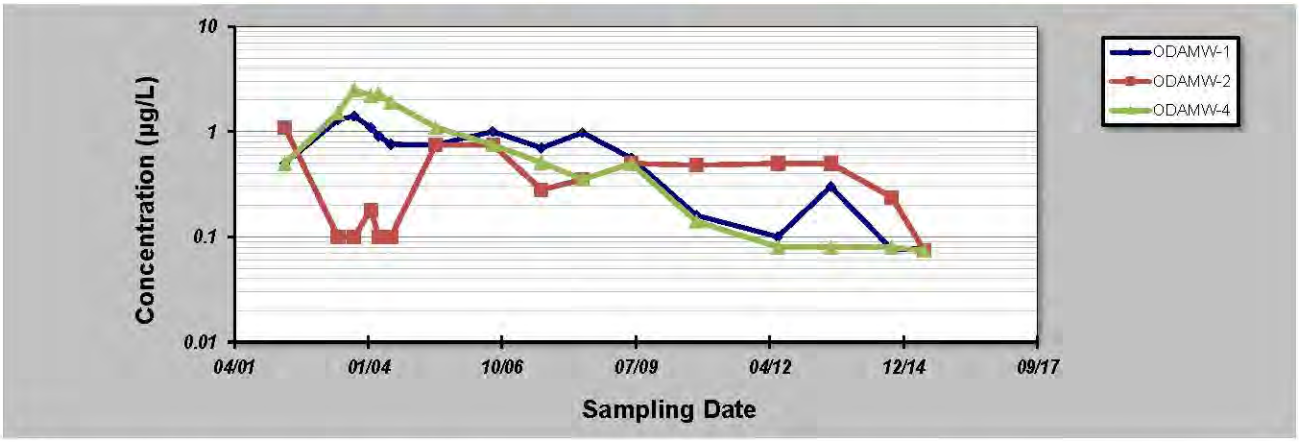
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

Figure 6-16 Mann-Kendall Trend Analysis for 4-Amino-2,6-dinitrotoluene (4A-2,6-DNT) at ODA OU

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	12-Jan-16	Job ID:	
Facility Name:	Ordnance Demolition Area	Constituent:	4-AMINO-2,6-DINITROTOLUENE (4A-2,6-DNT)
Conducted By:	Andrew Layman	Concentration Units:	µg/L

Sampling Point ID:	ODAMW-1	ODAMW-2	ODAMW-4				
Sampling Event	Sampling Date	4-AMINO-2,6-DINITROTOLUENE (4A-2,6-DNT) CONCENTRATION (µg/L)						
1	May-02	0.5	1.1	0.5				
2	Jun-03	1.3	0.1	1.5				
3	Oct-03	1.4	0.1	2.5				
4	Feb-04	1.1	0.18	2.2				
5	Apr-04	0.91	0.1	2.3				
6	Jul-04	0.76	0.1	1.9				
7	Jun-05	0.75	0.75	1.1				
8	Aug-06	1	0.75	0.75				
9	Aug-07	0.7	0.28	0.51				
10	Jun-08	0.98	0.35	0.35				
11	Jun-09	0.56	0.5	0.5				
12	Oct-10	0.16	0.48	0.14				
13	Jun-12	0.1	0.5	0.08				
14	Jul-13	0.3	0.5	0.08				
15	Oct-14	0.076	0.238	0.08				
16	Jun-15	0.077	0.074	0.074				
17								
18								
19								
20								
Coefficient of Variation:		0.65	0.78	0.97				
Mann-Kendall Statistic (S):		-78	6	-88				
Confidence Factor:		>99.9%	58.8%	>99.9%				
Concentration Trend:		Decreasing	No Trend	Decreasing				



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

Tables

Table 6-1. ODA Analytical Parameters and Methods

Sample ID	Media	Well Type	Explosives [1]	VOCs (8260B) [2]	Metals (6010C Low) [3]	MNA Parameters [4]	Hardness [5]
ODAMW-1	GW	Existing	x	x	x	x	--
ODAMW-2	GW	Existing	x	x	x	x	--
ODAMW-3	GW	Existing	x	x	x	x	--
ODAMW-4	GW	Existing	x	x	x	x	--
ODAMW-5	GW	Existing	x	x	x	x	--
ODAMW-7	GW	Existing	x	x	x	x	--
ODAMW-10	GW	Existing	x	x	x	x	--
ODAMW-11	GW	Existing	x	x	x	x	--
ODAMW-12S	GW	Existing	x	x	x	x	--
ODAMW-12D	GW	Existing	x	x	x	x	--
ODAMW-13	GW	NEW	x	x	x	x	--
ODA_Seep_Up	SW	NA	x	x	x	x	x
ODA_Seep_Down	SW	NA	x	x	x	x	--
ODA_UID_Up	SW	NA	x	x	x	x	x
ODA_UID_Down	SW	NA	x	x	x	x	--

Notes:
x – sample to be collected
-- no sample
(1) RDX, TNT, 2-amino-4,6-DNT, and 4-amino-2,6-DNT
(2) Chloroform, TCE, PCE, cis-1,2-DCE, and vinyl chloride.
(3) Cadmium, Calcium, Magnesium, and Manganese. Groundwater samples are collected for dissolved metals and surface water samples are collected for total metals.
(4) Alkalinity, Chloride, Dissolved Organic Carbon, Ethane/Ethene, Ferric/Ferrous Iron, Iron, Nitrate/Nitrite, Sulfate, Sulfite, and Total Organic Carbon.
(5) Hardness will be calculated by the laboratory.

Table 6-2 ODA OU Groundwater Chemical Results for the 2015 Sampling Event and Screening Criteria

Aquifer/Sample Location							Quaternary/Upper Patapsco											
Well ID							ODAMW-1	ODAMW-2	ODAGW-DUP2	ODAMW-3	ODAMW-4	ODAMW-5	ODAMW-7	ODAMW-10	ODAMW-11	ODAMW-12S	ODAMW-12D	ODAMW-13
Date Sampled:							6/24/2015	6/24/2015	6/24/2015	6/24/2015	6/24/2015	6/24/2015	6/24/2015	6/24/2015	6/24/2015	6/24/2015	6/24/2015	6/24/2015
Screen Interval (ft bgs)							3.5-13.5	4-14	5-15	5-15	2-12	2-12	9.5-19.5	5-15	5-15	5-15	32-42	7-17
Parent Sample ID:									ODAMW-3									
Upgradient/Downgradient							D	D	D	U	D	U	U	D	D	D	D	D
Analyte	PRG	MCL	MCLG	Tap Water RSL		Unit												
Volatile Organic Compounds																		
Chloroform	80	80	70	0.22	c	µg/l	< 0.500 U	< 0.500 U	< 1.00 U	< 0.500 U	< 1.00 U	< 1.00 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	0.631 J
cis-1,2-dichloroethene	-	70	70	36	n	µg/l	< 0.500 U	< 0.500 U	< 1.00 U	< 0.500 U	< 1.00 U	< 1.00 U	< 0.500 U	< 0.500 U	< 0.500 U	1.55	< 0.500 U	< 0.500 U
Tetrachloroethene	5	5	0	11	c	µg/l	0.526 J	< 0.500 U	0.551 J	0.722 J	< 1.00 U	< 1.00 U	< 0.500 U	< 0.500 U	< 0.500 U	**5.94**	< 0.500 U	< 0.500 U
Trichloroethene	5	5	0	0.49	c	µg/l	< 0.500 U	< 0.500 U	< 1.00 U	0.439 J	< 1.00 U	< 1.00 U	< 0.500 U	< 0.500 U	< 0.500 U	0.884 J	< 0.500 U	0.570 J
Vinyl chloride	-	2	0	0.019	c	µg/l	< 0.500 U	< 0.500 U	< 1.00 U	< 0.500 U	< 1.00 U	< 1.00 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
Explosives																		
2,4,6-trinitrotoluene	3.4	-	-	2.5	c	µg/l	< 0.154 U	< 0.148 U	< 0.154 U	< 0.154 U	< 0.148 U	< 0.160 U	< 0.148 U	< 0.154 U	< 0.148 U	< 0.157 U	< 0.148 U	< 0.148 U
2-amino-4,6-dinitrotoluene	0.8	-	-	39	n	µg/l	< 0.154 U	< 0.148 U	< 0.154 U	< 0.154 U	< 0.148 U	< 0.160 U	< 0.148 U	< 0.154 U	< 0.148 U	< 0.157 U	< 0.148 U	< 0.148 U
4-amino-2,6-dinitrotoluene	0.8	-	-	39	n	µg/l	< 0.154 U	< 0.148 U	< 0.154 U	< 0.154 U	< 0.148 U	< 0.160 U	< 0.148 U	< 0.154 U	< 0.148 U	0.246 J	< 0.148 U	< 0.148 U
RDX	20	-	-	0.7	c	µg/l	1.75	1.78	0.297 J	0.253 J	2.47	< 0.160 U	< 0.148 U	< 0.154 U	< 0.148 U	7.11	< 0.148 U	< 0.148 U
Dissolved Metals																		
Cadmium	5	5	5	9.2	n	µg/l	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	0.474 J	< 0.500 U	< 0.500 U	3.22	< 0.500 U	< 0.500 U
Calcium	-	-	-	-		µg/l	6010	18000	27200	27800	13000	5730	924 J	1240 J	1590	4750	1180 J	1030 J
Iron	-	-	-	14000	n	µg/l	1970	1160	3080	3160	7750	686	< 15.0 U	< 15.0 U	251	< 15.0 U	27.4	1000
Manganese	-	-	-	430	n	µg/l	34.2	2.45 J	65.4	67.7	50.3	5.77	119	49.5	106	139	34.0	14.8
Magnesium	-	-	-	-		µg/l	1210 J	1450	4430	4480	1600	1130 J	1680	1240 J	1260	3210	1640	1370
General Chemistry Parameters																		
Alkalinity, total (as CaCO3)	-	-	-	-		mg/l	9.90	45.1	89.9	94.6	31.3	16.6	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	3.96
Chloride	-	-	-	-		mg/l	1.04	0.631	0.985	1.01	0.890	0.748	2.22	2.55	4.35	2.66	2.76	3.17
Dissolved Organic Carbon	-	-	-	-		mg/l	2.35 J	2.27 J	5.62	5.58	5.33	8.00	< 2.50 U	< 2.50 U	2.58 J	1.26 J	< 2.50 U	< 2.50 U
Nitrate	-	10	10	32	n	mg/l	0.0416 J	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	0.371	< 0.100 U	< 0.100 U
Nitrogen as nitrite	-	1	1	2	n	mg/l	< 0.100 U	0.165 J	< 0.100 U	0.0523 J	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U
Sulfate	-	-	-	-		mg/l	7.30 J	8.98 J	3.15 J	3.15 J	15.2 J	3.83 J	15.2 J	12.1 J	11.5 J	26.4 J	9.77 J	5.61 J
Ethane	-	-	-	-		µg/l	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U
Ethene	-	-	-	-		µg/l	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U
Total Carbon	-	-	-	-		mg/l	1.79 J	2.57 J	5.71	5.64	5.39	7.81	1.43 J	1.29 J	2.21 J	< 2.50 U	< 2.50 U	< 2.50 U

NOTES:

Bolded and highlighted results exceed the MCL or PRGs
Gray shaded results exceed the Tap water RSL in the absence of PRGs/MCL.
ft = Foot (feet).
bgs = Below ground surface.
mg/L = Milligram per liter.
µg/L = Microgram per liter.
MCL = EPA Maximum Contaminant Level, June 2015.
MCLG = EPA Maximum Contaminant Level Goal, June 2015.
RSL = EPA Regional Screening Levels, June 2015.
PRG = Preliminary Remediation Goal as specified in the 2011 Record of Decision.
J = Estimated.
c = Cancer.
n = Non-cancer.
U = Not detected.

Table 6-3
ODA OU Groundwater Chemical Results for the 2014 Sampling Event and Screening Criteria

							Aquifer/Sample Location	Quaternary/Upper Patapsco									Middle Patapsco	
							Well ID	ODAMW-1	ODAMW-2	ODAMW-3 Dup	ODAMW-3	ODAMW-4	ODAMW-5	ODAMW-7	ODAMW-10	ODAMW-11	ODAMW-12S	ODAMW-13	ODAMW-12D Dup	ODAMW-12D
							Sample Collection Date	10/28/2014	10/28/2014	10/29/2014	10/29/2014	10/29/2014	10/29/2014	10/29/2014	10/28/2014	10/28/2014	10/28/2014	10/28/2014	10/28/2014	10/28/2014
							Screen Interval (ft bgs)	3.5-13.5	4-14	5-15	5-15	2-12	2-12	9.5-19.5	5-15	5-15	5-15	7-17	32-42	32-42
							Upgradient/Downgradient	D	D	U	U	D	U	U	D	D	D	D	D	D
chemical_name	PRG	MCL	MCLG	EPA Tap Water RSL		Unit														
General Chemistry Parameters																				
Alkalinity, total (as CaCO3)	-	-	-	-		mg/l		3.25	6.09	45.5	43.8	< 1.00 U	17.5	< 1.00 U	< 1.00 U	< 1.00 U	< 1.00 U	7.31	1.62	1.62
Chloride	-	-	-	-		mg/l		1.14 Q	2.36 Q	2.72 B	2.75 B	2.03 B	5.29	2.65 B	2.24 Q	4.48 Q	2.68 Q	3.70 Q	2.84 Q	2.81 Q
Dissolved Organic Carbon	-	-	-	-		mg/l		< 2.50 U	< 2.50 U	4.22	5.68	2.10 J	10.8	< 2.50 U	< 2.50 U	1.86 J	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U
Iron, Ferric	-	-	-	-		mg/l		1.19	< 0.0150 U	5.97	5.49	0.527	< 0.0150 U	< 0.0150 U	< 0.0150 U	0.102	< 0.0150 U	1.54	< 0.0150 U	< 0.0150 U
Iron, Ferrous	-	-	-	-		mg/l		0.246	0.0388 J	3.77	4.53	0.185	4.35	0.0754	0.106	0.216	0.0205 J	5.47	0.0815	0.130
Nitrate	-	10	10	32	n	mg/l		0.0755 J	0.363	< 0.100 U	< 0.100 U	0.0779 J	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	0.198 J	< 0.100 U	< 0.100 U	< 0.100 U
Nitrogen as nitrite	-	1	1	2	n	mg/l		< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U	< 0.100 U
Sulfate	-	-	-	-		mg/l		15.2	17.3	12.2	12.1	40.3	2.39 J	14.1	11.6	10.5	21.7	4.90	8.95	8.87
Ethane	-	-	-	-		ug/l		< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U
Ethene	-	-	-	-		ug/l		< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U	< 2.00 U
Total Organic Carbon	-	-	-	-		mg/l		< 2.50 U	< 2.50 U	3.51	3.29	1.82 J	14.0	< 2.50 U	1.31 J	1.78 J	< 2.50 U	< 2.50 U	< 2.50 U	< 2.50 U
Volatile Organic Compounds																				
Chloroform	80	80	70	0.22	c	ug/l		< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 1.00 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
cis-1,2-dichloroethene	-	70	70	36	n	ug/l		< 0.500 U	0.338 J	15.5	15.4	0.425 J	< 1.00 U	< 0.500 U	< 0.500 U	< 0.500 U	0.719 J	< 0.500 U	< 0.500 U	< 0.500 U
Tetrachloroethene	5	5	0	11	c	ug/l		0.439 J	2.71	1.37	1.39	2.18	< 1.00 U	< 0.500 U	< 0.500 U	< 0.500 U	4.06	< 0.500 U	< 0.500 U	< 0.500 U
Trichloroethene	5	5	0	0.49	c	ug/l		< 0.500 U	0.263 J	1.41	1.56	0.351 J	< 1.00 U	< 0.500 U	< 0.500 U	< 0.500 U	1.06	0.952 J	< 0.500 U	< 0.500 U
Vinyl chloride	-	2	0	0.019	c	ug/l		< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 1.00 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U	< 0.500 U
Explosives																				
2,4,6-trinitrotoluene	3.4	-	-	2.5	c	ug/l		< 0.151 U	< 0.148 U	< 0.157 U	< 0.157 U	< 0.160 U	< 0.151 U	< 0.148 U	< 0.148 U	< 0.148 U	< 0.154 U	< 0.148 U	< 0.154 U	< 0.151 U
2-amino-4,6-dinitrotoluene	0.8	-	-	39	n	ug/l		< 0.151 U	0.192 J	0.114 J	< 0.157 UJ	< 0.160 U	0.257 J	< 0.148 U	< 0.148 U	< 0.148 U	0.284 J	< 0.148 U	< 0.154 U	< 0.151 U
4-amino-2,6-dinitrotoluene	0.8	-	-	39	n	ug/l		< 0.151 U	0.238 J	< 0.157 U	< 0.157 U	< 0.160 U	< 0.151 U	< 0.151 U	< 0.148 U	< 0.148 U	0.319	< 0.148 U	< 0.154 U	< 0.151 U
RDX	20	-	-	0.7	c	ug/l		2.27	5.31	0.232 J	0.161 J	2.20	< 0.151 U	< 0.148 U	< 0.148 U	< 0.148 U	5.86	< 0.148 U	< 0.154 U	< 0.151 U
Dissolved Metals																				
Cadmium	5	5	5	9.2	n	ug/l		0.437 J	0.411 J	< 0.500 U	< 0.500 U	4.32	< 0.500 U	< 0.500 U	0.318 J	< 0.500 U	1.92	< 0.500 U	< 0.500 U	< 0.500 U
Calcium	-	-	-	-		ug/l		6100	6630	18300	18200	11200	5940	1090 J	1020 J	1460	3410	1370	1300	1220 J
Iron	-	-	-	14000	n	ug/l		1440 J	37.1 J	9750	10000	713	4370	< 15.0 U	10.8 J	318 J	< 15.0 U	7010 J	16.5 J	16.2 J
Magnesium	-	-	-	-		ug/l		1270	1680	2930	2820	1740	1150 J	1570	679 J	1090 J	2310	1110 J	1470	1360
Manganese	-	-	-	430	n	ug/l		31.2	52.0	104	101	40.2	348	129	42.9	98.9	106	20.3	31.8	30.6

