Third Five-Year Review Report

for the

Former Naval Air Warfare Center
Trenton, New Jersey

Naval Facilities Engineering Command
Mid-Atlantic

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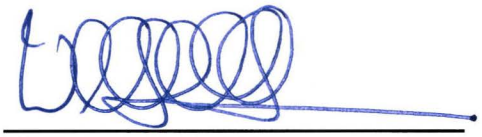
THIRD FIVE-YEAR REVIEW REPORT

FOR THE

FORMER NAVAL AIR WARFARE CENTER
TRENTON, NEW JERSEY

DECEMBER 2013

APPROVED BY: **DATE:**



12/31/2013

Willington Lin, P.E.
BRAC Environmental Coordinator
By direction of BRAC PMO
SIGNED IN MY OFFICIAL CAPACITY ONLY

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

SECTION **PAGE**

TABLE OF CONTENTS (Continued)

TABLES

SECTION

FIGURES

SECTION

ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
µg/m^3	Microgram per cubic meter
ADAF	Age-dependent-adjustment-factor
AOC	Area of Concern
ARAR	applicable or relevant and appropriate requirement
bgs	Below Ground Surface
BRAC	Base Realignment and Closure
CEA	Classification Exception Area
CERCLA	Comprehensive Response, Compensation, and Liability Act
C.F.R.	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action Navy
COC	Constituent of Concern
COPC	Chemical of Potential Concern
CTO	Contract Task Order
CVOC	Chlorinated Volatile Organic Compound
DCE	dichloroethene
DER	Declaration of Environmental Restriction
DHC	dehalococcoides bacteria
DOD	Department of Defense
DON	Department of the Navy
EA	EA Engineering, Science, and Technology
EBS	Environmental Baseline Survey
ECOR	Environmental, Construction, Operation, and Remediation Solutions, Inc.
EOS	Emulsified Soybean Oil
EPA	U. S. Environmental Protection Agency
ERA	Ecological Risk Assessment
FFS	Focused Feasibility Study
GAC	Granular Activated Carbon
GWQS	Groundwater Quality Standards
HHRA	Human Health Risk Assessment
IR	Installation Restoration
IUR	Inhalation Unit Risk
LEL	Lowest Effects Level
LGAC	Liquid Phase Granular Activated Carbon
mg/kg	milligram per kilogram

ACRONYMS AND ABBREVIATIONS

mg/kg/day	Milligram per kilogram per day
mg/m^3	Milligram per cubic meter
MIDLANT	Mid-Atlantic
MNA	Monitored Natural Attenuation
MOGAS	Motor Gasoline
N.J.A.C.	New Jersey Administrative Code
N.J.R.	New Jersey Register
NAPL	Non-aqueous phase liquid
NAVFAC	Naval Facilities Engineering Command
NAWC	Naval Air Warfare Center
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NJPDES	New Jersey Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operations and Maintenance
OSWER	Office of Solid Waste and Emergency Response
PAH	Polycyclic Aromatic Hydrocarbon
PCE	Tetrachloroethene
RAO	Remedial Action Objective
RDCSCC	Residential Direct Contact Soil Cleanup Criteria
RfC	Reference Concentration
RfD	Reference Dose
RGH	Rogers, Golden, and Halpern
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SEL	Severe Effects Level
SERDP	Strategic Environmental Research and Development Program
SFO	Slope Factor Oral
SI	Site Inspection
sq ft	Square Feet
SRS	Soil Remediation Standards
SWQS	Surface Water Quality Standards
TBC	To Be Considered

ACRONYMS AND ABBREVIATIONS

TCE	Trichloroethene
TCH	Thermal Conductive Heating
U.S.	United States
USGS	United States Geological Survey
VC	vinyl chloride
VI	Vapor Intrusion
VISL	Vapor Intrusion Screening Level
VOC	volatile organic compound
Watermark	Watermark Environmental, Inc.
WRA	Well Restriction Area

EXECUTIVE SUMMARY

This Third Five-Year Review Report for the former Naval Air Warfare Center (NAWC) Trenton in Trenton, New Jersey was prepared for the Naval Facilities Engineering Command Mid-Atlantic (NAVFAC MIDLANT) as part of Contract Task Order (CTO) WE47 under Contract N62470-08-D-1001. The United States Navy (Navy), in conjunction with the New Jersey Department of Environmental Protection (NJDEP), has conducted the third five-year review of the remedial actions implemented at the former NAWC in Trenton, New Jersey. This review serves to meet the requirements of the August 2000 Voluntary Cleanup Agreement among the NJDEP, U.S. Department of the Army, Navy, U.S. Department of the Air Force, and U.S. Defense Logistics Agency. As outlined in the Voluntary Agreement, those agencies with sites that are subject to this Agreement, are required to conduct response actions for releases of hazardous substances, pollutants and contaminants in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and its amendments and be consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Five-year reviews are required at those sites where the selected remedial action results in hazardous substances, pollutants, or contaminants remaining at levels that do not allow for unlimited use and unrestricted exposure. The purpose of this Third Five-Year Review was to determine whether the various remedies that have been implemented by the Navy at NAWC Trenton continue to be protective of human health and the environment. The methods, findings, and conclusions of the Five-year Review are documented in this report. In addition, the report identifies deficiencies found, if any, during the review and makes recommendations to address these.

The former NAWC Trenton facility was purchased by the Navy in 1949 from General Motors and commissioned in 1951 as the Naval Air Turbine Test Station. The approximately 66-acre facility mainly conducted performance testing of aircraft jet engines under simulated high and low altitude conditions. By the mid-1980s, construction of missile-related test equipment became a priority at the site. Operational closure of NAWC Trenton occurred on December 15, 1998 under the Base Realignment and Closure (BRAC) Act of 1993. The Reuse Plan for NAWC Trenton was approved on July 15, 1996. The NAWC Trenton property was divided into four separate parcels, Parcels A, B, C, and D. Transfer of the individual parcels from the Navy to the new owners occurred between 1997 and 2001.

Environmental investigations at the site were conducted by the Navy beginning in the 1980s with an initial preliminary assessment. The study identified seven sites of potential concern and recommended further investigation. A subsequent Site Inspection (SI) followed the preliminary assessment to confirm the presence or absence of contamination in soils and groundwater at the seven sites identified during the preliminary assessment and at two additional sites. Under the Navy Installation Restoration (IR) Program, a Remedial Investigation (RI) was conducted at NAWC Trenton in two phases; Phase I in 1992

and Phase II in 1993. Groundwater was determined to be heavily impacted by chlorinated hydrocarbons, mainly trichloroethylene (TCE), 1,2-dichloroethylene (1,2-DCE), and vinyl chloride (VC) at seven of the nine sites. The soil investigation determined that soil contamination is generally limited to metals in shallow soils.

IR Program Site 1 (Brine Handling area and West-End Drainage Ditch) and Site 3 (Former Sludge Disposal Area) were identified as the primary sources for impacted groundwater at the facility. Other sites at the former NAWC Trenton were also identified as impacting groundwater to a lesser extent; however detected contaminants were present at concentrations above NJDEP Groundwater Quality Standards (GWQS) or above average background concentrations. Eleven sites or areas of concern were identified as exhibiting soil concentrations above NJDEP residential soil cleanup criteria or impact to groundwater criteria and required capping as an engineering control. Elevated mercury concentrations, exceeding NJDEP sediment guidance values, were detected in sediment samples from storm sewer outfalls during a supplemental ecological study conducted by the Navy following the RI. The Navy implemented cleaning operations in a number of buildings and within the storm sewer system to address suspected source areas for mercury. Decision Documents and Removal Action Completion Reports, as agreed to by the Navy and NJDEP, were developed for the cleanup and monitoring of the following impacted media and sites at NAWC Trenton. Table ES-1 summarizes the media of concern, related decision documents, site status and five-year review status.

The triggering action for the Five-Year Review at the NAWC Trenton facility was the onsite construction of the interim groundwater collection and treatment system. The First Five-Year Review was completed and is summarized in the First Five-Year Review Report dated December 2003 (EA, 2003). The Second Five-Year Review was completed in December 2008 and is summarized in the Second Five-Year Review Report (TtNUS, 2008). This Third Five-Year Review addresses site-wide groundwater, capped soil areas and mercury in storm sewer sediment, as outlined above. Because hazardous substances remain at the facility above levels that allow for unrestricted use and unlimited exposure, subsequent five-year reviews will be required.

The results of the Third Five-Year Review did not reveal that contaminant characteristics have changed in such a manner that could affect the protectiveness of the remedies selected for site-wide groundwater, the capped soil areas or mercury in storm sewer sediment at the facility. The groundwater extraction and treatment system is operating consistently and effectively and discharge limits are being met. Based on the recent interpretations of synoptic water-level data and preliminary data, the Navy and United States Geological Survey (USGS), have concluded that the discharge of contaminated groundwater to the upstream reach of the West Ditch is occurring and this discharge causes contamination of the downstream reach of the West Ditch and of Gold Run. The Navy and USGS are continuing to investigate

the groundwater infiltration into the West Ditch and the Navy will be implementing piping replacement and repairs to structures in the West Ditch in 2014. In addition, site-related contaminants in the northeast and southwest portion of the site were at or above GWQS for certain wells located just outside or adjacent to the Classification Exception Area (CEA) boundary. Continued operation and maintenance of the extraction and treatment system and long-term monitoring is needed in order to maintain protection of human health and the environment. Caps are currently in place at a number of impacted soil sites and the Navy is implementing an ongoing inspection and monitoring program to ensure the effectiveness of the various caps. Monitoring for mercury is conducted by the Navy on a regular basis at each of the four storm sewer outfalls. Based on the monitoring results, the Navy conducts cleaning of the storm sewer system on an as-needed basis. Institutional controls are in place for groundwater and soils and the Navy conducts biennial reviews in accordance with NJDEP requirements. The Navy continues to coordinate the development of the individual property parcels with the respective owners to minimize damage to monitoring or extraction wells, piping, or capped areas and to maintain the operation of the groundwater extraction and treatment system.

This five-year review shows that the Navy is meeting the requirements of the Decision Documents for the impacted media and sites at NAWC Trenton. In addition, the Navy in coordination with the United States Geological Survey (USGS) is conducting pilot studies to evaluate advanced treatment options as part of the groundwater remedy.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Former Naval Air Warfare Center Trenton		
EPA ID: Voluntary Cleanup between NJDEP and US Navy		
Region: 2	**State:** NJ	**City/County:** Trenton/Mercer

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

REVIEW STATUS
Lead agency: Other Federal Agency **If "Other Federal Agency" was selected above, enter Agency name:** Department of the Navy
Author name (Federal or State Project Manager): Jeffrey Dale
Author affiliation: US Navy-BRAC
Review period: 2009 - 2013
Date of site inspection: 9/17/13 (DON)
Type of review: Statutory
Review number: 3
Triggering action date: Groundwater pump-and-treat system construction; 1998
Due date *(five years after triggering action date)*: December 2013

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:
Capped Impacted Soil Areas; Mercury In Storm Sewer Sediment

Issues and Recommendations Identified in the Five-Year Review:

OU(s): Site-Wide Groundwater	Issue Category: Remedy Performance			
	Issue: Infiltration of contaminated site groundwater into the upper reach of West Ditch and Gold Run.			
	Recommendation: Implement planned replacement and repairs to piping and structures in West Ditch and continue to monitor and investigate groundwater infiltration.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	Federal Facility	State	Ongoing

To add additional issues/recommendations here, copy and paste the above table as many times as necessary to document all issues/recommendations identified in the FYR report.

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: Site-Wide Groundwater	*Protectiveness Determination:* Will be Protective	*Addendum Due Date (if applicable):* Click here to enter date.

Protectiveness Statement:

Based on this five-year review, the selected remedy for site-wide groundwater is expected to be protective of human health and the environment upon completion. Data collected and assessed show implementation of remedy components that will prevent a potential or actual exposure pathway is underway, and expected to be protective upon completion. In the interim, exposure pathways that could result in unacceptable risks are being controlled. The Navy is implementing recommendations outlined in the Second Five-Year Review Report (TtNUS, 2008) regarding the infiltration of volatile organic compound (VOC)-impacted groundwater into the Gold Run storm sewer system. Replacement and repairs to the piping and structures within the West Ditch will be implemented by the Navy in 2014. Continued monitoring and evaluation of this issue will be conducted by the Navy and U.S. Geological Survey (USGS). The groundwater pump and treat system was expanded to include impacted groundwater beneath the former NAWC Trenton facility and south of the bedrock fault and

when operating successfully, is hydraulically effective at controlling most of the Site 1 and Site 3 groundwater plumes. The treatment system is effective in removing CVOCs from the contaminated groundwater and discharge limits are being met. Site-related CVOC levels in groundwater are decreasing. Institutional controls, including the establishment of CEA and WRA designations for site groundwater have been implemented by the Navy and biennial certifications are prepared and submitted to NJDEP. The Navy will determine the distance from impacted site monitoring wells to off-site properties and will include monitoring well MW-33S in the long-term monitoring program to evaluate the need for further action, if any, per NJDEP VI Technical Guidance. Future development activities conducted within Parcels A, B and D may warrant engineering controls. The Navy has formally notified the current parcel owners that future development activities need to address applicable NJDEP regulations.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
Capped Impacted Soil Areas	Protective	Click here to enter date.

Protectiveness Statement:

Based on this five-year review, the remedy selected for impacted soils in the AOCs and IR Sites listed in Section 3.1 at the Former NAWC Trenton facility has been successfully implemented to date and is protective of human health and the environment under current land use. Where appropriate, and as agreed to with the NJDEP, impacted soils were removed from various sites within Parcels A and B of the former NAWC Trenton. Communication and coordination with the owners of the various parcels is ongoing in order to facilitate the development of the site and minimize and/or prevent damage to capped areas. Future development activities to be conducted within the capped areas will be monitored for protectiveness.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
Mercury In Storm Sewer Sediment	Protective	Click here to enter date.

Protectiveness Statement:

Based on this five-year review, the remedy selected for mercury in storm sewer sediment at the Former NAWC Trenton facility has been successfully implemented to date and is protective of human health and the environment under the current land use. Future development activities in Parcel A (owned by County of Mercer) or in Parcel B (owned by N&H Mercer Realty LLC/Nassimi Realty) will be monitored for protectiveness.

Sitewide Protectiveness Statement (if applicable)

For sites that have achieved construction completion, enter a sitewide protectiveness determination and statement.

Protectiveness Determination:	*Addendum Due Date (if applicable):*
Will be Protective	Click here to enter date.

Protectiveness Statement:

The site-wide remedy is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed the exposure pathways that could result in unacceptable risks in these areas.

1.0 INTRODUCTION

The United States Navy, in conjunction with the New Jersey Department of Environmental Protection (NJDEP), has conducted the Third Five-Year Review of the remedial actions implemented at the former Naval Air Warfare Center (NAWC) Trenton in Trenton, New Jersey. This review report has been prepared by Tetra Tech under Contract Task Order WE47, as part of the Comprehensive Long-Term Environmental Action Navy (CLEAN) contract N62470-08-D-1001. The purpose of this Third Five-Year Review is to evaluate the performance of completed and ongoing remedial actions that have been implemented for site-wide groundwater, various soil contaminated areas (capped soil areas), and storm sewer system sediments at the former NAWC Trenton and to assess whether the remedial actions remain protective of human health and the environment.

The general location of former NAWC Trenton is shown on Figure 1-1. The former NAWC Trenton property is no longer owned by the Navy and was formally sub-divided into four separately owned parcels. Figure 1-2 details the parcel designations (i.e., A, B, C, and D), parcel boundaries, and owner names. Locations of the Navy's Installation Restoration (IR) Program sites at the former NAWC Trenton are shown on Figure 1-3.

The former NAWC Trenton is being remediated per the August 30, 2000 Voluntary Cleanup Agreement as agreed to among the NJDEP, U.S. Department of the Army, Navy, U.S. Department of the Air Force, and U.S. Defense Logistics Agency. As outlined in the agreement, sites covered by this agreement are those not on the National Priorities List (NPL) specified at 40 Code of Federal Regulations (C.F.R.), Part 300, Appendix B and that are eligible for funding from an Environmental Restoration Account or for restoration funding from a Base Closure or Realignment Account. Response actions for release of hazardous substances, pollutants, and contaminants on sites that are being addressed under the Voluntary Cleanup Agreement must follow the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and be consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

1.1 OVERVIEW OF THE FIVE-YEAR REVIEW PROCESS

The purpose of the five-year review is to determine if the remedies selected and implemented for the sites continue to be protective of human health and the environment. The methods, findings, and conclusions of the review are documented in this Third Five-Year Review Report. In addition, the report identifies deficiencies found, if any, during the review and provides recommendations to address them.

The U.S. Environmental Protection Agency (EPA) classifies five-year reviews as either "statutory" or "policy" depending on whether it is required by statute or conducted as a matter of EPA policy

(DON, 2004). This review is required by statute. The Navy must implement five-year reviews consistent with CERCLA; Part 300.430(f)(4)(ii) of the NCP; Executive Order 12580; EPA Office of Solid Waste and Emergency Response directive 9355.7-03B-P (EPA, 2001); and Navy/Marine Corps Policy For Conducting CERCLA Statutory Five-Year Reviews (DON, 2001, Revised 2004).

As stated in the NCP Part 300.430(f)(4)(ii):

"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 is the third Five-Year Review of sites at NAWC Trenton. The first Five-Year Review was finalized in December 2003 by the Navy (EA, 2003). The triggering action for the first Five-Year Review was the on-site construction of the interim groundwater extraction and treatment system. The second Five-Year Review was finalized in December 2008 (TtNUS, 2008). Site-wide groundwater, capped soil areas and mercury in storm sewer sediment were evaluated as part of both the first and second Five-Year Reviews.

As discussed in the EPA Comprehensive Five-Year Review Guidance (EPA, 2001), a five-year review determines whether the remedy at a site is protective of human health and the environment. Where a remedial action is still under construction, a five-year review determines whether immediate threats have been addressed and whether the remedy is expected to be protective when the remedial actions are completed. In addition, a five-year review identifies deficiencies and recommends steps to correct them. To do this, the technical assessment conducted during a five-year review examines the following three questions:

- Is the remedy functioning as intended by the decision documents?

- Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

- Has any other information come to light that could call into question the protectiveness of the remedy?

These questions will be answered in Subsection X.6 (Technical Assessment) for each of the media or areas at former NAWC Trenton where a remedy has been implemented or is currently being implemented. To answer these questions this five-year review consisted of several steps including a

review of documents, interviews with personnel associated with the facility, and a site inspection of the groundwater treatment system. This report also includes the findings of a review of newly promulgated standards, and changes in the standards that were identified as applicable or relevant and appropriate requirements (ARARs) and criteria to be considered (TBCs) at the time the Decision Documents for Site-Wide Groundwater, Site 1 Soil, Site 3 Soil, Site 4 Soil, and Sites 2, 5, 6, 7, and 9 Soils were signed, and the factors used to develop site-specific, risk-based levels (if any were developed). No recalculation of risk or reassessment of risk was conducted to determine whether a remedy protects human health and the environment. Remediation goals were largely determined by the NJDEP clean-up criteria that are applicable to the various media. Where applicable, monitoring and sampling data and the documentation of operations and maintenance (O&M) are also examined and included in the subsequent media-specific sections.

1.2 OVERVIEW OF FORMER NAWC TRENTON

The former NAWC Trenton is located five miles northwest of Trenton, New Jersey, 30 miles northeast of Philadelphia, Pennsylvania, and two miles north-northeast of the Delaware River. The former NAWC Trenton consists of approximately 66 acres in Ewing Township, Mercer County, New Jersey (Figure 1-1).

1.2.1 Land Use and Characteristics

Mercer County Airport borders most of the northern and western portions of the former NAWC Trenton property, while a railroad borders the site to the east. The U.S. Naval Reserve Center is located north of the airport. The southern boundary of the former NAWC Trenton property is Parkway Avenue. Across Parkway Avenue and east of the railroad is a former General Motors Corporation manufacturing facility. East of the General Motors facility are the Gold Run Creek and three associated ponds. The Gold Run system drains southeasterly to the Delaware River. Predominantly residential, agricultural, and light-industrial areas are located further south and southwest of the former NAWC Trenton. A large portion of the land between the Delaware River and the former NAWC Trenton facility location is owned by the state of New Jersey.

Three large buildings formerly comprised the NAWC Trenton facility operations including the Blower Wing (B-40), the Test Wing (B-41), and the Exhauster Wing (B-42). Simulated and experimental atmospheric conditions for engine performance testing were provided in the Test Wing and Blower Wing buildings. The Exhauster Wing received the engine exhaust gas and simulated altitude conditions. The buildings currently remain in place; however, they were emptied by the Navy as part of the 1998 closure activities, and have no active utility hookups.

The unconsolidated overburden soil at former NAWC Trenton consists of natural alluvial deposits, in situ weathered rock, and fill. The overburden is composed mainly of silt with intermixed clay, sand, and gravel deposits that exhibit poor vertical permeability and influence local surface water runoff and infiltration. The area has been altered by excavation, filling, construction, and other disturbances. The overburden is thickest in the northern portion of the former NAWC Trenton and is thinnest in the southern portion. The thick overburden is approximately 22 feet deep and the thin overburden is approximately 6 feet deep. Average depth to bedrock is approximately 30 feet below ground surface (bgs), but ranges between 10 and 80 bgs, with the greatest depth occurring in the northeast corner of the site.

Bedrock at former NAWC Trenton is comprised of the upper strata of the Stockton Formation and the lower strata of the Lockatong Formation. The Stockton formation is comprised of sandstone with siltstone/mudstone facies. The Lockatong Formation is comprised of siltstone with sandstone and limestone facies. The contact between the two formations is gradational and a fault is located very close to the contact.

Depth to groundwater ranges from approximately 3 to 16 feet bgs. Overburden groundwater flow is influenced by numerous underground utility lines and historically by sumps operating at numerous locations across the former NAWC Trenton. Bedrock groundwater flow occurs mainly in partings parallel to bedding and in vertical partings. The general groundwater flow gradient is to the south-southeast; however, actual groundwater flow depends upon available pathways within the aquifer and the pumping influence of remedial extraction wells.

There are no permanent surface water bodies on the former NAWC Trenton property. Three shallow streams including Gold Run Creek, the western branch of Shabakunk Creek, and Jacobs Creek are located near the former NAWC Trenton. These creeks drain into the Delaware and Raritan Canal and the Delaware River.

Surface water drainage at the former NAWC Trenton is controlled by a series of storm water catch drains and underground piping. The storm water system is connected to a pipeline that discharges into the ancestral west branch of Gold Run Creek. Gold Run Creek receives surface water runoff from paved areas of the former NAWC Trenton and several other off-site sources.

1.2.2 History and Site Chronology

Important NAWC Trenton historical events and relevant dates in the site chronology are listed in the following table. The identified events are illustrative, not comprehensive.

EVENT	DATE
Navy purchases property from General Motors	1949
Commissioned as the Naval Air Turbine Test Station	1951
Re-designated as the Naval Air Propulsion Center	1975-1977
Initial Assessment Study (RGH, 1986)	1986
Site Inspection (IT, 1989)	1988-1989
Remedial Investigation (IT, 1994)	1992-1994
Interim Remedial Action– start groundwater treatment system	1995
Environmental Baseline Survey (EA, 1996, 1999)	1996-1999
Decision Documents for various soil sites	1997-1998
Supplemental Ecological Investigation (EA, 1998)	April 1998
Operational Closure under Base Realignment and Closure (BRAC) Act of 1993	Dec. 1998
Mercury decontamination and sediment removal	1998-1999
Focused Feasibility Study for Groundwater (EA, 2000) and Decision Document for Groundwater (EA, 2000)	Feb. 2000
Designation of Classification Exception Area (CEA) for Groundwater (EA, 2000)	April 2000
Cap Inspection Report (FW, 2001)	2001
First Five-Year Review (EA, 2003)	2003
Second Five-Year Review (TtNUS, 2008)	2008

The former NAWC Trenton facility property was purchased by the Navy in 1949 from General Motors and commissioned in 1951 as the Naval Air Turbine Test Station. By the mid-1980s, construction of missile-related test equipment became a priority at the site.

The primary mission of the facility was to conduct performance testing of aircraft jet engines under simulated high and low altitude conditions. The former NAWC Trenton used ethylene glycol and trichloroethene (TCE) as heat exchange media for air and fuel used during engine testing. Other tests conducted included testing of new fuels, Tomahawk Cruise Missiles, classified foreign engines, and fiber-optic digital communications. The former NAWC Trenton testing complex also included an on-site industrial wastewater treatment plant, three high-capacity water cooling towers, an automotive workshop, machine and woodworking shops, fuel and lubrication laboratories, a general chemistry laboratory, and various engineering and administrative offices.

Operational closure of NAWC Trenton occurred on December 15, 1998 under the BRAC Act of 1993. The Reuse Plan for NAWC Trenton was approved on July 15, 1996. The NAWC Trenton property was

divided into four separate parcels, Parcels A, B, C, and D. Transfer of the individual parcels from the Navy to the new owners occurred between 1997 and 2001.

The first environmental investigation at NAWC Trenton was a preliminary assessment conducted by Rogers, Golden, and Halpern (RGH) to identify areas of potential environmental concern. The preliminary assessment was limited to a reconnaissance project with no sampling. The results of the preliminary assessment were reported in the Initial Assessment Study (RGH, 1986). The study identified seven areas of potential concern (Sites 1 through 7) and recommended further investigation (See Figure 1-3).

A subsequent Site Inspection (SI) followed the preliminary assessment to confirm the presence or absence of contamination in soils and groundwater at the seven sites outlined in the Initial Assessment Study and at two additional sites (Sites 8 and 9) requested by the Navy and NJDEP (See Figure 1-3). Thirty-one soil borings and 27 groundwater monitoring wells were completed in this investigation. All nine sites were recommended for further study except for Site 2 in the Site Inspection Report (IT, 1989). Additional soil studies were recommended for Sites 3, 6, and 9. Additional groundwater investigations were recommended for Sites 1, 4, and 5.

Following the SI, a Remedial Investigation (RI) was conducted under the IR Program in two phases; Phase I in 1992 and Phase II in 1993. Groundwater was determined to be heavily impacted by chlorinated hydrocarbons, mainly TCE, 1,2-dichloroethene (DCE), and vinyl chloride (VC) in seven of the nine sites. Contaminant concentrations were significantly higher in bedrock groundwater than in overburden groundwater with the highest concentrations between Buildings 40 and 41. The soil investigation determined that soil contamination is generally limited to metals in shallow soils. The results of a baseline Human Health Risk Assessment (HHRA) determined that there were no unacceptable carcinogenic or non-carcinogenic risks based on current industrial land use. However, future residential land use scenarios posed unacceptable carcinogenic and non-carcinogenic risks. The ecological assessment determined that contaminants in surface runoff were not at levels that cause environmental impact.

1.2.3 Site Information

1.2.3.1 Site-Wide Groundwater

IR Program Sites 1 (Brine Handling Area and West-End Drainage Ditch) and Site 3 (Former Sludge Disposal Area) were identified as the primary sources for impacted groundwater at the former NAWC Trenton (see Figure 1-3).

Site 1

Site 1 is located in the southwest corner of the NAWC Trenton facility between Buildings 40 and 41 (the Blower Wing and West Wing, respectively) and the West-end Drainage Ditch. The Brine Handling Area is rectangular, measuring approximately 150 feet by 300 feet. Four types of cooling systems were used in the Blower Wing area: the brine heat exchangers, ethylene glycol coolers, Freon coolers, and cooling water towers (RGH, 1986). An average of 500 gallons per year of TCE was used as a heat exchange medium in this area. Lesser amounts of TCE (approximately 100 gallons per year) were used as a cleaning solvent. Ethylene glycol and Freon were also used as coolants in the cooling systems. Periodic leaks of TCE and ethylene glycol on primarily unpaved areas throughout Site 1 occurred from 1955, when the heat exchangers went into operation at Site 1, until operational closure. An additional estimated 1,200 gallons of TCE were spilled in this area between 1978 and 1982 as the result of three additional spills (RGH, 1986). Liquid solvents and heat exchange fluids from Site 1 systems drained into the West-end Drainage Ditch from 1951 to 1957 when the facility's Industrial Wastewater Treatment Plant was modified to receive and treat those wastes.

During the SI and RI, 23 monitoring wells were installed and several soil samples were collected from borings at Site 1. No VOCs were detected in soil at concentrations that exceeded NJDEP standards. Groundwater samples exhibited the highest TCE concentrations at the former NAWC Trenton. The maximum amount of TCE detected during the RI was located in deep bedrock well MW-36BR, immediately west of the West-end Drainage Ditch, at a concentration of 750,000 micrograms per liter (µg/L). Other chlorinated VOCs were also detected in overburden, shallow bedrock, and deep bedrock wells at Site 1. Elevated levels of dissolved aluminum and manganese exceeded NJDEP standards.

Site 3

Site 3 is located in the northeast corner of the NAWC Trenton property, nearly adjacent to the Mercer County Airport property and the Delaware and Bound Brook rail line. Site 3 was used as a disposal area for waste sludge from 1958 to 1970. The sludge was disposed in linear, north-south trending trenches. Two types of sludge were disposed at Site 3; a dry, dewatered sludge and a liquid sludge from the NAWC Trenton Industrial Wastewater Treatment Plant.