Notes:
Bolded and highlighted results exceed the MCL or PRGs
Gray shaded results exceed the Tap water RSL in the absence of PRGs/MCL
- = data not available
-- = sample not tested for
ft = feet
bgs = below ground surface
mg/l = milligrams per liter
ug/l = micrograms per liter
MCL = US EPA Maximum Contaminant Level, Nov 2014
MCLG = US EPA Maximum Contaminant Level Goal, Nov 2014
RSL = US EPA Regional Screening Levels, Nov 2014
PRG = Preliminary Remediation Goal as specified in the 2011 ROD
c = cancer
n = non-cancer
B = blank contamination
J = estimated
Q = lab QC RPD outside of criteria
U = not detected above Practical Quantitation Limits

Table 6-4
Ordnance Demolition Area Operable Unit
Groundwater Chemical Results for 2013 Sampling Event and Screening Criteria

Aquifer/Sample Location	Quaternary/Upper Patapsco																																		Middle Patapsco						Screening Criteria (µg/L)				
Well ID	ODAMW-1				ODAMW-2				ODAMW-2 Dup				ODAMW-3				ODAMW-4				ODAMW-5				ODAMW-7				ODAMW-10				ODAMW-11				ODAMW-12S				ODAMW-12S Dup				ODAMW-12D				Historical Concentration Range, where available	Laboratory Method Detection Limit	PRG	National Drinking Water Regulations		EPA Tap Water RSL	
Sample Collection Date	7/18/2013				7/18/2013				7/18/2013				7/18/2013				7/18/2013				7/18/2013				7/19/2013				7/19/2013				7/18/2013				7/18/2013				7/18/2013				7/18/2013										
Screen Interval (ft bgs)	3.5-13.5				4-14				4-14				5-15				2-12				2-12				9.5-19.5				5-15				5-15				5-15				5-15				32-42										
Upgradient/Dowgradient (U/D)	D				D				D				U				D				U				U				D				D				D (New Well)				D (New Well)				D (New Well)										
		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC								
General Chemistry Parameters																																																								
Alkalinity, total as CaCO3 (mg/L)	12				28.7				29.8				51.5				25.9				21.2				ND				ND				1.1	J			ND				ND				3.9				-	1	-	-	-	-	-
Chloride (mg/L)	1.2				0.55				0.62				1.5				1.2				1.9				1.5				2.1				3.9				2.4				2.5				2.54				-	0.06	-	-	-	-	-
Dissolved Organic Carbon (DOC) (mg/L)	1.36				1.49				1.47				4.04				8.62				10.8				0.86				2.27				2.95				0.89				0.88				0.59				-	0.07	-	-	-	-	-
Ferric Iron (Total Iron - Ferrous Iron) (µg/l)																																																-	--	-	-	-	-	-
Ferrous Iron (µg/l)																																																-	--	-	-	-	-	-
Nitrate+Nitrite as Nitrogen (mg/L)	0.443				0.086				0.067				0.034	J			0.042	J			0.011	J			0.011	J			0.025	J			0.01	J			0.365				0.353				0.034	J			-	0.009	-	-	-	-	-
Sulfate (mg/L)	22				14.7				14.8				5.76				1.62				2.68				13				11.8				10.4				23.4				24.1				7.54				-	0.1	-	-	-	-	-
Sulfite (µg/l)																																																-	--	-	-	-	-	-
Total Organic Carbon (TOC) (mg/L)	1.33				1.25				1.42	J	b		3.94				8.53				10.7				0.96	J	b		2.2				3.05				0.86				0.74				0.29	J			-	0.07	-	-	-	-	-
Volatile Organic Compounds (µg/l)																																																						
CHLOROFORM	ND				ND				ND				ND				ND				ND				ND				ND				ND				0.31	J			0.4	J			0.1	J	J	s	ND - 0.18	0.072	80	80*	70	0.19	ca
CIS-1,2-DICHLOROETHENE	0.64				ND				ND				8.7				ND				ND				ND				ND				ND				1.8				1.7				ND				ND - 6.2	0.067	-	70	70	28	n
TETRACHLOROETHENE (PCE)	5.1				ND				ND				48				ND				ND				ND				ND				ND				9.7				9.5				ND				ND - 60	0.099	5	5	0	9.7	ca
TRICHLOROETHENE (TCE)	0.71				ND				ND				14				0.69				ND				ND				ND				ND				1.8				2.1				ND				ND - 28	0.1	5	5	0	0.44	ca
VINYL CHLORIDE	ND		UJ	c	ND		UJ	c	ND		UJ	c	ND		UJ	c	ND		UJ	c	ND		UJ	c	ND				ND				ND		UJ	c	ND				ND		UJ	c	ND				ND	0.075	-	2	0	0.015	ca
Explosives (µg/l)																																																						
2-AMINO-4,6-DINITROTOLUENE	0.26	C			ND				ND				ND				ND				ND				ND				ND				ND				0.26	C			0.2	C			ND				ND - 1.8	0.0091	0.8	-	-	30	n
4-AMINO-2,6-DINITROTOLUENE	0.3	C			ND				ND				ND				ND				ND				ND				ND				ND				0.31	C			0.27	C			ND				ND - 2.5	0.16	0.8	-	-	30	n
HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE (RDX)	11	C			3	C			2.9	C			0.34		J	g	0.93		J	g	ND				ND				ND				ND				7.6	C			6.6	C			ND				ND - 41	0.017	20	-	-	0.61	ca
2,4,6-TRINITROTOLUENE (TNT)	ND				ND				ND				ND				ND				ND				ND				ND				ND				ND				ND				ND				ND - 0.52	0.26	3.4	-	-	2.2	ca
Dissolved Metals (µg/l)																																																					
CADMIUM	0.164				0.028	J			0.023	J			ND				0.008	J			0.026	J			0.246				0.25				0.086				2.77				3.05				0.038				ND - 6.3	0.005	5	5	5	6.9	n
CALCIUM	8,480				14,900				15,000				17,000				8,410				5,850				1,250				1,900				1,460				3,980				3,940				1,190				-	6	-	-	-	-	-
IRON	894				111				133				7,090				7,660				1,490				9.7	J			13	J			1,280				3.4	J			ND				12.5	J			-	3	-	-	-	11,000	n
MAGNESIUM	1,840				1,240				1,250				2,870				1,230				1,110				2,040				936				1,180				2,870				2,540				1,380				-	2	-	-	-	-	-
MANGANESE	46.5				3.33				3.4				60.4				30.2				888				108				40.3				124				157				194				30.5				-	0.006	-	-	-	320	n

Notes:

Shaded results indicate exceedance of PRGs or MCLs/MCLGs in the absence of PRGs

Shaded results indicate exceedance of RSLs in the absence of PRGs/MCLs/MCLGs

screening values = PRGs are from the 2011 ROD (URS, 2011). For detected analytes not discussed in the ROD, screening criteria are MCLS, MCLGs, and RSLs.

- = No data available

-- = Sample not tested for component

* = Sum of the concentrations of all four trihalomethanes, as an annual average

ft = feet

bgs = below ground surface

mg/L = millimgrams per liter

µg/L = micrograms per liter

Dup = Duplicate

ND = Non Detect, Sample concentration below laboratory method detection limit (MDL)

EPA = U.S. Environmental Protection Agency

MCL = National Primary Drinking Water Regulations, Maximum Contaminant Level, EPA, June 2013.

MCLG = National Primary Drinking Water Regulations, Maximum Contaminant Level Goal, EPA, June 2013.

ODA = Ordnance Demolition Area

PRG = Preliminary Remediation Goal

RSL = EPA Regional Screening Levels, June 2013.

ca = Cancer

n = Non-cancer

Laboratory Qualifiers/Data Validation:

C = The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing historical data.

J = Analyte present, reported value is estimated, concentration is greater than the MDL but less than the limit of quantification

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

LQ = Laboratory Qualifier

RC = Reason Code

VF = Validation Flag

b = Laboratory duplicate imprecision

c = Calibration failure; poor or unstable response

g = Tuning failure or poor mass spec performance

s = Serial dilution failure

Table 6-5
Ordnance Demolition Area Operable Unit
Groundwater Chemical Results for 2012 Sampling Event and Screening Criteria

Aquifer/Sample Location	Quaternary/Upper Patapsco																																Middle Patapsco						Screening Criteria (µg/L)							
Well ID	ODAMW-1				ODAMW-2				ODAMW-3				ODAMW-4				ODAMW-5				ODAMW-7				ODAMW-10				ODAMW-10Dup				ODAMW-11				ODAMW-12S				ODAMW-12D				Historical Concentration Range, where available	Laboratory Method Detection Limit	PRG		National Drinking Water Regulations			EPA Tap Water RSL	
Sample Collection Date	6/4/2012				6/4/2012				6/5/2012				6/4/2012				6/4/2012				6/5/2012				6/4/2012				6/4/2012				6/5/2012				6/5/2012				6/5/2012												
Screen Interval (ft bgs)	3.5-13.5				4-14				5-15				2-12				2-12				9.5-19.5				5-15				5-15				5-15				5-15				32-42												
Upgradient/Dowgradient (U/D)	D				D				U				D				U				U				D				D				D				D (New Well)				D (New Well)								MCL		MCLG			
		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC		LQ	VF	RC												
General Chemistry Parameters																																																						
Alkalinity, total as CaCO3 (mg/L)	20.9		B	z	31.6				47				21		B	z	8.8		B	z	ND				ND				ND				ND				ND				4.9		B	z	-	1	-	-	-	-	-	-
Chloride (mg/L)	1.19				0.74				1.6				1.78				4				1.7				2.8				2.8				4.4				2.3				2.6				-	0.06	-	-	-	-	-	-
Dissolved Organic Carbon (DOC) (mg/L)	1.52				1.11				4.12				3.28				9		J	b	1.73				1.42				1.32				2.54				1.65				1.46				-	0.07	-	-	-	-	-	-
Ferric Iron (Total Iron - Ferrous Iron) (µg/l)	2,488				541				12,585				6,084				--								--				--				2,289				31.1				80.2				-	--	-	-	-	-	-	-
Ferrous Iron (µg/l)	2				0.25				15				6.5				--				< 0.1				--				--				1.5				< 0.1				0.35				-	--	-	-	-	-	-	-
Nitrate+Nitrite as Nitrogen (mg/L)	0.284				0.063		B	o	0.03	J			0.054		B	o	0.037	J	B	o	ND				0.035	J	B	o	0.032	J	B	o	0.026	J	B	o	0.625				0.019	J			-	0.009	-	-	-	-	-	-
Sulfate (mg/L)	20.2				17.1				2.9		L	m	31.3				5.3				18		L	m	12.1				13.2				10.9				28		L	m	7.6		L	m	-	0.1	-	-	-	-	-	-
Sulfite (µg/l)	2.4				< 2				6.5				3.2				< 2				< 2				--				--				< 2				< 2				< 2				-	--	-	-	-	-	-	-
Total Organic Carbon (TOC) (mg/L)	1.64				1.09				3.43				3.2				11.3				0.87				1.77				1.68				2.61				0.85				0.44	J	J	b	-	0.07	-	-	-	-	-	-
Volatile Organic Compounds (µg/l)																																																			
CHLOROFORM	ND				ND				ND				ND				ND				ND				ND				ND				ND				0.19	J	B	z	0.11	J	B	z	ND - 0.18	0.072	80	c	80*		70	0.19	c
CIS-1,2-DICHLOROETHENE	0.65				ND				16				0.14	J			ND				ND				ND				ND				ND				3.8				ND				ND - 6.2	0.067	-	-	70		70	28	n
TETRACHLOROETHENE (PCE)	3.2				ND				**17**				3.1				ND				ND				ND				ND				ND				**11**				ND				ND - 60	0.099	5	c	5		0	9.7	c
TRICHLOROETHENE (TCE)	0.36	J			ND				**9.6**				1.6				ND				ND				ND				ND				ND				1.9				ND				ND - 28	0.1	5	c	5		0	0.44	c
VINYL CHLORIDE	ND				ND				ND				ND				ND				ND				ND				ND				ND				ND				ND				ND	0.075	-	-	2		0	0.015	c
Explosives (µg/l)																																																			
2-AMINO-4,6-DINITROTOLUENE	0.16	J	J	q	ND				ND				ND				0.02	J	J	q	ND				ND				ND				ND				0.35	C			ND				ND - 1.8	0.0091	0.8	n	-		-	30	n
4-AMINO-2,6-DINITROTOLUENE	ND				ND				ND				ND				ND				ND				ND				ND				ND				0.47	J,D,C			ND				ND - 2.5	0.16	0.8	n	-		-	30	n
HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE (RDX)	10	C			2.6	C			ND				5.7	C			ND				ND				ND				ND				ND				10	C			ND				ND - 41	0.017	20	c	-		-	0.61	c
2,4,6-TRINITROTOLUENE (TNT)	ND				ND				ND				ND				ND				ND				ND				ND				ND				ND				ND				ND - 0.52	0.26	3.4	c	-		-	2.2	c
Total Metals (µg/l)																																																			
CADMIUM	0.513				0.04				0.093				0.027	J			0.105				0.269				0.265				0.257				0.083				3.29				0.044				ND - 6.3	0.005	5	n	5		5	6.9	n
CALCIUM	11,000				16,100				15,200				12,500				4,080				1,300				1,560				1,560				1,360				4,420				1,240				-	6	-	-	-		-	-	-
IRON	2,490				541				12,600				6,090				1,880				4.7	J			1,110				1,100				2,290				31.2				80.5				-	3	-	-	-		-	11,000	n
MAGNESIUM	2,130				1,460				2,950		J	s	2,230				1,040				2,130		J	s	1,160				1,180				1,260				3,080		J	s	1,240		J	s	-	2	-	-	-		-	-	-
MANGANESE	45.7				6.89				174				61.3				359				109				57.8				56.3				119				135				29.4				-	0.006	-	-	-		-	320	n

Notes:

Shaded results indicate exceedance of PRGs or MCLs/MCLGs in the absence of PRGs
Shaded results indicate exceedance of RSLs in the absence of PRGs/MCLs/MCLGs
screening values = PRGs are from the 2011 ROD (URS, 2011). For detected analytes not discussed in the ROD, screening criteria are MCLS, MCLGs, and RSLs.
- = No data available
-- = Sample not tested for component
* = Sum of the concentrations of all four trihalomethanes, as an annual average
ft = feet
bgs = below ground surface
mg/L = millimgrams per liter
µg/L = micrograms per liter
Dup = Duplicate
ND = Non Detect, Sample concentration below laboratory method detection limit (MDL)
EPA = U.S. Environmental Protection Agency
MCL = National Primary Drinking Water Regulations, Maximum Contaminant Level, EPA, June 2012.
MCLG = National Primary Drinking Water Regulations, Maximum Contaminant Level Goal, EPA, June 2012.
ODA = Ordnance Demolition Area
PRG = Preliminary Remediation Goal
RSL = EPA Regional Screening Levels, May 2012.
c = Cancer
n = Non-cancer

Laboratory Qualifiers/Data Validation:

B = Not detected substantially above the level reported in laboratory or field blanks.
C = The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing historical data.
D = The reported result is from a dilution.
J = Analyte present, reported value is estimated, concentration is greater than the MDL but less than the limit of quantification
L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.
U = The analyte was analyzed for, but was not detected at or above the MDL.
LQ = Laboratory Qualifier
RC = Reason Code
VF = Validation Flag
b = Laboratory duplicate imprecision
m = MS/MSD recovery failure
o = Calibration blank contamination
q = Concentration exceeded the linear range
s = Serial dilution failure
z = Method Blank Contamination

ODA Historical Chemical Results

Summary of Historical Chemical Results for Selected Analytes

ODAMW-1														
Sampling Event Date	**9-May-02**	**11-Jun-03**	**24-Oct-03**	**10-Feb-04**	**30-Apr-04**	**23-Jul-04**	**25-Jun-05**	**31-Aug-06**	**16-Aug-07**	**30-Jun-08**	**29-Jun-09**	**22-Sep-10**	**4-Jun-12**	**18-Jul-13**	**28-Oct-14**
Chemical															
cis12DCE	-	-	-	-	-	-	-	-	-	-	-	0.33 J	0.65	0.64	< 0.500 U
PCE	22	14	12	8.90	8.30	3.70	1.40	9.40	6.30	7.50	8.4 J	1.20	3.20	5.10	0.439 J
TCE	2.40	1.60	1.50	1.50	1.10	0.45 J	<1 U	1.10	0.84 J	1.20	1.3 J	0.15 J	0.36 J	0.71	< 0.500 U
Vinyl Chloride	-	-	-	-	-	-	-	-	-	-	-	<1 U	ND	ND	< 0.500 U
Chloroform	<0.6 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	0.18 J	<1 U	<1 U	<0.2 UJ	<0.17	ND	ND	< 0.500 U
RDX	10	25	31 J	24	21	25	19	19	15	20	12	10	10 C	11 C	2.27
TNT	<0.2 U	0.26 J	0.24 J	0.23 J	0.2 J	0.52 J	<1 U	<1 U	<0.7 U	<0.7 U	<1 U	-	ND	ND	< 0.151 U
2A46-TNT	0.25	1.30	1.3 J	1.10	0.97	0.80	<2.5 U	0.82 J	0.47 J	0.7 J	0.56 J	0.23	0.16 J	0.26 C	< 0.151 U
4A26-DNT	<1 U	1.30	1.4 J	1.10	0.91	0.76 J	<1.5 U	1.0 J	0.7 J	0.98	0.56 J	0.16 J	ND	0.3 C	< 0.151 U
Cadmium	-	3.90	4.90	4.60	4.20	4.7 J	2.00	2.8 J	2.9 J	0.6 J	0.36 J	1.30	0.51	0.16	0.437 J

ODAMW-2															
Sampling Event Date	**9-May-02**	**11-Jun-03**	**20-Oct-03**	**10-Feb-04**	**30-Apr-04**	**21-Jul-04**	**25-Jun-05**	**31-Aug-06**	**17-Aug-07**	**30-Jun-08**	**29-Jun-09**	**28-Sep-10**	**4-Jun-12**	**18-Jul-13**	**28-Oct-14**
Chemical															
cis12DCE	-	-	-	-	-	-	-	-	-	-	-	0.98 J	ND	ND	0.338 J
PCE	4.20	<1 U	0.29 J	1.70	<1 U	<1 U	<1 U	0.56 J	0.91 J	<1 U	<0.2 U	4.30	ND	ND	2.71
TCE	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<0.2 U	0.4 J	ND	ND	0.263 J
Vinyl Chloride	-	-	-	-	-	-	-	-	-	-	-	<1 U	ND	ND	< 0.500 U
Chloroform	<0.6 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<0.2 U	<0.17 U	ND	ND	< 0.500 U
RDX	24.00	1.50	5.5 J	7.50	3.50	3.50	4.40	8.70	10	1.90	1.2 J	10	2.6 C	3 C	5.31
TNT	<0.2 U	<0.2 U	<0.2 UJ	<0.2 U	<0.2 U	<0.2 U	<1 U	<1 U	<0.7 U	<0.7 U	<1 U	-	ND	ND	< 0.148 U
2A46-TNT	0.82	<0.2 U	<0.2 UJ	0.16 J	<0.2 U	<0.2 U	<2.5 U	<2.5 U	<0.7 U	<0.8 U	<0.9 U	0.57	ND	ND	0.192 J
4A26-DNT	1.10	<0.2 U	<0.2 UJ	0.18 J	<0.2 U	<0.2 U	<1.5 U	<1.5 U	0.28 J	<0.7 U	<1 U	0.48	ND	ND	0.238 J
Cadmium	-	<2 U	0.87 B	1.0 B	0.81 B	0.73 B	-	0.6 J B p	0.62 J	0.2 J	<0.53 U	0.57	0.04	0.028 J	0.411 J

ODAMW-3															
Sampling Event Date	**9-May-02**	**11-Jun-03**	**22-Oct-03**	**9-Feb-04**	**29-Apr-04**	**22-Jul-04**	**25-Jun-05**	**31-Aug-06**	**16-Aug-07**	**1-Jul-08**	**30-Jun-09**	**22-Sep-10**	**5-Jun-12**	**18-Jul-13**	**29-Oct-14**
Chemical															
cis12DCE	-	-	-	-	-	-	-	-	-	-	-	<1 U	16	8.70	15.5
PCE	30	1.20	28	3.70	1.40	17	11.70	26	60	22	7.9 J	3.20	17	48	1.39
TCE	6.30	<1 U	7.40	0.38 J	<1 U	5.40	1.80	7.50	28 J c	5.60	1.3 J	1	9.60	14	1.56
Vinyl Chloride	-	-	-	-	-	-	-	-	-	-	-	<1 U	ND	ND	< 0.500 U
Chloroform	<0.6 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<0.2	<0.17	ND	ND	< 0.500 U
RDX	2.10	2.20	1.50	1.90	2.20	1.10	2.30	0.87	1.3 J	0.6 J	<0.9 U	0.15 J	ND	0.34	0.161 J
TNT	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<1 U	<2	<0.7 U	<0.7 U	<1 U	-	ND	ND	< 0.157 U
2A46-TNT	<1 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<2.5 U	<2.5 U	<0.7 U	<0.8 U	<0.9 U	-	ND	ND	< 0.157 UJ
4A26-DNT	<1 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<1.5 U	<1.5 U	<0.7 U	<0.7 U	<1 U	-	ND	ND	< 0.157 U
Cadmium	-	<2 U	2.10	1.7 B	1.2 B	2.2 J	6.00	2.3 J	5.40	3 J	<0.53 U	0.49	0.09	ND	< 0.500 U

ODA Historical Chemical Results

Summary of Historical Chemical Results for Selected Analytes

ODAMW-4														
Sampling Event Date	**9-May-02**	**14-Jun-03**	**20-Oct-03**	**10-Feb-04**	**30-Apr-04**	**22-Jul-04**	**25-Jun-05**	**31-Aug-06**	**16-Aug-07**	**30-Jun-08**	**29-Jun-09**	**22-Sep-10**	**4-Jun-12**	**18-Jul-13**	**29-Oct-14**
Chemical															
cis12DCE	-	-	-	-	-	-	-	-	-	-	-	6.20	0.14 J	ND	0.425 J
PCE	4.60	35	32	26	19	10	40.80	13	39	7.90	7.90	14	3.10	ND	2.18
TCE	0.33	3.90	4.10	2.90	2.20	1.30	4.90	1.70	6.1 J	1.00	0.90	1.60	1.60	0.69	0.351 J
Vinyl Chloride	-	-	-	-	-	-	-	-	-	-	-	<1 U	ND	ND	< 0.500 U
Chloroform	<0.6 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	0.2 J	<1 U	<1 U	<0.2 U	<0.17 U	ND	ND	< 0.500 U
RDX	11	41	43 J	37	39	35	34	17	20	9.90	15	16	5.7 C	0.93	2.20
TNT	<0.2 U	<0.2 U	0.16 J	0.18 J	0.33 UJ	0.33 UJ	<1 U	<1 U	<0.7 U	<0.7 U	<1 U	-	ND	ND	< 0.160 U
2A46-TNT	<1 U	0.83	0.16 J	1.60	1.80	1.60	0.8 J	<2.5 U	<0.7 U	<0.8 U	<0.9 U	0.30	ND	ND	< 0.160 U
4A26-DNT	<1 U	1.50	2.5 J	2.20	2.30	1.90	1.1 J	<1.5 U	0.51 J	<0.7 U	<1 U	0.14 J	ND	ND	< 0.160 U
Cadmium	-	5.20	5.30	6.30	5.30	5.4 J	4	2.3 J	2.6 J	0.8 J	3	2	0.027 J	0.008 J	4.32

ODAMW-5															
Sampling Event Date	**9-May-02**	**10-Jun-03**	**24-Oct-03**	**9-Feb-04**	**29-Apr-04**	**20-Jul-04**	**25-Jun-05**	**3-Sep-06**	**17-Aug-07**	**1-Jul-08**	**30-Jun-09**	**28-Sep-10**	**4-Jun-12**	**18-Jul-13**	**29-Oct-14**
Chemical															
cis12DCE	-	-	-	-	-	-	-	-	-	-	-	<1 U	ND	ND	< 1.00 U
PCE	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	NS	<1 U	<1 U	<1 U	<0.2 U	<0.15	ND	ND	< 1.00 U
TCE	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	NS	<1 U	<1 U	<1 U	<0.2 U	<0.15	ND	ND	< 1.00 U
Vinyl Chloride	-	-	-	-	-	-	-	-	-	-	-	<1 U	ND	ND	< 1.00 U
Chloroform	<0.6 U	<1 U	<1 U	<1 U	<1 U	<1 U	NS	<1 U	<1 U	<1 U	<0.2 U	<0.17 U	ND	ND	< 1.00 U
RDX	<0.4	<0.5	<0.5 UJ	<0.5 U	<0.5 U	<0.5 U	NS	<1 U	<0.7 U	<0.7 U	<0.9 U	-	ND	ND	< 0.151 U
TNT	<0.2	<0.2	<0.2 UJ	<0.2 U	<0.2 U	<0.2 U	NS	<1 U	<0.7 U	<0.7 U	<1 U	-	ND	ND	< 0.151 U
2A46-TNT	<1 U	<0.2	<0.2 UJ	<0.2 U	<0.2 U	<0.2 U	NS	<2.5 U	<0.7 U	<0.8 U	<0.9 U	-	0.02 J	ND	0.257 J
4A26-DNT	<1 U	<0.2	<0.2 UJ	<0.2 U	<0.2 U	<0.2 U	NS	<1.5 U	<0.7 U	<0.7 U	<1 U	-	ND	ND	< 0.151 U
Cadmium	-	0.29 B	0.34 B	0.4 B	<2 U	<2 U	NS	0.18 J	0.13 J	0.2 J	<0.53 U	<0.11 U	0.105 U	0.026 J	< 0.500 U

ODAMW-7															
Sampling Event Date	**9-May-02**	**11-Jun-03**	**22-Oct-03**	**9-Feb-04**	**28-Apr-04**	**20-Jul-04**	**25-Jun-05**	**31-Aug-06**	**17-Aug-07**	**30-Jun-08**	**30-Jun-09**	**23-Sep-10**	**5-Jun-12**	**19-Jul-13**	**29-Oct-14**
Chemical															
cis12DCE	-	-	-	-	-	-	-	-	-	-	-	<1 U	ND	ND	< 0.500 U
PCE	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	NS	<1 U	<1 U	<1 U	<0.2 U	<0.15 U	ND	ND	< 0.500 U
TCE	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	NS	<1 U	<1 U	<1 U	<0.2 U	<0.14 U	ND	ND	< 0.500 U
Vinyl Chloride	-	-	-	-	-	-	-	-	-	-	-	<1 U	ND	ND	< 0.500 U
Chloroform	<0.6 U	<1 U	<1 U	<1 U	<1 U	<1 U	NS	<1 U	<1 U	<1 U	<0.2 U	<0.17 U	ND	ND	< 0.500 U
RDX	<0.4 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NS	<1 U	<0.7 U	<0.7 U	<0.9 U	-	ND	ND	< 0.0741 U
TNT	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	NS	<1 U	<0.7 U	<0.7 U	<1 U	-	ND	ND	< 0.0741 U
2A46-TNT	<1 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	NS	<2.5 U	<0.7 U	<0.8 U	<0.9 U	-	ND	ND	< 0.0741 U
4A26-DNT	<1 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	NS	<1.5 U	<0.7 U	<0.7 U	<1 U	-	ND	ND	< 0.151 U
Cadmium	-	0.39 B	0.38 B	0.71 B	0.43 B	<0.2 U	NS	0.21 JB	0.16 J	0.4 J	0.41 J	<0.11 U	0.27	0.25	< 0.500 U