Other Sites

Historic data indicate the presence of other sites at the former NAWC Trenton with lesser impacts to groundwater but containing chemical constituents at concentrations above NJDEP Groundwater Quality Standards (GWQS) or above average background concentrations. The site-wide groundwater remedy addresses groundwater at these Areas of Concern (AOCs) and IR sites. AOCs identified during the Environmental Baseline Survey (EBS) are:

- AOC 11 – Fuel Oil Unloading Pads Outside Building 24
- AOC 12 – Aviation Fuel Unloading Pad
- AOC 20b – Building 40 Southeast Exterior Corner
- AOC 35 – Building 31 Wash Rack
- AOC 39 – Inactive Railroad Siding and Soil Adjacent to Former Waste Drum Pad
- AOC 42 – Soil Adjacent to Building 26
- AOC 60 – Substations E and I

Additional Sites identified during the RI are:

- Site 2 – Fire Fighting Area
- Site 4 – Building 41 Test Wing, Overhead Fuel Lines Leakage Area
- Site 5 – Building 42 Exhauster Wing, Overhead Fuel Lines Leakage Area
- Site 6 – Oil Contamination Near Building 34
- Site 7 – Motor Gasoline (MOGAS) Tank Area
- Site 8 – Barometric Well
- Site 9 – Former Sludge Drying Beds
- Jet Fuel Storage Tank Area

1.2.3.2 Capped Soil Areas

There are several capped soil areas at the former NAWC Trenton. Capping prevents direct contact with contaminants that exceeded NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC) including various metals, volatile organic compounds (VOCs), and polycyclic aromatic hydrocarbons (PAHs), and reduces rainwater infiltration which could lead to leaching of these contaminants from the soil. Different cap types range from concrete, flexible membrane liner, asphalt, and soil depending on the constituent of concern (COC). Areas where capped soils are located include:

- Site 1 – Brine Handling Area and West-end Drainage Ditch
- Site 4/AOC 20I – Building 41 Test Wing, Overhead Fuel Lines Leakage Area
- Site 6 – Oil Contamination Near Building 34
- Site 9 – Former Sludge Drying Beds
- AOC 23
- AOC 45
- AOC 53 (encompasses AOC 36)
- Jet Fuel Storage Tank Farm

- Area between Sites 4 and 8
- Cooling Water Sump
- Former Header Pit UST

1.2.3.3 Storm Sewer Sediment

Elevated mercury concentrations were detected in sediment from storm sewer outfalls during a supplemental ecological study following the RI. Mercury concentrations at Outfalls 1, 2, and 3 exceeded the NJDEP sediment guidance Severe Effects Level (SEL) of 2.0 milligrams per kilogram (mg/kg). Mercury concentrations were below the SEL in Outfall 4. As a result of elevated mercury concentrations, source areas were investigated and identified as AOCs in Buildings 40, 41, and 42. Mercury contamination was also discovered in the machine shop in Building 21. Mercury remediation in these buildings was completed in 1998 including removal and disposal of mercury-impacted materials. Repeated cleaning of mercury contaminated sediments from the on-site storm sewer system was conducted between March 1998 and November 1999. Outfalls 2, 3, and 4 exhibited mercury concentrations below the SEL; however, the mercury concentration at Outfall 1 stabilized slightly above the SEL. Quarterly sampling is conducted along with the site-wide groundwater sampling to determine if sediment mercury concentrations continue to be below or close to the SEL.

1.3 FIVE-YEAR REVIEW PROCESS

The former NAWC Trenton third Five-Year review was led by Mr. Jeffrey Dale, the Naval Facilities Engineering Command (NAVFAC) Remedial Project Manager. The following team members assisted in the review:

- Donna Gaffigan, NJDEP Remedial Project Manager
- Mary Mang, Tetra Tech Project Manager

This third five-year review consisted of a review of relevant documents and a site inspection conducted on September 17, 2013. Photographs taken during the site inspection are provided in Appendix A and site inspection checklists are provided in Appendix B. Upon finalization, the third Five-Year Review Report will be placed in the information repository at the Ewing Branch of the Mercer County Free Library in Mercer County, New Jersey.

Public notification that the Navy was conducting the third five-year review was provided by the Navy in August 2013. A notice of availability of the Final Third Five-Year Review Report will also be provided to the public upon its completion.

1.4 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND SITE-SPECIFIC ACTION LEVEL CHANGES

The chemical-specific ARARs identified in the Decision Document for Groundwater (EA, 2000) were reviewed, as were new federal and state regulations that have been promulgated. Table 1-1 is a summary table of ARARs and action levels that have changed since the 2000 Decision Document for Site-Wide Groundwater and the 1999 Mercury in Storm Sewer Sediment report. This section considers potential impacts of new or changed ARARs on potential risk posed to human health or the environment. This analysis determined that modifications to the selected remedy and long-term monitoring were not necessary for the sites covered by this five-year review.

The benchmarks used to select the COCs for groundwater were the NJDEP GWQS (N.J.A.C. 7:9C). The NJDEP GWQS were last modified August 23, 2010. For this review, the ARARs in effect as of the second five year review (2008) will be compared with current (2013) standards. Table 1-1 lists the COCs in groundwater. None of the NJDEP GWQS for these COCs have been changed in the last five years. Recently, NJDEP has published vapor intrusion screening levels (VISL) criteria for groundwater along with the publication of new guidance for vapor intrusion (VI) (NJDEP, 2013). These changes are not expected to significantly change the overall decisions regarding the need to treat on-site groundwater. However, to ensure the protectiveness of the remedy for the VI pathway, the monitoring wells results that exhibited concentrations exceeding VISLs should be evaluated in the context of NJDEP guidance for VI (NJDEP, 2013).

Relevant points to consider in determining whether or where to conduct a VI investigation are discussed in NJDEP guidance (NJDEP, 2013). According to Section 2.4.3 of the *Vapor Intrusion Technical Guidance*, NJDEP "requires a VI investigation where buildings are within 100 feet horizontally or vertically of free product or shallow ground water contamination in excess of the GWSL that is not PHC-related [N.J.A.C. 7:26E-1.15(a)]." Section 2.4.3 further states, "trigger distances are applied from the edge of the ground water plume based on linear interpolation (not a contaminated monitoring well) when determining which buildings should be investigated." Section 2.3.1 also states, "the trigger distance is utilized for the identification of buildings and subsurface utilities in all directions from the limits of the source (or trigger), not just downgradient based on the ground water flow."

Vapor migration may extend a short distance beyond the boundaries of the plume at NAWC Trenton, within the trigger distances mentioned earlier. The groundwater plume encompasses areas where on-site buildings exist, so any re-use of the existing structures or future development (i.e., new construction) would require an evaluation of potential VI impacts as per NJDEP guidance. The trigger distances specified in NJDEP guidance could possibly include adjacent existing properties offsite to the south and planned construction offsite to the east. As noted in the 2008 Second Five-Year Review, the United

States Geological Survey (USGS), under agreement with the Navy, reviews and interprets the routine monitoring analytical data and collected water level measurements. The USGS publishes their findings in annual reports; the 2009 annual sampling program is the most recent event for which a final report is available (USGS, 2010). As noted in the most recent report, groundwater level measurements are used to assess containment of the contaminated groundwater plume, which is the primary intention of the groundwater pump and treat remedy component. While potentiometric surface mapping shows that the cone of depression produced by MW-22BR is acting as designed and intercepting contaminated groundwater that would discharge into the reach of Gold Run located beneath Parkway Boulevard, the southern edge of the groundwater plume (along Parkway Avenue) should be determined and compared to the location of buildings located across the street to the south of NAWC Trenton. Development of Parcel C, consisting of commercial and residential properties, is also proceeding. Parcel C is separated from the Parcel B portion of the former NAWC Trenton by an active rail line that represents a buffer zone of roughly 100 feet. As further discussed in Section 2.0, a bedrock fault running east-to-west, exists beneath the southern portion of the site. The USGS has determined that this fault acts as a hydrogeologic boundary to groundwater flow south and east of the former NAWC facility. Parcel C is located on the southern and eastern sides of the fault. Monitoring wells located within and immediately adjacent to Parcel C have not exhibited site-related contaminants.

In summary, the existence of groundwater results exceeding NJDEP VISLs does not necessarily indicate that a VI problem exists at or near the former NAWC Trenton site. As noted above, the southern edge of the groundwater plume (along Parkway Avenue) should be determined and compared to the location of buildings located across the street to the south of NAWC Trenton. Groundwater data reflect a potential for adverse impact on indoor air quality based on modeling, but not actual exposure. No vapor intrusion sampling (i.e., sub-slab, near-slab, indoor air) is proposed at this time.

Some of the procedures used in risk assessment (such as how to calculate inhalation risks), and the cancer and non-cancer toxicity factors for COCs have been changed since the last five-year review. Therefore, risks might be slightly different if the HHRA were conducted at present. However, the overall decision to remediate or not remediate based on risk assessment results would not be affected by revisions to risk assessment toxicity values, and the regulatory criteria relevant for monitoring would include NJDEP GWQS and groundwater vapor intrusion screening levels. In addition, the groundwater remedy has demonstrated effectiveness in reducing site related contaminant concentrations, so while some of the risk assessment procedures have changed; the recalculation of risk is not warranted as concentrations are decreasing.

The benchmarks used to monitor mercury deposition in the sediment at the surface water outfalls is the NJDEP Guidance for Sediment Quality Evaluations Lowest Effects Level (LEL) and SEL (November

1998). These values have not changed since the last five-year review. NJDEP recently updated their *Ecological Evaluation Technical Guidance*, August, 2012, version 1.2. However, the guidance cites the same sediment evaluation criteria for mercury and provides details for the implementation of N.J.A.C. 7:26E, which is in accordance with EPA ecological guidance (1997).

Several decision documents were issued to address impacted soils at the former NAWC Trenton. These documents outline proposed remedies for those IR Program sites where concentrations of site-related contaminants were present at concentrations higher than the New Jersey Soil Cleanup Criteria which were the benchmarks used for screening in 1998. These benchmarks were revised subsequent to the 2008 Second Five-Year Review. The current NJDEP criteria are the residential and non-residential direct contact soil remediation standards (SRS) last amended May 7, 2012. In December 2008, the NJDEP issued Revised Guidance for Development of Site-Specific Impact to Groundwater Soil Remediation Standards. The changes to the criteria do not impact the decision to remediate site-related soil impacts.

In general, most of the changes in the updated documents are not expected to significantly change the overall conclusions of the site investigations and the Focused Feasibility Study (FFS). Some of the Regional Screening Level (RSL) criteria for tap water contact are lower in the updated documents, and some of the values are higher. Therefore, different chemicals might be retained as chemicals of potential concern (COPCs) during the screening if it was conducted at present. However, the decision to remediate a site is typically not based on screening benchmarks. NJDEP GWQS for groundwater and NJDEP criteria for sediment have not changed for the COCs identified in the NAWC Trenton *Decision Document for Groundwater* and the *Mercury in Storm Sewer Sediment* report (DON, 1999).

1.5 REPORT ORGANIZATION

This report has been organized to meet the general format requirements specified in the Comprehensive Five-Year Review Guidance document (EPA, 2001). Section 1.0 gives an overview of former NAWC Trenton, the five-year review process conducted for former NAWC Trenton, and a discussion of ARARs and site-specific remediation goals. Sections 2.0 through 4.0 include the five-year reviews conducted for the individual sites. Section 5.0 provides a general summary, conclusions, and protectiveness statement for former NAWC Trenton. Section 5.0 also identifies when the next five-year review is required and the tasks that should be performed as part of that five-year review.

2.0 SITE-WIDE GROUNDWATER

2.1 INTRODUCTION

In February 2000, the Navy outlined a proposed remedy to address impacted groundwater at the former NAWC Trenton facility. Although a base-wide groundwater remedy, the primary impacted areas of groundwater include two IR Program sites – Site 1, Brine Handling Area and West-End Ditch, and Site 3, Former Sludge Disposal Area. This five-year review of Site-Wide Groundwater is required by statute because hazardous substances, pollutants, or contaminants remain in groundwater at concentrations that do not allow for unlimited use or unrestricted exposure. The February 2000 Decision Document for groundwater outlined that recovery and treatment (pump and treat) of COCs in groundwater at and migrating from NAWC Trenton was warranted (DON, 2000). Pump and treat, monitored natural attenuation (MNA), as well as multiple pilot studies are currently ongoing. Pump and treat and MNA data collected during the monitoring period are evaluated within this report.

2.2 SITE BACKGROUND AND CHRONOLOGY

As outlined in Section 1, various RIs at the site including a 1992 Phase I and a 1993 Phase II, indicated that groundwater was impacted by chlorinated VOCs (CVOCs), mainly TCE and its degradation products cis-1,2-DCE, and VC. TCE, DCE, and VC contaminated groundwater was also found to be discharging into the stormwater outfall (Outfall 1) located immediately west of Building 40. In March 1995, the Navy initiated the operation of a groundwater pump and treat and MNA system to contain and monitor the contaminated groundwater and to control the groundwater discharge to the stormwater culverts. Groundwater was pumped from well MW-15BR to an on-site treatment system, which included an air stripper and two 8-foot diameter vessels containing granular activated carbon (GAC) for the removal of the CVOCs, prior to discharge to the Ewing-Lawrence Sewage Authority via a designated discharge point. In March 1998, the Navy expanded the pump and treat piping network to 14 additional wells (MW-22BR, MW-5BR, MW-20BR, BRP-2, MW-45BR, MW-29BR, MW-8BR, MW-4BR, BRP-1, MW-16BR, MW-41BR, MW-48BR, MW-31S, and the West Ditch Well) so that multiple pumping schemes could be easily implemented.

In February 2000, the Navy and NJDEP outlined the selected remedy for base-wide groundwater in the Decision Document for Ground Water at NAWC Trenton (DON, 2000). The Navy's selected remedy components include the operation of a comprehensive groundwater pump and treat system; the establishment of a CEA and Well Restriction Area (WRA) preventing the use of ground water in impacted areas; a long-term MNA program; and a program of five-year reviews by the Navy, NJDEP, and EPA. Treated groundwater would be discharged to the west branch of Gold Run Creek that is confined to a

culvert under Parkway Avenue and in accordance with a New Jersey Pollutant Discharge Elimination System (NJPDES) permit to be obtained.

In 2005, the Navy funded a pilot study to inoculate the northeast sector of the Site 1 contamination plume by injecting emulsified soybean oil (EOS) and dehalococcoides bacteria (DHC) into four wells (BRP1, MW-16BR, MW-38BR, and MW-41BR). The effort caused the CVOCs to biodegrade to below the detection limit in the wells and nearby areas for more than three years. Subsequent injections of EOS have been conducted as part of the pilot study and monitoring continues.

In spring 2007, the Department of Defense (DOD) and Strategic Environmental Research and Development Program (SERDP) in cooperation with the Navy, funded a pilot study to inoculate the most contaminated part of the Site 1 plume by injecting EOS and DHC into MW-36BR. During 2007-2008 preliminary laboratory work and field work were conducted, and in Fall 2008 the USGS and the Navy inoculated the aquifer. This effort is continuing to be evaluated.

In winter 2007, the DOD and SERDP in cooperation with the Navy funded a pilot study involving the use of Thermal Conductive Heating (TCH) to remove CVOCs from both the secondary and primary porosity of a small portion of the bedrock. During 2008, the Navy and TerraTherm conducted field work and laboratory work in preparation for a spring 2009 heating of the rock mass just north of MW-7BR and MW-24 BR. Field testing was completed in 2009 and results were summarized in several reports. Appendix C contains a summary prepared by the USGS of the research activities and reports compiled during the 2008 to 2013 five-year review period.

As of the July 2013 O&M report (Watermark, August 2013), the pump and treat system used to contain and recover impacted groundwater at the site, consisted of nine wells (BRP2, MW-8BR, MW-15BR, MW-20BR, MW-22BR, MW-29BR, MW-45BR, MW-48BR, and MW-56BR). Extraction well WDW had a flow rate of less than 0.5 gpm.

Monthly performance monitoring of untreated influent and treated effluent groundwater is conducted by the Navy in accordance with the permit equivalent NJPDES reporting requirements. In addition, quarterly sampling of extraction wells and quadrennial and biennial sampling of site monitoring wells for site-related VOCs, is conducted to assess hydraulic containment of the extraction system and monitor groundwater quality. If sufficient water is available, surface water samples are collected for VOCs from the four storm sewer manholes and the Gold Run outfall on a semiannual basis. The MNA component of the remedy is monitored in a number of wells on a quadrennial basis to assess the rate of CVOC attenuation. A full discussion of the groundwater monitoring program is presented in the Long-Term Monitoring Sampling

and Analysis Plan (SAP) dated October 2011 (Watermark, 2011). Figure 2-1 details the locations of the site recovery wells, monitoring wells, and Gold Run monitoring stations.

Figure 2-2 was developed and included in the 2011 Long-Term Monitoring SAP (Watermark, 2011) and shows a visual description of the current conceptual site model (CSM) for the former NAWC Trenton. Spills and releases from former general site activities at NAWC Trenton are the sources of contamination. Analytical results from previous site investigations have shown that the historical operations at the site have resulted in releases directly into site soils and underlying groundwater, floor drains, and stormwater catch basins that are piped to the storm sewer collection system that drains into a Navy-dedicated storm line along Parkway Avenue. The CSM is considered protective for groundwater under current use of the site. Contaminated groundwater is being captured with the extraction well network and is treated on-site before being discharged. Treated effluent is being monitored and meets discharge permit equivalency requirements.

2.3 REMEDIAL ACTIONS

2.3.1 Remedy Selection

An FFS for groundwater was completed in February 2000 in response to the recommendations of the Phase I and Phase II RIs. The FFS addressed base-wide groundwater at NAWC Trenton. The remedial alternatives (pump and treat and MNA) were developed and implemented for IR Program Sites 1 and 3, where the most substantial impacts to groundwater were identified (EA, 2000). Sites 1 and 3 were identified in the RIs as the primary source areas for impacted groundwater. As detailed in the FFS, lesser-impacted groundwater at the remaining IR sites and at AOCs identified during an Environmental Baseline Survey will be addressed by the Site 1/Site 3 groundwater remedy because these lesser-impacted areas mainly contain the same COCs and are predominantly located within or upgradient of the main plume area. For purposes of the FFS, the plume was defined as groundwater containing COCs above NJDEP GWQS. Table 2-1 details the groundwater COCs as identified in the FFS.

In 2000, the Navy and NJDEP outlined in the Decision Document for Ground Water that Comprehensive Ground-Water Recovery (pump and treat and MNA) was the selected remedy. The Decision Document outlined continuation of the Interim Remedial Action and ongoing groundwater monitoring programs at NAWC Trenton with activation of existing extraction wells south of the bedrock fault and west of Site 1. Expansion of the treatment facility to handle the additional flow was also included. A CEA for the area exceeding NJDEP GWQS and a WRA preventing the use of impacted groundwater were also components of the selected remedy. Table 2-2 summarizes the remedial action objectives (RAOs), remedy and performance metrics for site-wide groundwater.

2.3.2 Remedy Implementation

The Navy has implemented the selected remedy as outlined in the 2000 Decision Document. A CEA and WRA were established per NJDEP guidance to address impacted groundwater containing COCs that exceed NJDEP GWQS (EA, 2000). Operation of the Interim Remedial Action pump-and-treat system was expanded in 1998 to recover impacted groundwater at and west of NAWC Trenton and south of the bedrock fault. The Navy received a permit per NJPDES regulations approval to change the discharge of treated groundwater from the Ewing-Lawrence Sewer Authority system to the west branch of Gold Run Creek.

Long-term groundwater monitoring for evaluation of MNA and pump and treat system performance continue to be implemented on a routine basis. The First Five-Year Review was completed in 2003; the Second Five-Year Review was completed in 2008.

2.3.3 Remedy Cost

As this is the Third Five-Year Review, the capital costs for implementation of the groundwater extraction and treatment system were not reviewed.

2.3.4 System Operations/Operation and Maintenance

Routine O&M of the pump and treat system is currently conducted for the Navy by Watermark Environmental, Inc. (Watermark). O&M activities are being conducted in accordance with the June 1998 *Operation and Maintenance Manual, Groundwater Treatment Building, Naval Air Warfare Center* and recent updates. The O&M plan provides operating information relative to the extraction well pumps and pump controllers and the treatment system. Groundwater, storm water outfall, and sediment monitoring are being conducted in accordance with the October 2011 *Long-Term Monitoring Sampling and Analysis Plan (SAP)* for the Former Naval Air Warfare Center (Watermark, 2011).

2.4 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

The following recommendations and follow-up actions were developed based on the second five-year review (2008) for site-wide groundwater. Progress since the last five-year review is provided.

Issue	Previous Recommendation/ Follow-Up Actions	Current Status
Infiltration of CVOC impacted groundwater discharge into the storm sewer system.	Navy to investigate southern extent of Site 3 plume to determine if discharging into Gold Run.	Ongoing. *Remedial Action Report, Evaluation of Groundwater Infiltration to Gold Run Creek* (submitted September 2010); *Tier II Sampling and Analysis Plan for West Ditch Area Groundwater Infiltration Investigation* (submitted June 2012); and *Interim Report of Results, West Ditch Groundwater Infiltration Investigation* (submitted May 2013). Navy is currently implementing piping replacement and repairs to structures in the West Ditch; work expected to be completed 2014.
Continue operation of pump and treat system and monitoring.	Navy to continue operation of the groundwater pump and treat system and monitoring of Gold Run and storm sewer outfalls.	Ongoing. Routine monitoring is being conducted. Operating reports issued on a monthly basis. Monitoring reports issued on a quarterly basis.
Conduct Five-Year Reviews	Navy to conduct five-year review for groundwater.	Ongoing. Second Five-Year Review issued December 2008.

2.5 FIVE-YEAR REVIEW PROCESS

2.5.1 Site Inspection

A site inspection of the groundwater treatment plant was conducted on September 17, 2013. The extraction system wells and piping were not inspected. Site wells are inspected on a routine basis. The December 2012 biennial certification for the groundwater CEA included the well inspection and repair records for the October 2011 and May 2012 events. The Five-Year Site Inspection Checklist from the September 2013 inspection is included in Appendix B.

2.5.2 Document and Analytical Data Review

This five-year review consisted of a review of relevant documents for the site-wide groundwater remedy including:

- *Focused Feasibility Study*, (EA, 2000).
- *Decision Document for Ground Water* (EA, 2000).
- *Operations and Maintenance Manual* (OHM, 1995) and updates.
- Monthly O&M reports [*July 2013 Groundwater Treatment Facility Report* (Watermark, August 2013) (most recent)].

- Annual groundwater monitoring reports [*Summary Report 2013 Annual (Spring) Sampling Event* (Watermark, October 2013) (most recent)].
- USGS administrative report, *Ground-Water Levels, and Potentiometric Surfaces, Naval Air Warfare Center, West Trenton, New Jersey 2009* (dated April 2010).
- Potentiometric surface figures for 2010 and October 2013 prepared by the USGS.
- 2013 draft report prepared by the USGS titled, *Chlorinated Solvents Concentrations in Monitoring Wells, Naval Air Warfare Center, West Trenton, NJ, 1992-2012.*

2.6 TECHNICAL ASSESSMENT

2.6.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

- ***Remedial Action Performance:*** The 2000 Decision Document required the recovery and treatment of groundwater COCs migrating from NAWC Trenton in order to meet the following remedial objectives:

    - Prevent human exposure to contaminants in groundwater.
    - Prevent off-site migration of contaminants in groundwater that exceed New Jersey GWQS, and prevent migration of contaminants that exceed New Jersey SWQS to off-site surface water bodies.
    - Reduce contaminant concentrations in groundwater to meet New Jersey GWQS, unless it is determined by NJDEP to be technically impracticable to do so.
    - Prevent adverse impacts to aquatic ecosystems.
    - Treat and/or control free and residual product, unless it is determined by NJDEP to be technically impracticable to do so.

To address the RAO to prevent human exposure to groundwater, the Navy submitted documentation to the NJDEP and a CEA is in place for the former NAWC Trenton. The most recent biennial certification for the groundwater CEA was submitted in December 2012 (Tetra Tech, 2012). Figures 2-3 through 2-5 detail the CEA boundaries and groundwater sampling results for the site organic COCs from the most recently monitored sampling event for each individual well. Based on these figures and the most recent sampling results, the CEA boundary does not include two bedrock wells, MW-11BR and MW-50BR, which exhibited TCE concentrations slightly above the current GWQS. Bedrock wells MW-21BR, MW-40BR, and MW-60BR also exhibited TCE concentrations above the GWQS and are located near the boundary of the CEA. Tables 2-3 through 2-6 summarize the most recent VOC COC analytical results for each well for the monitoring period of May-June 2010 through

July 2013. Tables 2-7 through 2-8 summarize site-related inorganics for the most recent monitoring event for each well. Because groundwater concentrations exceed current GWQS, the CEA designation needs to be maintained and may need to be extended northeast and possibly, southwest of the site.

The NJDEP also designated the former NAWC Trenton CEA as a WRA, which prohibits the installation of a production well or a well to be used for potable water supply until NJDEP GWQS are achieved. Based on a 2012 well search conducted by the NJDEP in accordance with requirements of the Biennial Certification of Groundwater CEAs, no reported supply or potable wells have been installed within the CEA/WRA boundaries (Tetra Tech, 2012).

To meet the RAOs to prevent off-site migration of site-related groundwater contaminants above GWQS and impact surface water at concentrations greater than SWQS, and to reduce contaminant concentrations in groundwater to meet New Jersey GWQS, unless it is determined by NJDEP to be technically impracticable to do so, the existing pump and treat groundwater extraction system was expanded by the Navy in 1998 and 2000 to (1) recover COC mass from the overburden and bedrock groundwater, and (2) establish hydraulic control of the plume to prevent the migration of impacted groundwater to offsite areas. The Navy conducts routine groundwater sampling of a number of site monitoring wells and selected surface water locations in order to assess current site conditions and to evaluate whether the remedial objectives of the pump and treat and MNA remedies are being met. The USGS, as technical advisor to the Navy, compiles groundwater sample concentration data for certain site-related COCs and prepared maps and sections to show the vertical and lateral extent of contamination. The USGS, working with the Navy, has conducted these yearly analyses since the early 1990s. The 2013 draft report, *Chlorinated Solvents Concentrations in Monitoring Wells, Naval Air Warfare Center, West Trenton, NJ, 1992-2012* provides the most recent analysis of the current extent of the TCE, cis-1,2-DCE, and VC plumes (as depicted by concentrations in groundwater). Figure 2-6 shows the current extent of the site-related TCE plume near land surface (overburden and shallow bedrock) and Figure 2-7 shows the current extent of the site-related TCE plume about 150 feet below land surface (deep bedrock). The current groundwater concentrations for the site organic COCs exceeding NJDEP GWQS in the groundwater extraction wells are illustrated in Figure 2-3, the exceedances in the overburden or shallow bedrock are illustrated in Figure 2-4, and the exceedances in the deeper bedrock are illustrated in Figure 2-5.

It should be noted that since 2010, the frequency of sampling of the site monitoring wells was decreased in agreement with the NJDEP. Therefore, the data represented in various figures and tables is reflective of the most recent sampling results for a given well. Sampling rationale, frequency

and parameters are detailed in the *Long Term Monitoring Final Sampling and Analysis Plan* dated October 2011 (Watermark, 2011).

As noted in the 2013 draft USGS report, *Chlorinated Solvents Concentrations in Monitoring Wells, Naval Air Warfare Center, West Trenton, NJ, 1992-2012*, USGS reviewed the current results and compared these groundwater concentrations to those measured since the early to mid-1990s. Based on this review, the USGS concluded that 1) as a result of the containment and remediation schemes, the CVOC plumes (TCE, cis-1,2-DCE, and VC) related to the Site 3 source area, have reduced in size since first mapped in 1995; 2) as a result of the containment and remediation schemes the CVOC plumes related to the Site 1 TCE source area have reduced in size since first mapped in 1995; and 3) the core concentration in the Site 1 plume has decreased in size and the lateral extent of the Site 1 CVOC plumes appear to be stable. Further details and discussion can be found in the cited USGS report.

In addition to groundwater monitoring, the Navy collects water elevation measurements on a yearly basis to interpret the groundwater flow directions and to assess whether the groundwater extraction wells are preventing the off-site migration of CVOCs through the capture of the groundwater plumes. Under agreement with the Navy, analytical data and water level measurements from the annual monitoring event are reviewed and interpreted by the USGS and published in annual reports. Water level measurements and potentiometric surface maps have been measured and prepared for the site since the early 1990s. The September 2009 water level measurements are the most recent event for which a published report is available (USGS, 2010). As noted in the 2010 USGS report, continuous groundwater levels were measured in 15 monitoring wells from January 1, 2009 through December 31, 2009. During the 2009 event, water levels were measured in 124 wells on September 2, 2009. The USGS report included a series of cross sections depicting the water-level altitude and potentiometric surface.

Potentiometric surface maps for 2010 and 2013 were also prepared by the USGS for water levels collected on August 31, 2010 and October 24-25, 2013, respectively. Figure 2-8 shows the potentiometric surface for the shallow elevation (or near the land surface) for 2010 and Figure 2-9 shows the 2010 potentiometric surface for a deeper elevation (of approximately 100 feet below ground surface). Figure 2-10 shows the potentiometric surface for the shallow elevation (or near the land surface) for October 2013 and Figure 2-11 shows the October 2013 potentiometric surface for a deeper elevation (of approximately 100 feet below ground surface).

The following conclusions are summarized from the August 2010 USGS report. For the 2009 monitoring period, the USGS concluded that the synoptic water-level data show that the cone of

depression created by pumping well MW-48BR intercepts the flow of contaminated groundwater from the Site 3 contamination source area, as designed. The cone of depression does not intercept the down-gradient part of the CVOC plume that developed prior to implementing the pump and treat remedy. As outlined in the Decision Document, MNA is the remedy for this portion of the groundwater plume. The USGS also concluded based on the 2009 water level measurements, that the pumping of well MW-22BR is acting as designed and intercepts contaminated groundwater that would otherwise discharge into the nearby reach of Gold Run. Pumping of extraction wells MW-15BR, MW-20BR, MW-45BR, WDW, BRP-2, and MW-56BR created a cone of depression that prevents discharge of site-related groundwater to Gold Run and the lower reach of the West Ditch. Discharge of contaminated groundwater to the upstream reach of the West Ditch is occurring based on review of preliminary data and this discharge causes contamination of the downstream reach of the West Ditch and of Gold Run.