ODA Historical Chemical Results

Summary of Historical Chemical Results for Selected Analytes

ODAMW-10														
Sampling Event Date	**9-May-02**	**10-Jul-03**	**22-Oct-03**	**5-Feb-04**	**30-Apr-04**	**21-Jul-04**	**25-Jun-05**	**3-Sep-06**	**16-Aug-07**	**1-Jul-08**	**1-Jul-09**	**21-Sep-10**	**4-Jun-12**	**19-Jul-13**	**28-Oct-14**
Chemical															
cis12DCE	-	-	-	-	-	-	-	-	-	-	-	<1 U	ND	ND	< 0.500 U
PCE	-	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<0.2 U	<0.15 U	ND	ND	< 0.500 U
TCE	-	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<0.2 U	<0.14 U	ND	ND	< 0.500 U
Vinyl Chloride	-	-	-	-	-	-	-	-	-	-	-	<1 U	ND	ND	< 0.500 U
Chloroform	-	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<0.2 U	<0.17 U	ND	ND	< 0.500 U
RDX	-	<0.5 U	<0.5 U	0.35 J	<0.5 U	0.33 J	<1 U	<1 U	<0.7 U	<0.7 U	<0.9 U	-	ND	ND	< 0.148 U
TNT	-	<0.2 U	<0.2 U	0.62	<0.2 U	<0.2 U	<1 U	<1 U	<0.7 U	<0.7 U	<1 U	-	ND	ND	< 0.148 U
2A46-TNT	-	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<2.5 U	<2.5 U	<0.7 U	<0.8 U	<0.9 U	-	ND	ND	< 0.148 U
4A26-DNT	-	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<1.5 U	<1.5 U	<0.7 U	<0.7 U	<1 U	-	ND	ND	< 0.148 U
Cadmium	-	<0.2 U	0.37 B	<2 U	<2 U	<2 U	NS	0.22 JB	0.29 J	0.1 J	<0.53 U	0.12 J	0.27	0.25	0.318 J

ODAMW-11															
Sampling Event Date	**9-May-02**	**11-Jun-03**	**22-Oct-03**	**5-Feb-04**	**29-Apr-04**	**21-Jul-04**	**25-Jun-05**	**3-Sep-06**	**16-Aug-07**	**1-Jul-08**	**30-Jun-09**	**23-Sep-10**	**5-Jun-12**	**18-Jul-13**	**28-Oct-14**
Chemical															
cis12DCE	-	-	-	-	-	-	-	-	-	-	-	<1 U	ND	ND	< 0.500 U
PCE	-	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<0.2 U	<0.15 U	ND	ND	< 0.500 U
TCE	-	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<0.2 U	<0.14 U	ND	ND	< 0.500 U
Vinyl Chloride	-	-	-	-	-	-	-	-	-	-	-	<1 U	ND	ND	< 0.500 U
Chloroform	-	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	0.09 J	<0.2 U	<0.17 U	ND	ND	< 0.500 U
RDX	-	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.089 J	<1 U	<1 U	<0.7 U	<0.7 U	<0.9 U	-	ND	ND	< 0.148 U
TNT	-	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<1 U	<1 U	<0.7 U	<0.7 U	<1 U	-	ND	ND	< 0.148 U
2A46-TNT	-	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<2.5 U	<2.5 U	<0.7 U	<0.8 U	<0.9 U	-	ND	ND	< 0.148 U
4A26-DNT	-	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<1.5 U	<1.5 U	<0.7 U	<0.7 U	<1 U	-	ND	ND	< 0.148 U
Cadmium	-	0.38 B	0.37 B	0.4 JB	<0.2 U	<0.2 U	NS	0.34 JB	0.16 J	0.4 J	0.16 J	<0.11 U	0.08	0.09	< 0.500 U

ODAMW-12S		
Sampling Event Date	**18-Jul-13**	**28-Oct-14**
Chemical		
cis12DCE	1.80	0.719 J
PCE	9.70	4.06
TCE	1.80	1.06
Vinyl Chloride	ND	< 0.500 U
Chloroform	0.31 J	< 0.500 U
RDX	7.6 C	5.86
TNT	ND	< 0.154 U
2A46-TNT	0.26 C	0.284 J
4A26-DNT	0.31 C	0.319
Cadmium	2.77	1.92

ODA Historical Chemical Results

Summary of Historical Chemical Results for Selected Analytes

ODAMW-12D		
Sampling Event Date	**18-Jul-13**	**28-Oct-14**
Chemical		
cis12DCE	ND	< 0.500 U
PCE	ND	< 0.500 U
TCE	ND	< 0.500 U
Vinyl Chloride	ND	< 0.500 U
Chloroform	0.1 J	< 0.500 U
RDX	ND	< 0.151 U
TNT	ND	< 0.151 U
2A46-TNT	ND	< 0.151 U
4A26-DNT	ND	< 0.151 U
Cadmium	0.04	< 0.500 U

ODAMW-13	
Sampling Event Date	**28-Oct-14**
Chemical	
cis12DCE	< 0.500 U
PCE	< 0.500 U
TCE	0.952 J
Vinyl Chloride	< 0.500 U
Chloroform	< 0.500 U
RDX	< 0.148 U
TNT	< 0.148 U
2A46-TNT	< 0.148 U
4A26-DNT	< 0.148 U
Cadmium	< 0.500 U

Notes:

All concentrations in micrograms per liter (parts per billion).

[1] = 1 1,2-Dichloroethene (from 1991 and 1993 sampling events) and cis-1,2-Dichloroethene (from subsequent sampling events) have been combined as "DCE".

[2] = Tetrachloroethene (PCE).

[3] = Trichloroethene (TCE).

J = Analyte present. Reported value may not be accurate or precise and is an estimated value.

ND = Analyte was not detected.

- = Not analyzed in this sampling event.

U = Indicates the analyte was analyzed for but not detected.

B = Blank contamination.

Appendix A

Memo for Record, USACE Site Inspection, May 8, 2015

CENAB-EN-HT (200-1C) 12 May 2015

STAFF OFFICIAL: Mona D. Ponnapalli, Project Engineer, CENAB-EN-HT, (410) 962-3548, Richard Braun, Risk Assessor, CENAE-EN-HT 410-962-2842

PROJECT VISITED: Ordnance Demolition Area Operable Unit 15 (ODA OU) Fort Meade, BRAC Property, Odenton, Maryland

DATE OF VISIT: 8 May 2015, 1100 to 1130

PRINCIPAL CONTACTS for ODA OU Site Visit:
Dionne Briggs, Refuge Operations Specialist, Patuxent Research Refuge (301-776-3090),
Sherry Krest, Environmental Contaminants, Supervisor USFWS, Chesapeake Bay Field (410-573-4525),
Brad Knudsen, Refuge Manager, Patuxent Research Refuge (301-497-5582)
Steven C. Cardon, BRAC Environmental Coordinator (301-677-9178)

PURPOSE OF VISIT: To perform a site visit for Five Year Review of ODA OU (a Fort George G. Meade BRAC site).

FINDINGS:

Met Dionne Briggs, Sherry Krest, Brad Knudsen and Steve Cardon at the Fish and Wildlife Service Visitor Center of the Patuxent Research Refuge, North, Bald Eagle Drive. The weather at the time of the site visit was warm (~85^{o}F) and mostly sunny.

No sampling was performed during the site visit. After discussing Ordnance Demolition Area and the other Department of the Interior site, Clean Fill Dump, we started the site visit. The U.S. Fish and Wildlife Service provided a 4-wheel drive SUV, which carried the group. We drove clockwise along the Wildlife Loop Road, to reach ODA OU (after the CFD OU site visit). Wildlife Loop Road was damaged (washed out) by heavy rains in 2010. It has since been minimally repaired. It is a rough gravel road with ponding in various areas.

ODA is a small site, approximately 2.5 acres. The terrain is rumpled grassy fields with weeds. There is an outer berm approximately 8-feet high and 3 or 4-feet wide, mid-way up. The outer berm is roughly ring-shaped with two gaps in its circumference. Clumps of brush and larger trees are found outside the outer berm.

There is an inner berm inside the outer berm. The inner berm is about the same height and it, too, had gaps in its roughly elliptical circumference. The area between the inner and outer berms is

covered with grass and weeds. The demolition pit, inside the inner berm, is an elliptical area that is covered with grass.

The inner and outer berms were constructed as safety features to reduce the hazard from ejected debris. Ordnance demolition occurred within the demolition pit. Both the inner and outer berm had pieces of concrete either in the berm or near it. Both berms are covered with grass and small weeds. No water was observed within the perimeter of the bermed area.

No major depressions, erosion, cracks, seeps or ponding was observed. No unexploded ordnance or animal burrows were observed, either. It was observed that some of the construction material of the inner berm was chunks of concrete.

The site visit continued down Lemon Bridge Road as far as the BG & E power lines. Monitoring well ODAMW-10, beside the road had only three (instead of four) protective bollards. There was standing water on both sides of Lemon Bridge Road. The power lines were in a slightly drier area.

Overall the vegetation at ODA OU looks healthy. Surficial debris of man-made origin (pipes, building materials) was observed. The most prominent debris were several pieces of concrete. No commercial or residential construction was observed at or near the ODA OU that would raise the possibility of groundwater use.

Several of the ODA OU monitoring wells were observed. All of the observed MW had secure caps, but, at the time of the site visit, the MW wells' paint was peeling. The 2015 LTGM sampling, which occurred after the site visit, reportedly resolved these monitoring well maintenance issues.

Five-Year Review Site Inspection Checklist is in Appendix B.

The fence surrounding ODA OU is incomplete. There is a locked gate for the ODA OU, near where Lemon Bridge Road meets Wildlife Loop Road. There are warning signs on the ODA OU gate. We returned, walking, back to the FWS 4-wheel drive SUV, which carried the group.

CONTACT INFORMATION: If there are any questions concerning this Resume of Staff Visit, please contact the undersigned at (410) 962-3548.

Mona D. Ponnapalli
Chemical Engineer
RID Section, EMDC Branch

Figure 1. Dirt Road from Lemon Bridge Road to ODA, Bermed Area.

Figure 2. Ordnance Demolition Area, outside Bermed Area.

Figure 3. Ordnance Demolition Area, Monitoring Well, Probably ODAMW-2.

Figure 4. Ordnance Demolition Area, Outer Berm.

Figure 5. Ordnance Demolition Area, showing Gap in Inner Berm.

Figure 6. Vegetation on ODA Inner Berm.

Figure 7. Concrete Piece, Part of ODA Inner Berm Fill Material.

Figure 8. Several Monitoring Wells at ODA OU.

Figure 9. PRR Manager Brad Knudsen (USFWS), walks down Lemon Bridge Road, towards BG & E Power Lines.

Figure 10. Wetlands South of ODA's Bermed Area.

Figure 11. ODA OU Monitoring Well ODAMW-10.

Figure 12. Ms. Dionne Briggs (left) and Ms. Sherry Krest, both of USFWS, Talk below BG & E Power Lines

Figure 13. ODA OU's most Downgradient Monitoring Well ODAMW-11.

Appendix B

Five-Year Review, Site Inspection Checklist and Interview Record, USACE Site Inspection, May 8, 2015

5 Year Review, Site Inspection Checklist

I. SITE INFORMATION	
Site name: Ordnance Demolition Area Operable Unit 15 (ODA OU)	**Date of inspection: May 8, 2015**
Location and Region: Patuxent Research Refuge, North Tract, FGGM-BRAC, Odenton, MD	**EPA ID/CERCLIS No.: MD0910020567**
Agency, office, or company leading the five-year review: US Army Corps of Engineers (USACE)	**Weather/temperature: Sunny, Warm, 80s F**

Remedy Includes: Check all that apply

- [X] Access controls
- [X] Institutional controls
- [ ] Landfill cover/containment
- [X] Monitored natural attenuation
- [ ] Groundwater containment
- [ ] Vertical barrier walls
- [ ] Groundwater pump and treatment
- [ ] Surface water collection and treatment
- [ ] Groundwater Monitoring of VOCs
- [ ] Other

_____

Inspection team roster: Mona D. Ponnapalli, Chemical Engineer, Steve Cardon, BRAC Environmental Coordinator, Dionne Briggs, USFWS, Refuge Operations Specialist, Patuxent Research Refuge (PRR), Sherry Krest, USFWS, Environmental Contaminants Supervisor, Brad Knudsen, USFWS, Refuge Manager, PRR.

II. INTERVIEWS (Check all that apply)

1. **USFWS, PRR, Refuge Operations Specialist**

Dionne Briggs	Refuge Operations Specialist	May 8, 2015	301-497-5770
Name	Title	Date	Phone no.

Problems, suggestions: Interview record at end of Site Inspection Checklist.

2. **USFWS, PRR, Environmental Contaminants Supervisor, Chesapeake Bay Field Office**

Sherry Krest	Environmental Contaminants Supervisor	May 8, 2015	410-573-4525
Name	Title	Date	Phone no.

Problems, suggestions: Interview record at end of Site Inspection Checklist.

3. **USFWS, PRR, Refuge Manager**

Brad Knudsen	Refuge Manage,PRR	May 8, 2015	301-497-5582
Name	Title	Date	Phone no.

Problems, suggestions: Interview record at end of Site Inspection Checklist.

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency Maryland Department of the Environment

Contact: Elisabeth Green MDE Remedial Project Manager July 22, 2015 410-537-3346

Name Title Date Phone no.

1800 Washington Blvd., Suite 625, Baltimore, MD 21230-1719

Problems/Suggestions: Interview record at end of Site Inspection Checklist.

Agency Fort Meade DPW, Environmental Division

Contact Steven Cardon BRAC Environmental Coordinator July 16, 2015 301-677-9178

Name Title Date Phone no.

Problems/Suggestions: Interview record at end of Site Inspection Checklist.

Agency EPA Region III

Contact Robert Stroud EPA Regonal Project Manager August 26, 2015 410-305-2748

Name Title Date Phone no.

Problems/Suggestions: Interview record at end of Site Inspection Checklist.

4. **Other interviews** (optional)

Name, Agency & Title:
Date & Phone No

Name, Agency & Title:
Date & Phone No

Name, Agency & Title:
Date & Phone No

Name, Agency & Title:
Date & Phone No

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

O&M manual	Readily available	Up to date	X N/A
As-built drawings	Readily available	Up to date	X N/A
Maintenance logs	Readily available	Up to date	X N/A

Remarks. The remedy at ODA OU is Monitored Natural Attenuation and LUCs.

2. **Site-Specific Health and Safety Plan (SSHP)** Readily available Up to date X N/A
   Contingency plan/emergency response plan Readily available Up to date X N/A
Remarks. The Fort Meade-BRAC site ODA OU does not require SSHP or contingency or emergency response plans.