To meet the RAO to treat and/or control free and residual product, in 1999, the Navy excavated more than 30,000 cubic yards of heavily contaminated soil between Buildings 40 and 41. In addition, the Navy is conducting a bioremediation pilot test started in 2005, and designed to reduce the concentrations of CVOCs in shallow bedrock in the Site 1 northeast sector. The Navy is conducting a second bioremediation pilot test, started in 2007, designed to reduce concentrations of the most highly contaminated deep fractured bedrock source areas. A third pilot test evaluation, Thermal Conductive Heating in the Site 1 contamination area, was conducted in 2009 to determine the effectiveness of this technology in destroying the contaminant mass within the aquifer's fractured bedrock. The Navy continues to work with the USGS to identify and evaluate technologies for treatment of groundwater impacted by former site activities.

To meet the RAO to prevent adverse impacts to aquatic ecosystems, surface water samples are collected by the Navy on a semiannual basis from the Gold Run/storm water culvert that is located along the southern boundary of the facility immediately adjacent to Parkway Avenue and from the four storm sewer outfalls of the NAWC Trenton facility. Results from the semiannual sampling are included in the sampling reports that are provided to the NJDEP. Figure 2-12 details the surface water/storm water line sampling locations and Table 2-9 summarizes the results from the surface water/storm water sampling events conducted from 2009 through July 2013. Based on these results, site-related VOC concentrations, primarily TCE and VC, have exceeded their respective NJDEP SWQS at various outfall locations for the majority of sampling events. No other contaminants have been detected on a routine basis during the five-year review period. As noted in Section 2.4, the Navy is investigating the infiltration of site-related impacted groundwater discharge into the storm sewer system, particularly in the vicinity of the West Ditch and Outfall 1 locations. Based on the investigations conducted to date, the Navy will be implementing replacement or repairs to the piping

and structures located in the West Ditch. The objective of these repairs is to reduce and/or eliminate the discharge of contaminated site groundwater into the West Ditch and eventually to Gold Run. The pipe replacement and structure repairs are expected to be completed in 2014.

The review of documents and the results of the site inspection indicate that the remedy is in general, functioning as intended by the Decision Document. Site groundwater is being intercepted by the pumping of various extraction wells and the mass of site-related contaminants has decreased since the 1990s as reflected by the size and concentration levels in the Site 1 and Site 3 CVOC plumes. The Navy is investigating the infiltration of groundwater into the storm sewer system, particularly in the vicinity of the West Ditch and Outfall 1 locations. Replacement or repairs to the piping and structures located in the West Ditch will be completed in 2014. The area of the CEA designation should be reviewed with NJDEP to determine if the boundary needs to be extended.

- ***System Operations/O&M:*** O&M of the groundwater recovery and treatment system is conducted on a routine basis. Monthly results of O&M activities (including carbon replacements) and sampling are provided by the Navy's contractor and forwarded to the Navy and NJDEP. Treatment system influent and effluent waters are sampled and analyzed each month. Groundwater monitoring is conducted on a semiannual, annual, biennial, or quadrennial basis. During the semiannual sampling events, only the extraction or recovery wells are sampled. Annual groundwater sampling consists of the extraction/recovery wells and select monitoring wells. Water level measurements are recorded on a daily basis for certain wells; a site-wide collection of water levels is conducted on an annual basis. Gold Run/storm water culvert samples are collected on a semiannual basis from a storm drain along the northern side of Parkway Avenue (between Parkway Avenue and the former NAWC Trenton facility) and from several outfalls that direct discharge into the storm drain. Results from each monitoring event are summarized by the Navy's subcontractor and forwarded to the Navy and NJDEP.

  During the five-year review period (2008–2013), the Navy addressed various operating issues related to the groundwater treatment system. Due to exceedance of vapor phase effluent requirements and damage to the vapor phase treatment system equipment, the Navy shut down the groundwater extraction and treatment system from December 29, 2010 to March 2011. System operation resumed in March 2011 at a reduced extraction rate (30-35 gallons per minute) by bypassing the current air stripping treatment process and treating the influent groundwater with liquid phase granular activated carbon (LGAC). Based upon engineering evaluations and performance testing, the Navy modified the system process treatment from air stripping, LGAC effluent polishing, and vapor phase treatment to just LGAC treatment. In September 2012, the Navy submitted to the NJDEP an evaluation of various treatment options and recommendation to install additional LGAC units, refurbish the piping on existing LGAC units, and modify back flushing to optimize LGAC consumption.

The upgraded capacity was designed to operate at the Navy's targeted extraction rate of 60 gallons per minute (DON, 2012). System upgrades were made during December 2012 and January 2013 resulting in reduced extraction rates during the upgrade period. Active operations were resumed in February 2013. As part of the system upgrade, the Navy has conducted additional and more frequent treatment system performance monitoring to monitor the effectiveness of the LGAC units. As of July 2013, the reported average effective flow rate was 36.6 gallons per minute and the system was operational 69.3 percent of the monitored period (Watermark, 2013). During the preceding monthly period (June 2013), the reported average effective flow rate was 47.9 gallons per minute and the system was operational 96.9 percent of the monitored period (Watermark, 2013).

Effluent from the groundwater treatment plant is monitored on a monthly basis for total recoverable copper and several organic compounds including TCE as outlined in the NJPDES permit equivalent. In addition, flow rates, total suspended solids, chronic toxicity, and pH of the effluent discharge are also monitored and recorded. Monitoring results are submitted on a monthly basis to the NJDEP. During the July 2013 monitoring period, TCE was detected in the effluent at levels higher than permit limitations. Based on additional testing, it was determine that the effluent exceedance was due to fouled carbon in the new carbon units. The system was shut down on July 23, 2013 and the carbon will be replaced. Review of the April 2013, May 2013, and June 2013 monitoring reports did not show any effluent limitations. Copies of the April, May, June, and July self-monitoring report sheets are included in Appendix D.

- ***Cost of System Operations/O&M:*** Navy funded O&M costs for the five-year review period for the groundwater extraction and treatment system including long-term monitoring events and the groundwater infiltration investigation and associated remediation work are summarized below.

YEAR	TREATMENT PLANT OPERATIONS/LTM	INFILTRATION INVESTIGATION AND REMEDIATION	UTILITY COSTS
2009	$628,284	Included in Operations and LTM	$50,000
2010	$660,243	$221,006	$55,000
2011	$76,077	$120,066	$55,000
2012	$549,291	Funded 2010/2011	$51,709
2013	$348,076	$1,127,501	2009-2012 Surplus Utilized

- ***Implementation of Institutional Controls and Other Measures:*** The Navy has implemented the institutional controls associated with the selected remedy. These include the establishment of the

CEA and WRA per NJDEP regulations. Well inspection and repair logs are included for the subject two-year period in each biennial certification. The most recent biennial certification was conducted in 2012.

During the five-year review period, the Navy also prepared documentation related to an Alternative Notification and Public Outreach Plan in accordance with NJDEP Technical Requirements for Site Remediation, N.J.A.C. 7:26E and other applicable requirements. Approval of the Navy's plan was received from the NJDEP on May 4, 2010.

- ***Monitoring Activities:*** The Navy conducts routine sampling of groundwater extraction wells, selected surface water/storm water locations, and most site groundwater monitoring wells (24 wells were sampled during the Spring 2013 event). The Navy collects synoptic groundwater elevation data during the annual sampling event, and collects continuous groundwater elevation data through the use of transducers in selected site wells. The next comprehensive sampling round for both VOCs, inorganics, and MNA parameters is scheduled for Spring 2014.

- ***Opportunities for Optimization:*** 1) The Navy recently relocated the discharge point for the treated groundwater in order to improve the capture efficiency of the extraction system in the shallow groundwater zone. 2) The Navy with the USGS continues to evaluate two pilot tests for bioremediation. A thermal conductive heating pilot test was conducted during the five-year review period. The objective of these tests is to evaluate the potential for advance remedial technologies to improve the efficiency of the groundwater remediation by reducing the volume of free and residual product that continues to serve as the source of the groundwater contamination.

- ***Early Indicators of Potential Remedy Problems:*** As noted in the 2008 Second Five-Year Review, the groundwater plume was impacting the surface waters of Gold Run through discharge of groundwater into the storm sewer outfalls or structures. One interpreted cause of this impact was the short-circuiting of the groundwater extraction system by the site's groundwater treatment plant, which was discharging the treated groundwater in the immediate vicinity of the extraction wells. To address this, in 2008, the Navy relocated the treatment plant's discharge outfall to an area downgradient, and outside of, the groundwater extraction zone. The Navy continues to further investigate the discharge of groundwater into Gold Run surface waters. Based on field investigations and additional surface water sampling, including video surveys and soil sampling, the Navy is implementing replacement and repairs to piping and structures located in the West Ditch in an effort to minimize groundwater discharge. The replacement/repair work is scheduled to be completed in 2014.

2.6.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels and RAOs Used at the Time of Remedy Selection Still Valid?

- ***Changes in Standards and TBCs:*** Revised health-based regulatory criteria were included in the tabular comparison of recent groundwater monitoring data for this five-year review (See Tables 2-3 through 2-8). NJDEP GWQS criteria for tap water exposure were not changed for any of the inorganic and organic site-related COCs. NJDEP VISL criteria have been published along with the publication of revised guidance for VI (NJDEP, 2013). EPA has released an external review draft of new VI guidance (EPA, 2013a).

- ***Changes in Exposure Pathways:*** As shown on Figure 1-2, the former NAWC property is divided into four parcels. Parcel A is used for vehicle and equipment parking and storage by Mercer County. Currently, the majority of Parcel B is not used or inactive; however, future commercial/industrial development is planned. The Navy operated groundwater treatment plant building and storage sheds are located to the west of the West Ditch. Beginning in 2012, Parcel C started being actively developed for mixed commercial and residential use. Parcel D is owned by Ewing Township and is now actively used by the Township for drop-off and staging of residential leaf and brush cuttings.

  Although nearby developments will utilize public water supplies, possible groundwater plume impacts may still need to be further evaluated with respect to VI, based on criteria specified in recent NJDEP guidance (NJDEP, 2013). Well sampling results that exceed NJDEP VISLs are shown in Table 2-10 (along with well screened intervals). Figure 2-13 shows the most recent overburden or shallow well concentrations of site-related COCs that are above VISLs. Figure 2-4 shows the extent of the TCE plume at approximate land surface interpreted from overburden and shallow bedrock well data. As shown on Figure 2-13, a fault line is located along the southern perimeter of the site. As noted in the USGS report, this fault acts as a hydrogeologic boundary to groundwater flow south and east of the former NAWC facility. In the event any of these wells are within 100 feet of commercial buildings or homes, this could trigger the need for further evaluation. (Note: NJDEP VI guidance addresses several issues or lines of evidence relevant to deciding whether or how to proceed with a VI investigation, including the proximate location of a non-aqueous phase liquid (NAPL) zone, the presence of a clean water lens that protects against upwards migration originating from deeper groundwater, the depth to saturated zone and stratigraphy, fluctuations in depth to saturated zone, complex hydrogeologic settings, proximity to preferential pathways that could allow rapid lateral transport for vapor migration, and the potential for contaminant degradation). The groundwater treatment building is a slab-on-grade structure (i.e., no crawl space or basement) and is accessed only for activities related to O&M of the treatment system components. Aside from the interpretation of revised VI guidance, the other concern that could result in changes in exposure pathways relates to future commercial/industrial development of Parcel B. In the future, the Gold Run/storm water drain system may be dismantled and a new system constructed for the intended use of the site. The

new storm water conveyance system if built, will have to deal with the spring near MW-9BR and, unless the new system is hermetically sealed, groundwater from beneath Parcel B will rise and discharge through it.

- ***Changes in Toxicity and Other Contaminant Characteristics:*** Since the last five year review in December 2008, the following changes in toxicity factors have been published for COCs listed in the NAWC Trenton February 2000 Decision Document: Two of the primary groundwater COCs, TCE and tetrachloroethene (PCE), have undergone revisions to toxicity factors since the last five-year review.

    - For PCE, the oral cancer slope factor (SFO) was revised downwards [2.1E-3 versus 0.54 milligrams per kilogram per day (mg/kg/day)$^{-1}$], the cancer inhalation unit risk (IUR) was revised downwards [2.6E-7 versus 5.9E-6 micrograms per cubic meter (µg/m^3)$^{-1}$], the non-cancer oral reference dose (RfD) was revised downwards (6E-3 versus 0.01 mg/kg/day), and the non-cancer inhalation reference dose (RfC) was revised downwards [4E-2 versus 0.27 milligrams per cubic meter (mg/m^3)]. (Note that a decrease in the cancer SFO or cancer inhalation unit risk (IUR) would yield lower cancer risk estimates at a given chemical exposure concentration, while a decrease in the non-cancer RfD or non-cancer RfC would indicate the potential for greater non-cancer toxicity – i.e., a lower threshold concentration for ruling out non-cancer toxicity.)
    - For TCE, the SFO was revised upwards [0.046 versus 0.013 (mg/kg/day)$^{-1}$], the IUR was revised upwards [4.1E-6 versus 2.0E-6 (ug/m^3)$^{-1}$], a new RfD was published (5E-4 mg/kg/day versus no prior value available), and a new RfC was published (2E-3 mg/m^3 versus no prior value available). In addition, TCE was recently classified as a mutagen, which increases cancer potency for early life exposure.

Other toxicity factors were also revised, and included several chlorinated VOCs:

- For 1,2-dichloroethane, the non-cancer RfD was revised downwards (6E-3 versus 0.02 mg/kg/day), and the non-cancer RfC was revised downwards (7E-3 versus 2.4 mg/m^3). The previous cancer SFO and cancer IUR have been rescinded and no published values are currently recommended for use.
- For 1,1-dichloroethane, the non-cancer RfC was rescinded, and no published value is currently recommended for use.
- For cis-1,2-DCE, the non-cancer RfD was revised downwards (2E-3 versus 0.01 mg/m^3). For bromodichloromethane, a new cancer IUR was published [3.7E-5 (ug/m^3)$^{-1}$ versus no prior value available].

The only inorganic COC associated with a revised toxicity value was chromium (hexavalent species), with a new published cancer SFO, 0.5 $(mg/kg/day)^{-1}$ versus no prior value available.

- ***Changes in Risk Assessment Methodologies:*** There have been a few minor changes, but no major changes in HHRA methodology since the last five-year review completed in December 2008, and only minor changes since the February 2000 Decision Document. Minor changes are listed as follows:

    - Certain chemicals were classified as mutagens, which require a modified cancer risk calculation using age-dependent-adjustment-factors (ADAFs). The adjustments multiply the effective cancer potency by either 10 or 3 during early life exposure periods (EPA, 2005). For groundwater, ADAFs would apply to hexavalent chromium and TCE.
    - Risk assessment methodology was revised for calculating inhalation cancer risks and inhalation non-cancer hazard quotients (EPA, 2009). This would affect risks to residential receptors exposed to VOCs during showering. The revised method utilizes IURs and RfCs in place of inhalation slope factors and inhalation RfDs, respectively. Body weight and breathing rate have been factored out of the new inhalation risk calculations.
    - For groundwater COCs, some of the RSL criteria for tap water contact are lower in the updated documents, and some of the values are higher. Therefore, in a few cases different chemicals might be retained as COPCs during the screening if it was conducted at present. However, the decision to remediate a site is typically not based on screening benchmarks because of their conservative nature, and the parent chlorinated VOCs and associated degradation products would still be selected as COPCs if the screening process were to be revised using current benchmarks.

  Some of the cancer and non-cancer toxicity factors have been changed, withdrawn, or added. Therefore, risks might be slightly different if the HHRA were conducted at present. However, the overall decision to remediate or not remediate based on risk assessment results would not be affected, and the regulatory criteria relevant for monitoring would still be the NJDEP standards for groundwater.

2.6.3 Question C: Has Any Other Information Come to Light that Could Call Into Question the Protectiveness of the Remedy?

The Navy is currently operating a groundwater extraction and treatment system for removal of site-related contaminants and institutional controls have been established. Concentrations of site-related contaminant(s) at levels, at or above their respective NJDEP GWQS, have decreased in site wells since the implementation of the remedy, but are present in several wells located immediately adjacent to or

beyond the CEA boundary. The USGS and Navy have concluded that the discharge of contaminated groundwater to the upstream reach of the West Ditch is occurring and that this discharge causes contamination of the downstream reach of the West Ditch and of Gold Run.

Investigation of potential VI impacts may be warranted for that portion of Parkway Avenue as bordered by Jack Stephan Way and Outfall #4 depending upon measured distances from the existing monitoring well network. The groundwater treatment plant building is accessed only for system O&M related activities; it is not occupied.

As noted under Question B, Changes in Exposure Pathways, future building development of Parcels A, B, and D will need to address potential VI and mitigation, if necessary.

No other information has been identified that has affected the protectiveness of the remedy.

2.7 ISSUES, RECOMMENDATIONS, AND FOLLOW-UP ACTIONS

Based on the results of the site inspections and the review of available reports and data, Table 2-11 summarizes the issues, recommendations, and follow-up actions that were identified and are recommended for site-wide groundwater:

2.8 PROTECTIVENESS STATEMENT

The selected remedy for site-wide groundwater is expected to be protective of human health and the environment upon completion. Data collected and assessed show implementation of remedy components that will prevent a potential or actual exposure pathway is underway, and expected to be protective upon completion. In the interim, exposure pathways that could result in unacceptable risks are being controlled.

The Navy is implementing recommendations outlined in the Second Five-Year Review Report (TtNUS, 2008) regarding the infiltration of volatile organic compound (VOC)-impacted groundwater into the Gold Run storm sewer system. Replacement and repairs to the piping and structures within the West Ditch will be implemented by the Navy in 2014. Continued monitoring and evaluation of this issue will be conducted by the Navy and USGS. In addition, the Navy working with the USGS continues to evaluate and test various treatment technologies to improve the effectiveness of the groundwater remedy. The Navy routinely submits monitoring reports to the NJDEP regarding the operation and effectiveness of the site-wide groundwater remedy.

The groundwater pump and treat system was expanded to include impacted groundwater beneath the former NAWC Trenton facility and south of the bedrock fault and when operating successfully, is hydraulically effective at controlling most of the Site 1 and Site 3 groundwater plumes. The treatment system is effective in removing CVOCs from the contaminated groundwater and discharge limits are being met. Site-related CVOC levels in groundwater are decreasing. Routine operation and maintenance of the groundwater pump and treat system is ongoing and monitoring of the treatment system influent and effluent and site-wide groundwater is occurring on a regular basis. Monitoring activities are conducted in accordance with the Operation and Maintenance Manual (OHM, 1995) and its updates, and the Long-Term Monitoring SAP for the Former NAWC (Watermark, 2011).

Institutional controls, including the establishment of CEA and WRA designations for site groundwater have been implemented by the Navy and biennial certifications are prepared and submitted to NJDEP. The institutional controls place restrictions on use of site groundwater. No new supply wells have been installed within the facility boundaries. TCE concentrations in the northeast and southwest portion of the site were above the GWQS in several wells located outside or near the CEA boundary.

The Navy will determine the distance from impacted site monitoring wells to off-site properties and will include monitoring well MW-33S in the long-term monitoring program to evaluate the need for further action, if any, per NJDEP VI Technical Guidance. Future development activities conducted within Parcels A, B and D may warrant engineering controls. The Navy has formally notified the current parcel owners that future development activities need to address applicable NJDEP regulations.

Because contaminants remain in the groundwater at concentrations above NJDEP GWQS, continued operation of the groundwater pump and treat system, MNA, and pilot studies to investigate advanced remediation methods are warranted. In addition, long-term monitoring for plume extent and system performance are necessary until concentrations of groundwater COCs fall below current GWQS or action levels. Continued establishment of the CEA and WRA will insure that site groundwater is not used as a source of drinking water. Until groundwater levels are below NJDEP GWQS, additional five-year reviews will be required.

3.0 CAPPED IMPACTED SOIL AREAS

3.1 INTRODUCTION

As part of the SI (IT, 1989) and RI (IT, 1994) field activities at the former NAWC Trenton facility, sampling and analysis of site surface and subsurface soils was conducted. Investigations were conducted at each of the nine IR Program sites and a number of AOCs that were identified during the EBS conducted in 1996; a site-wide Phase II EBS investigation was completed in 1999 and recommended that groundwater at several AOCs be addressed under the site-wide groundwater RI and FFS. Results of the soil sampling investigations were compared to NJDEP soil cleanup criteria for residential, non-residential (industrial), and impact to groundwater scenarios. Based on these comparisons, the Navy implemented remedial actions consisting of the placement of soil, concrete, asphalt, or flexible membrane liners as engineering controls (caps) at the following IR Program sites and AOCs:

- Concrete Apron (AOC 53 and AOC 36)
- Jet Fuel Storage Tank Farm
- AOC 45
- IR Site 1
- IR Site 4
- Area between IR Site 4 and Site 8
- IR Site 6
- IR Site 9
- AOC 23
- Cooling Water Sump
- Former Header Pit Underground Storage Tank

Locations of each of the capped soil areas are shown in Figure 3-1. Table 3-1 provides a summary of the individual cap types and their extent. The following is a brief description of each of the capped soil sites.

3.2 SITE BACKGROUND AND CHRONOLOGY

Concrete Apron (AOC 53 and AOC 36) - AOC 53 is located between Buildings 65 and T-1 within Parcel A (Figure 3-1). As discussed in the previous five-year review (EA, 2003), construction workers at Buildings 65 and T-1 found an ash-like material approximately 2-feet bgs. Soil boring data collected during the EBS confirmed that this ash-like material was present at the site. Analysis of the ash found arsenic concentrations that exceeded the NJDEP soil cleanup criteria for Residential Direct Contact Soil and Non-Residential Direct Contact exposure scenarios.

AOC 36 is located in the area south of Building 31 where aerial photographs indicated that a coal boiler plant and coal piles were previously located. Soil borings during the EBS confirmed that a thin layer of coal ash was present at AOC 36.

The concrete cap located over AOC 53, AOC 36, and surrounding areas (Figure 3-1) is maintained by the Navy to reduce rainwater infiltration and to mitigate direct contact with the soil. Prevention of rainwater infiltration reduces the leaching of soil contaminants into the groundwater.

The approximate areal extent of the concrete capped area at AOC 53 and AOC 36 is 946,530.43 square feet (sq ft).

Jet Fuel Storage Tank Farm - The jet fuel storage tank farm is located southeast of the concrete apron (Figure 3-1). The tank farm contains 18 aboveground tanks formerly used to store jet fuel. These tanks were transferred with the property (Parcel A) and are currently unused. In the mid-1990s, a flexible membrane was installed at grade, within and around the tank farm, to contain spilled fluid from the storage tanks. Prior to membrane installation, concentrations of methylene chloride in soils were found to exceed NJDEP Impact to Ground Water soil cleanup criteria. The liner at the former jet fuel storage tank farm prevents rainwater from leaching methylene chloride into the groundwater.

The approximate areal extent of the flexible membrane capped area at the Jet Fuel Storage Tank Farm is 25,367.59 sq ft.

AOC 45 - AOC 45 was identified because of scarring that was identified on aerial photographs from approximately 1952. AOC 45 is located south of former drum storage area S-34 (Figure 3-1). Results from soil sampling conducted during the EBS Phase II indicated that PAHs and metals exceeded NJDEP residential and non-residential soil cleanup criteria. Between October 1997 and September 1998, the Navy conducted a test pit investigation to further delineate the extent of contamination and to remove impacted soils. Arsenic concentrations that exceeded NJDEP residential and non-residential criteria were present north of the AOC 45 test pits locations. In October 1998, the Navy installed an asphalt cap to prevent surface exposure to the contaminated soils.

The approximate areal extent of the asphalt capped area at AOC 45 is 4,361 sq ft.

IR Site 1 - IR Site 1 is located in the area between Buildings 40 and 41 (the Blower Wing and the Test Wing, respectively) and the West Ditch (Figure 3-1). The West Ditch is a collection basin where surface water runoff entered the sewer system. From 1951 until 1957, liquid waste solvents and heat exchanger fluids from various Site 1 systems discharged into the West Ditch. In 1958, floor drains from Buildings 40,

41, and 42 that formerly discharged to the West Ditch were reconnected to flow into the Barometric Well. Oil/water separators previously in use at the buildings were also removed.

The West Ditch was rectangular and measured approximately 25 feet by 400 feet. The ditch was an open swale until 1970, at which time a corrugated sewer pipe was installed and the ditch was backfilled. The ditch has served as a major storm drainage route for the facility since 1951, and has received runoff from the brine handling area since 1955.

Ethylene glycol and TCE were used in heat exchangers and associated piping systems at IR Site 1 from 1955 to 1997. Approximately 500 gallons of TCE and 10,000 gallons of ethylene glycol are believed to have been released in this area due to periodic leaks from pipe flanges and fittings. Releases occurred primarily in unpaved areas. The Navy retrofitted piping within the Site 1 area in 1975 and in 1986. Additional quantities of TCE, estimated to have totaled 1,200 gallons, were released in the area as the result of three spills that occurred between 1978 and 1982 (DON, 1998).

Based on the RI field investigations that included soil, soil vapor, and groundwater sampling and analysis, it was determined that soil located within IR Site 1 exceeded NJDEP soil cleanup criteria for select VOCs, semivolatile organic compounds, and inorganic compounds. Results also indicated that groundwater beneath the site might be impacted from the various soil contaminants. In 1998, the Navy elected to excavate the most elevated contaminated soil (above NJDEP criteria) from IR Site 1, specifically between Buildings 40 and 41 and towards Building 48, from the existing ground surface to the top of bedrock or groundwater (approximately 6-8 feet below grade). Approximately 30,000 cubic yards of excavated soil was transported offsite for treatment and disposal. The disturbed areas were backfilled to grade with clean soil. A soil cap was then installed over the remaining areas of the site (i.e., West Ditch) to limit potential for direct contact with PAHs and inorganic compounds.

The approximate areal extent of the soil capped area at IR Site 1 is 80,975.27 sq ft.

IR Site 4 and AOC 20i – IR Site 4 is an area of ground located at the eastern side of the west end of Building 41 (Test Wing). Soil in the area was impacted by leakage from overhead jet fuel lines that were in the area. Between 1965 and 1970, jet fuel was released on approximately ten different occasions at IR Site 4. The amount of fuel lost in significant releases was not recorded, but is estimated at a maximum volume of approximately 3,000 gallons (DON, 1998).

AOC 20i consisted of Structure S-32, a 20,000 gallon above ground storage tank and sump. The tank contained closed circuit water for the cooling system associated with propulsion testing (DON, 1998). The storage tank and nearby sump were transferred with the property in 2002 (Parcel B).

Based on soil sampling and analysis conducted during the RI and EBS field investigations, benzo(a)anthracene and benzo(b)fluoranthene concentrations exceeded NJDEP residential and nonresidential soil cleanup criteria. To protect human health and the environment, the Navy installed an impermeable asphalt cap over Site 4.

The approximate areal extent of the Site 4 cap, including AOC 20i, is 5,450.96 sq ft.

Area between IR Site 4 and Site 8 – This area is located between Buildings 41 (Test Wing) and 42 (Exhaust Wing) as detailed on Figure 3-1. Soil between the buildings was impacted by leakage from overhead jet fuel lines that ran between the two buildings. In February 1983, a release of approximately 3000 gallons of a 50/50 mixture of ethylene glycol and water also occurred on the ground surface between Buildings 41 and 43. Based on the 1993 RI and the 1996 EBS field investigations, soil in the area between IR Site 4 and IR Site 8 (Barometric Well) was found to contain antimony, arsenic, lead, zinc, and several PAH compounds that exceeded NJDEP residential soil cleanup criteria. Arsenic, zinc and benzo(a)pyrene concentrations, at depths greater than 2 feet below grade, also exceeded non-residential (industrial) cleanup criteria. To protect human health and the environment, the Navy installed a soil cap over the area between IR Site 4 and Site 8.

The approximate areal extent of the soil capped area between IR Sites 4 and 8 is 28,725.64 sq ft.

IR Site 6 (Oil Contamination near Building 34) – Site 6 is the former location of two 25,000-gallon underground storage tanks previously used for the storage of sludge from the on-site industrial wastewater treatment plant from 1957 to 1986. The tanks were removed by the Navy in March 1988 in accordance with state regulations. As detailed on Figure 3-1, Site 6 is located west of Building 60 (and Building 34) and approximately 100 feet north of the Cooling Towers. Soil samples collected during the RI field investigation exhibited elevated antimony and cadmium concentrations above NJDEP residential soil cleanup criteria. Arsenic soil concentrations exceeded both residential and non-residential criteria. Beryllium was found at a concentration above its respective cleanup goal at one location. Both the elevated arsenic and beryllium soil concentrations were detected at depths greater than 10 feet below grade. A soil and concrete cap is located at Site 6.

The approximate areal extent of the soil and concrete capped area at Site 6 is 18,495.07 sq. ft.

IR Site 9 (Former Sludge Drying Area) – Primary clarifier sludge from the facility industrial wastewater treatment plant was air-dried in sludge beds at this location from approximately 1966 to 1968. The sludge material may have contained residual solvents, oils, or other common waste materials generated at

various buildings and shops at the former NAWC Trenton. The sludge beds were constructed of sand and overlying drain tiles. Upon drying, the sludge was transported to IR Site 3 and buried. Soil samples collected during the RI field investigation indicated that antimony and cadmium concentrations exceeded NJDEP residential soil cleanup criteria; detected arsenic concentrations exceeded both residential and non-residential criteria. As outlined in the 2003 Five-Year Review Report (EA, 2003) the arsenic concentrations that exceeded non-residential criteria were detected at 0-2 feet and 12-14 feet below grade at one location. Subsequent samples collected adjacent to this location did not confirm elevated arsenic concentrations in the soil at 0-2 feet below grade. A soil cap is in place at Site 9 to limit the potential for direct contact with subsurface soils.

The approximate areal extent of the soil capped area at Site 9 is 5,531.01 sq ft.

AOC 23 – Area of Concern 23 is located between Buildings 41 and 42 as shown on Figure 3-1. The area was used by base personnel for the cleaning of rust, carbon, and unused fuel from the gas coolers that were used to cool engine exhaust gas as it left the test cells prior to discharge to the atmosphere. The rust, carbon, and unused fuel materials were piled adjacent to the coolers prior to disposal. Soil samples collected during the EBS field investigation indicated that soil adjacent to the eastern-most gas cooler contained arsenic at concentrations exceeding both NJDEP residential and non-residential soil cleanup criteria. Further delineation of soil contamination in this area was conducted by the Navy in October and November 1998. Due to the access limitations caused by the presence of above-ground structures and underground utilities, the Navy elected to install an asphalt cap over the contaminated area.

The approximate extent of the asphalt cap at AOC 23 is 1,769.64 sq ft.

Cooling Water Sump – As shown on Figure 3-1, the cooling water sump is located west of Building 41 along an asphalt drive. The sump was removed by the Navy and as part of the removal activities post-excavation soil samples were collected and submitted for laboratory analysis. Based on the analysis, benzo(a)anthracene exceeded residential soil cleanup criteria at one location. Barium concentrations also exceeded its respective residential criteria, and arsenic and beryllium exceeded both their respective residential and non-residential criteria. The excavated area was backfilled with clean material and the Navy installed an asphalt cap to prevent surface exposure of the impacted soil.

The approximate extent of the asphalt cap at the former Cooling Water Sump location is 864 sq ft.

Former Header Pit Underground Storage Tank – As shown on Figure 3-1, the former header pit is located adjacent to the south side of Building 42. In January 1999, the Navy abandoned in place (removal of tank contents, cleaning and filling with grout) a 550-gallon waste oil underground storage tank

at this location (FWEC, 2001). Structural integrity issues prohibited the tank's removal. As part of the tank abandonment, soil sampling was conducted adjacent to the tank. Based on the analytical results, several soil samples exhibited concentration of various PAH compounds that exceeded residential and non-residential direct contact soil cleanup criteria. To prevent potential exposure to impacted soils, the Navy installed a soil cap over the tank and adjacent area.

The approximate extent of the soil capped area at this site is 264 sq ft.

Figure 2-2 was developed and included in the 2011 Long-Term Monitoring SAP (Watermark, 2011) and shows a visual description of the current conceptual site model (CSM) for the former NAWC Trenton. Spills and releases from former general site activities at NAWC Trenton are the sources of contamination. Analytical results from previous site investigations have shown that the historical operations at the site have resulted in releases directly into site soils and underlying groundwater, floor drains, and stormwater catch basins that are piped to the storm sewer collection system that drains into a Navy-dedicated storm line along Parkway Avenue. The CSM is considered protective for soil under current use of the site. Remaining impacted soils at the site are capped and the Navy conducts routine inspection and monitoring of the capped areas in accordance with the April 2001 *Cap Maintenance Plan*.

3.3 REMEDIAL ACTIONS

3.3.1 Remedy Selection

The following Decision Documents were agreed to by the Navy and NJDEP for the IR Program soil impacted areas at the former NAWC Trenton:

- *Decision Document for Installation Restoration Site 1 Soil,* dated September 9, 1998.
- *Final Decision Document for Installation Restoration Sites 2, 5, 6, 7, and 9,* dated January 21, 1998.
- *Final Decision Document for Installation Restoration Site 3,* dated January 21, 1998.
- *Decision Document for Installation Restoration Site 4 Soil,* dated July 21, 1998.
- *Decision Document for Installation Restoration Site 8 Soil,* dated October 28, 1998.

The Decision Documents detail the remedies that were selected for each of the IR Program site impacted soil areas. The following remedies were selected and implemented for each site:

SITE NUMBER	REMEDIAL ACTION OBJECTIVE	SELECTED REMEDY	REMEDY IMPLEMENTED
Site 1 including AOCs 4, 20, 20a, and 20h	Prevent exposure to impacted soils	Excavation of impacted soil between Buildings 40 and 41 to bedrock or the groundwater table, whichever is encountered first; soil cover.	Excavation implemented; soil cover in place; Declaration of Environmental Restriction in place.
Site 2	Prevent exposure to impacted soils	Institutional or engineering control to prevent exposure to soils with contaminants above state residential soil cleanup criteria.	Declaration of Environmental Restriction in place.
Site 3	Prevent exposure to impacted soils	Institutional or engineering control to prevent exposure to soils with contaminants above state residential soil cleanup criteria.	Declaration of Environmental Restriction in place.
Site 4 Encompassing AOC 20i and AOC 30a	Prevent exposure to impacted soils	Placement of an impermeable asphalt barrier over the site.	Asphalt cover in place; Declaration of Environmental Restriction in place.
Site 5	Prevent exposure to impacted soils	Institutional or engineering control to prevent exposure to soils with contaminants above state residential soil cleanup criteria.	Declaration of Environmental Restriction in place.
Site 6	Prevent exposure to impacted soils	Institutional or engineering control to prevent exposure to soils with contaminants above state residential soil cleanup criteria.	Soil and/or concrete cover in place; Declaration of Environmental Restriction in place.
Site 7	Prevent exposure to impacted soils	Institutional or engineering control to prevent exposure to soils with contaminants above state residential soil cleanup criteria.	Declaration of Environmental Restriction in place.
Site 8 - Area Between IRP Sites 4 & 8 encompassing AOC 29	Prevent exposure to impacted soils	Institutional or engineering control to prevent exposure to soils with contaminants above state residential soil cleanup criteria.	Soil cover in place; Declaration of Environmental Restriction in place.
Site 9	Prevent exposure to impacted soils	Institutional or engineering control to prevent exposure to soils with contaminants above state residential soil cleanup criteria.	Soil cover in place; Declaration of Environmental Restriction in place.

The April 2011, *Cap Maintenance Plan, NAWC Trenton, NJ* (Navy, 2011) addresses the inspection and maintenance of caps that were implemented at several of the IRP sites noted above, and the AOCs that were addressed in the *Final Site-Wide Phase II EBS Investigation for Naval Air Warfare Center Trenton (Ewing Township), New Jersey* (EA, 1999).

3.3.2 Remedy Implementation

The Navy has implemented the selected soil impacted remedies in accordance with the Decision Document for each IR Program site and the Cap Maintenance Plan for the EBS AOCs. Section 3.2 details the removal activities (if any) that the Navy implemented for each of the respective soil impacted areas and the type of cap (if required) that was placed over the impacted soils. Figure 3-1 details the location of the capped areas (both IRP sites and AOCs), type of cap (soil, asphalt, concrete, or impermeable liner), and the areal extent. In addition to soil removal and capping, the Navy prepared Declaration of Environmental Restrictions (DERs) for the two property parcels (Parcel A and Parcel B) that contain impacted soil areas. The DERs serve as institutional controls for the capped soil areas and restrict activities that would disturb the caps in a manner that causes an unacceptable risk of exposure to human health or the environment. There are no AOCs or impacted area located within Parcel C or Parcel D.

The Navy inspects the capped soil areas semiannually and maintains them in accordance with the 2001 *Cap Maintenance Plan*. As outlined in the Second Five-Year Review Report, asphalt and concrete caps are inspected for extreme differential settling, cracking of the asphalt/concrete layers, and removal or alteration. Soil caps are inspected for possible disturbances including erosion, removal, or alteration. The flexible membrane liner is inspected for possible disturbance or removal of the overlying 6-inch layer of gravel, the liner itself, and/or the underlying sand/cement layer.

3.3.3 Remedy Cost

Costs for implementation of the selected remedies at the nine sites are not included in this Third Five-Year Review Report.

3.3.4 System Operations/Operation and Maintenance

There are no operating systems associated with the capped areas. Maintenance of the individual capped areas is conducted in accordance with the April 2001 *Cap Maintenance Plan*. Semiannual inspections were conducted during the five-year reporting period in accordance with the Cap Maintenance Plan and are included in the biennial certifications that are submitted by the Navy to the NJDEP on a regular basis.

In December 2012, the Navy prepared and submitted to the NJDEP a *Biennial Certification Monitoring Report for Remedial Action Protectiveness – Soil* (Tetra Tech, 2012) which addresses the institutional and engineering controls (caps) that have been implemented by the Navy. Inspection, maintenance and

repair logs for the two-year period 2010-2011 were included in the 2012 report. The next biennial certification is due in December 2014.

3.4 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

The following recommendations and required actions were outlined in the 2008 Second Five-Year Review:

Issue	Previous Recommendation/ Follow-Up Actions	2008 Status
Need to confirm that applicable deed was filed for Parcel A	Navy will confirm filing of deed during biennial certification to be performed in accordance with N.J.A.C. 7:26E-8.	On September 30, 2008, the Navy submitted a letter to the Mercer County counsel requesting a copy of the filed deed (see Appendix B of the Second Five-Year Review). No response has been received to date.

As noted in the December 2012, *Biennial Certification Monitoring Report for Remedial Action Protectiveness – Soil*, the Quitclaim Deed (dated 5/29/2001) for Parcel A (County of Mercer Airport Administration) and its associated DER have not been filed with the Registry of Deeds for Mercer County. A copy of the most recent correspondence from the Navy to Mercer County requesting a copy of the recorded deed is included in Appendix E. To date, the Navy has not received the requested information. The deed for Parcel B has been filed, as required.

Based on this review, the following recommendations and required actions are outlined:

Issue	Previous Recommendation/ Follow-Up Actions	Current Status
Parcel A Need to confirm that applicable deed was filed with Mercer County.	Navy will confirm filing of deed during biennial certification to be performed in accordance with N.J.A.C. 7:26E-8.	On July 9, 2012, the Navy submitted an email to the Mercer County counsel requesting a copy of the filed deed (see Appendix C) No response has been received to date.

3.5 FIVE-YEAR REVIEW PROCESS

3.5.1 Site Inspection

In December 2012, the Navy prepared and submitted to the NJDEP a *Biennial Certification Monitoring Report for Remedial Action Protectiveness – Soil* (Tetra Tech, 2012) which addresses the institutional

and engineering controls (caps) that have been implemented by the Navy. Inspection, maintenance, and repair logs for the two-year period 2010-2011 were included in the 2012 report and are included in Appendix D of this report. The next biennial certification is due in December 2014 and will address the 2012 and 2013 monitoring periods.

As part of the Third Five-Year Review site inspection, photographs of a number of the soil caps were collected. The photo log, including the soil capped areas, are included in Appendix A.

3.5.2 Document and Analytical Data Review

This five-year review consisted of a review of relevant documents for the soil capped areas including the Decision Documents (see above), *Final Cap Maintenance Plan* (DON, 2001) and the *Biennial Certification Monitoring Report for Remedial Action Protectiveness – Soil* (Tetra Tech, 2012).

3.6 TECHNICAL ASSESSMENT

3.6.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

- ***Remedial Action Performance:*** The review of documents and the results of the site inspection indicate that the remedy is functioning as intended by the respective Decision Document for each of the IR Program sites and the *Cap Maintenance Plan* for the AOCs. Based on the completed activities, the remedial action objective to prevent exposure to site impacted soils is being met, and there are no deficiencies or early indicators of potential remedy failure.

- ***System Operations/O&M:*** There are no system operations associated with the implemented remedies at the capped areas. The Navy conducts routine inspections of the capped areas in accordance with the *Cap Maintenance Plan.* The most recent *Biennial Certification Monitoring Report for Remedial Action Protectiveness – Soil* which addresses the institutional and engineering controls (caps) that have been implemented by the Navy was submitted to NJDEP in December 2012. Inspection, maintenance, and repair logs for the two-year period 2010-2011 were included in the 2012 report. The next biennial certification is due in December 2014.

- ***Cost of System Operations/O&M:*** There are no significant costs associated with the O&M of the implemented remedies at each of the nine sites.

- ***Implementation of Institutional Controls and Other Measures:*** The Navy has implemented the selected institutional controls for each of the sites. DERs have been provided in the deeds for

Parcels A and B that contain impacted soil sites. The Navy is continuing to work with the Mercer County Counsel to have the deed filed for Parcel A. The Parcel B deed has been filed, as required.

- In 2012, Nassimi Realty (current owner of Parcel B) conducted a soil removal, north of Building 42. The soil removal did not occur within an AOC and/or engineering control. Details of this soil removal were documented in the report, "*Remedial Action Report, April 2012, Former Naval Air Warfare Center"* (Compliance Management International, 2012).

- ***Monitoring Activities:*** The caps on each of the sites are monitored on a routine basis in accordance with the *Cap Maintenance Plan* (DON, April 2001).

- ***Opportunities for Optimization:*** No opportunities for optimization were identified.

3.6.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives Used at the Time of the Remedy Selection Still Valid?

- ***Changes in Standards and TBCs:*** NJDEP soil cleanup standards have been revised for various contaminants since the remedies were implemented at each of the nine sites. However, soils at certain locations were excavated and disposed offsite, and/or caps were constructed to prevent potential exposure. Notices regarding the nature and extent of impacted soils have been placed in the deeds for Parcels A and B and the Navy continues to coordinate inspection/maintenance and development activities with the parcel owners. The implemented remedies are in place, are maintained by the Navy, and remain protective.

- ***Changes in Exposure Pathways:*** Land use has not changed for the impacted soil sites covered in this review. The 2008 Second Five-Year Review noted the current land use for Parcels A and B as industrial. Current land use is more accurately identified as government for Parcel A (owned and operated by County of Mercer, New Jersey) and inactive commercial/industrial for Parcel B (owned by N&H Mercer Realty LLC/Nassimi Realty). Future actions will be required should development or changes in land use of either Parcels A or B occur and impact any of the remedies currently in place.

- ***Changes in Toxicity and Other Contaminant Characteristics:*** Since the 2008 review, there have been no significant changes in toxicity or other contaminant characteristics that would affect the protectiveness of the implemented remedies at the nine impacted soil sites.

- ***Changes in Risk Assessment Methodologies:*** There have been no significant changes in HHRA or ERA methodology that would affect the protectiveness of the remedies at each of the nine sites. The exposure assumptions used to develop the baseline HHRA during the RI were conservative and

included residential and/or recreational use of on-site and immediate off-site areas (EA, 2003). There have been no changes in land use at Parcels A and B, and no change to the risk assessment assumptions is warranted.

3.6.3 Question C: Has Any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?

No human health or ecological risks have been identified during this review, and no weather-related events have impacted the protectiveness of the remedies for each of the sites.

3.6.4 Technical Assessment Summary

According to the information reviewed and the 2013 SI, the selected remedies are functioning as intended by the Decision Documents and Cap Maintenance Plan for the various sites. The Navy is monitoring the development activities that are being implemented within Parcel B. To date there has been no changes in the physical conditions of the sites that would affect the protectiveness of the implemented remedies. The caps and institutional controls are in place.

3.7 ISSUES, RECOMMENDATIONS, AND FOLLOW-UP ACTIONS

Based on the results of the site inspection and the review of available reports, Table 3-2 summarizes issues, recommendations, and follow-up actions that were identified for capped impacted soil areas.

3.8 PROTECTIVENESS STATEMENT

The remedy selected for impacted soils in the AOCs and IR Sites listed in Section 3.1 at the Former NAWC Trenton facility has been successfully implemented to date and is protective of human health and the environment under current land use. Where appropriate, and as agreed to with the NJDEP, impacted soils were removed from various sites within Parcels A and B of the former NAWC Trenton. In addition, the Navy has implemented the remedy that was selected for each of the impacted areas including the placement of soil, concrete, asphalt, or flexible membrane liners as engineering controls (caps) over soils that exhibited concentrations that exceeded NJDEP soil cleanup criteria. The caps were installed and are being inspected and maintained by the Navy in accordance with the April 2001 Final *Cap Maintenance Plan* (DON, 2001). The caps were most recently inspected in 2013. Inspection, maintenance, and repair logs for the 2010 and 2011 monitoring period were included in the *Biennial Certification Monitoring Report for Remedial Action Protectiveness – Soil* (Tetra Tech, 2012). Institutional controls, including notices in the deeds for Parcels A and B have been implemented by the Navy. The Navy continues to coordinate with Mercer County regarding the completion of the filing activities for the Parcel A deed. Communication

and coordination with the owners of the various parcels is ongoing in order to facilitate the development of the site and minimize and/or prevent damage to capped areas. Future development activities conducted within the capped areas will be monitored for protectiveness.

4.0 MERCURY IN STORM SEWER SEDIMENT

4.1 INTRODUCTION

As part of the equipment testing conducted by the Navy at NAWC Trenton, pressure-reading instruments, including manometers and barometers, were used. Many of these instruments contained mercury which through breakage made its way into floor drains that ultimately discharged into the on-site storm sewer system. The on-site storm drains and associated outfalls (1 through 4) were identified as potential pathways for mercury migration from the source areas investigated in Buildings 21, 40, 41, and 42. Figure 4-1 details the storm sewer system layout and outfall locations at the Former NAWC facility. As shown, the majority of the storm sewer system is located beneath Parcel B. All four outfall locations are located along the Parkway Avenue boundary of Parcel B. A portion of the storm sewer collection system is located beneath Parcel A.

4.2 SITE BACKGROUND AND CHRONOLOGY

Under the Navy's IR Program, suspected sites of environmental contamination at NAWC Trenton were investigated to determine if contamination was present. As a follow-up to the 1994 RI, the NJDEP required the Navy to perform an ecological study on Gold Run to assess the impact that storm water runoff from the former NAWC Trenton may have had on the downstream environment. Based on a Supplemental Ecological Investigation (EA 1998, 2000) and field sampling of sediment material collected from four on-site storm water outfalls (1 through 4), it was determined that sediment in the storm water outfalls contained elevated mercury concentrations ranging from 4.3 mg/kg (Outfall No. 3) to 60.1 mg/kg (Outfall No. 2). Current NJDEP *Guidance for Sediment Quality Evaluations* (NJDEP, 1998) outlines 0.2 mg/kg (dry weight) as the LEL screening value and 2.0 mg/kg (dry weight) as the SEL screening value for mercury. LELs indicate concentrations at which adverse benthic impact may begin to occur (level tolerated by most benthic organisms). SELs indicate concentrations at which severe impacts to the benthic community occur for most of the cases studied. Based on the sediment sampling investigation, the Navy conducted an investigation of potential source areas in the on-site buildings and on-site storm sewer system. Mercury decontamination and cleanup activities, including the grouting of floor drains, were conducted by the Navy in Buildings 21, 40, 41, and 42 in 1998 (Navy 1999). From March 1998 through November 1999, the Navy performed several cleaning operations of the on-site storm drains including flushing and cleaning of outfalls, manholes, and catch basins. Post removal sediment sampling by the Navy was also conducted from August 1998 through May 1999. Post removal sampling was conducted in accordance with the April 1998 Storm Drain Sediment Sampling Work Plan for NAWC (EA, 1998).

Subsequent to the late 1990s storm drain cleanings and samplings, sediment samples were collected in March 2000 from each of the four outfalls and then on a quarterly basis beginning in March 2001. Sampling is currently conducted in accordance with the *Long-Term Monitoring SAP for the Former Naval Air Warfare Center* dated October 2011 (Watermark, 2011). Based on the quarterly sampling results, the Navy conducts storm drain cleanings on an as-needed basis. During the five-year period covered by this review, the Navy conducted storm water drain and sediment cleanings in August 2011 (H&S, 2011). Storm water and sediment removed from the drains are transported off-site to a permitted facility for treatment.

Figure 2-2 was developed and included in the 2011 Long-Term Monitoring SAP (Watermark, 2011) and shows a visual description of the current conceptual site model (CSM) for the former NAWC Trenton. Spills and releases from former general site activities at NAWC Trenton are the sources of contamination. Analytical results from previous site investigations have shown that the historical operations at the site have resulted in releases directly into site soils and underlying groundwater, floor drains, and stormwater catch basins that are piped to the storm sewer collection system that drains into a Navy-dedicated storm line along Parkway Avenue. The CSM is considered protective for storm sewer sediment under current use of the site. The Navy conducts quarterly monitoring of the sediment that collects in the storm sewer outfalls and has the sediment removed and disposed as needed. Sediment monitoring is conducted in accordance with the conclusions outlined in November 1999 *Mercury in Storm Sewer Sediment* (Navy, 1999).

4.3 REMEDIAL ACTIONS

4.3.1 Remedy Selection

No decision document has been issued for storm sewer sediment and subsequently, no RAOs have been identified. The results of the 1997 through 1999 investigation, cleanings, and post removal sampling events were summarized in a November 1999 report, Mercury in Storm Sewer Sediment (DON, 1999). The report outlined that sample results from the 1998 through 1999 post removal sampling events indicated that mercury levels in the outfalls and associated manholes/catch basins have been reduced significantly by the cleaning operations; however, additional sampling is necessary to show that all locations have been reduced to acceptable levels (i.e., LEL and SEL screening values). Current NJDEP *Guidance for Sediment Quality Evaluations* (NJDEP, 1998) outlines 0.2 mg/kg (dry weight) as the LEL screening value and 2.0 mg/kg (dry weight) as the SEL screening value for mercury. The report concluded that additional sampling of outfalls, manholes, and catch basins would be conducted until two consecutive results below the action/cleanup level (LEL (0.2 mg/kg) or SEL (2.0 mg/kg) as required) are obtained for each location. Additional sampling of Outfall 4 would be conducted to determine if this

location exceeds the action/cleanup level. Additional flushing and cleaning of outfalls, manholes, and catch basins would be conducted in the future, as necessary, based on post removal sampling results.

As noted above, the cleanup levels for mercury in sediment are the freshwater sediment screening guidelines LEL (0.2 mg/kg) or SEL (2.0 mg/kg). Monitoring and removal of contaminated sediment are to be conducted until two consecutive results below the action/cleanup level are obtained for each location.

4.3.2 Remedy Implementation

The Navy investigated and identified potential source areas for mercury in the storm drain sediment and implemented decontamination and cleaning operations at Buildings 21, 40, 41, and 42 in 1998. Cleaning of the storm sewer system was also implemented in 1998 and 1999. Post removal sampling was conducted as part of the 1998/1999 storm sewer system cleanings.

The Navy currently conducts sampling of the sediment from each of the four outfalls on a quarterly basis. Cleaning is conducted on an as-needed basis, as determined by the quarterly sampling results. The most recent cleaning operation occurred in August 2011 in the Outfall 1 (OF-1) basin as documented in the October 2011 *Summary Report for Repair Activities – July-August 2011* prepared by H&S Environmental. Based on recent monitoring results, the Navy will be conducting sediment removal from Outfalls 1, 2, 3, and 4 (if sufficient material is present) as part of the planned West Ditch piping repairs/replacement work.

4.3.3 Remedy Cost

The Navy currently conducts quarterly sampling of the four outfalls that are connected to the storm sewer system. Based on these results, the Navy conducts cleaning of the storm sewer system on an as-needed basis. The Navy has noted that less sediment appears to be accumulating in the outfalls basins (based on visual inspections). The most recent cleaning was conducted in August 2011 in the West End Ditch connected to Outfall 1 (H&S, 2011). The average cost for quarterly sampling, including laboratory analyses is about $500.00 per event. The cost incurred in 2011 for cleaning of the West End Ditch (Outfall 1) was approximately $10,000.

4.3.4 System Operations/Operation and Maintenance

There are no operating systems or O&M associated with the monitoring/cleaning recommendations for mercury in storm sewer sediment.

4.4 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

The following recommendations and required actions were developed for storm sewer sediment based on the previous five-year review.

Issue	Previous Recommendation/ Follow-Up Actions	Current Status
Mercury recurring in sediment within the on-site storm sewers.	Continue monitoring mercury concentrations in the storm sewer outfalls in accordance with the Long-Term Monitoring Plan (Watermark, 2011). Clean storm sewer outfalls and sewer lines as needed.	Ongoing.

4.5 FIVE-YEAR REVIEW PROCESS

4.5.1 Site Inspection

No inspections of the on-site sewers were conducted during the 2013 site inspection. However, as noted in Section 2.0, the Navy is conducting an investigation of groundwater infiltration in the West Ditch area. As part of that investigation two video surveys were conducted in 2011. The first video survey was conducted in that portion of piping between the West Ditch headwall southward to Manhole 140. A second video survey was performed along the lowest segment of the West Ditch, between the downgradient outlet of the former oil/water separator and Outfall 1. The results of the video inspection are provided in the May 2013 Interim Report of Results of the West Ditch Groundwater Infiltration Investigation (DON, 2013).

4.5.2 Document and Analytical Data Review

This five-year review consisted of a review of relevant documents for the mercury in storm water sediment remedy including the *Mercury in Storm Sewer Sediment at the Naval Air Warfare Center, Aircraft Division* report (DON, 1999), the *Long-Term Monitoring SAP for Former NAWC* (Watermark, 2011), various Summary Reports for quarterly and annual sampling events, which include results from the routine sediment monitoring events (ECOR, 2009-2010; H&S, 2011; and Watermark, 2012-2013), and the *Second Five-Year Review Report* (TtNUS, 2008). Table 4-1 is a summary of the analytical results from the routine sediment monitoring events conducted from February 2009 through July 2013.

4.6 TECHNICAL ASSESSMENT

4.6.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

- ***Remedial Action Performance:*** No decision documents were issued for the mercury in storm sewer sediment remedy. However, the review of documents and conversations with the Navy indicate that the Navy is implementing quarterly sampling and periodic cleaning operations as recommended in the November 1999 report, *Mercury in Storm Sewer Sediment* (DON, 1999). Based on the completed and ongoing activities, the intent and goals of the recommendations for monitoring the storm sewer sediment are being met. The overall impact of the mercury in storm sewer sediment monitoring and periodic cleanouts has reduced exposure pathways to mercury concentrations in the outfall sediments.

- ***System Operations/O&M:*** There are no system operations or routine O&M required for the mercury in storm sewer remedy.

- ***Cost of System Operations/O&M:*** No system operations or O&M costs are associated with this remedy. The Navy incurred costs of approximately $10,000 for the August 2011 outfall cleaning, including disposal of recovered storm water and sediment. The average cost of quarterly monitoring, including analysis and reporting is approximately $500.00 per event.

- ***Implementation of Institutional Controls and Other Measures*:** Institutional controls are not part of the mercury in storm sewer sediment remedy.

- ***Monitoring Activities:*** The Navy currently conducts monitoring of Outfalls Nos. 1 through 4 on a quarterly basis in accordance with the 2011 *Long-Term Monitoring SAP for the Former NAWC* (Watermark, 2011). Table 4-1 details the results from quarterly sampling conducted from February 2009 through July 2013. Based on the July 2013 analytical results, the mercury concentration in a sediment sample collected from Outfall 2 exceeded current NJDEP sediment screening value for SEL. The mercury concentration of sediment in Outfall 1 slightly exceeded the current NJDEP sediment screening value for LEL. Figure 4-2 details the outfall sample locations that the Navy monitors including Outfall 2.

  In May 2013, the Navy notified the NJDEP that based on investigation activities related to the West Ditch groundwater infiltration study, that they intend to repair and/or replace various segments of piping upstream of Outfall No. 1 (DON, 2013). As part of these repairs, the Navy intends to inspect and remove accumulated sediment (if sufficient material is present) from Outfalls No. 1, 2, 3, and 4.

- ***Opportunities for Optimization:*** No opportunities for optimization were identified.

- ***Early Indicators of Potential Remedy Problems:*** No deficiencies were noted in the remedy that has been completed and the current long-term monitoring and cleaning operations. Current levels of mercury are, in general, substantially lower than those observed prior to the remedy implementation.

4.6.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and RAOs Used at the Time of Remedy Selection Still Valid?

- ***Changes in Standards and TBCs:*** Since the 2008 five-year review, there have been no changes in the NJDEP sediment screening values for SEL and LEL for mercury.

- ***Changes in Exposure Pathways:*** Since the last five-year review in 2008, there have been no changes in the exposure pathway for mercury in storm sewer sediments. The majority of the storm sewer system is located within the Parcel B boundary; a small portion is located beneath Parcel A. A portion of Parcel A is used by Mercer County for staging of vehicles and equipment. Currently, there are no active operations within Parcel B. However, future commercial and/or industrial development is planned for Parcel B. At that time, the current structures and storm water drain system will be dismantled and a new storm water collection system constructed for the intended use of the parcel. The removal of the existing structures and storm water drain system will eliminate the exposure pathway for sediment at Parcel B. The current storm sewer layout is not located beneath Parcel C and Parcel D, as shown on Figure 4-1.

- ***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in the ecological screening benchmark for mercury.

- ***Changes in Risk Assessment Methodologies:*** The ERAs for NAWC Trenton were conducted following EPA guidance as outlined in the 1997 interim final document, *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA, 1997). No major changes in ERA methodology have occurred during the period covered by this five-year review. NJDEP recently updated their *Ecological Evaluation Technical Guidance*, August, 2012, version 1.2. The guidance supplements and provides details for the implementation of N.J.A.C. 7:26E and is in accordance with USEPA (1997).

4.6.3 Question C: Has Any Other Information Come to Light that Could Call Into Question the Protectiveness of the Remedy?

At this time, no information has been identified that could call into question the protectiveness of the remedy for mercury in storm sewer sediment. Mercer County and N&H Mercer Realty/Nassimi Realty

currently own the former NAWC Trenton parcels on which the storm sewer piping and outfalls are located. Both entities are in the process of, or have plans for future development. The Navy will maintain communication with them to sustain the protectiveness of the remedy for storm sewer sediment and will continue with quarterly monitoring and as-needed cleanings until development at the site is implemented.