3. **O&M and OSHA Training Records** Readily available Up to date X N/A
Remarks_____
_____

4. **Permits and Service Agreements**

Air discharge permit	Readily available	Up to date	[X] N/A
Effluent discharge	Readily available	Up to date	[X] N/A
Waste disposal	Readily available	Up to date	[X] N/A
Other permits_____	Readily available	Up to date	[X] N/A

Remarks._____

5. **Gas Generation Records** N/A

6. **Settlement Monument Records** Readily available Up to date X N/A
Remarks_____
_____

7. **Groundwater Monitoring Records** **X** Readily available X Up to date N/A
Remarks_____
_____

8. **Leachate Extraction Records** Readily available Up to date X N/A
Remarks_____
_____

9. **Discharge Compliance Records**

Air	Readily available	Up to date	X N/A
Water (effluent)	Readily available	Up to date	X N/A

Remarks_____
_____

10. **Daily Access/Security Logs** Readily available Up to date X N/A
Remarks_____
_____

IV. O&M COSTS

1. **O&M Organization**

State in-house — Contractor for State
PRP in-house — Contractor for PRP
Federal Facility in-house — X Contractor for Federal Facility
Other_____

2. **O&M Cost Records**

X Readily available — X Up to date
X Funding mechanism/agreement in place
Original O&M cost estimate_____ Breakdown attached

Total annual cost by year for review period if available

From October 1, 2009 (Date)	To September 30, 2010 (Date)	$ 37,370 (Total cost)
From October 1, 2010 (Date)	To September 30, 2011 (Date)	$ 72,135 (Total cost)
From October 1, 2011 (Date)	To September 30, 2012 (Date)	$50,830 (Total cost)
From October 1, 2012 (Date)	To September 30, 2013 (Date)	$50,830 (Total cost)
From October 1, 2013 (Date)	To September 30, 2014 (Date)	$ 28,676 (Total cost)
From October 1, 2014 (Date)	To September 30, 2015 (Date)	$ 22,275 (Total cost)

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _ Boundary Road to CFD OU was washed out in heavy rains in 2010. Road repair in 2011, increased the O & M costs._____

V. ACCESS AND INSTITUTIONAL CONTROLS X Applicable N/A

A. **Fencing, ODA OU:** The ODA OU has a locked gate at its entrance at the Wildlife Loop Road. However, the fence, on either side of the gate only extends 20-feet or so past each end of the gate.

1. **Fencing damaged** Location shown on site map X Gates secured N/A

Remarks__The fence, on either side of the gate only extends 20-feet or so past each end of the gate, on each side._____

B. Other Access Restrictions

1. **Signs and other security measures** There is a precautionary sign at the Gate.

Remarks The ODA OU property is enclosed in a partial fence. PRR-NT is mostly, but not completely enclosed and FWS controls access to the PRR-NT_____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented Yes X No N/A
Site conditions imply ICs not being fully enforced Yes X No N/A

Type of monitoring (*e.g.*, self-reporting, drive by) __Self-reporting by Ft. George G. Meade (FGGM) BRAC Environmental Coordinator (BEC), Mr. Steve Cardon, approximately annually. Also USFWS Refuge Specialist, Dionne Briggs, drives by the area, approximately monthly.

Frequency __See above._____
Responsible party/agency __ FGGM BRAC._____
Contact ___Mr. Steve Cardon, FGGM BEC, Ft. Meade DPW___May 8, 2015 _301-677-9178_
Name Title Date Phone no.

Reporting is up-to-date X Yes No N/A
Reports are verified by the lead agency X Yes No N/A

Specific requirements in deed or decision documents have been met X Yes No N/A
Violations have been reported Yes No X N/A
Other problems or suggestions:
__No violations of Institutional Controls at FGGM BRAC sites at Patuxent Research Refuge, North Tract: Ordnance Demolition Area OU._____
_____

2. **Adequacy** X ICs are adequate ICs are inadequate N/A
Remarks_____

D. General

1. **Vandalism/trespassing** Location shown on site map X No vandalism evident
Remarks_____

2. **Land use changes on site** N/A
Remarks_____

3. **Land use changes off site** N/A
Remarks_____

VI. GENERAL SITE CONDITIONS

A. Roads [X] Applicable

1. **Roads damaged** Roads adequate X
Remarks__Unpaved road inside the ODA OU . Road is single-lane, dirt and gravel. Road outside ODA OU is called "Wildlife Loop". Wildlife Loop is located north of ODA OU and it is a 2-lane dirt and gravel road with pot holes filled with water. _____
_____

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS Not Applicable

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map Settlement not evident
Areal extent_____ Depth_____
Remarks_____
__

2. **Cracks** Location shown on site map [X] Cracking not evident
Lengths_____ Widths_____ Depths_____
Remarks_____

3. **Erosion** Location shown on site map Erosion not evident
Areal extent_____ Depth_____
Remarks_____

4. **Holes** Location shown on site map Holes not evident
Areal extent_____ Depth_____
Remarks___No animal burrows were observed._____

5. **Vegetative Cover** [X] Grass [X] Cover properly established [X] No signs of stress [X] Trees/Shrubs
Remarks__Grass cover at the ODA OU, with scattered trees and bushes, throughout. (See photos.) The ODA OU was a double bermed ordnance explosion area..._____

6. **Alternative Cover (armored rock, concrete, etc.)** N/A
Remarks_____

7. **Bulges** Location shown on site map [X] Bulges not evident
Areal extent_____ Height_____
Remarks_____

8. **Wet Areas/Water Damage** Wet areas/ [X] water damage not evident
Wet areas Location shown on site map Areal extent_The wetlands are south of the ODA berm and less than one acre in size._____
Ponding Location shown on site map Areal extent_____
Seeps Location shown on site map Areal extent_____
Soft subgrade Location shown on site map Areal extent_____
Remarks_____

9. **Slope Instability** Slides Location shown on site map [X] No slope instability was observed.
Areal extent_____
Remarks_____

B. Benches Not Applicable
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** Location shown on site map [X] N/A or okay
Remarks_____

2. **Bench Breached** Location shown on site map [X] N/A or okay
Remarks_____

3. **Bench Overtopped** Location shown on site map [X] N/A or okay
Remarks_____

C. Letdown Channels Applicable Not Applicable

1. **Settlement** Location shown on site map No evidence of settlement [X] Not Applicable
Areal extent_____ Depth_____
Remarks_____
_____

2. **Material Degradation** Location shown on site map No evidence of degradation [X] Not Applicable
Material type_____ Areal extent_____
Remarks_____
_____

3. **Erosion** Location shown on site map No evidence of erosion [X] Not Applicable
Areal extent_____ Depth_____
Remarks_____
_____

4. **Undercutting** Location shown on site map No evidence of undercutting [X] Not Applicable
Areal extent_____ Depth_____
Remarks_____
_____

5. **Obstructions** Type_____ No obstructions [X] Not Applicable
Location shown on site map Areal extent_____
Size_____
Remarks_____
_____

6. **Excessive Vegetative Growth** Type_____ [X] Not Applicable
No evidence of excessive growth
Vegetation in channels does not obstruct flow
Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations Applicable

1. **Gas Vents** Active Passive [X] N/A
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance
Remarks_____

2. **Gas Monitoring Probes** Active Passive [X] N/A
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

3. **Monitoring Wells** (not at a landfill – ODA OU isn't a landfill)
[X] Properly secured/locked [X] Functioning [X] Routinely sampled [ ] Good condition
[ ] Evidence of leakage at penetration [X] Needs Maintenance
Remarks_ODA OU site visit was on May 8, 2015, a few months before annual sampling and well maintenance. The paint on the monitoring wells had peeled and faded. _Reportedly, well maintenance occurred after groundwater sampling, September 2015, but there was only one site visit and the maintenance has not been verified._____

4. **Leachate Extraction Wells** Active Passive [X] N/A
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____
_____

5. **Settlement Monuments** Located Routinely surveyed [X] N/A
Remarks_____
_____

E. Gas Collection and Treatment Not Applicable
1. **Gas Treatment Facilities** [X] N/A
Flaring Thermal destruction Collection for reuse
Good condition Needs Maintenance
Remarks_____
_____

2. **Gas Collection Wells, Manifolds and Piping** [X] N/A
Good condition Needs Maintenance
Remarks_____
_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings) [X] N/A
Good condition Needs Maintenance N/A
Remarks_____
_____

F. Cover Drainage Layer Not Applicable
1. **Outlet Pipes Inspected** Functioning [X] N/A
Remarks_____
_____

2. **Outlet Rock Inspected** Functioning [X] N/A
Remarks_____
_____

G. Detention/Sedimentation Ponds Not Applicable

1. **Siltation** Areal extent_____ Depth_____ [X] N/A
Siltation not evident
Remarks_____
_____

2. **Erosion** Areal extent_____ Depth_____ [X] N/A
Erosion not evident
Remarks_____
_____

3. **Outlet Works** Functioning [X] N/A
Remarks_____

4. **Dam** Functioning [X] N/A
Remarks_____
_____

H. Retaining Walls Not Applicable

1. **Deformations** Location shown on site map Deformation not evident [X] N/A
Horizontal displacement_____ Vertical displacement_____
Rotational displacement_____
Remarks_____

2. **Degradation** Location shown on site map Degradation not evident [X] N/A
Remarks_____
_____

I. Perimeter Ditches/Off-Site Discharge Not Applicable
1. **Siltation** Location shown on site map Siltation not evident [X] N/A
Areal extent_____ Depth_____
Remarks_____
_____

2. **Vegetative Growth** Location shown on site map [X] N/A
Vegetation does not impede flow
Areal extent_____ Type_____
Remarks_____
_____

3. **Erosion** Location shown on site map Erosion not evident [X] N/A
Areal extent_____ Depth_____
Remarks_____
_____

4. **Discharge Structure** Functioning [X] N/A
Remarks_____
_____

VIII. VERTICAL BARRIER WALLS Not Applicable

1. **Settlement** Location shown on site map Settlement not evident [X] N/A
Areal extent_____ Depth_____
Remarks_____
_____

2. **Performance Monitoring** Type of monitoring_____ Performance not monitored [X] N/A
Frequency_____ Evidence of breaching
Head differential_____
Remarks_____
_____

IX. GROUNDWATER/SURFACE WATER REMEDIES Not Applicable

A. Groundwater Extraction Wells, Pumps, and Pipelines Applicable [X] N/A
1. **Pumps, Wellhead Plumbing, and Electrical**
Good condition All required wells properly operating Needs Maintenance N/A
Remarks_____
_____
_____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** [X] N/A
Good condition Needs Maintenance
Remarks_____
_____

3. **Spare Parts and Equipment** [X] N/A
Readily available Good condition Requires upgrade Needs to be provided
Remarks_____

B. Surface Water Collection Structures, Pumps, and Pipelines Not Applicable

1. **Collection Structures, Pumps, and Electrical** [X] N/A
Good condition Needs Maintenance
Remarks_____
_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
Good condition Needs Maintenance [X] N/A
Remarks_____
_____

3. **Spare Parts and Equipment** [X] N/A
Readily available Good condition Requires upgrade Needs to be provided
Remarks_____
_____

C. Treatment System Not Applicable

1. **Treatment Train** (Check components that apply) [X] N/A
Metals removal Oil/water separation Bioremediation
Air stripping Carbon adsorbers
Filters_____
Additive (*e.g.*, chelation agent, flocculent)_____
Others_____
Good condition Needs Maintenance
Sampling ports properly marked and functional
Sampling/maintenance log displayed and up to date
Equipment properly identified
Quantity of groundwater treated annually_____
Quantity of surface water treated annually_____
Remarks_____
_____

2. **Electrical Enclosures and Panels** (properly rated and functional) [X] N/A
N/A Good condition Needs Maintenance
Remarks_____
_____

3. **Tanks, Vaults, Storage Vessels** [X] N/A
N/A Good condition Proper secondary containment Needs Maintenance
Remarks_____
_____

4. **Discharge Structure and Appurtenances** [X] N/A
N/A Good condition Needs Maintenance
Remarks_____
_____

5. **Treatment Building(s)** [X] N/A
N/A Good condition (esp. roof and doorways) Needs repair
Chemicals and equipment properly stored
Remarks_____
_____

6. **Monitoring Wells** (pump and treatment remedy) [X] N/A
Properly secured/locked Functioning Routinely sampled Good condition
All required wells located Needs Maintenance N/A
Remarks_____
_____

D. Monitoring Data

1. Monitoring Data
[X] Is routinely submitted on time [X] Is of acceptable quality
Remarks__Ordnance Demolition Area OU 15 has a MNA remedy with LUCs. There is routine (annual) sampling._____
_____

2. Monitoring data suggests:
Remarks__Groundwater plume is effectively contained Contaminant concentrations are declining.

E. Monitored Natural Attenuation Applicable

1. **Monitoring Wells** (natural attenuation remedy) [X] Properly secured/locked Functioning
[X] Routinely sampled. _____[X] Good condition
[X] All required wells located need better identification. At the time of the site inspection the well ID numbers were hard to read and did not seem to match the sample ID numbers in the LTGM reports.
Remarks_____

X. OTHER REMEDIES
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction. __None._____

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

__The ROD for Ordnance Demolition Area OU 15 is Monitored Natural Attenuation with Land Use Controls. There are LUCs to prevent groundwater use except for environmental sampling. The effective implementation of LUCs has prevented extraction of groundwater except for environmental sampling. There is no residential development at ODA OU. There has been no excavation at the site without proper MEC support. There have been no activities that would interfere with the site remedy. The LUCs are being successfully implemented and annual groundwater monitoring is performed._____

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.
____Not Applicable._____
_____

C. Early Indicators of Potential Remedy Problems

_____
_____None. _____
_____

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

___ The first recommendation is that the Army, EPA, and MDE should establish FGGM-specific groundwater background levels. Background levels for metals should be established. Thereby, if observed metals concentrations are statistically at background, sampling for metals can be discontinued in the future.

The second recommendation is that the Army and EPA should determine an exit strategy for the ODA OU monitoring wells, since COC concentrations are at or below PRGs, for many of the ODA OU monitoring wells. For example, in the interests of optimizing sampling, it is recommended that there be no further analysis for the four explosives: TNT, 2-amino 4,6-DNT, 4-amino 2,6-DNT and RDX. The concentrations of the four explosives have diminished to below their respective PRGs (RDX: 20 ug/L, TNT: 3.4 ug/L, DNT (both types): 0.8 ug/L), at all sampled ODA OU monitoring wells, for the last six consecutive sampling periods.

See interviews following this page, with:

1) USFWS personnel: Dionne Briggs, Sherry Krest and Brad Knudsen
2) Elisabeth Green, Remedial Project Manager, Maryland Department of the Environment
3) Robert Stroud, Remedial Project Manager, EPA Region III
4) Steve Cardon, BRAC Environmental Coordinator

Dionne Briggs, Refuge Operations Specialist (USFWS), Patuxent Research Refuge (301-776-3090),
Sherry Krest, Environmental Contaminants, Supervisor USFWS, Chesapeake Bay Field (410-573-4525),
Brad Knudsen, Refuge Manager (USFWS), Patuxent Research Refuge (301-497-5582)

Post-Site Visit Interview at PRR-NT, Visitors Center
Date/Time: Friday, May 8, 2015 @ 1215 to 1230
Participants: Mona D. Ponnapalli, Brad Knudsen, Sherry Krest and Dionne Briggs

Ms. Ponnapalli reviewed the remedy of the FGGM BRAC site Ordnance Demolition Area Operable Unit 15 (ODA OU 15): Monitored Natural Attenuation (MNA) with Land Use Controls (LUCs). All three U.S. Fish and Wildlife Service (FWS) personnel agreed with Ponnapalli's description. Their overall impression of the project was that the MNA with LUCs remedy was functioning as expected. The remedy at ODA OU is protective of human health and the environment. The effective implementation of LUCs has prevented extraction of groundwater except for environmental sampling. There is no residential development at ODA OU. There has been no excavation at the site without proper MEC support. There have been no activities that would interfere with the site remedy. Specific questions below.

1. What is your overall impression of the remedial action and long-term monitoring activities at ODA OU? (General sentiment)

They FWS personnel all feel that the Contaminants of Concern (COC) have fluctuating groundwater concentrations.

2. Do you feel that the land-use controls at the ODA OU are adequately communicated to the public?

Sherry Krest thinks ODA OU is a relatively unknown site/area and that only hunters know about it. Dionne Briggs noted that all the documentation regarding the site state that the groundwater is non-potable. She is the person most familiar with the site and she has seen no evidence of groundwater use.