4.7 ISSUES

Concentrations of mercury, at levels that exceed the NJDEP sediment screening value for SEL, continue to be present in sediment samples collected from one or more on-site storm sewer outfalls. No other issues were identified.

4.8 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Based on the review of documents included in this Third Five-Year Review the following recommendations and actions are outlined for mercury in on-site storm sewer sediment:

- Continue monitoring mercury concentrations in the storm sewer outfalls (Outfall 1 through 4) in accordance with the 2011 *Long-Term Monitoring SAP for the Former NAWC* (Watermark, 2011). Clean storm sewer outfalls and associated piping as needed.

- Because mercury remains in the on-site storm sewer sediment at concentrations that do not allow for unlimited use and unrestricted exposure, additional five-year reviews will be required.

4.9 PROTECTIVENESS STATEMENT

The remedy selected for mercury in storm sewer sediment at the Former NAWC Trenton facility has been successfully implemented to date and is protective of human health and the environment under the current land use. The Navy previously investigated and remediated on-site buildings and the on-site sewer system in order to address potential source areas for the mercury. Long-term monitoring (i.e., sediment sampling from the four storm sewer outfalls) is conducted by the Navy on a quarterly basis and sediment removal activities are conducted on an as needed basis (as determined by the sampling analytical results). Monitoring activities are being conducted in accordance with the Long-Term Monitoring Plan for the Former NAWC Trenton (Watermark, 2011). The Navy routinely submits reports to the NJDEP regarding the monitoring results and effectiveness of the mercury in storm sewer remedy. Future development activities in Parcel A (owned by County of Mercer) and in Parcel B (owned by N&H Mercer Realty LLC/Nassimi Realty) will be monitored for protectiveness.

5.0 PROTECTIVENESS STATEMENT AND OTHER COMMENTS

The purpose of this third five-year review is to evaluate the implementation and performance of the selected remedies for the sites associated with the three media of concern (groundwater, soils, and storm sewer sediment) at the former NAWC Trenton facility and to assess whether they remain protective of human health and the environment. The site-wide protectiveness statement and a summary of the requirements for the next five-year review are presented below. Per EPA guidance, a site-wide protectiveness statement is required when the remedy has been constructed and is operating and will generally be the same protectiveness statement as the least protective operable unit at the site. Because operable units were not formally designated for the former NAWC Trenton, for purposes of this review, the individual media of concern are viewed as individual operable units.

5.1 COMPREHENSIVE SITE-WIDE PROTECTIVENESS STATEMENT

The site-wide remedy at the former NAWC Trenton is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

Site-Wide Groundwater

The selected remedy for site-wide groundwater is in place and is expected to be protective of human health and the environment upon completion. The Navy is implementing recommendations outlined in the Second Five-Year Review Report (TtNUS, 2008) regarding the infiltration of volatile organic compound (VOC)-impacted groundwater into the Gold Run storm sewer system. Replacement and repairs to the piping and structures within the West Ditch will be implemented by the Navy in 2014. Continued monitoring and evaluation of this issue will be conducted by the Navy and USGS. In addition, the Navy working with the USGS continues to evaluate and test various treatment technologies to improve the effectiveness of the groundwater remedy. The groundwater pump and treat system, when operating successfully, is hydraulically effective at controlling most of the Site 1 and Site 3 groundwater plumes, and is effective in removing CVOCs from the contaminated groundwater. Treated groundwater discharge limits are being met and site-related CVOC levels in groundwater are decreasing. Institutional controls for site groundwater have been implemented by the Navy.

The Navy will determine the distance from impacted site monitoring wells to off-site properties and will include monitoring well MW-33S in the long-term monitoring program to evaluate the need for further action, if any, per NJDEP VI Technical Guidance. Future development activities conducted within Parcels

A, B and D may warrant engineering controls. The Navy has formally notified the current parcel owners that future development activities need to address applicable NJDEP regulations.

Impacted Soil Areas

The remedy selected for impacted soils in the AOCs and IR Sites listed in Section 3.1 at the Former NAWC Trenton facility has been successfully implemented to date and is protective of human health and the environment under current land use. Communication and coordination with the owners of the various parcels is ongoing in order to facilitate the development of the site and minimize and/or prevent damage to capped areas. Future development activities conducted within the capped areas will be monitored for protectiveness.

Storm Sewer Sediment

The remedy selected for mercury in storm sewer sediment at the Former NAWC Trenton facility has been successfully implemented to date and is protective of human health and the environment under the current land use. Future development activities in Parcel A (owned by County of Mercer) and in Parcel B (owned by N&H Mercer Realty LLC/Nassimi Realty) will be monitored for protectiveness.

5.2 TIMETABLE FOR NEXT REVIEW

Five-year reviews are required by statute or as a matter of policy, depending on the RAOs defined in a Record of Decision (ROD) and the remedial actions that are completed for a given site. A Voluntary Cleanup Agreement between the NJDEP and Navy is in place for the former NAWC Trenton facility. In accordance with that agreement and CERCLA, former NAWC Trenton is required to conduct five-year reviews. This report presents the Third Five-Year Review conducted at former NAWC Trenton. The next five-year review will be conducted within five-years of the completion of this five-year review, no later than December 2018. The completion date is the date of signature shown on the cover page included in the front of this report.

5.2.1 Statutory Review

The impacted soil sites, Concrete Apron (AOC 53 and AOC 36), Jet Fuel Storage Tank Farm, AOC 45, IR Program Site 1, IR Site 4, Area between IR Site 4 and Site 8, IR Site 6, IR Site 9, AOC 23, Cooling Water Sump, and the Former Header Pit Underground Storage Tank will require a statutory review during the next five-year review at the former NAWC Trenton. Five-year reviews will continue at these sites because potential site-related risks remain at the sites that do not allow for unlimited use or unrestricted exposure.

Site-wide groundwater and mercury in storm sewer sediment will require five-year reviews until the remedial actions are completed and cleanup levels are achieved allowing unlimited use and unrestricted exposure. As part of the next five-year review, an evaluation of monitoring data for both of these media of concern will be conducted to determine if applicable cleanup levels, identified in the Decision Document for Ground Water and Remediation Plan for Mercury in Storm Sewer Sediment, have been met. If cleanup criteria are achieved that allow for unlimited use and unrestricted exposure, a No Further Action memorandum would be prepared.

REFERENCES

Compliance Management International, 2012. Remedial Action Report; Former Naval Air Warfare Center. April.

DON (Department of the Navy), 1998. Final Decision Document for Installation Restoration Sites 2, 5, 6, 7, and 9, Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey. January.

DON, 1998. Final Decision Document for Installation Restoration Site 3, Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey. January.

DON, 1998. Decision Document for Installation Restoration Site 4 Soil, Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey. July.

DON, 1998. Decision Document for Installation Restoration Site 1 Soil, Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey. September.

DON, 1998. Decision Document for Installation Restoration Site 8 Soil, Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey. October.

DON, 1999. Mercury in Storm Sewer Sediment at the Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey. November.

DON, 2001. Final Cap Maintenance Plan NAWC Trenton, New Jersey. April.

DON, 2004. Navy/Marine Corps Policy for Conducting Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Five-year Reviews. (November 2001; Revised) May.

DON, 2013. Interim Report of Results West Ditch Groundwater Infiltration Investigation at the former Naval Air Warfare Center (NAWC) Trenton, NJ. May 24.

EA (EA Engineering, Science, and Technology, Inc.), 1996. Final Environmental Baseline Survey Area of Concern Screening Matrix, Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey. January.

EA, 1998. Draft Supplemental Ecological Report (SER), Naval Air Warfare Center (NAWC) Trenton, New Jersey. April.

EA, 1998. Storm Drain Sediment Sampling Work Plan for NAWC Trenton. April.

EA, 1999. Final Site-Wide EBS Phase II Investigation for Naval Air Warfare Center Trenton (Ewing Township), New Jersy. July.

EA, 2000. Final Focused Feasibility Study for Ground Water at the Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey. February.

EA, 2000. Decision Document for Ground Water at the Naval Air Warfare Center, Aircraft Division Trenton, New Jersey. February.

EA, 2003. Five-Year Review Report for the Former Naval Air Warfare Center, Trenton, New Jersey. December.

ECOR (Environmental, Construction, Operation, and Remediation Solutions, Inc.), 2009. Final Summary Report for the 2009 Annual (Spring) Sampling Event, Former Naval Air Warfare Center, West Trenton, New Jersey. August.

REFERENCES (Continued)

ECOR, 2010. Draft Summary Report for the 2010 Annual (Spring) Sampling Event, Former Naval Air Warfare Center, West Trenton, New Jersey. September.

EPA (U.S. Environmental Protection Agency), 1997. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim final. Environmental Response Team. June 5.

EPA, 2001. Comprehensive Five-Year Review Guidance. EPA 540-R-01-007. OSWER Directive No. 9355.7-03B-P. Office of Emergency and Remedial Response, Washington, D.C. June

EPA, 2003. National Primary Drinking Water Standards. Office of Water, EPA 816-F-03-016, Accessed from the Internet at http://www.epa.gov/safewater/consumer/pdf/mcl.pdf.

EPA, 2005. Supplemental guidance for assessing cancer susceptibility from early-life exposure to carcinogens. Risk Assessment Forum, Washington, DC. From website: http://www.epa.gov/ncea/raf.

EPA, 2006. National Recommended Water Quality Criteria. Office of Water, Office of Science and Technology. Accessed from the Internet at http://www.epa.gov/waterscience/criteria/nrwqc-2006.pdf.

EPA, 2009. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final. EPA 540-R-070-002. Office of Emergency and Remedial Response. Washington, DC. January.

EPA, 2013.OSWER Guidance for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Sources to Indoor Air (External Review Draft). Office of Solid Waster and Emergency Response. Washington, DC. April.

EPA, 2013. EPA Risk-Based Concentration Table. Region 3 Human Health Risk Assessment internet website at: http://www.epa.gov/reg3hwmd/risk/human/index.htm. May.

FWEC (Foster Wheeler Environmental Corp.), 1998. Updated Operation and Maintenance Manual Groundwater Treatment Building, Naval Air Warfare Center, Trenton, New Jersey. June.

FWEC, 2001. Final Underground Storage Tank closure Report at the Naval Air Warfare Center at Trenton, Trenton, New Jersey. July.

FWEC, 2001. Draft Cap Inspection Report at Naval Air Warfare Center at Trenton, Trenton, New Jersey. July.

H&S (H&S Environmental), 2011. Summary Report for Repair Activities – July-August 2011. October.

IT (IT Corporation), 1989. Final Site Inspection Report for Naval Air Propulsion Center, Trenton, New Jersey. 3 Volumes. November.

IT, 1994. Remedial Investigation Report, Installation Restoration Program, Naval Air Warfare Center, Trenton, New Jersey. November.

NJDEP (New Jersey Department of Environmental Protection), 1998. Guidance For Sediment Quality Evaluations. Trenton, New Jersey. November.

NJDEP, 2000. Voluntary Cleanup Agreement Among the NJDEP, U.S. Department of the Army, U.S. Department of the Navy, U.S. Department of the Air Force, and U.S. Defense Logistics Agency. August.

REFERENCES (Continued)

NJDEP, 2005. Ground Water Quality Standards, New Jersey Administrative Code 7:9C. Accessed from the Internet at http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf. October.

NJDEP, 2008. Guidance Document, Development of Site-Specific Impact to Groundwater Soil Remediation Standards Using The Soil-Water Partition Equation. December.

NJDEP, 2013. Vapor Intrusion Technical Guidance. Site Remediation Program. Version 3.1. March.

OHM (OHM Remediation Services Corp.), 1995. Operations and Maintenance Manual for Interim Remedial Groundwater Treatment System, Naval Air Warfare Center Aircraft Division, Trenton, New Jersey. 4 Volumes. September.

RGH (Rogers, Golden, and Halpern), 1986. Initial Assessment Study: Naval Air Propulsion Center, Trenton, New Jersey. RGH, Philadelphia, and BCM Eastern, Inc. Plymouth Meeting, Pennsylvania. Environmental Restoration Department, Naval Energy and Environmental Support Activity, Port Huememe, California.

TtNUS (Tetra Tech NUS, Inc.), 2007. Initial Groundwater Infiltration Assessment Study (Final), Former Naval Air Warfare Center (NAWC) Trenton Facility, Trenton, New Jersey. March.

TtNUS, 2008. Second Five-Year Review Report for the Former Naval Air Warfare Center, Trenton, New Jersey. December.

TtNUS, 2010. Biennial Certification Monitoring Report for a Deed Notice & Engineering Control for the Former Naval Air Warfare Center Trenton Facility, Trenton New Jersey. February.

TtNUS, 2010. Remedial Action Report, Evaluation of Groundwater Infiltration to Gold Run Creek, Former Naval Air Warfare Center Trenton, New Jersey. September.

TtNUS, 2010. Biennial Certification Monitoring Report for a Groundwater Classification Exception Area, Monitoring Period: February 2007-May/June 2010 for the Former Naval Air Warfare Center Trenton Facility, Trenton New Jersey. November.

Tetra Tech (Tetra Tech, Inc.), 2012. Final Tier II Sampling and Analysis Plan (Field Sampling and Quality Assurance Project Plan), West Ditch Area Groundwater Infiltration Investigation, Former Naval Air Warfare Center Trenton, Trenton, New Jersey. June.

Tetra Tech, 2012. Biennial Certification Monitoring Reports for Remedial Action Protectiveness-soil and Remedial Action Protectiveness-Groundwater for the Former Naval Air Warfare Center Trenton Facility, Trenton, New Jersey. December.

USGS (U. S. Geological Survey), 2010. Ground-water Levels and Potentiometric Surfaces, Naval Air Warfare Center, West Trenton, New Jersey 2009. April.

USGS, 2013. DRAFT Chlorinated Solvents Concentrations in Monitoring Wells, Naval Air Warfare Center, West Trenton, NJ, 1992-2012. October.

Watermark, 2011. Long Term Monitoring, Former Naval Air Warfare Center Trenton, Trenton, New Jersey, Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan). October.

Watermark, 2012. Summary Report 2011 Annual (Spring) Sampling Event, Former Naval Air Warfare Center, Trenton, New Jersey. *Draft*. May.

REFERENCES (Continued)

Watermark, 2013a. Summary Report 2012 Annual (Spring) Sampling Event, Former Naval Air Warfare Center, Trenton, New Jersey. *Final*. February.

Watermark, 2013b. January 2013 Groundwater Treatment Facility Report, Former Naval Air Warfare (NAWC) West Trenton, NJ. March 19.

Watermark, 2013c. February 2013 Groundwater Treatment Facility Report, Former Naval Air Warfare (NAWC) West Trenton, NJ . April 22.

Watermark, 2013d. March 2013 Groundwater Treatment Facility Report, Former Naval Air Warfare (NAWC) West Trenton, NJ. April 17.

Watermark, 2013e. April 2013 Groundwater Treatment Facility Report, Former Naval Air Warfare (NAWC) West Trenton, NJ. June 3.

Watermark, 2013f. May 2013 Groundwater Treatment Facility Report Former, Naval Air Warfare (NAWC) West Trenton, NJ. July 31.

Watermark, 2013g. June 2013 Groundwater Treatment Facility Report, Former Naval Air Warfare (NAWC) West Trenton, NJ. July 31.

Watermark, 2013h. July 2013 Groundwater Treatment Facility Report, Former Naval Air Warfare (NAWC) West Trenton, NJ. August 29.

Watermark, 2013i. Summary Report 2013 Annual (Spring) Sampling Event, Former Naval Air Warfare Center, Trenton, New Jersey. *Final*. October.

TABLES

TABLE ES-1

MEDIA OF CONCERN AND FIVE-YEAR REVIEW STATUS
FORMER NAVAL AIR WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

Media of Concern	Description	Decision Document	Site Status	Five-Year Site Status
Site-wide Groundwater	IR Program Site 1 (Brine Handling area and West-End Drainage Ditch and Site 3 (Former Sludge Disposal Area) were identified as the primary sources of impacted groundwater. Other sites were also identified but to a lesser extent.	Decision Document For Ground Water at the Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey (February 2000).	Remedy implemented; system operating and being maintained. Long-term monitoring of groundwater and surface water being conducted in accordance with approved Sampling and Analysis Plan.	Because contaminants remain in groundwater at concentrations above NJDEP GWQS and EPA MCLs, future five-year reviews will be required.
Capped Impacted Soil Areas	Various IR Program sites and EBS Phase II AOCs	Decision Document for Installation Restoration Site 1 Soil, Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey (September 1998). Final Decision Document for Installation restoration Sites 2, 5, 6, 7, and 9, Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey (January 1998). Final Decision Document for Installation Restoration Site 3, Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey (January 1998). Decision Document for Installation Restoration	Remedies implemented; inspection and maintenance being conducted according to Cap Maintenance Plan.	Because contaminants remain in soils at concentrations above residential soil remediation standards, future five-year reviews will be required.

TABLE ES-1

MEDIA OF CONCERN AND FIVE-YEAR REVIEW STATUS
FORMER NAVAL AIR WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

Media of Concern	Description	Decision Document	Site Status	Five-Year Site Status
		Site 4 Soil, Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey (July 1998). Decision Document for Installation Restoration Site 8 Soil, Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey (October 1998). Cap Maintenance Plan, NAWC Trenton, NJ (April 2001)		
Mercury in Storm Sewer Sediment	Outfalls 1, 2, 3, and 4	Mercury in Storm Sewer Sediment at The Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey (November 1999).	Remedy implemented and routine monitoring being conducted; sediment removed as required.	Because contaminants remain in storm sewer sediment at concentrations above cleanup criteria, future five-year reviews will be required.

TABLE 1-1

SUMMARY OF ARARs AND ACTION LEVEL CHANGES SINCE DECISION DOCUMENT FOR GROUNDWATER AND STORM WATER SEDIMENT
FORMER NAVAL AIR WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

Chemicals of Concern	Original ARAR/Site-Specific Level	New ARAR/Site-Specific Level		
Groundwater (µg/L)		**USEPA MCLs**[1]	**NJDEP GWQS**[2]	**NJDEP VISL**[7]
Aluminum	200	NS	200	--
Arsenic	8	10	3	--
Barium	2000	2000	6000	--
Cadmium	4	5	4	--
Chromium (total)	100	100	70	--
Iron	1660	NS	300	--
Lead	10	15[TTAL]	5	--
Manganese	55	NS	50	--
Mercury	2	2	2	--
Nickel	100	NS	100	--
1,1,1-Trichloroethane	30	200	30	13000
1,1-Dichloroethane	50	NS	50	50
1,1-Dichloroethene	2	7	1	260
1,2-Dichloroethane	2	5	2	3
1,2-Dichloroethene (cis)	70	70	70	NS
1,2-Dichloroethene (trans)	100	100	100	520
Benzene	1	5	1	20
Bromodichloromethane	1	0.08[8]	1	2
Chloroform	6	0.08[8]	70	70
Tetrachloroethene	1	5	1	31
Trichloroethene	1	5	1	2
Vinyl Chloride	5	2	1	1
Storm Sewer Sediment (mg/kg)	**OME SEL**[5]	**OME SEL**[5]	**NJDEP SEL**[6]	
Mercury	2	2	2	

TABLE 1-1

SUMMARY OF ARARs AND ACTION LEVEL CHANGES SINCE DECISION DOCUMENT FOR GROUNDWATER AND STORM WATER SEDIMENT
FORMER NAVAL AIR WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

Notes:

Shading indicates an ARAR/Site-Specific Level change since Decision Document.
NS = No Standard
TTAL = Treatment Technology Action Level

1 National Primary Drinking Water Standards (USEPA, 2012)
2 Ground Water Quality Standards (NJDEP, 2013)
3 Water Quality Criteria (USEPA, 2013) - Criterion Continuous Chronic Concentration for Freshwater
4 Surface Water Quality Standards (NJDEP, 2013) - Fresh Water (FW2) Criteria for chronic aquatic life
5 Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario (OME, 1993)
6 Guidance for Sediment Quality Evaluations (NJDEP, 1998)
7 Vapor Intrusion Screening Levels (NJDEP, 2013)
8 1998 Final Rule for Disinfectants and Disinfection By-products: The total for trihalomethanes (THM) is 80 ug/L.

ARAR/Site-Specific Level References
Groundwater

NJDEP (New Jersey Department of Environmental Protection), 2013. Ground Water Quality Standards, New Jersey Administrative Code 7:9C. Accessed from the Internet at http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf, October 4.

NJDEP, 2013. From Table 1. NJDEP Master Table. Generic Vapor Intrusion Screening Levels. NJDEP Site Remediation Program. Accessed from the Internet at http://www.state.nj.us/dep/srp/guidance/vaporintrusion/vig_tables.pdf, October 4.

USEPA (United States Environmental Protection Agency), 2012. 2012 Edition of the Drinking Water Standards and Health Advisories. Office of Water, 822-S-12-001, Accessed from the Internet at http://water.epa.gov/action/advisories/drinking/upload/dwstandards2012.pdf, November 12.

Sediment

NJDEP, 2013. Ecological Screening Criteria. Accessed from the Internet at http://www.nj.gov/dep/srp/guidance/ecoscreening/esc_table.pdf, October 24.

TABLE 2-1

GROUNDWATER CONSTITUENTS OF CONCERN (COCs)
FORMER NAVAL AIR WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

Chemical Class	Constituent of Concern (COC)
Volatile Organic Compounds	Trichloroethene (TCE)*****
	1,2-Dichloroethene (1,2-DCE)(*cis*- and *trans*-)*****
	Vinyl Chloride (VC)*****
	1,1,1-Trichloroethane
	1,2-Dichloroethane
	1,1-Dichloroethane
	1,1-Dichloroethene
	Tetrachloroethene (PCE)
	Benzene
	Bromodichloromethane
	Chloroform
Inorganics	Aluminum
	Arsenic
	Barium
	Cadmium
	Chromium
	Iron
	Lead
	Manganese
	Mercury
	Nickel
***** Primary impacts to groundwater are associated with these COCs.	

Source: Decision Document For Ground Water at the Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey. (Navy, 2000).

TABLE 2-2

GROUNDWATER REMEDIAL ACTION OBJECTIVES
FORMER NAVAL AIR WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

Remedial Action Objectives (RAOs)[1]	Remedial Components[2]	Performance Objectives	Performance Metrics
Prevent human exposure to contaminants in groundwater	NJDEP Classification Exception Area (CEA) for area exceeding NJDEP GWQS; Well Restriction Area (WRA) to prevent use of impacted groundwater.	Establish CEA and WRA.	CEA and WRA established 2000. Biennial monitoring reports are conducted in accordance with NJDEP guidance.
Prevent offsite migration of contaminants in groundwater that exceed NJ GWQS and prevent migration of contaminants that exceed NJ Surface Water Quality Standards to offsite surface waterbodies.	Continued operation of the existing pump-and-treat system to recover impacted groundwater at Sites 1 and 3, and expansion of the system to recover and treat impacted groundwater west of Site 1 and south of the bedrock fault. Discharge of treated groundwater to the ancestral west branch of Gold Run Creek.	Install two additional extraction wells west of Site 1 and Site 2 in the area between the bedrock fault and Gold Run Creek. Conduct additional investigations west of Site 1 for further evaluation of the extent of COCs in groundwater. Navy will obtain a NJPDES permit to allow for discharge of treated groundwater. Periodic sampling of the treated water will be performed to ensure compliance with the NJPDES permit.	Additional wells (MW-57BR, MW-58BR, and MW-59BR) installed in 2000; Navy continues to operate and maintain pump-and-treat system. Water level measurements are collected and analyzed by the USGS to determine if groundwater contained on-site. Investigation of area west of Site 1 including the West Ditch is ongoing and repairs to piping and structures are being implemented by the Navy. Routine monitoring of treated effluent and outfalls is conducted to prevent release of groundwater contaminants to offsite surface. Self-monitoring reports are submitted on monthly basis to the NJDEP.
Treat and/or control free and residual product, unless it is determined by NJDEP to be technically impracticable to do so.	---[3]	Pilot studies of emerging technologies	Navy, USGS and SERDP have implemented various pilot studies and continue to evaluate emerging technologies for treatment of free and residual product in bedrock.

TABLE 2-2

GROUNDWATER REMEDIAL ACTION OBJECTIVES
FORMER NAVAL AIR WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

Remedial Action Objectives (RAOs)[1]	Remedial Components[2]	Performance Objectives	Performance Metrics
Reduce contaminant concentration in groundwater to meet NJ GWQS, unless it is determined by NJDEP to be technically impracticable to do so.	Long-term monitoring of groundwater for plume evaluation and system performance.	Develop and implement a comprehensive monitoring program that includes monitoring for COC extent and treatment system performance.	Long-Term Monitoring Program was developed; revised Sampling and Analysis Plan (SAP) implemented in 2011; monitoring and reporting are conducted on routine basis. Results are compared to NJ GWQS.
Prevent adverse impacts to aquatic ecosystems.	Five-year reviews by the Navy, NJDEP, and EPA.	Review to determine if remedial alternative decision is demonstrating continued protection of human health and the environment.	Conduct Five-Year Reviews.

[1] Decision Document for Groundwater At the Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey (EA, 2000).
[2] Decision Document for Groundwater At the Naval Air Warfare Center, Aircraft Division, Trenton, New Jersey (EA, 2000).
[3] No remedial component defined in Decision Document.

TABLE 2-3

MAY-JUNE 2010 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR VOLATILES (ONLY LOCATIONS NOT SAMPLED IN JULY 2013, MAY 2012, OR OCTOBER 2011)
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

				Sample ID:	3 BR	12 MW 1	32 S	34 BR	35 BR	37 BR	43 BR	44 BR	57 BR
				Duplicate:									
				Sample Date:	6/8/2010	5/12/2010	6/8/2010	6/8/2010	6/8/2010	6/9/2010	6/9/2010	6/9/2010	6/8/2010
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	1.0 U	1.0 U	**1.0**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.4**
1,1-Dichloroethane	µg/l	50	50	10 c	1.0 U	1.0 U	**0.97 J**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/l	1.0	260	280 n	1.0 U	1.0 U	**0.52 J**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	µg/l	70	70	1.1 c	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/l	70	--	--	1.0 U	**0.78 J**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/l	1.0	31	23 c	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/l	1.0	2.0	1.8 c	1.0 U	**0.61 J**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

				Sample ID:	58 BR	59 BR	62 BR	66 BR
				Duplicate:				
				Sample Date:	6/8/2010	6/8/2010	6/8/2010	6/8/2010
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**				
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	µg/l	50	50	10 c	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/l	1.0	260	280 n	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	µg/l	70	70	1.1 c	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/l	70	--	--	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/l	1.0	31	23 c	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/l	1.0	2.0	1.8 c	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	1.0 U	1.0 U	1.0 U	1.0 U

Notes:
All results given in micrograms per liter (µg/L).
NJ GWQS -- New Jersey Department of Environmental Protection, 2013. Ground Water Quality Standards, New Jersey Administrative Code 7:9C.
Accessed from the Internet at http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf, October 4.
NJ VISL -- NJDEP Vapor Intrusion Screening Levels, 2013. From Table 1. NJDEP Master Table. Generic Vapor Intrusion Screening Levels.
Accessed from the Internet at http://www.state.nj.us/dep/srp/guidance/vaporintrusion/vig_tables.pdf, October 4.
EPA VISL -- Calculated EPA Vapor Intrusion Screening Level. Criteria based on cancer risk of 1E-6 or non-cancer hazard quotient of 1.0, Henry's Law adjusted to a groundwater temperature of 15° C
VISL calculator incorporates toxicity factors from the June 2013 EPA RSL table. Accessed from the Internet athttp://www.epa.gov/oswer/vaporintrusion/documents/VISL-Calculator.xlsm, November 1.
c - EPA VISL based on cancer risk; n - EPA VISL based on non-cancer hazard
Bold data indicates a detection.
Yellow highlight indicates concentration exceeds NJDEP GWQS, NJDEP VISL, and EPA VISL. Mauve indicates level exceeds only the NJDEP GWQS but not EPA or NJDEP VISLs.
Orange indicates level exceeds only EPA VISL. Brown indicates level exceeds NJDEP GWQS and EPA VISL, but not NJDEP VISL
J = estimated value
UJ = not detected, sample quantitation limit is estimated
U = compound analyzed but not detected at the stated detection limit

TABLE 2-4

OCTOBER 2011 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR VOLATILES (ONLY LOCATIONS NOT SAMPLED IN JULY 2013 OR MAY 2012)
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

				Sample ID:	11 S	13 S	14 BR	14 S	28 S	29 S	30 S	32 BR
				Duplicate:								
				Sample Date:	10/25/2011	10/25/2011	10/25/2011	10/25/2011	10/25/2011	10/25/2011	10/25/2011	10/26/2011
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**								
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/l	50	50	10 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,1-Dichloroethene	µg/l	1.0	260	280 n	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzene	µg/l	1.0	20	2.2 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	70	70	1.1 c	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	70	--	--	0.15 U	0.15 U	0.15 U	0.15 U	**8.90**	**0.19 J**	**0.37 J**	0.15 U
Tetrachloroethene	µg/l	1.0	31	23 c	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	µg/l	1.0	2.0	1.8 c	0.13 U	**0.61 J**	**0.61 J**	**0.53 J**	**5.40**	0.13 U	0.13 U	0.13 U
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	0.18 U	0.18 U	0.18 U	0.18 U	**1.40**	0.18 U	0.18 U	0.18 U

				Sample ID:	35 S	35 S	42 S	68 BR-A	68 BR-A	68 BR-B	68 BR-C	68 BR-D
				Duplicate:	Original	Duplicate		Original	Duplicate			
				Sample Date:	10/26/2011	10/26/2011	10/25/2011	10/24/2011	10/24/2011	10/24/2011	10/24/2011	10/25/2011
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**								
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	2.50 U	50.0 U	50.0 U
1,1-Dichloroethane	µg/l	50	50	10 c	0.25 U	0.25 U	0.25 U	**0.71 J**	**0.65 J**	1.30 U	25.00 U	25.0 U
1,1-Dichloroethene	µg/l	1.0	260	280 n	0.11 U	0.11 U	11.00 U	0.64 U	**0.77 J**	**2.30 J**	**29.0 J**	**39.0 J**
Benzene	µg/l	1.0	20	2.2 c	0.25 U	0.25 U	0.25 U	**0.25 J**	0.25 UJ	1.30 U	25.00 U	25.0 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.30 U	25.00 U	25.0 U
Chloroform	µg/l	70	70	1.1 c	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.70 U	14.00 U	14.0 U
cis-1,2-Dichloroethene	µg/l	70	--	--	0.15 U	0.15 U	0.15 U	**89.0**	**88.0**	**490**	**6,600**	**3,400**
Tetrachloroethene	µg/l	1.0	31	23 c	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.75 U	15.0 U	15.0 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	0.20 U	0.20 U	0.20 U	0.77 U	**0.76 J**	**2.50 J**	**69.0 J**	**29.0 J**
Trichloroethene	µg/l	1.0	2.0	1.8 c	0.13 U	0.13 U	0.13 U	**15.0**	**25.0**	**4.30 J**	**220**	**15,000**
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	0.18 U	0.18 U	0.18 U	**4.20**	**4.20**	**260**	**240**	**140**

				Sample ID:	68 BR-F	74 BR
				Duplicate:		
				Sample Date:	10/25/2011	10/24/2011
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**		
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	100 U	0.50 U
1,1-Dichloroethane	µg/l	50	50	10 c	50.0 U	**0.25 J**
1,1-Dichloroethene	µg/l	1.0	260	280 n	**51.0 J**	**1.10**
Benzene	µg/l	1.0	20	2.2 c	50.0 U	0.25 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	50.0 U	0.25 U
Chloroform	µg/l	70	70	1.1 c	28.0 U	0.14 U
cis-1,2-Dichloroethene	µg/l	70	--	--	**16,000**	**150**
Tetrachloroethene	µg/l	1.0	31	23 c	30.0 U	0.15 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	**180 J**	**1.00**
Trichloroethene	µg/l	1.0	2.0	1.8 c	**7,500**	**5.90**
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	**650**	**100**

Notes:
All results given in micrograms per liter (µg/L).
NJ GWQS -- New Jersey Department of Environmental Protection, 2013. Ground Water Quality Standards, New Jersey Administrative Code 7:9C.
Accessed from the Internet at http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf, October 4.
NJ VISL -- NJDEP Vapor Intrusion Screening Levels, 2013. From Table 1. NJDEP Master Table. Generic Vapor Intrusion Screening Levels.
Accessed from the Internet at http://www.state.nj.us/dep/srp/guidance/vaporintrusion/vig_tables.pdf, October 4.
EPA VISL -- Calculated EPA Vapor Intrusion Screening Level. Criteria based on cancer risk of 1E-6 or non-cancer hazard quotient of 1.0, Henry's Law adjusted to a groundwater temperature of 15° C
VISL calculator incorporates toxicity factors from the June 2013 EPA RSL table. Accessed from the Internet at http://www.epa.gov/oswer/vaporintrusion/documents/VISL-Calculator.xlsm, November 1.
c - EPA VISL based on cancer risk; n - EPA VISL based on non-cancer hazarc
Bold data indicates a detection.
Yellow highlight indicates concentration exceeds NJDEP GWQS, NJDEP VISL, and EPA VISL. Mauve indicates level exceeds only the NJDEP GWQS but not EPA or NJDEP VISLs.
Orange indicates level exceeds only EPA VISL. Brown indicates level exceeds NJDEP GWQS and EPA VISL, but not NJDEP VISL
J = estimated value
UJ = not detected, sample quantitation limit is estimated
U = compound analyzed but not detected at the stated detection limit

TABLE 2-5

MAY-JULY 2012 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR VOLATILES (ONLY LOCATIONS NOT SAMPLED IN JULY 2013)
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

				Sample ID:	02 BR	02 BR-42	02 BR-47	02 BR-52	02 BR-57	05 BR	06 BR	09 BR	11 BR
				Duplicate:									
				Sample Date:	5/15/2012	5/15/2012	5/15/2012	5/15/2012	5/15/2012	5/14/2012	5/11/2012	5/14/2012	7/26/2012
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**1.30**	0.50 U
1,1-Dichloroethane	µg/l	50	50	10 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	**3.00**	0.25 U
1,1-Dichloroethene	µg/l	1.0	260	280 n	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.27 J**	0.11 U
Benzene	µg/l	1.0	20	2.2 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	70	70	1.1 c	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	70	--	--	**16.0**	**0.69 J**	**3.10**	**2.80**	**1.80**	0.15 U	0.15 U	**5.20**	**4.80**
Tetrachloroethene	µg/l	1.0	31	23 c	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	**5.90**	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	µg/l	1.0	2.0	1.8 c	**22.0**	0.27 U	**1.20**	0.99 U	0.18 U	0.13 U	**0.54 J**	**6.10**	**1.30**
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	**0.54 J**	0.18 U	0.18 U	0.18 U	0.17 U	0.18 U	0.18 U	**0.70 J**	0.18 U

				Sample ID:	11 BR-57	11 BR-62	11 BR-67	11 BR-72	12 BR	12 BR-59	12 BR-64	12 BR-69	16 BR
				Duplicate:									Original
				Sample Date:	7/26/2012	7/26/2012	7/26/2012	7/26/2012	5/15/2012	5/15/2012	5/15/2012	5/15/2012	5/8/2012
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/l	50	50	10 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 UJ
1,1-Dichloroethene	µg/l	1.0	260	280 n	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 UJ
Benzene	µg/l	1.0	20	2.2 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	**0.42 J**	**0.28 J**	0.25 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	70	70	1.1 c	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	70	--	--	**2.00**	**3.40**	**2.90**	**3.00**	**4.00**	0.15 U	**0.17 J**	0.15 U	**19.0**
Tetrachloroethene	µg/l	1.0	31	23 c	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	µg/l	1.0	2.0	1.8 c	**0.79 J**	**1.10**	**0.93 J**	**1.00**	0.82 U	0.13 U	0.13 U	0.13 U	**0.21 J**
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	**0.18**	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	**8.90**

TABLE 2-5

MAY-JULY 2012 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR VOLATILES (ONLY LOCATIONS NOT SAMPLED IN JULY 2013)
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

				Sample ID:	16 BR	19 BR	21 BR	21 BR-52	21 BR-57	21 BR-62	23 BR	23 BR-67	23 BR-72
				Duplicate:	Duplicate								
				Sample Date:	5/8/2012	5/15/2012	5/18/2012	5/18/2012	5/18/2012	5/18/2012	5/17/2012	5/17/2012	5/17/2012
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	0.50 U	0.50 U	**0.97 J**	**0.71 J**	**0.66 J**	**0.60 J**	2.50 U	2.50 U	2.50 U
1,1-Dichloroethane	µg/l	50	50	10 c	0.25 UJ	0.25 U	**0.38 J**	**0.39 J**	**0.34 J**	**0.36 J**	1.30 U	1.30 U	1.30 U
1,1-Dichloroethene	µg/l	1.0	260	280 n	0.11 UJ	0.11 U	**0.48 J**	**0.54 J**	**0.43 J**	**0.41 J**	**1.20 J**	**1.20 J**	**1.20 J**
Benzene	µg/l	1.0	20	2.2 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.30 U	1.30 U	1.30 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.30 U	1.30 U	1.30 U
Chloroform	µg/l	70	70	1.1 c	0.14 U	0.14 U	**0.42 J**	**0.34 J**	**0.33 J**	**0.32 J**	**2.30 J**	**2.40 J**	**2.50 J**
cis-1,2-Dichloroethene	µg/l	70	--	--	**19.0**	0.15 U	**1.20**	**1.20**	**1.10**	**1.00**	**170**	**160**	**2.40 J**
Tetrachloroethene	µg/l	1.0	31	23 c	0.15 U	0.15 U	0.15 U	0.14 U	0.15 U	0.15 U	0.75 U	0.75 U	0.75 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	0.20 U	0.20 U	0.20 U	0.15 U	0.20 U	0.20 U	**1.00 J**	0.75 U	1.00 U
Trichloroethene	µg/l	1.0	2.0	1.8 c	**0.16 J**	0.13 U	**2.40**	**2.00**	**1.90**	**1.90**	**540 J**	**560**	**560**
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	**9.20**	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	**3.90 J**	**3.80 J**	**3.50 J**

				Sample ID:	23 BR-77	23 BR-82	23 BR-87	27 BR	28 BR	30 BR	31 BR	33 BR	33 BR
				Duplicate:								Original	Duplicate
				Sample Date:	5/17/2012	5/17/2012	5/17/2012	5/11/2012	5/14/2012	5/9/2012	5/16/2012	5/14/2012	5/14/2012
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	2.50 U	2.50 U	1.00 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/l	50	50	10 c	1.30 U	1.30 U	0.50 U	0.25 U	0.25 U	0.25 U	**1.80**	0.25 U	0.25 U
1,1-Dichloroethene	µg/l	1.0	260	280 n	**1.20 J**	**1.2 J**	**0.76 J**	0.11 U	0.11 U	0.11 U	**0.17 J**	0.11 UJ	**0.11 J**
Benzene	µg/l	1.0	20	2.2 c	0.25 U	1.30 U	0.50 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	1.30 U	1.30 U	0.50 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	70	70	1.1 c	**2.30 J**	**2.40 J**	**1.70 J**	0.14 U	**0.61 J**	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	70	--	--	**160**	**160**	**90**	0.15 U	0.15 U	**4.10**	**6.70**	**3.60**	**3.70**
Tetrachloroethene	µg/l	1.0	31	23 c	0.75 U	0.75 U	0.30 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	1.00 U	1.00 U	**0.40 J**	0.20 U	0.20 U	**0.39 J**	0.20 U	0.20 U	0.20 U
Trichloroethene	µg/l	1.0	2.0	1.8 c	**550**	**530**	**150**	0.13 U	0.13 U	**0.33 J**	**10.0**	**0.59 J**	**0.56 J**
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	**2.90 J**	**3.80 J**	**2.4**	0.18 U	0.18 U	**6.70**	**0.27 J**	**0.57 J**	**0.59 J**

TABLE 2-5

MAY-JULY 2012 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR VOLATILES (ONLY LOCATIONS NOT SAMPLED IN JULY 2013)
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

				Sample ID:	33 BR-32	33 BR-37	33 BR-42	38 BR	39 BR	41 BR	42 BR	49 BR	50 BR
				Duplicate:									
				Sample Date:	5/14/2012	5/14/2012	5/14/2012	5/10/2012	5/11/2012	5/11/2012	5/11/2012	5/14/2012	5/17/2012
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	0.50 U	0.50 U	0.50 U	1.00 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/l	50	50	10 c	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U	**0.68 J**	0.25 U	0.25 U	0.25 U
1,1-Dichloroethene	µg/l	1.0	260	280 n	0.11 U	0.11 U	0.11 U	**0.61 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzene	µg/l	1.0	20	2.2 c	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U	**0.30 J**	0.25 U	0.25 U	0.25 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	70	70	1.1 c	0.14 U	0.14 U	0.14 U	0.28 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	70	--	--	**0.34 J**	**1.00**	**1.50**	**200**	0.15 U	**17.0**	0.15 U	0.15 U	**3.10**
Tetrachloroethene	µg/l	1.0	31	23 c	0.15 U	0.15 U	0.15 U	0.30 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	0.20 U	0.20 U	0.20 U	**0.45 J**	0.20 U	**0.67 J**	0.20 U	0.20 U	0.20 U
Trichloroethene	µg/l	1.0	2.0	1.8 c	**0.17 J**	**0.63 J**	**0.25 J**	**1.50 J**	0.13 U	**0.77 J**	0.13 U	0.13 U	**5.40**
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	**0.19 J**	**0.49 J**	**0.53 J**	**180**	0.18 U	**23.0**	0.18 U	0.18 U	0.18 U

				Sample ID:	51 BR	51 BR-88	51 BR-93	52 BR	53 BR	53 BR-97	53 BR-102	53 BR-107	53 BR-112
				Duplicate:									
				Sample Date:	7/26/2012	7/26/2012	7/26/2012	5/11/2012	5/17/2012	5/17/2012	5/17/2012	5/17/2012	5/17/2012
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/l	50	50	10 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,1-Dichloroethene	µg/l	1.0	260	280 n	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzene	µg/l	1.0	20	2.2 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	70	70	1.1 c	0.15 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	70	--	--	**4.20**	**3.90**	**4.40**	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Tetrachloroethene	µg/l	1.0	31	23 c	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	0.20 U	**4.70**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	µg/l	1.0	2.0	1.8 c	**1.80**	**2.00**	**2.70**	0.13 U	0.13 U	0.13 U	**0.21 J**	0.13 U	0.13 U
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U

TABLE 2-5

MAY-JULY 2012 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR VOLATILES (ONLY LOCATIONS NOT SAMPLED IN JULY 2013)
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

				Sample ID:	53 BR-117	55 BR	55 BR-137	55 BR-142	55 BR-147	55 BR-152	55 BR-157	63 BR	63 BR-17
				Duplicate:									
				Sample Date:	5/17/2012	5/18/2012	5/18/2012	5/18/2012	5/18/2012	5/18/2012	5/18/2012	5/16/2012	5/16/2012
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/l	50	50	10 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	**0.45 J**	0.25 U
1,1-Dichloroethene	µg/l	1.0	260	280 n	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzene	µg/l	1.0	20	2.2 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	70	70	1.1 c	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	70	--	--	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	**5.20**	**6.90**
Tetrachloroethene	µg/l	1.0	31	23 c	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	µg/l	1.0	2.0	1.8 c	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	**6.00**
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	**0.92 J**	**0.38 J**

				Sample ID:	63 BR-22	63 BR-27	63 BR-32	63 BR-37	64 BR	BRP 1	BRP 3	12 S	16 S
				Duplicate:									
				Sample Date:	5/16/2012	5/16/2012	5/16/2012	5/16/2012	5/11/2012	5/10/2012	5/10/2012	5/15/2012	5/10/2012
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.67 J**
1,1-Dichloroethane	µg/l	50	50	10 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	**0.57 J**	0.25 U	0.25 U	**0.82 J**
1,1-Dichloroethene	µg/l	1.0	260	280 n	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.54 J**	0.11 U	0.11 U	0.11 U
Benzene	µg/l	1.0	20	2.2 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	70	70	1.1 c	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	70	--	--	**0.15**	**1.20**	**1.20**	**1.40**	**4.00**	**96.0**	0.33 U	**0.69 J**	1.00 U
Tetrachloroethene	µg/l	1.0	31	23 c	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.75 J**	0.20 U	0.20 U	0.20 U
Trichloroethene	µg/l	1.0	2.0	1.8 c	0.13 U	0.13 U	0.13 U	0.13 U	**0.24 J**	**0.94 J**	**0.64 J**	0.13 U	**1.90**
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	**45.0**	0.18 U	0.18 U	0.18 U

TABLE 2-5

MAY-JULY 2012 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR VOLATILES (ONLY LOCATIONS NOT SAMPLED IN JULY 2013)
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

				Sample ID:	31 S	34 S	37 S	11-MW-1	35-MW-1	35-MW-2	WDW
				Duplicate:							
				Sample Date:	5/16/2012	5/9/2012	5/14/2012	5/11/2012	5/10/2012	5/11/2012	5/8/2012
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**							
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/l	50	50	10 c	**1.70**	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 UJ
1,1-Dichloroethene	µg/l	1.0	260	280 n	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.35 J**
Benzene	µg/l	1.0	20	2.2 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	70	70	1.1 c	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	**0.28 J**	0.14 U
cis-1,2-Dichloroethene	µg/l	70	--	--	**2.30**	0.15 U	0.15 U	0.37 U	0.15 U	0.15 U	**27.0**
Tetrachloroethene	µg/l	1.0	31	23 c	0.15 U	0.15 U	0.15 U	**0.35 J**	0.15 U	0.17 J	0.15 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.51 J**
Trichloroethene	µg/l	1.0	2.0	1.8 c	**1.10**	0.13 U	**0.50 J**	**0.90 J**	**0.33 J**	**0.82 J**	**44.0**
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	**0.42 J**

Notes:
All results given in micrograms per liter (µg/L).
NJ GWQS -- New Jersey Department of Environmental Protection, 2013. Ground Water Quality Standards, New Jersey Administrative Code 7:9C.
Accessed from the Internet at http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf, October 4.
NJ VISL -- NJDEP Vapor Intrusion Screening Levels, 2013. From Table 1. NJDEP Master Table. Generic Vapor Intrusion Screening Levels.
Accessed from the Internet at http://www.state.nj.us/dep/srp/guidance/vaporintrusion/vig_tables.pdf, October 4.
EPA VISL -- Calculated EPA Vapor Intrusion Screening Level. Criteria based on cancer risk of 1E-6 or non-cancer hazard quotient of 1.0, Henry's Law adjusted to a groundwater temperature of 15° C.
VISL calculator incorporates toxicity factors from the June 2013 EPA RSL table. Accessed from the Internet at http://www.epa.gov/oswer/vaporintrusion/documents/VISL-Calculator.xlsm, November 1.
c - EPA VISL based on cancer risk; n - EPA VISL based on non-cancer hazard
Bold data indicates a detection.
Yellow highlight indicates concentration exceeds NJDEP GWQS, NJDEP VISL, and EPA VISL. Mauve indicates level exceeds only the NJDEP GWQS but not EPA or NJDEP VISLs.
Orange indicates level exceeds only EPA VISL. Brown indicates level exceeds NJDEP GWQS and EPA VISL, but not NJDEP VISL.
J = estimated value
UJ = not detected, sample quantitation limit is estimated
U = compound analyzed but not detected at the stated detection limit

TABLE 2-6

JULY 2013 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR VOLATILES
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

				Sample ID:	04 BR	07 BR	08 BR	15 BR	17 BR	20 BR	22 BR	22 BR	24 BR
				Duplicate:							Original	Duplicate	
				Sample Date:	7/8/2013	7/10/2013	7/9/2013	7/9/2013	7/9/2013	7/10/2013	7/9/2013	7/9/2013	7/10/2013
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	5.00 U	50.0 U	2.50 U	25.0 U	**0.62 J**	13.0 U	0.50 U	0.50 U	100 U
1,1-Dichloroethane	µg/l	50	50	10 c	2.50 U	25.0 U	1.30 U	13.0 U	**0.29 J**	6.30 U	0.25 U	0.25 U	50.0 U
1,1-Dichloroethene	µg/l	1.0	260	280 n	**3.90 J**	**42.0 J**	0.55 U	**26.0 J**	**0.37 J**	2.80 U	**0.52 J**	**0.68 J**	22.0 U
1,2-Dichloroethane	µg/l	2.0	3.0	3.2 c	1.00 U	10.0 U	0.50 U	5.00 U	0.10 U	2.50 U	0.10 U	0.10 U	20.0 U
Benzene	µg/l	1.0	20	2.2 c	**2.90 J**	25.0 U	1.30 U	13.0 U	0.25 U	6.30 U	0.25 U	0.25 U	50.0 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	2.50 U	25.0 U	1.30 U	13.0 U	0.25 U	6.30 U	0.25 U	0.25 U	50.0 U
Chloroform	µg/l	70	70	1.1 c	1.40 U	14.0 U	0.70 U	7.00 U	0.14 U	3.50 U	**0.23 J**	0.14 UJ	28.0 U
cis-1,2-Dichloroethene	µg/l	70	--	--	**380 J**	**8,600 J**	**9.40 J**	**4,200 J**	**3.20 J**	**2,000 J**	**28.0 J**	**35.0 J**	**2,600 J**
Tetrachloroethene	µg/l	1.0	31	23 c	1.50 U	15.0 U	0.75 U	7.50 U	0.15 U	3.80 U	0.15 U	0.15 U	30.0 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	2.00 U	20.0 U	1.00 U	**32.0 J**	0.20 U	5.00 U	0.20 U	0.20 U	40.0 U
Trichloroethene	µg/l	1.0	2.0	1.8 c	**570 J**	**6,100 J**	**490 J**	**5,900 J**	**4.20 J**	**360 J**	**15.0 J**	**18.0 J**	**14,000 J**
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	**26.0**	**1,400 J**	0.90 U	**260**	0.18 U	**250**	0.18 U	0.18 U	**250**

				Sample ID:	25 BR	29 BR	36 BR	36 BR	40 BR	40 BR	40 S	45 BR	46 BR
				Duplicate:			Original	Duplicate	Original	Duplicate			
				Sample Date:	7/8/2013	7/9/2013	7/8/2013	7/8/2013	7/10/2013	7/10/2013	7/10/2013	7/9/2013	7/10/2013
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	2.50 U	5.00 U	250 U	130 U	0.50 U	0.50 U	5.00 U	13.0 U	13.0 U
1,1-Dichloroethane	µg/l	50	50	10 c	1.30 U	2.50 U	130 U	63.0 U	0.25 U	0.25 U	2.50 U	6.30 U	6.30 U
1,1-Dichloroethene	µg/l	1.0	260	280 n	0.55 U	**4.00 J**	55.0 UJ	28.0 UJ	**0.17 J**	0.11 UJ	**2.00 J**	2.80 U	2.80 U
1,2-Dichloroethane	µg/l	2.0	3.0	3.2 c	0.50 U	1.00 U	50.0 U	25.0 U	0.10 U	0.10 U	1.00 U	2.50 U	2.50 U
Benzene	µg/l	1.0	20	2.2 c	1.30 U	**2.90 J**	130 UJ	63.0 UJ	0.25 UJ	**0.33 J**	2.50 U	6.30 U	6.30 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	1.30 U	2.50 U	130 U	63.0 U	0.25 U	0.25 U	2.50 U	6.30 U	6.30 U
Chloroform	µg/l	70	70	1.1 c	0.70 U	1.40 U	70.0 U	35.0 U	0.14 U	0.14 U	1.40 U	3.50 U	3.50 U
cis-1,2-Dichloroethene	µg/l	70	--	--	**570 J**	**75.0 J**	**34,000 J**	**34,000 J**	**50.0 J**	**70.0 J**	**520 J**	**1,400 J**	**12.0 J**
Tetrachloroethene	µg/l	1.0	31	23 c	0.75 U	1.50 U	75.0 U	38.0 U	0.15 U	0.15 U	1.50 U	3.80 U	3.80 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	**5.00**	2.00 U	100 UJ	50.0 UJ	0.20 U	0.20 U	2.00 U	5.00 U	5.00 U
Trichloroethene	µg/l	1.0	2.0	1.8 c	**400 J**	**1,200 J**	**230 J**	**33.0 J**	**5.30 J**	**7.30 J**	**50.0 J**	**1,900 J**	**1,800 J**
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	**330**	1.80 U	**12,000**	**13,000**	0.18 U	0.18 U	**86.0**	**41.0**	4.50 U

TABLE 2-6

JULY 2013 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR VOLATILES
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

				Sample ID:	47 BR	48 BR	54 BR	56 BR	60 BR	61 BR	65 BR	BRP 2
				Duplicate:								
				Sample Date:	7/9/2013	7/9/2013	7/10/2013	7/8/2013	7/10/2013	7/9/2013	7/8/2013	7/9/2013
VOCs	**Units**	**NJ GWQS**	**NJ VISL**	**EPA VISL**								
1,1,1-Trichloroethane	µg/l	30	13000	12000 n	0.50 U	2.50 U	0.50 U	100 U	0.50 U	0.50 U	0.50 U	50.0 U
1,1-Dichloroethane	µg/l	50	50	10 c	0.25 U	1.30 U	0.25 U	50.0 U	0.25 U	0.25 U	**0.25 J**	25.0 U
1,1-Dichloroethene	µg/l	1.0	260	280 n	0.11 U	**5.20**	**0.16 J**	22.0 U	0.11 U	**2.8**	0.11 U	**36.0 J**
1,2-Dichloroethane	µg/l	2.0	3.0	3.2 c	0.10 U	0.50 U	0.10 U	20.0 U	0.10 U	0.10 U	0.10 U	10.0 U
Benzene	µg/l	1.0	20	2.2 c	0.25 U	**1.4 J**	0.25 U	50.0 U	0.25 U	0.25 U	0.25 U	25.0 U
Bromodichloromethane	µg/l	1.0	2.0	1.3 c	0.25 U	1.30 U	0.25 U	50.0 U	0.25 U	0.25 U	0.25 U	25.0 U
Chloroform	µg/l	70	70	1.1 c	0.14 U	0.70 U	0.14 U	28.0 U	0.14 U	0.14 U	0.14 U	14.0 U
cis-1,2-Dichloroethene	µg/l	70	--	--	**5.00 J**	**23.0 J**	**30.0 J**	**1,500 J**	**13.0 J**	**120 J**	**3.60 J**	**11,000 J**
Tetrachloroethene	µg/l	1.0	31	23 c	0.15 U	0.75 U	0.15 U	30.0 U	0.15 U	0.15 U	0.15 U	15.0 U
trans-1,2-Dichloroethene	µg/l	100	520	570 n	0.20 U	1.00 U	0.20 U	40.0 U	0.20 U	**1.60**	0.20 U	**43.0 J**
Trichloroethene	µg/l	1.0	2.0	1.8 c	**2.2 J**	**700 J**	**58.0 J**	**14,000 J**	**120 J**	**47.0 J**	**0.98 J**	**1,900 J**
Vinyl Chloride	µg/l	1.0	1.0	0.19 c	0.18 U	0.90 U	0.18 U	36.0 U	0.18 U	**6.60**	**3.40**	**2,500**

Notes:
All results given in micrograms per liter (µg/L).
NJ GWQS -- New Jersey Department of Environmental Protection, 2013. Ground Water Quality Standards, New Jersey Administrative Code 7:9C.
Accessed from the Internet at http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf, October 4
NJ VISL -- NJDEP Vapor Intrusion Screening Levels, 2013. From Table 1. NJDEP Master Table. Generic Vapor Intrusion Screening Levels.
Accessed from the Internet at http://www.state.nj.us/dep/srp/guidance/vaporintrusion/vig_tables.pdf, October 4.
EPA VISL -- Calculated EPA Vapor Intrusion Screening Level. Criteria based on cancer risk of 1E-6 or non-cancer hazard quotient of 1.0, Henry's Law adjusted to a groundwater temperature of 15° C
VISL calculator incorporates toxicity factors from the June 2013 EPA RSL table. Accessed from the Internet at http://www.epa.gov/oswer/vaporintrusion/documents/VISL-Calculator.xlsm, November 1
c - EPA VISL based on cancer risk; n - EPA VISL based on non-cancer hazard
Bold data indicates a detection.
Yellow highlight indicates concentration exceeds NJDEP GWQS, NJDEP VISL, and EPA VISL. Mauve indicates level exceeds only the NJDEP GWQS but not EPA or NJDEP VISLs.
Orange indicates level exceeds only EPA VISL. Brown indicates level exceeds NJDEP GWQS and EPA VISL, but not NJDEP VISL
J = estimated value
UJ = not detected, sample quantitation limit is estimated
U = compound analyzed but not detected at the stated detection limit

TABLE 2-7

MAY-JUNE 2010 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR METALS
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	2 BR	3 BR	4 BR	5 BR	6 BR	7 BR	8 BR
		Duplicate:							
		Sample Date:	5/11/2010	6/8/2010	5/6/2010	6/8/2010	6/8/2010	6/9/2010	5/11/2010
Metals	**Units**	**NJ GWQS**							
Aluminum, Total	µg/l	200	**210**	NA	110 U	NA	NA	NA	110 U
Aluminum, Dissolved	µg/l	200	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Arsenic, Total	µg/l	3.0	9 U	NA	9 U	NA	NA	NA	**3.4 J**
Arsenic, Dissolved	µg/l	3.0	8 U	8 U	**6.5 J**	8 U	8 U	**15**	**8.4**
Barium, Total	µg/l	6,000	13	NA	78	NA	NA	NA	34
Barium, Dissolved	µg/l	6,000	11	11	80	78	160	48	36
Iron, Total	µg/l	300	**10000**	NA	**310**	NA	NA	NA	40 J
Iron, Dissolved	µg/l	300	**3000**	**1200**	140	100	**2400**	**5500**	60 U
Lead, Total	µg/l	5.0	3.4 J	NA	6.7 U	NA	NA	NA	**5.2 J**
Lead, Dissolved	µg/l	5.0	6 U	6 U	4.4 J	6 U	6 U	U	6 U
Manganese, Total	µg/l	50	**430**	NA	**820**	NA	NA	NA	6 U
Manganese, Dissolved	µg/l	50	**530**	**100**	**840**	29	**150**	**670**	5 U
Mercury, Total	µg/l	2.0	0.5 U	NA	0.5 U	NA	NA	NA	0.5 U
Mercury, Dissolved	µg/l	2.0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