3. There isn't a continuous on-Site presence for remedial activities and/or O & M. Please describe staff and frequency of Site inspections and activities.

Monitoring well sampling and general soil cover inspection, annually, by the contractor, usually occurs in the summer. The samplers are a two-person team. The FWS maintain the roads at PRR-NT.

4. What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

They FWS personnel all feel that the Contaminants of Concern (COC) have fluctuating groundwater concentrations. (See Question 1 and its answer.)

5. Are you aware of any problems or concerns associated with on-going monitoring and maintenance activities? Do you feel well informed about activities associated with the remedy for the ODA OU?

Sherry Krest mentioned that there is good communication as to when the contractor is coming to sample. Dionne Briggs noted that the shed at the ODA site, near Lemon Bridge Road, should be removed.

6. Is the remedy functioning as expected? How well is the remedy performing?

The FWS personnel feel that MNA is being monitored, but there are no decreasing trends. (See answer to Question 1.)

7. Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

The FWS personnel all feel that there have been no unexpected O & M difficulties or costs at the site in the last five years.

8. Have there been opportunities to optimize O&M, or sampling efforts?

The FWS personnel said that before the ROD, sampling at ODA OU had been more frequent – semi-annual or even quarterly. So the current annual sampling is an optimization.

9. Have there been any complaints, violations (state or federal), vandalism/emergency response/trespassing incidents or other activities related to the site, requiring a response by your office since the last Five Year Review of the Site? If so, please give details of the events and results of the responses.

Brad Knudsen, Sherry Krest and Dionne Briggs: No.

10. Are you aware of any community concerns regarding the ODA OU, its administration, or its remedy (No Further Action with groundwater monitoring)? If so, please give details.

Brad Knudsen, Sherry Krest and Dionne Briggs: No.

10. Do you have any comments, suggestions, or recommendations regarding the Site's management or operation?

Sherry Krest noted that the shed at the ODA site, near Lemon Bridge Road, should be removed.

CERCLA Five Year Interview, Ms. Elisabeth Green, MDE Project Manager FGGM-BRAC, Ordnance Demolition Area OU 15, First Five-Year Review

The U.S. Army Corps of Engineers, Baltimore District is doing a Five Year Review of the Ordnance Demolition Area OU 15 (ODA OU), a Fort Meade BRAC site. The remedy for the site is LUCs and annual long term groundwater monitoring (LTGM) with Monitored Natural Attenuation (MNA). Part of the Five Year Review process is to seek information from interested parties, hence this questionnaire and interview.

<<Interview: Wednesday, October 7, 2015 @ 1100 (duration: 7 minutes)>>
<<Participants: Elisabeth (Lis) Green, MDE and Mona D. Ponnapalli, USACE-NAB>>

1. What is your overall impression of the remedial action and long-term monitoring activities at ODA OU? (General sentiment)

Ms. Lis Green's overall impression of the project was that the remedy was functioning well. Ms. Green also states that she receives groundwater sampling reports on ODA OU regularly from the FGGM-BRAC.

2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the ODA OU? If so, please give purpose and results.

Ms. Ponnapalli reviewed the remedy of the Ordnance Demolition Area OU 15: LUCs and annual LTGM with MNA. Ms. Green agreed with Ponnapalli's description. Ms. Green has not been to the site to conduct inspections or view sampling. She is satisfied with the groundwater sampling reports she receives from the Army.

3. Are you aware of any problems or concerns associated with on-going monitoring and maintenance activities? Do you feel well informed about activities associated with the remedy for the ODA OU?

Ms. Lis Green is not aware of any problems or concerns associated with on-going monitoring and maintenance activities. Ms. Green feels well informed about activities associated with the remedy for the ODA OU.

4. Have there been any complaints, violations, or other incidents related to the ODA OU requiring a response by your office? If so, please give details of the events and results of the responses.

MDE has had no complaints, violations, or other incidents related to the ODA OU, which required a response by them.

5. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

Ms. Lis Green is not aware of events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities.

6. What effects have site operations at ODA OU, had on the surrounding community?

Ms. Lis Green knows of no effect from ODA OU site operations, on the surrounding community.

7. Are you aware of any community concerns regarding the ODA OU, its administration, or its remedy (LUCs and annual LTGM with MNA)? If so, please give details.

Ms. Lis Green is not aware of any community concerns regarding the ODA OU, its administration, or its remedy.

8. Do you feel that the land-use controls at the ODA OU are adequately communicated to the public?

Ms. Lis Green feels that the land-use controls at the ODA OU are adequately communicated to the public.

9. Do you feel well informed about ODA OU site activities and progress?

Ms. Lis Green feels well informed about ODA OU site activities and progress.

10. Do you have any comments, suggestions, or recommendations regarding the ODA OU management?

Ms. Lis Green has no comments, suggestions, or recommendations regarding the ODA OU management. Ms. Green feels that the remedy is working effectively and that the groundwater samples (LTGM), are being taken regularly.

Name: Elisabeth Green, Ph.D.

Title: Remedial Project Manager, Maryland Department of the Environment, Federal Facilities Division, Land Restoration Program

Office Address: 1800 Washington Blvd., Ste. 625, Baltimore, MD 21230-1719

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CERCLA Five Year Interview, Mr. Robert Stroud, EPA Project Manager
FGGM-BRAC, Ordnance Demolition Area OU 15, First Five-Year Review

The U.S. Army Corps of Engineers, Baltimore District is doing a Five Year Review of the Ordnance Demolition Area OU 15 (ODA OU), a Fort Meade BRAC site. The remedy for the site is LUCs and annual long term groundwater monitoring (LTGM) with Monitored Natural Attenuation (MNA). Part of the Five Year Review process is to seek information from interested parties, hence this questionnaire and interview.

<<Form (below) received: Friday, October 23, 2015 @ 1557>>

1. What is your overall impression of the remedial action and long-term monitoring activities at ODA OU? (General sentiment)

The LTM and RA activities are working as planned.

2. Are you aware of any community concerns regarding the ODA OU, its administration, or its remedy [LUCs and annual Long Term Groundwater Monitoring (LTGM) with MNA parameters]? If so, please give details.

I am not aware of any community concerns. The Army has an active RAB that meets bi-monthly.

3. What effects have site operations at ODA OU, had on the surrounding community?

None that I am aware of.

4. Do you feel that the land-use controls at the ODA OU are adequately communicated to the public?

Yes any member of the public can attend a RAB meetings. The meetings are advertised in local papers.

5. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

I am not aware of any of these types of incidents.

6. Do you feel well informed about ODA OU site activities and progress?

Yes the army does a great job with that.

7. Do you have any comments, suggestions, or recommendations regarding the ODA OU management or operation?

I have no issues with the management and operation of the ODA OU.

Name: **Robert Stroud**

Title: **Remedial Project Manager**

Contact Information (Office address, E-mail and Phone number): **701 Mapes Rd. Ft. Meade, MD 20755 stroud.robert@epa.gov 410-305-2748**

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Steve Cardon, CHMM, BRAC Environmental Coordinator, Fort Meade DPW - Environmental Division (IMND-MEA-PWE)
INTERVIEW
Phone Interview, Thursday, July 16, 2015 @ 1025 to ~ 1100
Participants: Mona D. Ponnapalli and Steve Cardon

Ms. Ponnapalli reviewed the remedy of the FGGM-BRAC site: Ordnance Demolition Area OU 15 (ODA OU). The remedy is Monitored Natural Attenuation (MNA) and Land Use Controls (LUCs). Mr. Cardon agreed with Ponnapalli's description. Mr. Cardon's overall impression of the project was that the LUC and MNA remedy was functioning as expected. Specific questions below.

1. What is your overall impression of the project?

Steve Cardon (BEC) feels that the ODA OU's remedy continues to be protective of human health and the environment.

2. Is the remedy functioning as expected? How well is the remedy performing?

Steve Cardon believes that the LUCs are functioning as intended. No one is using groundwater from the FGGM-BRAC ODA OU, except for environmental monitoring by the government appointed contractor. There is no excavation of soils at ODA OU, without proper MEC support. There is no residential use of ODA OU. Mr. Cardon believes that the groundwater contaminants [VOCs certain explosive compounds (RDX, TNT, DNT)], are slowly decreasing in the ODA OU monitoring wells.

3. What effects have Site operations had on the surrounding community?

Steve Cardon is not aware of any problems or concerns associated with on-going site monitoring and maintenance activities.

4. Are you aware of any community concerns regarding the Site or its operation and administration? If so, please give details.

Steve Cardon is not aware of any community concerns. He stated that the Army has an active RAB that meets bi-monthly.

5. Are you aware of any events, incidents, or activities at the Site such as vandalism, trespassing or emergency responses from local authorities, since the last Five Year Review of the Site? If so, please give details.

S**teve Cardon is not aware of any of these types of incidents at ODA OU.**

6. Have there been any complaints, violations, or other incidents related to the Site requiring a response by your office since the last Five Year Review of the Site? If so, please give details of the events and results of the responses.

Steve Cardon is not aware of any complaints or violations, at ODA OU.

7. What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

Steve Cardon states that the VOCs and explosive compounds (RDX, TNT, DNT), are slowly decreasing in the monitoring wells. He feels that trend will be more apparent with more data points due to the change from biennial to annual sampling. (Same as answer to Question 2.)

8. Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines in the last five years? Please describe changes and impacts, if there are any.

There was road repair for the Patuxent Research Refuge-North Tract's Boundary Road, in 2011. (The road had washed out from heavy rains.)

9. Have there been unexpected O&M difficulties or costs at the Site in the last five years? If so, please give details.

No unexpected O & M difficulties or costs at the Site, other than what is discussed in question 8.

10. There isn't a continuous on-Site presence for remedial activities and/or O & M. Please describe staff and frequency of Site inspections and activities.

Monitoring well sampling and general soil cover inspection, annually, by the contractor, usually occurs in the summer. The samplers are a two-person team.

11. Have there been opportunities to optimize O&M, or sampling efforts?

No.

12. Do you feel well informed about the Site's activities and progress?

Yes.

13. Do you have any comments, suggestions, or recommendations regarding the Site's management or operation?

The Army, MDE and the EPA should agree on the details of a background level for contaminants, especially metals, in Fort Meade and Fort Meade, BRAC, and perform the survey. Perhaps that will enable the Army to show that the occasional metals concentration fluctuations are background concentrations.

Appendix C
Groundwater Data and Trends

Groundwater Data and Trends

6.4.1 MCL Exceedances

Examination of Tables 6-2, 6-3, 6-4 and 6-5, show that PCE and TCE are the only groundwater constituents with several detections above the MCL/PRGs in the LTGM program. Two new wells, ODAMW-12S and ODAMW-12D, were installed in May 2012 at the ODA OU to better delineate vertical migration. PCE was detected above the MCL in 2012, 2013 and 2015 at well ODAMW-12S. The PCE concentrations decreased in ODAMW-12S in 2012, 2013 and 2014. The presence of PCE, TCE, and cis-1,2-DCE in the new downgradient well, ODAMW-12S, indicates site contamination has migrated outside the confines of the demolition pit but is within the boundaries of the groundwater OU. PCE, TCE and RDX concentrations at ODAMW-12S are graphed in Figure 6-4.

Another monitoring well nested with ODAMW-12S is ODAMW-12D (screened 32 –42 feet bgs). Monitoring well ODAMW-12D has only shown low levels of chloroform contamination (2012 and 2013), which was always "J" flagged. Note that chloroform is a common laboratory contaminant. Also, three deep screened monitoring wells, ODAMW-6D, ODAMW-8D and ODAMW-9D, had non-detect for all compounds so often that they were eventually dropped from the annual LTGM program. This leads to the conclusion that VOC groundwater contamination is shallow.

The monitoring wells with the most consistent detections of PCE, TCE and RDX in previous years were ODAMW-3, ODAMW-1, ODAMW-4 and ODAMW-12S. Monitoring wells ODAMW-3, ODAMW-1, ODAMW-4 and ODAMW-12S are graphed for PCE, TCE and RDX in Figures 6-5, 6-6, 6-7 and 6-4, respectively.

ODAMW-3, a source area monitoring well, is located in the outer bermed area of the demolition pit. ODAMW-3 contains the highest concentration of VOCs. The MCL for PCE and TCE (5 ug/L) was exceeded in 2012 and 2013 at ODAMW-3, but not exceeded in 2014 and 2015

The Mann-Kendall trend analysis of PCE (Figure 6-12) and TCE (Figure 6-13) at ODAMW-3 shows that PCE and TCE concentrations are neither increasing nor decreasing

ODAMW-1 is a well located between the inner and outer berms. The trend graph for ODAMW-1 (Figure 6-6), shows that RDX and PCE concentrations show a definite decreasing trend between 2002 and 2015. TCE for the same period shows a small downward slope of

concentrations. Since 2010, PCE, TCE and RDX have been below their PRG at ODAMW-1, except for the PCE detection of 5.1 ug/L in 2013.

ODAMW-4 is a well located between the inner and outer berms. The trend graph for ODAMW-4 (Figure 6-7), shows that RDX and PCE concentrations show a definite decreasing trend between 2002 and 2015. The Mann-Kendall analysis (Figure 6-13) of TCE for the same period shows a decreasing trend. For the four sampling events covered in this Five-Year Review (2012, 2013, 2014, 2015), PCE, TCE and RDX have been below their PRG at ODAMW-4.

Monitoring well ODAMW-13 was installed in 2013, down gradient of ODAMW-12S and ODAMW-12S (nested pair) and upgradient of ODAMW-10 and ODAMW-11, to further assess the horizontal and vertical extent of groundwater contamination in support of the selected remedy of MNA. No explosives or VOC have been detected at ODAMW-13, above practical quantitation limits save for two estimated detections of TCE (0.952 J; 2014 sampling and 0.570 J; 2015 sampling) and one estimated detection of chloroform (0.631 J; 2015 sampling).

Cis-1,2-DCE was not detected above PRGs in 2012, 2013, 2014 or 2015, at any ODA OU monitoring well. There are not enough data points to create PCE, or TCE isoconcentration maps for ODA OU. The groundwater trends are discussed in more detail in Appendix C.

6.4.2 Explosives Values at ODA OU

The concentrations for the explosives RDX, TNT, 2-amino 4,6-DNT and 4-amino 2,6-DNT, are graphed in Figures 6-8, 6-9, 6-10 and 6-11, respectively (URS August 2013, July 2014b, EA May 2015, EA September 2015).

At monitoring well ODAMW-2, Mann-Kendall analysis of RDX shows a stable (no trend) situation over the course of the LTGM sampling program, in Figure 6-14. There are not enough detections of TNT between 2011 and 2015 to determine a trend.

Mann-Kendall analysis of 2-amino 4,6-DNT (Figure 6-15), shows a decreasing trend for ODAMW-1 and ODAMW-4, but a stable (no trend) situation for ODAMW-2. Similarly the Mann-Kendall analysis of 4-amino 2,6-DNT (Figure 6-16), shows a decreasing trend for ODAMW-1 and ODAMW-4, but a stable (no trend) situation for ODAMW-2. Figure 6-5 shows that there is a slight decreasing trend for RDX.

Because groundwater explosives analytes have not exceeded the PRGs (RDX: 20 ug/L, TNT: 3.4 ug/L, DNT (both types): 0.8 ug/L), for six consecutive sampling periods (June 2009 sampling), it is recommended that there be no further analysis for the four explosives.