		Sample ID:	9 BR	11 BR	11 MW 1	12 BR	12 MW 1	12 S	15 BR
		Duplicate:							
		Sample Date:	6/9/2010	5/12/2010	6/9/2010	5/12/2010	5/12/2010	6/8/2010	5/13/2010
Metals	**Units**	**NJ GWQS**							
Aluminum, Total	µg/l	200	NA	110 U	NA	110 U	130	NA	110 U
Aluminum, Dissolved	µg/l	200	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Arsenic, Total	µg/l	3.0	NA	9 U	NA	9 U	9 U	NA	**3.6 J**
Arsenic, Dissolved	µg/l	3.0	8 U	8 U	8 U	8 U	**4.5 J**	8 U	**6.7 J**
Barium, Total	µg/l	6,000	NA	11 U	NA	35	65	NA	140
Barium, Dissolved	µg/l	6,000	32	10 U	24	35	68	26	150
Iron, Total	µg/l	300	NA	97	NA	**450**	**530**	NA	**1200**
Iron, Dissolved	µg/l	300	280	60 U	25 J	36 J	36 J	60 U	**1200**
Lead, Total	µg/l	5.0	NA	**5.4 J**	NA	**6.2 J**	**5.3 J**	NA	4.9 J
Lead, Dissolved	µg/l	5.0	6 U	2.2 J	6 U	6 U	3.2 J	6 U	4 J
Manganese, Total	µg/l	50	NA	5.1 J	NA	**100**	**590**	NA	**540**
Manganese, Dissolved	µg/l	50	**340**	2.5 J	3.1 J	**99**	**630**	**790**	**550**
Mercury, Total	µg/l	2.0	NA	0.5 U	NA	0.5 U	0.5 U	NA	0.5 U
Mercury, Dissolved	µg/l	2.0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

TABLE 2-7

MAY-JUNE 2010 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR METALS
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	16 BR	16 BR	17 BR	19 BR	20 BR	21 BR	22 BR
		Duplicate:	Original	Duplicate					
		Sample Date:	5/13/2010	5/13/2010	5/7/2010	6/8/2010	5/10/2010	5/11/2010	5/6/2010
Metals	**Units**	**NJ GWQS**							
Aluminum, Total	µg/l	200	110 U	110 U	110 U	NA	110 U	110 U	110 U
Aluminum, Dissolved	µg/l	200	100 U	100 U	100 U	**230**	100 U	100 U	100 U
Arsenic, Total	µg/l	3.0	9 U	9 U	9 U	NA	9 U	9 U	9 U
Arsenic, Dissolved	µg/l	3.0	2.7 J	8 U	**3.3 J**	8 U	**5.4 J**	8 U	2.9 J
Barium, Total	µg/l	6,000	170	170	16	NA	79	17	31
Barium, Dissolved	µg/l	6,000	160	160	15	12	80	16	32
Iron, Total	µg/l	300	**2200**	**2300**	**2400**	NA	**1400**	**1800**	67 U
Iron, Dissolved	µg/l	300	**740**	**730**	280	24 J	**820**	150	60 U
Lead, Total	µg/l	5.0	3.7 J	2.3 J	2.4 J	NA	**5.7 J**	**7.6**	4 J
Lead, Dissolved	µg/l	5.0	4.1 J	4 J	3 J	6 U	2.4 J	6 U	6 U
Manganese, Total	µg/l	50	**200**	**190**	**80**	NA	**780**	16	12
Manganese, Dissolved	µg/l	50	**190**	**190**	**80**	3.1 J	**800**	14	11
Mercury, Total	µg/l	2.0	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U
Mercury, Dissolved	µg/l	2.0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

		Sample ID:	23 BR	24 BR	24 BR	25 BR	27 BR	28 BR	29 BR
		Duplicate:		Original	Duplicate				Original
		Sample Date:	5/6/2010	5/7/2010	5/7/2010	5/7/2010	6/8/2010	6/8/2010	5/11/2010
Metals	**Units**	**NJ GWQS**							
Aluminum, Total	µg/l	200	**520**	110 U	110 U	110 U	NA	NA	110 U
Aluminum, Dissolved	µg/l	200	130	100 U	100 U	100 U	100 U	100 U	100 U
Arsenic, Total	µg/l	3.0	9 U	9 U	9 U	9 U	NA	NA	9 U
Arsenic, Dissolved	µg/l	3.0	8 U	**4.7 J**	**3.3 J**	8 U	8 U	8 U	**5 J**
Barium, Total	µg/l	6,000	47	630	630	73	NA	NA	220
Barium, Dissolved	µg/l	6,000	37	650	650	68	130	45	220
Iron, Total	µg/l	300	**7100**	**1200**	**1100**	**2400**	NA	NA	160
Iron, Dissolved	µg/l	300	60 U	200	280	6 U	**650**	34 J	41 J
Lead, Total	µg/l	5.0	**9.4**	3.9 J	3 J	6.7 U	NA	NA	3.9 J
Lead, Dissolved	µg/l	5.0	6 U	6 U	6 U	6 U	6 U	6 U	6 U
Manganese, Total	µg/l	50	**69**	35	37	40	NA	NA	**60**
Manganese, Dissolved	µg/l	50	5 U	32	31	30	**91**	33	**54**
Mercury, Total	µg/l	2.0	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
Mercury, Dissolved	µg/l	2.0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

TABLE 2-7

MAY-JUNE 2010 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR METALS
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	29 BR	30 BR	31 BR	31 S	32 S	33 BR	34 BR
		Duplicate:	Duplicate						
		Sample Date:	5/11/2010	5/7/2010	6/8/2010	6/8/2010	6/8/2010	5/14/2010	6/8/2010
Metals	**Units**	**NJ GWQS**							
Aluminum, Total	µg/l	200	110 U	110 U	NA	NA	NA	110 U	NA
Aluminum, Dissolved	µg/l	200	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Arsenic, Total	µg/l	3.0	9 U	**8.1 J**	NA	NA	NA	9 U	NA
Arsenic, Dissolved	µg/l	3.0	**3.7 J**	**27**	8 U	8 U	8 U	8 U	8 U
Barium, Total	µg/l	6,000	210	1400	NA	NA	NA	200	NA
Barium, Dissolved	µg/l	6,000	220	1400	36	11	170	210	15
Iron, Total	µg/l	300	220	**84300**	NA	NA	NA	**2000**	NA
Iron, Dissolved	µg/l	300	43 J	**81500**	42 J	30 J	60 U	**1000**	**10200**
Lead, Total	µg/l	5.0	2.9 J	3.6 J	NA	NA	NA	**7.7**	NA
Lead, Dissolved	µg/l	5.0	2.3 J	4.4 J	6 U	6 U	6 U	3.5 J	6 U
Manganese, Total	µg/l	50	**65**	**260**	NA	NA	NA	**620**	NA
Manganese, Dissolved	µg/l	50	**53**	**220**	**98**	6.4	18	**610**	**550**
Mercury, Total	µg/l	2.0	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	NA
Mercury, Dissolved	µg/l	2.0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

		Sample ID:	35 BR	35 MW 1	35 MW 2	36 BR	37 BR	37 S	38 BR
		Duplicate:							
		Sample Date:	6/8/2010	5/12/2010	6/8/2010	5/13/2010	6/9/2010	6/9/2010	5/13/2010
Metals	**Units**	**NJ GWQS**							
Aluminum, Total	µg/l	200	NA	120	NA	110 U	NA	NA	110 U
Aluminum, Dissolved	µg/l	200	100 U	34 J	36 J	100 U	100 U	100 U	100 U
Arsenic, Total	µg/l	3.0	NA	9 U	NA	**4.1 J**	NA	NA	9 U
Arsenic, Dissolved	µg/l	3.0	8 U	8 U	8 U	**6.5 J**	8 U	8 U	**9.5**
Barium, Total	µg/l	6,000	NA	18	NA	1100	NA	NA	1000
Barium, Dissolved	µg/l	6,000	10 U	17	33	1100	160	27	1000
Iron, Total	µg/l	300	NA	200	NA	**13700**	NA	NA	**10400**
Iron, Dissolved	µg/l	300	53 J	60 U	60 U	**14500**	**2100**	60 U	**9300**
Lead, Total	µg/l	5.0	NA	2.8 J	NA	**9**	NA	NA	4.7 J
Lead, Dissolved	µg/l	5.0	6 U	6 U	6 U	3.4 J	6 U	6 U	3.2 J
Manganese, Total	µg/l	50	NA	**1500**	NA	**280**	NA	NA	**60**
Manganese, Dissolved	µg/l	50	**330**	**1500**	**150**	**290**	**260**	2.8 J	50
Mercury, Total	µg/l	2.0	NA	0.5 U	NA	0.5 U	NA	NA	0.5 U
Mercury, Dissolved	µg/l	2.0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

TABLE 2-7

MAY-JUNE 2010 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR METALS
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	39 BR	40 BR	40 BR	40 S	41 BR	42 BR	43 BR
		Duplicate:		Original	Duplicate				
		Sample Date:	6/8/2010	6/9/2010	6/9/2010	5/12/2010	5/10/2010	6/8/2010	6/9/2010
Metals	**Units**	**NJ GWQS**							
Aluminum, Total	µg/l	200	NA	NA	NA	**430**	110 U	NA	NA
Aluminum, Dissolved	µg/l	200	100 U	100 U	100 U	100 U	100 U	100 U	350
Arsenic, Total	µg/l	3.0	NA	NA	NA	9 U	**5.4 J**	NA	NA
Arsenic, Dissolved	µg/l	3.0	8 U	8 U	8 U	8 U	**7.9 J**	8 U	8 U
Barium, Total	µg/l	6,000	NA	NA	NA	100	650	NA	NA
Barium, Dissolved	µg/l	6,000	200	48	46	97	650	49	55
Iron, Total	µg/l	300	NA	NA	NA	**1300**	**1900**	NA	NA
Iron, Dissolved	µg/l	300	**1800**	**870**	170	120	**1300**	**490**	41 J
Lead, Total	µg/l	5.0	NA	NA	NA	**7.3**	6.7 U	NA	NA
Lead, Dissolved	µg/l	5.0	6 U	6 U	6 U	2.1 J	6 U	6 U	6 U
Manganese, Total	µg/l	50	NA	NA	NA	**870**	**3200**	NA	NA
Manganese, Dissolved	µg/l	50	**83**	49	**55**	**610**	**3200**	12	5 U
Mercury, Total	µg/l	2.0	NA	NA	NA	0.5 U	0.1 U	NA	NA
Mercury, Dissolved	µg/l	2.0	0.5 U	0.5 U	0.5 U	0.5 U	0.03 J	0.04 J	0.5 U

		Sample ID:	44 BR	45 BR	46 BR	47 BR	48 BR	49 BR	50 BR
		Duplicate:							
		Sample Date:	6/9/2010	5/11/2010	6/9/2010	5/13/2010	5/10/2010	6/8/2010	6/8/2010
Metals	**Units**	**NJ GWQS**							
Aluminum, Total	µg/l	200	NA	110 U	NA	110 U	110 U	NA	NA
Aluminum, Dissolved	µg/l	200	68 J	100 U	**1900**	100 U	100 U	100 U	100 U
Arsenic, Total	µg/l	3.0	NA	9 U	NA	9 U	9 U	NA	NA
Arsenic, Dissolved	µg/l	3.0	8 U	**3.4 J**	8 U	**4.2 J**	**4.5 J**	8 U	8 U
Barium, Total	µg/l	6,000	NA	200	NA	30	25	NA	NA
Barium, Dissolved	µg/l	6,000	22	200	440	32	25	20	4.7 J
Iron, Total	µg/l	300	NA	**710**	NA	210	36 J	NA	NA
Iron, Dissolved	µg/l	300	100	**370**	60 U	200	60 U	**3900**	78
Lead, Total	µg/l	5.0	NA	4.7 J	NA	**5.7 J**	4.7 J	NA	NA
Lead, Dissolved	µg/l	5.0	6 U	6 U	6 U	3 J	6 U	3.5 J	6 U
Manganese, Total	µg/l	50	NA	**430**	NA	**3300**	**86**	NA	NA
Manganese, Dissolved	µg/l	50	5 U	**440**	5 U	**3300**	**88**	**190**	36
Mercury, Total	µg/l	2.0	NA	0.5 U	NA	0.5 U	0.5 U	NA	NA
Mercury, Dissolved	µg/l	2.0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U

TABLE 2-7

MAY-JUNE 2010 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR METALS
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	51 BR	52 BR	53 BR	54 BR	55 BR	56 BR	57 BR
		Duplicate:							
		Sample Date:	5/11/2010	6/8/2010	5/10/2010	6/9/2010	5/11/2010	5/13/2010	6/8/2010
Metals	**Units**	**NJ GWQS**							
Aluminum, Total	µg/l	200	110 U	NA	110 U	NA	110 U	110 U	NA
Aluminum, Dissolved	µg/l	200	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Arsenic, Total	µg/l	3.0	9 U	NA	9 U	NA	9 U	9 U	NA
Arsenic, Dissolved	µg/l	3.0	2.8 J	8 U	**3.6 J**	8 U	**4.2 J**	**3.2 J**	8 U
Barium, Total	µg/l	6,000	11 U	NA	140	NA	230	400	NA
Barium, Dissolved	µg/l	6,000	10 U	30	130	290	240	410	44
Iron, Total	µg/l	300	**830**	NA	**3400**	NA	190	61 J	NA
Iron, Dissolved	µg/l	300	60 U	60 U	**360**	60 U	60	28 J	**410**
Lead, Total	µg/l	5.0	**6 J**	NA	4.2 J	NA	2.2 J	3.9 J	NA
Lead, Dissolved	µg/l	5.0	6 U	6 U	6 U	**7.8**	6 U	4.8 J	6 U
Manganese, Total	µg/l	50	18	NA	57	NA	23	10	NA
Manganese, Dissolved	µg/l	50	5 U	14	46	**150**	24	13	**120**
Mercury, Total	µg/l	2.0	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	NA
Mercury, Dissolved	µg/l	2.0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

		Sample ID:	58 BR	59 BR	60 BR	61 BR	62 BR	63 BR	64 BR
		Duplicate:							
		Sample Date:	6/8/2010	6/8/2010	5/14/2010	5/14/2010	6/8/2010	5/6/2010	6/9/2010
Metals	**Units**	**NJ GWQS**							
Aluminum, Total	µg/l	200	NA	NA	110 U	110 U	NA	**1000**	NA
Aluminum, Dissolved	µg/l	200	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Arsenic, Total	µg/l	3.0	NA	NA	9 U	9 U	NA	9 U	NA
Arsenic, Dissolved	µg/l	3.0	8 U	8 U	**5.3 J**	**3.7 J**	8 U	**8.3**	8 U
Barium, Total	µg/l	6,000	NA	NA	200	150	NA	64	NA
Barium, Dissolved	µg/l	6,000	79	140	210	160	180	59	130
Iron, Total	µg/l	300	NA	NA	**3100**	**5000**	NA	**2700**	NA
Iron, Dissolved	µg/l	300	**15500**	**7800**	**1300**	**780**	250	**1700**	60 U
Lead, Total	µg/l	5.0	NA	NA	**5.6 J**	4.1 J	NA	4.3 J	NA
Lead, Dissolved	µg/l	5.0	6 U	6 U	2.1 J	3.7 J	6 U	2.4 J	6 U
Manganese, Total	µg/l	50	NA	NA	**530**	**310**	NA	**1000**	NA
Manganese, Dissolved	µg/l	50	**1400**	**790**	**520**	**300**	**730**	**1000**	**140**
Mercury, Total	µg/l	2.0	NA	NA	0.5 U	0.5 U	NA	0.5 U	NA
Mercury, Dissolved	µg/l	2.0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

TABLE 2-7

MAY-JUNE 2010 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR METALS
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	65 BR	66 BR	BRP 1	BRP 2	BRP 3	WDW
		Duplicate:						
		Sample Date:	5/6/2010	6/8/2010	5/13/2010	5/10/2010	5/7/2010	5/10/2010
Metals	**Units**	**NJ GWQS**						
Aluminum, Total	µg/l	200	39 J	NA	110 U	110 U	71 J	75 J
Aluminum, Dissolved	µg/l	200	100 U	100 U	100 U	100 U	100 U	100 U
Arsenic, Total	µg/l	3.0	9 U	NA	**3.2 J**	9 U	9 U	9 U
Arsenic, Dissolved	µg/l	3.0	**5.1 J**	8 U	**10**	**6.8 J**	**4.7 J**	8 U
Barium, Total	µg/l	6,000	63	NA	38	75	140	54
Barium, Dissolved	µg/l	6,000	65	230	37	75	140	54
Iron, Total	µg/l	300	100	NA	**4300**	**2000**	**5000**	300
Iron, Dissolved	µg/l	300	45 J	98	**4200**	**1000**	**3100**	33 J
Lead, Total	µg/l	5.0	2.3 J	NA	3.9 J	**5.6 J**	6.7 U	4.7 J
Lead, Dissolved	µg/l	5.0	6 U	6 U	6 U	6 U	3.4 J	6 U
Manganese, Total	µg/l	50	**210**	NA	**4500**	**660**	**600**	44
Manganese, Dissolved	µg/l	50	**200**	**57**	**4500**	**680**	**600**	29
Mercury, Total	µg/l	2.0	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U
Mercury, Dissolved	µg/l	2.0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Notes:
All results given in micrograms per liter (µg/L).
NJ GWQS -- New Jersey Department of Environmental Protection, 2013. Ground Water Quality Standards, New Jersey Administrative Code 7:9C.
Accessed from the Internet at http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf, October 4.
Bold and shaded data indicate the compound exceeds NJDEP GWQS.

J - estimated value.
UJ - not detected, sample detection limit is estimated.
U - compound analyzed but not detected at the stated detection limit.
NA - Not analyzed.

TABLE 2-8

OCTOBER 2011 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR METALS
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	11 S	13 S	14 BR	14 S	16 S	28 S	29 S
		Duplicate:							
		Sample Date:	10/25/2011	10/25/2011	10/25/2011	10/25/2011	10/25/2011	10/25/2011	10/25/2011
Metals	**Units**	**NJ GWQS**							
Aluminum, Total	µg/l	200	100 U	100 U	**370**	100 U	140 J	100 U	100 U
Arsenic, Total	µg/l	3.0	4.60 U	4.60 U	4.60 U	4.60 U	4.60 U	**6.10 J**	**4.80 J**
Barium, Total	µg/l	6,000	5.70 J	21.00	120	28.0	39.0	12.0	42.0
Barium, Dissolved	µg/l	6,000	5.10 J	19.00	110	29.0	41.0	13.0	39.0
Cadmium, Total	µg/l	4.0	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U
Chromium, Total	µg/l	70	1.71 U	2.2 J	7.30 U U	4.5 U	2.3 J	4 U	1.2 J
Iron, Total	µg/l	300	**3,400 J**	65 J	**9,400**	54 J	270	**3,600**	**700**
Iron, Dissolved	µg/l	300	**3,000**	24 U	**310**	24 J	24 U	**5,200**	**590**
Lead, Total	µg/l	5.0	4.00 U	4.00 U	4.30 J	4.00 U	4.00 U	4.00 U	4.00 U
Manganese, Total	µg/l	50	**470**	19	**210**	3.8 J	25	**2500**	**2100**
Mercury, Total	µg/l	2.0	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U
Nickel, Total	µg/l	100	2.30 U	3.20 J	6.40 J	6.50 J	2.30 U	5.10 J	10.00 J

		Sample ID:	30 S	32 BR	34 S	34 S	35 S	35 S	42 S
		Duplicate:					Original	Duplicate	
		Sample Date:	10/25/2011	10/26/2011	10/25/2011	10/28/2011	10/26/2011	10/26/2011	10/25/2011
Metals	**Units**	**NJ GWQS**							
Aluminum, Total	µg/l	200	100 U	100 U	100 U	100 U	100 U	100 U	130 J
Arsenic, Total	µg/l	3.0	**4.90 J**	4.60 U	4.60 U	4.60 U	4.60 U	4.60 U	4.60 U
Barium, Total	µg/l	6,000	86.0	6.80 J	59.0	58.0	25.0	25.0	30.0
Barium, Dissolved	µg/l	6,000	100	7.50 J	61.0	60.0	25.0	25.0	30.0
Cadmium, Total	µg/l	4.0	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U
Chromium, Total	µg/l	70	2.4 J	2.9 J	4.2 J	2.4 J	2.7 J	2.2 J	3.6 J
Iron, Total	µg/l	300	**3,900**	**15,000 J**	120 J	65 J	62 J	81 J	**1,700**
Iron, Dissolved	µg/l	300	**4,900**	**18,000**	41 J	46 J	24 U	24 U	**1,200**
Lead, Total	µg/l	5.0	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U
Manganese, Total	µg/l	50	**6200**	**290**	5.4 J	8.8 J	7.4 J	7.4 J	**540**
Mercury, Total	µg/l	2.0	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U
Nickel, Total	µg/l	100	2.30 U	2.80 J	6.40 J	5.00 J	4.50 J	6.00 J	4.90 J

TABLE 2-8

OCTOBER 2011 SAMPLING EVENT
GROUNDWATER ANALYTICAL RESULTS FOR METALS
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	68 BR-A	68 BR-A	68 BR-B	68 BR-C	68 BR-D	68 BR-F	74 BR
		Duplicate:	Original	Duplicate					
		Sample Date:	10/24/2011	10/24/2011	10/24/2011	10/24/2011	10/25/2011	10/25/2011	10/24/2011
Metals	**Units**	**NJ GWQS**							
Aluminum, Total	µg/l	200	100 U	100 U	100 U	100 U	100 U	100 U	**250**
Arsenic, Total	µg/l	3.0	4.60 U	4.60 U	4.60 U	4.60 U	4.60 U	4.60 U	4.60 U
Barium, Total	µg/l	6,000	26.0	26.0	190	440	150	250	490
Barium, Dissolved	µg/l	6,000	26.0	28.0	220	470	150	280	140
Cadmium, Total	µg/l	4.0	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U
Chromium, Total	µg/l	70	1.2 U	1.2 U	1.2 U	2.1 U	2.1 U	2.1 U	1.8 U
Iron, Total	µg/l	300	**6,200 J**	**4,200 J**	**5,700**	**5,000**	**5,600**	**1,300**	**5,400**
Iron, Dissolved	µg/l	300	**3,900**	**3,900**	**4,100**	**4,800**	**4,400**	**1,400**	**1,400**
Lead, Total	µg/l	5.0	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U
Manganese, Total	µg/l	50	**2800**	**2800**	**1100**	**370**	**320**	**89**	**290**
Mercury, Total	µg/l	2.0	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U	0.091 U
Nickel, Total	µg/l	100	2.30 UJ	2.70 J	2.30 J	4.00 J	2.30 U	2.30 U	2.70 U

Notes:
All results given in micrograms per liter (µg/L).
NJ GWQS -- New Jersey Department of Environmental Protection, 2013. Ground Water Quality Standards, New Jersey Administrative Code 7:9C.
Accessed from the Internet at http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf, October 4.
Bold and shaded data indicate the compound exceeds NJDEP GWQS.

J - estimated value.
UJ - not detected, sample detection limit is estimated.
U - compound analyzed but not detected at the stated detection limit.

TABLE 2-9

MAY 2009 SAMPLING EVENT
SURFACE WATER ANALYTICAL RESULTS FOR VOLATILES
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	GR-OF	MH-117N	MH-117T	MH-118.5N	MH-118.5T	MH-118.5T (DUP)	MH-121.5N	MH-121.5T	MH-125.9N
		Duplicate:					Original	Duplicate			
		Sample Date:	5/13/2009	5/13/2009	5/13/2009	5/13/2009	5/13/2009	5/13/2009	5/13/2009	5/13/2009	5/13/2009
VOCs	**Units**	**NJ SWQC**									
1,1-Dichloroethene	µg/l	4.7	1.0 U	1.0 U	**0.59 J**	1.0 U	**0.78 J**	**0.76 J**	1.0 U	**1.6**	**3.8**
cis-1,2-Dichloroethene	µg/l	NSE	**31.8**	**9.2**	**193**	**10.3**	**278**	**272**	**8.6**	**428**	**792**
trans-1,2-Dichloroethene	µg/l	590	1.0 U	1.0 U	**1.0**	**2.0**	**1.4**	**1.4**	1.0 U	**2.2**	**6.0**
1,1,1-Trichloroethane	µg/l	120	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**0.31 J**	1.0 U	1.0 U
Trichloroethene	µg/l	1.0	**15.5**	**1.0**	**127**	**4.8**	**157**	**165**	**5.7**	**277**	**800**
Vinyl Chloride	µg/l	0.082	**0.29 J**	1.0 U	**6.8**	1.0 U	**9.8**	**9.7**	1.0 U	**18.8**	**43.1**

		Sample ID:	MH-125.9T
		Duplicate:	
		Sample Date:	5/13/2009
VOCs	**Units**	**NJ SWQC**	
1,1-Dichloroethene	µg/l	4.7	1.0 U
cis-1,2-Dichloroethene	µg/l	NSE	**6.1**
trans-1,2-Dichloroethene	µg/l	590	1.0 U
1,1,1-Trichloroethane	µg/l	120	1.0 U
Trichloroethene	µg/l	1.0	**4.9**
Vinyl Chloride	µg/l	0.082	1.0 U

Notes:
All results given in micrograms per liter (µg/L).
Criteria - The New Jersey Department if Environmental Protection (NJDEP) Surface Water Quality Criteria (SWQC) for Class FW2 Surface Water (N.J.A.C 7:9B) readopted on 16 June 2009. The Criteria used are the Higher of Practical Quantitation Limits (PQLs) or SWQC.

Bold and shaded data indicate the compund exceeds the NJDEP SWQC.

J = estimated value
U = compound analyzed but not detected at the stated detection limit
NSE = no standard established

TABLE 2-9

SEPTEMBER 2009 SAMPLING EVENT
SURFACE WATER ANALYTICAL RESULTS FOR VOLATILES
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	GR-OF	MH-117N	MH-117T	MH-118.5N	MH-118.5N	MH-118.5T	MH-121.5N	MH-121.5T	MH-125.9N
		Duplicate:				Original	Duplicate				
		Sample Date:	9/2/2009	9/2/2009	9/2/2009	9/2/2009	9/2/2009	9/2/2009	9/2/2009	9/2/2009	9/2/2009
VOCs	**Units**	**NJ SWQC**									
1,1-Dichloroethene	µg/l	4.7	1.0 U	1.0 U	**0.69 J**	1.0 U	1.0 U	**1.1**	**0.28 J**	**1.8**	**5.0**
cis-1,2-Dichloroethene	µg/l	NSE	**44.8**	**20.6**	**271**	**28.6**	**29.0**	**390**	**18.5**	**570**	**1,250**
trans-1,2-Dichloroethene	µg/l	590	1.0 U	1.0 U	**1.4**	1.0 U	1.0 U	**3.1**	1.0 U	**4.0**	**9.0**
1,1,1-Trichloroethane	µg/l	120	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**0.40 J**	1.0 U	1.0 U
Trichloroethene	µg/l	1.0	**15.5**	**5.4**	**107**	**7.60**	**7.50**	**156**	**8.80**	**235**	**996**
Vinyl Chloride	µg/l	0.082	**0.76 J**	**0.17 J**	**10.8**	**0.32 J**	**0.27 J**	**17.1**	1.0 U	**34.1**	**90.5**

		Sample ID:	MH-125.9T
		Duplicate:	
		Sample Date:	9/2/2009
VOCs	**Units**	**NJ SWQC**	
1,1-Dichloroethene	µg/l	4.7	1.0 U
cis-1,2-Dichloroethene	µg/l	NSE	**24.0**
trans-1,2-Dichloroethene	µg/l	590	1.0 U
1,1,1-Trichloroethane	µg/l	120	1.0 U
Trichloroethene	µg/l	1.0	**10.3**
Vinyl Chloride	µg/l	0.082	**0.57 J**

Notes:
All results given in micrograms per liter (µg/L).
Criteria - The New Jersey Department if Environmental Protection (NJDEP) Surface Water Quality Criteria (SWQC) for Class FW2 Surface Water (N.J.A.C 7:9B) readopted on 16 June 2009. The Criteria used are the Higher of Practical Quantitation Limits (PQLs) or SWQC.

Bold and shaded data indicate the compund exceeds the NJDEP SWQC.

J = estimated value
U = compound analyzed but not detected at the stated detection limit
NSE = no standard established

TABLE 2-9

MAY 2010 SAMPLING EVENT
SURFACE WATER ANALYTICAL RESULTS FOR VOLATILES
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	GR-OF	MW-117N	MW-117T	MH-117T	MH-118.5N	MH-118.5T	MH-121.5N	MH-121.5T	MH-125.9N
		Duplicate:			Original	Duplicate					
		Sample Date:	5/10/2010	5/10/2010	5/10/2010	5/10/2010	5/10/2010	5/10/2010	5/10/2010	5/10/2010	5/10/2010
VOCs	**Units**	**NJ SWQC**									
1,1-Dichloroethane	µg/l	NSE	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**0.18 J**	1.0 U
1,1-Dichloroethene	µg/l	4.7	1.0 U	1.0 U	**0.83 J**	1.0 U	1.0 U	**0.34 J**	1.0 U	**1.3 J**	**5.8**
cis-1,2-Dichloroethene	µg/l	NSE	**2.4**	**1.8**	**86.4**	**86.6**	**2.9**	**169**	**2.8**	**653**	**2,420**
trans-1,2-Dichloroethene	µg/l	590	1.0 U	1.0 U	**0.37 J**	**0.37 J**	1.0 U	**0.95 J**	1.0 U	**3.0**	**17.6**
Trichloroethene	µg/l	1.0	**0.82 J**	**0.49 J**	**28.5**	**29.3**	**0.62 J**	**33.5**	**0.74 J**	**140**	**291**
Vinyl Chloride	µg/l	0.082	1.0 U	1.0 U	**0.69 J**	**0.71 J**	1.0 U	**1.60**	1.0 U	**10.5**	**108**

Notes:
All results given in micrograms per liter (µg/L).
Criteria - The New Jersey Department if Environmental Protection (NJDEP) Surface Water Quality Criteria (SWQC) for Class FW2 Surface Water (N.J.A.C 7:9B) readopted on 16 June 2009. The Criteria used are the Higher of Practical Quantitation Limits (PQLs) or SWQC.

Bold and shaded data indicate the compound exceeds the NJDEP SWQC.