6.4.3 Monitored Natural Attenuation

MNA parameter data collected at the ODA OU are used to identify any evidence of the reductive dechlorination of VOCs, such as PCE and TCE. However, the likelihood of any biochemical reactions in the site groundwater at the ODA OU is diminished by the extremely low groundwater VOC concentrations (URS, July 2014b).

In general, the overall site conditions may not be conducive to *in situ* biodegradation of CVOC under reducing conditions. However, other natural attenuation mechanisms, including cometabolic bioremediation, can further degrade the CVOCs, albeit it at reduced rates when compared to anaerobic biodegradation (EA, September 2015).

Low groundwater concentrations for the CVOCs at these sites indicate that it may not be technically practicable to identify decreasing trends or subsurface conditions attributable to specific MNA mechanisms. Accordingly, natural groundwater flushing/dispersion will likely be the dominant MNA mechanisms versus anaerobic, aerobic, and cometabolic biodegradation for the CFD OU, ODA OU, and TAP (EA, September 2015).

Groundwater contaminant concentrations are decreasing through natural attenuation and only low concentrations remain in the groundwater. LUCs are used to restrict groundwater use until the contaminant concentrations are below PRGs and the remedial action objectives of the 2011 ROD are met (URS, September 2011).

Appendix D
Newspaper Notice of Five-year Review

CEMETERY LOTS & CRYPTS

CEMETERY LOTS (2) side by side. Meadow Ridge. Paid $6K, asking $3800. 443-250-6697

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LOTS 2 lots, Cedar Hill, Garden of meditations, lot 14 site 3 & 4, $6000, 443-618-1592

FIREWOOD

STEEL POT BELLY STOVE
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FURNITURE Leather sofa $400, love seat $250, chair w/ottoman $125, 410-255-2165

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FAMILY ESTATE SALE Saturday/Sunday 4/16 and 4/17 8-2. No early birds. Selling contents of home indoor/outdoor. Furniture, house hold, linens, and tools. All sold as is. Cash only. 8476 Kenton road Pasadena.

GARAGE/YARD SALE- 4/16/16 - 7:00AM
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MOVING SALE 1736 Shore Drive, Edgewater. Apr 15, 16, 17 from 8-2. Lots of furniture, baseball cards, cast iron carousel horse, handmade porcelain dolls, tools, tires.

RED APRON ESTATE SALE
Saturday, April 16 and Sunday, April 17, 9:00am - 1:00pm
2219 Dairy Farm Road, Gambrills, MD 21054, Watch for Estate Sale signs! Many collectibles, Fenton & Depression glass, Quality furniture, Curio cabinets, Slate Pool table, garden decor, antique toys, mixing bowl/terrine/teacup/teapots, sports memorabilia, Dept. 56, Hollister/AE clothing and more!

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BOWIE BLADE - NEWS

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SEVERN 410-551-9787. House to share, room in basement, $600/mo inc util and cable TV service 1 mo sec dep

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REAL ESTATE SERVICES

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LEGAL NOTICES

CITY OF BOWIE
Legal Notice

Notice of Impounded Vehicle

Notice is hereby given, pursuant to Chapter 14-15 of the Bowie City Code that the City of Bowie has taken into custody a 2008 FORD F150 vehicle identification number 1FTRF122288KB30179. The owner and anyone having a secured interest in this vehicle may reclaim it within 21 days of the date of notice of impoundment, which its time period will expire on May 5, 2016, at 5:00 p.m., **To reclaim your vehicle**, you must bring proof of ownership and proper identification to the City of Bowie Police Department, located at 15901 Excalibur Road, Bowie, MD 20716. Upon payment of any delinquent parking citations and a $50.00 administrative fee, a release will be issued. Payment must be in cash, money order, or certified check. This administrative office is open from 7:00 am to 6:00 pm Monday through Friday, holidays excluded. If you need directions, please call 240-544-5700. Additional costs to reclaim your vehicle are to be paid directly to the towing company. The impoundment fee is a minimum of $100.00 plus a daily storage fee. Under Title 25-206 of Maryland Motor Vehicle Law, failure to reclaim the vehicle within 21 days may cause confiscation and abandonment procedures to be invoked. After 30 days, the City maintains the right to dispose of the vehicle at the discretion of the Police Department. A vehicle or any contents therein may not be removed from the impound lot until all towing, storage, citations, and any other expenses are paid. Failure to reclaim this vehicle within 21 days shall be deemed a waiver of all rights, title and interest in the vehicle, which will then be disposed of in accordance with Maryland motor vehicle laws, by conversion to Police Department use, by auction, or scrapping as junk.

David J. Deutsch
City Manager
BB 16/037 Apr. 14 4105449

CITY OF BOWIE
Legal Notice

Notice of Impounded Vehicle

Notice is hereby given, pursuant to Chapter 14-15 of the Bowie City Code that the City of Bowie has taken into custody a 2000 CADILLAC SRX vehicle identification number 1G6KS54Y7YU167589. The owner and anyone having a secured interest in this vehicle may reclaim it within 21 days of the date of notice of impoundment, which its time period will expire on May 5, 2016, at 5:00 p.m., **To reclaim your vehicle**, you must bring proof of ownership and proper identification to the City of Bowie Police Department, located at 15901 Excalibur Road, Bowie, MD 20716. Upon payment of any delinquent parking citations and a $50.00 administrative fee, a release will be issued. Payment must be in cash, money order, or certified check. This administrative office is open from 7:00 am to 6:00 pm Monday through Friday, holidays excluded. If you need directions, please call 240-544-5700. Additional costs to reclaim your vehicle are to be paid directly to the towing company. The impoundment fee is a minimum of $100.00 plus a daily storage fee. Under Title 25-206 of Maryland Motor Vehicle Law, failure to reclaim the vehicle within 21 days may cause confiscation and abandonment procedures to be invoked. After 30 days, the City maintains the right to dispose of the vehicle at the discretion of the Police Department. A vehicle or any contents therein may not be removed from the impound lot until all towing, storage, citations, and any other expenses are paid. Failure to reclaim this vehicle within 21 days shall be deemed a waiver of all rights, title and interest in the vehicle, which will then be disposed of in accordance with Maryland motor vehicle laws, by conversion to Police Department use, by auction, or scrapping as junk.

David J. Deutsch
City Manager
BB 16/053 Apr. 14 4105452

LEGAL NOTICES

FORT GEORGE G. MEADE
BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY
NOTIFICATION OF FIVE-YEAR REVIEW

US Army Corps of Engineers

This Public Notice is to inform the community of the U. S. Army Corps of Engineers' (USACE) intent to conduct the 2016 Five Year Review (5YR) for Clean Fill Dump (CFD), Ordnance Demolition Area (ODA) and Tipton Airfield Parcel (TAP), all of which are Fort George G. Meade (Fort Meade) 1998 Base Realignment and Closure (BRAC) properties. CFD and ODA are located on the Patuxent Research Refuge-North Tract (PRR-NT), administered by the U.S. Fish and Wildlife Service (USFWS). TAP is located south of Fort Meade and MD Route 32 and east of MD Route 198. The purpose of the 5YR is to determine if the remedy implemented when the Record of Decision (ROD) was signed for each site remains protective of human health and the environment.

Constituents of Potential Concern (COPCs): COPCs at the sites include various metals (arsenic, barium, cadmium, cobalt, lead), volatile organic compounds [VOCs: benzene, tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (DCE)], and Munitions and Explosives of Concern compounds [MEC: royal demolition explosive (RDX), 2,4,6-trinitrotoluene (TNT), 2-amino-4,6-dinitrotoluene (DNT), and 4-amino-2,6-DNT]. Some of these COPC are present in soils and groundwater at CFD, ODA and TAP, though no site contains all the COPCs. The COPC groundwater concentrations were slightly above the U.S Environmental Protection Agency (EPA) safe drinking water Maximum Contaminant Levels (MCLs).

Selected Remedies: The selected remedies for CFD and TAP are No Further Action (NFA) except groundwater monitoring with land use controls (LUCs). The selected remedy for ODA is Monitored Natural Attenuation (MNA) with LUCs. The implemented LUCs prohibit: unauthorized extraction or use of the groundwater, unauthorized use of the sites and soil disturbance without prior Army approval.

Comment Period: The Army welcomes the public's comments on the sites. The 30-day public comment period is: April 18 to May 17, 2016. The Army will review the public comments. For further information, please contact:

Steve Cardon
Fort Meade BRAC Environmental Coordinator
Phone #: (301) 677-9178
Steven.C.Cardon.ctr@Mail.mil

or

Mona D. Ponnapalli
U.S. Army Corps of Engineers
Phone #: (410) 962-3548
Mona.D.Ponnapalli@Usace.Army.mil

Scheduled date of completion of the Final 5YRs is anticipated to be September 30, 2016. The public is invited to examine the previous Five Year Reviews online at: http://www.ftmeade.army.mil/directorates/dpw/environment/bracLegacy/index.html and at the Information Repository located at:

Fort Meade DPW - Environmental Management Division
(IMND-MEA-PWE)
85th Medical Battalion Ave., Building 32460
Fort George G. Meade, MD 20755
301-677-9648
Hours: 7:30 am to 4:30 pm; Monday through Friday
BB/CW 16/043B Apr. 14 4105440

GARAGE/ YARD SALES

BOWIE
MOVING SALE FURN, TOOLS, HSHD GOODS, XMAS, EVEN FREE STUFF!! ALMOST EVERYTHING GOES!! NO REASONABLE OFFER REFUSED!! FRI 4/15 & SAT 4/16!! FROM 9A - 2P!! FOLLOW SIGNS!! FREE TOYS FOR THE KIDS! COME SEE AT 13305 LITTLEPAGE PL 20715!!

FAMILY ESTATE SALE Saturday/Sunday 4/16 and 4/17 8-2. No early birds. Selling contents of home indoor/outdoor. Furniture, house hold, linens, and tools. All sold as is. Cash only. 8476 Kenton road Pasadena.

MOVING SALE 1736 Shore Drive, Edgewater. Apr 15, 16, 17 from 8-2. Lots of furniture, baseball cards, cast iron carousel horse, handmade porcelain dolls, tools, tires.

RED APRON ESTATE SALE
Saturday, April 16 and Sunday, April 17, 9:00am - 1:00pm
2219 Dairy Farm Road, Gambrills, MD 21054, Watch for Estate Sale signs! Many collectibles, Fenton & Depression glass, Quality furniture, Curio cabinets, Slate Pool table, garden decor, antique toys, mixing bowl/terrine/teacup/teapots, sports memorabilia, Dept. 56, Hollister/AE clothing and more!

MERCHANDISE

GAS GENERATORS
Power Stroke 6000 / 7500 watt. $575, Used Once. Briggs & Stratton 5000 / 7350 watt $150. 301-467-3243

MISCELLANEOUS

KILL BED BUGS & THEIR EGGS! Buy Harris Bed Bug Killers / KIT Complete Treatment System. Available: Hardware Stores, The Home Depot, homedepot.com

MATTRESS
Mattress and box spring set,Twins $95, Full $125, Queen $175, King $250, Serta and Sealy delivery available, accept all major credit cards, call Beth 410-800-6307

REAL ESTATE

LOTS & ACREAGE

LIVE IN A RECREATIONAL PARADISE! Boat & golf all Summer! Ski all Winter! Bargain Prices!! www.lakegolfski.com

LIVE LONGER!!! Boat, Golf, Fish all Summer. Ski & snowmobile all Winter. Absolute best recreational location for your dream vacation / retirement home. Close to big cities, yet out in the country. Relaxing mountain homesites help you live life the way it was meant to be. Gentle prices and easy financing make owning as simple as 1-2-3. Learn more at www.lakegolfski.com Or call 877-888-7581 Ext. 617 and ask about our "Relax & Tour" weekend package.

NATURAL UNSPOILED COASTAL PROPERTY There is a place just hours away where you can find abundant natural beauty, clean air and space. Located on Virginia's Eastern Shore just an hour south of the MD/VA state line. Lots are 3 to 22 acres and priced just $60,000 to $98,000. All are near the shoreline, some with excellence water views. Amenities include paved roads, utilities, common areas, community dock with launching ramp and a sandy beach. Low property taxes and a great climate. Call (757) 442-2171 or email oceanlandtrust@yahoo.com, website- http://wibiti.com/5NBW

REAL ESTATE

DELAWARE'S RESORT LIVING WITHOUT RESORT PRICING! LOW TAXES! Close to Beaches, Gated, Amazing Amenities, Olympic Pool. FOUR New Models from $90's. Brochures Available 1-866-629-0770 or www.coolbranch.com.

REAL ESTATE SERVICES

VACATION PROPERTY

LINTHICUM 1 bedroom cottage, screened porch, private driveway. $775 a month + utilities. No smoking, no pets. 410-859-0298

COMMERCIAL PROPERTIES

BUSINESS OPPORTUNITIES

THE CITY OF WESTMINISTER IS SEEKING DEVELOPMENT OF THE FORMER WAKEFIELD VALLEY GOLF COURSE. Letters of interest received until April 15. Contact mwolf@westgov.com or visit www.westministermd.gov/wakefield-valleyproperty.

EQUAL HOUSING OPPORTUNITY

All real estate advertising in this newspaper is subject to the Federal Fair Housing Act, which makes it illegal to advertise "any preference, limitation or discrimination based on race, color, religion, sex, handicap or familial status or national origin, or an intention to make any such preference, limitation or discrimination."

It is the policy of Capital-Gazette Newspapers that advertising for any type of housing or financing of housing comply with the Federal Fair Housing Act. Capital-Gazette Newspapers may refuse to accept advertising that does not comply with this policy or may make changes to that advertising, to bring it within compliance.

LEGAL NOTICES

US Army Corps of Engineers

FORT GEORGE G. MEADE
BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY
NOTIFICATION OF FIVE-YEAR REVIEW

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Hours: 7:30 am to 4:30 pm; Monday through Friday
BB/CW 16/043B Apr. 14 4105440

RENTALS

APARTMENTS & CONDOS

ANNAP/FAIRWINDS
2br/2ba, w/d, pool priv, sec sys, heat incl, $1350. 443-871-2679

ROOMMATES

2 ROOMS FOR RENT
Whispering Woods Community. $350/mo available now, $500/mo available May 1st. One month rent security. Utilities shared. On street parking. Call 443-603-2634.

55+ LUXURY CONDO IN ANNAPOLIS
2Bdrm/2Bth 1550 sq ft condo. Secure building, indoor/outdoor pool, gym, club house, golf, $1900, John 301-793-8085.

ANNAP - ARNOLD
Lge BR Furn or Unfurn in upscale pvt comm on Severn River. Fios, util incl. 410-544-0020

GLEN BURNIE
Room for rent. Share house $150/wk. + $150 dep. No drugs, no alcohol. 443-962-3716 443-257-1267

LINTHICUM
1 br 2nd floor apt. Private entrance w/deck. Off street parking. Quiet safe neighborhood. $850 month/deposit. 443-250-6982

SEVERN 410-551-9787. House to share, room in basement, $600/mo inc util and cable TV service 1 mo sec dep

ROOM FOR RENT

BOWIE furnished room, private bath, utilities & cable included $850, no sec. dep, 240-381-1001

GLEN BURNIE clean, furn. room, many amenities, $155/wk, $155 sec dep a person, drug/alcoh free, over 50 environment, 410-768-6085

VACATION RENTAL

OCEAN CITY, MARYLAND Best selection of affordable rentals. Full / partial weeks. Call for FREE brochures. Open daily. Holiday Resort Services. 1-800-638-2102. Online reservations: www.holidayoc.com.

LEGAL NOTICES

US Army Corps of Engineers

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85th Medical Battalion Ave., Building 32460
Fort George G. Meade, MD 20755
301-677–9648
Hours: 7:30 am to 4:30 pm; Monday through Friday
MD 16/043A Apr. 16 4105438

ROBERT E RICHARDS
11253-B LOCKWOOD DRIVE
SILVER SPRING, MD 20901

NOTICE

OF APPOINTMENT NOTICE TO CREDITORS
NOTICE TO UNKNOWN HEIRS TO ALL PERSONS INTERESTED IN THE ESTATE OF
WAYNE T WALLACE II

Notice is given that: **KATHLEEN MARIE WALLACE** whose address is 324 PECAN COURT MILLERSVILLE, MD 21108 was on March 29th, 2016 appointed personal representative(s) of the estate of **WAYNE T WALLACE II** who died on March 19th, 2016 with a will.

Further information can be obtained by reviewing the estate file in the office of the Register of Wills or by contacting the personal representative or the attorney.
All persons having any objection to the appointment (or to the probate of the decedent's will) shall file their objections with the Register of Wills on or before September 29th, 2016

All persons having claims against the decedent must serve their claims on the undersigned personal representative or file them with the Register of Wills with a copy to the undersigned on or before the earlier of the following dates:
(1) Six months from the date of the decedent's death, except if the decedent died before October 1, 1992, nine months from the date of the decedent's death; or
(2) Two months after the personal representative mails or otherwise delivers to the creditor a copy of this published notice or other written notice, notifying the creditor that the claim will be barred unless the creditor presents the claims within two months from the mailing or other delivery of the notice. A claim not presented or filed on or before that date, or any extension provided by law, is unenforceable thereafter. Claim forms may be obtained from the Register of Wills.

KATHLEEN MARIE WALLACE, Personal Representative, Estate # 89162
True Test Copy
LAUREN M. PARKER, Register of Wills for Anne Arundel County Circuit Courthouse - Church Circle P.O. Box 2368 Annapolis, MD 21404-2368
MARYLAND GAZETTE, Date of First Publication: April 9th, 2016
4095605

SMALL ESTATE

NOTICE

OF APPOINTMENT NOTICE TO CREDITORS
NOTICE TO UNKNOWN HEIRS TO ALL PERSONS INTERESTED IN THE ESTATE OF
WINIFRED HOPE NELSON

Notice is given that: **MILTON L NELSON** whose address is 8238 WATERFORD ROAD PASADENA, MD 21122 was on October 11th, 2000 appointed personal representative(s) of the small estate of **WINIFRED HOPE NELSON** who died on September 4th, 2000 without a will.

Further information can be obtained by reviewing the estate file in the office of the Register of Wills or by contacting the personal representative or the attorney.

All persons having any objection to the appointment shall file their objections with the Register of Wills within 30 days after the date of publication of this Notice.

All persons having claims against the decedent must serve their claims on the undersigned personal representative or file them with the Register of Wills with a copy to the undersigned on or before the earlier of the following dates:
(1) Six months from the date of the decedent's death, except if the decedent died before October 1, 1992, nine months from the date of the decedent's death; or
(2) Thirty days after the personal representative mails or otherwise delivers to the creditor a copy of this published notice or other written notice, notifying the creditor that the claims will be barred unless the creditor presents the claim within thirty days from the mailing or other delivery of the notice. Any claim not served or filed within that time, or any extension provided by law, is unenforceable thereafter.

MILTON L NELSON
Personal Representative Estate # 46739
True Test Copy
LAUREN M. PARKER, Register of Wills for Anne Arundel County Circuit Courthouse - Church Circle P.O. Box 2368 Annapolis, MD 21404-2368
MARYLAND GAZETTE, Date of Publication: April 16th, 2016
4112658

NOTICE

OF APPOINTMENT NOTICE TO CREDITORS
NOTICE TO UNKNOWN HEIRS TO ALL PERSONS INTERESTED IN THE ESTATE OF
IRMGARD ELLIOTT

Notice is given that: **RANDY SUE JOHNSON** whose address is 8351 FOREST DR PASADENA, MD 21122 was on March 24th, 2016 appointed personal representative(s) of the estate of **IRMGARD ELLIOTT** who died on February 16th, 2016 without a will.

Further information can be obtained by reviewing the estate file in the office of the Register of Wills or by contacting the personal representative.
All persons having any objection to the appointment shall file their objections with the Register of Wills on or before September 24th, 2016

All persons having claims against the decedent must serve their claims on the undersigned personal representative or file them with the Register of Wills with a copy to the undersigned on or before the earlier of the following dates:
(1) Six months from the date of the decedent's death, except if the decedent died before October 1, 1992, nine months from the date of the decedent's death; or
(2) Two months after the personal representative mails or otherwise delivers to the creditor a copy of this published notice or other written notice, notifying the creditor that the claim will be barred unless the creditor presents the claims within two months from the mailing or other delivery of the notice. A claim not presented or filed on or before that date, or any extension provided by law, is unenforceable thereafter. Claim forms may be obtained from the Register of Wills.

RANDY SUE JOHNSON, Personal Representative, Estate # 89129
True Test Copy
LAUREN M. PARKER, Register of Wills for Anne Arundel County Circuit Courthouse - Church Circle P.O. Box 2368 Annapolis, MD 21404-2368
MARYLAND GAZETTE, Date of First Publication: April 9th, 2016
4095670

NOTICE

OF APPOINTMENT NOTICE TO CREDITORS
NOTICE TO UNKNOWN HEIRS TO ALL PERSONS INTERESTED IN THE ESTATE OF
WILLIAM C LONG

Notice is given that: **GLYNIS D LONG** whose address is 1129 CECIL AVE S MILLERSVILLE, MD 21108 was on March 28th, 2016 appointed personal representative(s) of the estate of **WILLIAM C LONG** who died on January 8th, 2016 with a will.

Further information can be obtained by reviewing the estate file in the office of the Register of Wills or by contacting the personal representative.
All persons having any objection to the appointment (or to the probate of the decedent's will) shall file their objections with the Register of Wills on or before September 28th, 2016

All persons having claims against the decedent must serve their claims on the undersigned personal representative or file them with the Register of Wills with a copy to the undersigned on or before the earlier of the following dates:
(1) Six months from the date of the decedent's death, except if the decedent died before October 1, 1992, nine months from the date of the decedent's death; or
(2) Two months after the personal representative mails or otherwise delivers to the creditor a copy of this published notice or other written notice, notifying the creditor that the claim will be barred unless the creditor presents the claims within two months from the mailing or other delivery of the notice. A claim not presented or filed on or before that date, or any extension provided by law, is unenforceable thereafter. Claim forms may be obtained from the Register of Wills.

GLYNIS D LONG, Personal Representative, Estate # 89150
True Test Copy
LAUREN M. PARKER, Register of Wills for Anne Arundel County Circuit Courthouse - Church Circle P.O. Box 2368 Annapolis, MD 21404-2368
MARYLAND GAZETTE, Date of First Publication: April 9th, 2016
4095625

MEETING NOTICE
Olde Mill Condominium III Inc.
CONDO RESIDENTS

In accordance with The Maryland Non-Stock Corporations Act, Section 5-206, the annual meeting for the election of the Board of Directors has been rescheduled to
Tuesday, May 17, 2016
at ProCom located at 400 Serendipity Drive Millersville, MD 21108 at 7:00 p.m. As stated in Section 5-206 of the Maryland Non-Stock Corporation Act, Section C, at this meeting, the number of members present in person or by proxy will constitute a quorum. A majority of the members present in person or by proxy may approve or authorize the proposed action at the additional meeting and may take any other action which could have been taken at the original meeting if a sufficient number of members had been present.
MD 16/064 Apr. 16 4112318

SMALL ESTATE

NOTICE

OF APPOINTMENT NOTICE TO CREDITORS
NOTICE TO UNKNOWN HEIRS TO ALL PERSONS INTERESTED IN THE ESTATE OF
CONNIE GAIL KISER

Notice is given that: **KRISTEN KISER** whose address is 3420 SENECA STREET BALTIMORE, MD 21211 was on April 7th, 2016 appointed personal representative(s) of the small estate of **CONNIE GAIL KISER** who died on May 24th, 2015 without a will.

Further information can be obtained by reviewing the estate file in the office of the Register of Wills or by contacting the personal representative.

All persons having any objection to the appointment shall file their objections with the Register of Wills within 30 days after the date of publication of this Notice.

All persons having claims against the decedent must serve their claims on the undersigned personal representative or file them with the Register of Wills with a copy to the undersigned on or before the earlier of the following dates:
(1) Six months from the date of the decedent's death, except if the decedent died before October 1, 1992, nine months from the date of the decedent's death; or
(2) Thirty days after the personal representative mails or otherwise delivers to the creditor a copy of this published notice or other written notice, notifying the creditor that the claims will be barred unless the creditor presents the claim within thirty days from the mailing or other delivery of the notice. Any claim not served or filed within that time, or any extension provided by law, is unenforceable thereafter.

KRISTEN KISER
Personal Representative Estate # 89245
True Test Copy
LAUREN M. PARKER, Register of Wills for Anne Arundel County Circuit Courthouse - Church Circle P.O. Box 2368 Annapolis, MD 21404-2368
MARYLAND GAZETTE, Date of Publication: April 16th, 2016
4112768

NOTICE

The ***Annual Meeting*** of Elizabeth's Landing Community Association will be held on Monday, May 9, 2016 at 7:00 p.m. at the Sunset Elementary School, 8572 Ft. Smallwood Rd., Pasadena; cafeteria. Registration will begin at 6:00 p.m. The purpose of the meeting is to elect board members and consider any topic(s) on the agenda specified in the mailing which was sent to all members.

If quorum is not met (by presence & proxy) the meeting will be adjourned and the Annual Meeting will be re-scheduled for Monday, June 6, 2016, at 7:00 p.m. This meeting will be held in the Community Farmhouse. The membership present shall constitute a quorum.
MD 16/040 Apr. 16, 20, 23 4105481

ANNE ARUNDEL COUNTY COUNCIL
FINAL LEGISLATION

BILL NO. 17-16 **(As Amended) –** AN ORDINANCE concerning: Subdivision and Development – Public Works Agreements - FOR the purpose of requiring a public works agreement to be ~~completed within six months of a plat being recorded~~ executed and delivered simultaneously with the approval of a plat or no later than twelve months after a plat has been recorded; and generally relating to subdivision and development.

BILL NO. 18-16 **(As Amended) –** AN ORDINANCE concerning: Licensing – Swimming Pools and Spas – Lifeguards and Signs - FOR the purpose of modifying the requirement for lifeguards at certain public pools; modifying the requirements for signs at certain pools and spas; and generally relating to swimming pools and ~~licensing~~ spas.

Approved and Enacted: April 8, 2016
CAP/MD 16/058 Apr. 16 4107110

PUBLIC AUCTION

Notification of the following owner(s) of properties stored at Ritchie Mini Storage, 20 Ertel Rd., Glen Burnie, MD 21060 (410-768-7944).

Your property will be sold at public auction on APRIL 27, 2016 AT 1:00 P.M. on the premises for delinquent rent and storage charges.

STACEY CROTTI B54/HOWARD PRINCE F20

MT. ROYAL MANAGEMENT CO.
MD 16/056 Apr. 16 4105494

THE BALTIMORE SUN MEDIA GROUP

501 N. Calvert St., P.O. Box 1377
Baltimore, Maryland 21278-0001
tel: 410/332-6000
800/829-8000

WE HEREBY CERTIFY, that the annexed advertisement of Order No 4105440

Sold To:
Dept. of the Army - CU00529790
10 S Howard St
Baltimore District Corps of Engineers
Baltimore,MD 21201-2526

Bill To:
Dept. of the Army - CU00529790
10 S Howard St
Baltimore District Corps of Engineers
Baltimore,MD 21201-2526

Was published in "CroftonWestCountyGazette", "Weekly", a newspaper printed and published in Anne Arundel County on the following dates:

Apr 14, 2016

The Baltimore Sun Media Group

By S. Wilkinson

US Army Corps of Engineers

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Was published in "The Bowie Blade", "Weekly", a newspaper printed and published in Prince Georges County on the following dates:

Apr 14, 2016

The Baltimore Sun Media Group

By S. Williamson

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US Army Corps of Engineers

FORT GEORGE G. MEADE
BASE REALIGNMENT AND CLOSURE PROPERTY REMEDY
NOTIFICATION OF FIVE-YEAR REVIEW

This Public Notice is to inform the community of the U. S. Army Corps of Engineers' (USACE) intent to conduct the 2016 Five Year Review (5YR) for Clean Fill Dump (CFD), Ordnance Demolition Area (ODA) and Tipton Airfield Parcel (TAP), all of which are Fort George G. Meade (Fort Meade) 1998 Base Realignment and Closure (BRAC) properties. CFD and ODA are located on the Patuxent Research Refuge-North Tract (PRR-NT), administered by the U.S. Fish and Wildlife Service (USFWS). TAP is located south of Fort Meade and MD Route 32 and east of MD Route 198. The purpose of the 5YR is to determine if the remedy implemented when the Record of Decision (ROD) was signed for each site remains protective of human health and the environment.

Constituents of Potential Concern (COPCs): COPCs at the sites include various metals (arsenic, barium, cadmium, cobalt, lead), volatile organic compounds [VOCs: benzene, tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (DCE)], and Munitions and Explosives of Concern compounds [MEC: royal demolition explosive (RDX), 2,4,6-trinitrotoluene (TNT), 2-amino-4,6-dinitrotoluene (DNT), and 4-amino-2,6-DNT]. Some of these COPC are present in soils and groundwater at CFD, ODA and TAP, though no site contains all the COPCs. The COPC groundwater concentrations were slightly above the U.S Environmental Protection Agency (EPA) safe drinking water Maximum Contaminant Levels (MCLs).

Selected Remedies: The selected remedies for CFD and TAP are No Further Action (NFA) except groundwater monitoring with land use controls (LUCs). The selected remedy for ODA is Monitored Natural Attenuation (MNA) with LUCs. The implemented LUCs prohibit: unauthorized extraction or use of the groundwater, unauthorized use of the sites and soil disturbance without prior Army approval.

Comment Period: The Army welcomes the public's comments on the sites. The 30-day public comment period is: April 18 to May 17, 2016. The Army will review the public comments. For further information, please contact:

Steve Cardon
Fort Meade BRAC Environmental Coordinator
Phone #: (301) 677-9178
Steven.C.Cardon.ctr@Mail.mil

or

Mona D. Ponnapalli
U.S. Army Corps of Engineers
Phone #: (410) 962-3548
Mona.D.Ponnapalli@Usace.Army.mil

Scheduled date of completion of the Final 5YRs is anticipated to be September 30, 2016. The public is invited to examine the previous Five Year Reviews online at:
http://www.ftmeade.army.mil/directorates/dpw/environment/bracLegacy/index.html
and at the Information Repository located at:

Fort Meade DPW - Environmental Management Division
(IMND-MEA-PWE)
85th Medical Battalion Ave., Building 32460
Fort George G. Meade, MD 20755
301-677-9648
Hours: 7:30 am to 4:30 pm; Monday through Friday
BB/CW 16/043B Apr. 14

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Was published in "Maryland Gazette", "Bi-Weekly", a newspaper printed and published in Anne Arundel County on the following dates:

Apr 16, 2016

The Baltimore Sun Media Group

By S. Wilkinson

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US Army Corps of Engineers

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Appendix E
RTC to Regulatory Comments, Table