J = estimated value
U = compound analyzed but not detected at the stated detection limit
NSE = no standard established

TABLE 2-9

NOVEMBER 2010 SAMPLING EVENT
SURFACE WATER ANALYTICAL RESULTS FOR VOLATILES
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	GR-OF	MW-117N	MW-117T	MH-118.5N	MH-118.5N	MH-118.5T	MH-121.5N	MH-121.5T
		Duplicate:				Original	Duplicate			
		Sample Date:	11/11/2010	11/11/2010	11/11/2010	11/11/2010	11/11/2010	11/11/2010	11/11/2010	11/11/2010
VOCs	**Units**	**NJ SWQC**								
1,1-Dichloroethene	µg/l	4.7	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.4**
cis-1,2-Dichloroethene	µg/l	NSE	1.0 U	1.0 U	**4.6**	**1.6**	**1.1**	**12.5**	1.0 U	**91.3**
trans-1,2-Dichloroethene	µg/l	590	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**0.97 J**
Trichloroethene	µg/l	1.0	**0.75 J**	**0.43 J**	**9.8**	**0.66 J**	**0.64 J**	**4.8**	1.0 U	**38.4**
Vinyl Chloride	µg/l	0.082	1.0 U	1.0 U	**0.39 J**	1.0 U	1.0 U	**0.38 J**	1.0 U	**0.65 J**

Notes:
All results given in micrograms per liter (µg/L).
Criteria - The New Jersey Department if Environmental Protection (NJDEP) Surface Water Quality Criteria (SWQC) for Class FW2 Surface Water (N.J.A.C 7:9B) readopted on 16 June 2009. The Criteria used are the Higher of Practical Quantitation Limits (PQLs) or SWQC.

Bold and shaded data indicate the compund exceeds the NJDEP SWQC.

J = estimated value
U = compound analyzed but not detected at the stated detection limit
NSE = no standard established

TABLE 2-9

MARCH 2011 SAMPLING EVENT
SURFACE WATER ANALYTICAL RESULTS FOR VOLATILES
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	GR-OF	MW-117N	MW-117N	MH-117T	MH-118.5N	MH-118.5T	MH-121.9N	MH-121.9T	MH-125.9N
		Duplicate:		Original	Duplicate						
		Sample Date:	3/9/2011	3/9/2011	3/9/2011	3/9/2011	3/9/2011	3/9/2011	3/9/2011	3/9/2011	3/9/2011
VOCs	**Units**	**NJ SWQC**									
1,1-Dichloroethane	µg/l	NSE	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/l	4.7	1.0 U	1.0 U	1.0 U	**0.50 J**	1.0 U	**0.44 J**	**0.69 J**	**0.85 J**	**2.4**
cis-1,2-Dichloroethene	µg/l	NSE	**9.4**	**12.6**	**13**	**95**	**4.8**	**112**	**20.4**	**183**	**434**
trans-1,2-Dichloroethene	µg/l	590	1.0 U	1.0 U	1.0 U	**0.61 J**	1.0 U	**0.84 J**	1.0 U	**1.3**	**3.7**
Tetrachloroethene	µg/l	0.34	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	µg/l	120	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**0.53 J**	1.0 U	1.0 U
Trichloroethene	µg/l	1.0	**6**	**5.7**	**5.7**	**61.2**	**3.3**	**71.2**	**10.1**	**122**	**516**
Vinyl Chloride	µg/l	0.082	1.0 U	1.0 U	1.0 U	**1.9**	1.0 U	**2.3**	**0.32 J**	**4.2**	**8.5**

		Sample ID:	MH-125.9T	OF1-A (Culvert)	OF1-B (MH-140)	OF1-C (OS infl.)	Port 001
		Duplicate:					
		Sample Date:	3/9/2011	3/9/2011	3/9/2011	3/9/2011	3/9/2011
VOCs	**Units**	**NJ SWQC**					
1,1-Dichloroethane	µg/l	NSE	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/l	4.7	1.0 U	1.0 U	**2.9**	**3.4**	1.0 U
cis-1,2-Dichloroethene	µg/l	NSE	**4.8**	1.0 U	**179**	**178**	**1.2**
trans-1,2-Dichloroethene	µg/l	590	1.0 U	1.0 U	**2.9**	**3.3**	1.0 U
Tetrachloroethene	µg/l	0.34	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	µg/l	120	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/l	1.0	**2.6**	**0.40 J**	**724**	**770**	**2.9**
Vinyl Chloride	µg/l	0.082	1.0 U	1.0 U	**2.7**	**2.7**	1.0 U

Notes:
All results given in micrograms per liter (µg/L).
Criteria - The New Jersey Department if Environmental Protection (NJDEP) Surface Water Quality Criteria (SWQC) for Class FW2 Surface Water (N.J.A.C 7:9B) readopted on 16 June 2009. The Criteria used are the Higher of Practical Quantitation Limits (PQLs) or SWQC.

Bold and shaded data indicate the compund exceeds the NJDEP SWQC.

J = estimated value
U = compound analyzed but not detected at the stated detection limit
NSE = no standard established

TABLE 2-9

OCTOBER 2011 SAMPLING EVENT
SURFACE WATER ANALYTICAL RESULTS FOR VOLATILES
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	MH 117 N	MH 117 T	MH 118.5 N	MH 118.5 T	MH 121.5 N	MH 121.5 T	MH 125.9 N	MH 125.9 N	MH 125.9 T
		Duplicate:							Original	Duplicate	
		Sample Date:	10/21/2011	10/24/2011	10/21/2011	10/24/2011	10/21/2011	10/23/2011	10/21/2011	10/21/2011	10/23/2011
VOCs	**Units**	**NJ SWQC**									
Benzene	µg/l	0.15	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U	0.25 U	2.50 U
Bromodichloromethane	µg/l	0.55	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U	0.25 U	2.50 U
Chloroform	µg/l	68	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.28 U	0.14 U	0.14 U	1.40 U
1,1-Dichloroethane	µg/l	NSE	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U	0.25 U	2.50 U
1,1-Dichloroethene	µg/l	4.7	0.11 U	0.11 U	0.11 U	0.48 U	0.11 U	1.00 U	0.56 U	0.58 U	1.10 U
cis-1,2-Dichloroethene	µg/l	NSE	2.40 U	2.80 U	3.70 U	**140 J**	2.20 U	**290 J**	**26.0 J**	**26.0 J**	670 U
trans-1,2-Dichloroethene	µg/l	590	0.20 U	0.20 U	0.20 U	**0.66 J**	0.20 U	**1.50 J**	**0.77 J**	**0.69 J**	**4.10 J**
Tetrachloroethene	µg/l	0.34	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.30 U	0.15 U	0.15 U	1.50 U
1,1,1-Trichloroethane	µg/l	120	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.00 U	0.50 U	0.50 U	5.00 U
Trichloroethene	µg/l	1.0	**0.82 J**	**0.88 J**	**0.94 J**	**37.0**	**1.50**	**76.0**	**71.0**	**68.0**	**110**
Vinyl Chloride	µg/l	0.082	0.18 U	0.18 U	0.18 U	**3.2**	**0.18**	**8.30**	**0.68 J**	**0.64 J**	**17.0**

Notes:
All results given in micrograms per liter (µg/L).
Criteria - The New Jersey Department if Environmental Protection (NJDEP) Surface Water Quality Criteria (SWQC) for Class FW2 Surface Water (N.J.A.C 7:9B) readopted on 16 June 2009. The Criteria used are the Higher of Practical Quantitation Limits (PQLs) or SWQC.

Bold and shaded data indicate the compund exceeds the NJDEP SWQC.

J - estimated value.
U - compound analyzed but not detected at the stated detection limit.
NSE - no standard established.

TABLE 2-9

MAY 2012 SAMPLING EVENT
SURFACE WATER ANALYTICAL RESULTS FOR VOLATILES
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	MH 117 N	MH 117 T	MH 118.5 N	MH 118.5 T	MH 121.5 N	MH 121.5 T	MH 125.9 N	GR-OF
		Duplicate:								Original
		Sample Date:	5/8/2012	5/8/2012	5/8/2012	5/8/2012	5/8/2012	5/8/2012	5/8/2012	5/8/2012
VOCs	**Units**	**NJ SWQC**								
1,1,1-Trichloroethane	µg/l	120	0.50 U	0.50 U	0.50 U	1.00 U	0.50 U	0.50 U	5.00 U	0.50 U
1,1-Dichloroethane	µg/l	NSE	0.25 UJ	0.25 UJ	0.25 UJ	0.50 UJ	0.25 UJ	0.25 UJ	2.50 UJ	0.25 UJ
1,1-Dichloroethene	µg/l	4.7	0.11 UJ	0.11 UJ	0.11 UJ	0.42 U	0.11 UJ	1.30 U	**2.40 J**	0.11 UJ
Benzene	µg/l	0.15	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U	0.25 U	2.50 U	0.25 U
Bromodichloromethane	µg/l	0.55	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U	0.14 U	2.50 U	0.25 U
Chloroform	µg/l	68	0.14 U	0.14 U	0.14 U	0.28 U	0.14 U	0.15 U	1.40 U	0.14 U
cis-1,2-Dichloroethene	µg/l	NSE	**1.30**	0.15 U	**3.10**	**230**	**3.10**	**310**	**950**	**5.60**
Tetrachloroethene	µg/l	0.34	0.15 U	**0.27 J**	0.15 U	0.30 U	0.15 U	**0.37 J**	1.50 U	0.15 UJ
trans-1,2-Dichloroethene	µg/l	590	0.20 U	**0.65 J**	0.20 U	**0.96 J**	0.20 U	**2.10**	**4.70 J**	0.20 U
Trichloroethene	µg/l	1.0	**0.77 J**	**17.0**	**1.10**	**72.0**	**1.50**	**120**	**180**	**2.50**
Vinyl Chloride	µg/l	0.082	0.18 U	**61.0**	0.18 U	**3.60**	0.18 U	**12.0**	**34.0**	0.18 U

		Sample ID:	GR-OF	MH 140	West Ditch Culvert	West Ditch Out	West Ditch In	Spring
		Duplicate:	Duplicate					
		Sample Date:	5/8/2012	5/8/2012	5/8/2012	5/8/2012	5/8/2012	5/8/2012
VOCs	**Units**	**NJ SWQC**						
1,1,1-Trichloroethane	µg/l	120	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/l	NSE	0.25 UJ	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,1-Dichloroethene	µg/l	4.7	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzene	µg/l	0.15	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Bromodichloromethane	µg/l	0.55	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	68	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	NSE	**5.70**	**12.0**	**21.0**	**16.0**	**20.0**	0.15 U
Tetrachloroethene	µg/l	0.34	**0.21 J**	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	590	0.20 U	0.20 U	**0.47 J**	**0.50 J**	**0.44 J**	0.20 U
Trichloroethene	µg/l	1.0	**2.70**	**20.0**	**38.0**	**29.0**	**38.0**	0.20 U
Vinyl Chloride	µg/l	0.082	0.18 U	**0.57 J**	**0.43 J**	**0.28 J**	**0.36 J**	0.18 U

Notes:
All results given in micrograms per liter (µg/L).
Criteria - The New Jersey Department if Environmental Protection (NJDEP) Surface Water Quality Criteria (SWQC) for Class FW2 Surface Water (N.J.A.C 7:9B) readopted on 16 June 2009. The Criteria used are the Higher of Practical Quantitation Limits (PQLs) or SWQC.

Bold and shaded data indicate the compund exceeds the NJDEP SWQC.

J = estimated value
U = compound analyzed but not detected at the stated detection limit
NSE = no standard established

TABLE 2-9

JULY 2012
SURFACE WATER ANALYTICAL RESULTS FOR VOLATILES
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Station ID:	MH 140	MH 117N	MH 117T	MH 118.5N	MH 118.5T	MH 118.5T
		Duplicate:					Original	Duplicate
		Sample Date:	7/26/2012	7/26/2012	7/26/2012	7/26/2012	7/26/2012	7/26/2012
VOCs	**Units**	**NJDEP SWQC**						
1,1,1-Trichloroethane	µg/l	120	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/l	NSE	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,1-Dichloroethene	µg/l	4.7	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzene	µg/l	0.15	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Bromodichloromethane	µg/l	0.55	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	68	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	NSE	**4.1**	**0.27 J**	**11**	**0.47 J**	**18**	**18**
Tetrachloroethene	µg/l	0.34	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	590	0.20 U	0.20 U	0.25 U	0.20 U	0.20 U	0.20 U
Trichloroethene	µg/l	1.0	**0.34 J**	0.13 U	**7.0**	**0.41 J**	**7.1**	**7.0**
Vinyl chloride	µg/l	0.082	**0.27 J**	0.18 U	0.18 U	0.18 U	0.18 U	**0.18 J**

		Station ID:	MH 121.5N	MH 121.5T	West Ditch In	GR-OF
		Duplicate:				
		Sample Date:	7/26/2012	7/26/2012	7/26/2012	7/26/2012
VOCs	**Units**	**NJDEP SWQC**				
1,1,1-Trichloroethane	µg/l	120	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/l	NSE	0.25 U	**0.27 J**	0.25 U	0.25 U
1,1-Dichloroethene	µg/l	4.7	0.11 U	**0.79 J**	0.11 U	0.11 U
Benzene	µg/l	0.15	0.25 U	0.25 U	0.25 U	0.25 U
Bromodichloromethane	µg/l	0.55	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	68	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	NSE	**6.3**	**170**	**0.80 J**	**1.6**
Tetrachloroethene	µg/l	0.34	0.15 U	**0.33 J**	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	590	0.20 U	**0.86 J**	0.20 U	0.20 U
Trichloroethene	µg/l	1.0	**0.25 J**	**95.0**	**0.21 J**	**0.71 J**
Vinyl chloride	µg/l	0.082	**0.65 J**	**1.1**	0.18 U	0.18 U

Notes:
All results given in micrograms per liter (µg/L).
Criteria - The New Jersey Department of Environmental Protection (NJDEP) Surface Water Quality Criteria (SWQC) for Class FW2 Surface Water (N.J.A.C 7:9B) readopted on 16 June 2009. The Criteria used are the Higher of Practical Quantitation Limits (PQLs) or SWQC

Bold and shaded data indicate the compound exceeds the NJDEP SWQC.

J = estimated value
U = compound analyzed but not detected at the stated detection limit
NSE = no standard established

TABLE 2-9

JULY 2013 SAMPLING EVENT
SURFACE WATER ANALYTICAL RESULTS FOR VOLATILES
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

		Sample ID:	MH 117 N	MH 117 T	MH 118.5 N	MH 118.5 T	MH 121.5 N	MH 121.5 N	MH 121.5 T	MH 125.9 N	MH 125.9 T
		Duplicate:						Original	Duplicate		
		Sample Date:	7/10/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013
VOCs	**Units**	**NJ SWQC**									
1,1-Dichloroethene	µg/l	4.7	0.11 U	0.11 U	0.11 U	**0.16 J**	0.50 U	0.50 U	**0.57 J**	0.11 U	0.11 U
cis-1,2-Dichloroethene	µg/l	NSE	**0.41 J**	**59.0 J**	**0.57 J**	**67.0 J**	**110 J**	**130 J**	**110 J**	**57.0 J**	**0.19 J**
Tetrachloroethene	µg/l	0.34	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	**0.20 J**	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	590	0.20 U	0.20 U	0.20 U	0.20 U	**0.44 J**	**0.48 J**	**0.78 J**	**0.86 J**	0.20 U
Trichloroethene	µg/l	1.0	**0.56 J**	**16.0 J**	**0.81 J**	**17.0 J**	**21.0 J**	**24.0 J**	**58.0 J**	**37.0 J**	0.13 U
Vinyl Chloride	µg/l	0.082	0.18 U	0.18 U	0.18 U	0.18 U	**0.18 J**	**0.60 J**	**3.10 J**	0.18 U	0.18 U

		Sample ID:	GR-OF	GR-OF	MH 140	MH 318.9	MH 388.9	West Ditch Culvert	West Ditch In	Spring
		Duplicate:								
		Sample Date:	7/10/2013	7/10/2013	7/11/2013	7/10/2013	7/10/2013	7/11/2013	7/11/2013	7/11/2013
VOCs	**Units**	**NJ SWQC**								
1,1-Dichloroethene	µg/l	4.7	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.35 J**	**0.31 J**	0.11 U
cis-1,2-Dichloroethene	µg/l	NSE	**15.0 J**	**12.0 J**	**4.80 J**	0.15 U	0.15 U	**14.0 J**	**12.0 J**	0.15 U
Tetrachloroethene	µg/l	0.34	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	590	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	µg/l	1.0	**3.40 J**	**2.60 J**	**8.80 J**	0.13 U	**0.15 J**	**46.0 J**	**42.0 J**	**0.21 J**
Vinyl Chloride	µg/l	0.082	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U

Notes:
All results given in micrograms per liter (µg/L).
Criteria - The New Jersey Department if Environmental Protection (NJDEP) Surface Water Quality Criteria (SWQC) for Class FW2 Surface Water (N.J.A.C 7:9B) readopted on 16 June 2009. The Criteria used are the Higher of Practical Quantitation Limits (PQLs) or SWQC.

Bold and shaded data indicate the compund exceeds the NJDEP SWQC.

J = estimated value
U = compound analyzed but not detected at the stated detection limit
NSE = no standard established

TABLE 2-10

MOST RECENT GROUNDWATER SAMPLING RESULTS EXCEEDING EPA OR NJDEP VISL CRITERIA
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

				Parcel:	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B
				Sample ID:	04 BR	07 BR	08 BR	09 BR	15 BR	16 BR	16 BR	16 S	17 BR
				Duplicate:						Original	Duplicate		
				Sampled Interval:	24 - 39 ft	38.5 - 53.5 ft	32 - 57 ft	19 - 44 ft	26 - 41 ft	40 - 65 ft	40 - 65 ft	2 - 12 ft	19 - 44 ft
				Sample Date:	7/8/2013	7/10/2013	7/9/2013	5/14/2012	7/9/2013	5/8/2012	5/8/2012	5/10/2012	7/9/2013
VOCs	**Units**	**NJ VISL**	**EPA VISL**										
1,1,1-Trichloroethane	µg/l	13000	12000 n	5.00 U	50.0 U	2.50 U	**1.30**	25.0 U	0.50 U	0.50 U	**0.67 J**	**0.62 J**
1,1-Dichloroethane	µg/l	50	10 c	2.50 U	25.0 U	1.30 U	**3.00**	13.0 U	0.25 UJ	0.25 UJ	**0.82 J**	**0.29 J**
1,1-Dichloroethene	µg/l	260	280 n	**3.90 J**	**42.0 J**	0.55 U	**0.27 J**	**26.0 J**	0.11 UJ	0.11 UJ	0.11 U	**0.37 J**
1,2-Dichloroethane	µg/l	3.0	3.2 c	1.00 U	10.0 U	0.50 U	0.10 U	5.00 U	0.10 U	0.10 U	0.10 U	0.10 U
Benzene	µg/l	20	2.2 c	**2.90 J**	25.0 U	1.30 U	0.25 U	13.0 U	0.25 U	0.25 U	0.25 U	0.25 U
Bromodichloromethane	µg/l	2.0	1.3 c	2.50 U	25.0 U	1.30 U	0.25 U	13.0 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	70	1.1 c	1.40 U	14.0 U	0.70 U	0.14 U	7.00 U	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	--	--	**380 J**	**8,600 J**	**9.40 J**	**5.20**	**4,200 J**	**19.0**	**19.0**	1.00 U	**3.20 J**
Tetrachloroethene	µg/l	31	23 c	1.50 U	15.0 U	0.75 U	0.15 U	7.50 U	0.15 U	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	520	570 n	2.00 U	20.0 U	1.00 U	0.20 U	**32.0 J**	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	µg/l	2.0	1.8 c	**570 J**	**6,100 J**	**490 J**	**6.10**	**5,900 J**	**0.21 J**	**0.16 J**	**1.90**	**4.20 J**
Vinyl Chloride	µg/l	1.0	0.19 c	**26.0**	**1,400 J**	0.90 U	**0.70 J**	**260**	**8.90**	**9.20**	0.18 U	0.18 U

				Parcel:	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B
				Sample ID:	20 BR	21 BR	21 BR-52	21 BR-57	21 BR-62	22 BR	22 BR	23 BR	23 BR-67
				Duplicate:						Original	Duplicate		
				Sampled Interval:	28 - 43 ft	50 - 65 ft	52 ft	57 ft	62 ft	24 -49 ft	24 -49 ft	65 - 90 ft	67 ft
				Sample Date:	7/10/2013	5/18/2012	5/18/2012	5/18/2012	5/18/2012	7/9/2013	7/9/2013	5/17/2012	5/17/2012
VOCs	**Units**	**NJ VISL**	**EPA VISL**										
1,1,1-Trichloroethane	µg/l	13000	12000 n	13.0 U	**0.97 J**	**0.71 J**	**0.66 J**	**0.60 J**	0.50 U	0.50 U	2.50 U	2.50 U
1,1-Dichloroethane	µg/l	50	10 c	6.30 U	**0.38 J**	**0.39 J**	**0.34 J**	**0.36 J**	0.25 U	0.25 U	1.30 U	1.30 U
1,1-Dichloroethene	µg/l	260	280 n	2.80 U	**0.48 J**	**0.54 J**	**0.43 J**	**0.41 J**	**0.52 J**	**0.68 J**	**1.20 J**	**1.20 J**
1,2-Dichloroethane	µg/l	3.0	3.2 c	2.50 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U	0.50 U
Benzene	µg/l	20	2.2 c	6.30 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.30 U	1.30 U
Bromodichloromethane	µg/l	2.0	1.3 c	6.30 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.30 U	1.30 U
Chloroform	µg/l	70	1.1 c	3.50 U	**0.42 J**	**0.34 J**	**0.33 J**	**0.32 J**	**0.23 J**	0.14 UJ	**2.30 J**	**2.40 J**
cis-1,2-Dichloroethene	µg/l	--	--	**2,000 J**	**1.20**	**1.20**	**1.10**	**1.00**	**28.0 J**	**35.0 J**	**170**	**160**
Tetrachloroethene	µg/l	31	23 c	3.80 U	0.15 U	0.14 U	0.15 U	0.15 U	0.15 U	0.15 U	0.75 U	0.75 U
trans-1,2-Dichloroethene	µg/l	520	570 n	5.00 U	0.20 U	0.15 U	0.20 U	0.20 U	0.20 U	0.20 U	**1.00 J**	0.75 U
Trichloroethene	µg/l	2.0	1.8 c	**360 J**	**2.40**	**2.00**	**1.90**	**1.90**	**15.0 J**	**18.0 J**	**540 J**	**560**
Vinyl Chloride	µg/l	1.0	0.19 c	**250**	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	**3.90 J**	**3.80 J**

TABLE 2-10

MOST RECENT GROUNDWATER SAMPLING RESULTS EXCEEDING EPA OR NJDEP VISL CRITERIA
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

			Parcel:	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B
			Sample ID:	23 BR-72	23 BR-77	23 BR-82	23 BR-87	24 BR	25 BR	29 BR	30 BR	31 BR
			Duplicate:									
			Sampled Interval:	72 ft	77 ft	82 ft	87 ft	80 - 95 ft	75 - 100 ft	85 - 100 ft	85 - 110 ft	36 - 46 ft
			Sample Date:	5/17/2012	5/17/2012	5/17/2012	5/17/2012	7/10/2013	7/8/2013	7/9/2013	5/9/2012	5/16/2012
VOCs	**Units**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	13000	12000 n	2.50 U	2.50 U	2.50 U	1.00 U	100 U	2.50 U	5.00 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/l	50	10 c	1.30 U	1.30 U	1.30 U	0.50 U	50.0 U	1.30 U	2.50 U	0.25 U	**1.80**
1,1-Dichloroethene	µg/l	260	280 n	**1.20 J**	**1.20 J**	**1.2 J**	**0.76 J**	22.0 U	0.55 U	**4.00 J**	0.11 U	**0.17 J**
1,2-Dichloroethane	µg/l	3.0	3.2 c	0.50 U	0.50 U	0.50 U	0.20 U	20.0 U	0.50 U	1.00 U	0.10 U	0.10 U
Benzene	µg/l	20	2.2 c	1.30 U	1.30 U	1.30 U	0.50 U	50.0 U	1.30 U	**2.90 J**	0.25 U	0.25 U
Bromodichloromethane	µg/l	2.0	1.3 c	1.30 U	1.30 U	1.30 U	0.50 U	50.0 U	1.30 U	2.50 U	0.25 U	0.25 U
Chloroform	µg/l	70	1.1 c	**2.50 J**	**2.30 J**	**2.40 J**	**1.70 J**	28.0 U	0.70 U	1.40 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	--	--	**2.40 J**	**160**	**160**	**90**	**2,600 J**	**570 J**	**75.0 J**	**4.10**	**6.70**
Tetrachloroethene	µg/l	31	23 c	0.75 U	0.75 U	0.75 U	0.30 U	30.0 U	0.75 U	1.50 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	520	570 n	1.00 U	1.00 U	1.00 U	**0.40 J**	40.0 U	**5.00**	2.00 U	**0.39 J**	0.20 U
Trichloroethene	µg/l	2.0	1.8 c	**560**	**550**	**530**	**150**	**14,000 J**	**400 J**	**1,200 J**	**0.33 J**	**10.0**
Vinyl Chloride	µg/l	1.0	0.19 c	**3.50 J**	**2.90 J**	**3.80 J**	**2.4**	**250**	**330**	1.80 U	**6.70**	**0.27 J**

			Parcel:	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B
			Sample ID:	36 BR	36 BR	38 BR	40 BR	40 BR	40 S	41 BR	46 BR	47 BR
			Duplicate:	Original	Duplicate		Original	Duplicate				
			Sampled Interval:	102 - 125 ft	102 - 125 ft	100 - 115 ft	95 - 120 ft	95 - 120 ft	3 - 13 ft	85 - 110 ft	196 - 221 ft	3 - 18 ft
			Sample Date:	7/8/2013	7/8/2013	5/10/2012	7/10/2013	7/10/2013	7/10/2013	5/11/2012	7/10/2013	7/9/2013
VOCs	**Units**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	13000	12000 n	250 U	130 U	1.00 U	0.50 U	0.50 U	5.00 U	0.50 U	13.0 U	0.50 U
1,1-Dichloroethane	µg/l	50	10 c	130 U	63.0 U	0.50 U	0.25 U	0.25 U	2.50 U	**0.68 J**	6.30 U	0.25 U
1,1-Dichloroethene	µg/l	260	280 n	55.0 UJ	28.0 UJ	**0.61 J**	**0.17 J**	0.11 UJ	**2.00 J**	0.11 U	2.80 U	0.11 U
1,2-Dichloroethane	µg/l	3.0	3.2 c	50.0 U	25.0 U	0.20 U	0.10 U	0.10 U	1.00 U	0.10 U	2.50 U	0.10 U
Benzene	µg/l	20	2.2 c	130 UJ	63.0 UJ	0.50 U	0.25 UJ	**0.33 J**	2.50 U	**0.30 J**	6.30 U	0.25 U
Bromodichloromethane	µg/l	2.0	1.3 c	130 U	63.0 U	0.50 U	0.25 U	0.25 U	2.50 U	0.25 U	6.30 U	0.25 U
Chloroform	µg/l	70	1.1 c	70.0 U	35.0 U	0.28 U	0.14 U	0.14 U	1.40 U	0.14 U	3.50 U	0.14 U
cis-1,2-Dichloroethene	µg/l	--	--	**34,000 J**	**34,000 J**	**200**	**50.0 J**	**70.0 J**	**520 J**	**17.0**	**12.0 J**	**5.00 J**
Tetrachloroethene	µg/l	31	23 c	75.0 U	38.0 U	0.30 U	0.15 U	0.15 U	1.50 U	0.15 U	3.80 U	0.15 U
trans-1,2-Dichloroethene	µg/l	520	570 n	100 UJ	50.0 UJ	**0.45 J**	0.20 U	0.20 U	2.00 U	**0.67 J**	5.00 U	0.20 U
Trichloroethene	µg/l	2.0	1.8 c	**230 J**	**33.0 J**	**1.50 J**	**5.30 J**	**7.30 J**	**50.0 J**	**0.77 J**	**1,800 J**	**2.2 J**
Vinyl Chloride	µg/l	1.0	0.19 c	**12,000**	**13,000**	**180**	0.18 U	0.18 U	**86.0**	**23.0**	4.50 U	0.18 U

TABLE 2-10

MOST RECENT GROUNDWATER SAMPLING RESULTS EXCEEDING EPA OR NJDEP VISL CRITERIA
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

				Parcel:	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B
				Sample ID:	48 BR	54 BR	56 BR	60 BR	61 BR	63 BR	63 BR-17	65 BR	68 BR-A
				Duplicate:									Original
				Sampled Interval:	82 - 100 ft	175 - 200 ft	140 - 165 ft	70 - 85 ft	70 - 100 ft	15 - 40 ft	17 ft	15 - 40 ft	0 - 53.5 ft
				Sample Date:	7/9/2013	7/10/2013	7/8/2013	7/10/2013	7/9/2013	5/16/2012	5/16/2012	7/8/2013	10/24/2011
VOCs	**Units**	**NJ VISL**	**EPA VISL**										
1,1,1-Trichloroethane	µg/l	13000	12000 n		2.50 U	0.50 U	100 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/l	50	10 c		1.30 U	0.25 U	50.0 U	0.25 U	0.25 U	**0.45 J**	0.25 U	**0.25 J**	**0.71 J**
1,1-Dichloroethene	µg/l	260	280 n		**5.20**	**0.16 J**	22.0 U	0.11 U	**2.8**	0.11 U	0.11 U	0.11 U	0.64 U
1,2-Dichloroethane	µg/l	3.0	3.2 c		0.50 U	0.10 U	20.0 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Benzene	µg/l	20	2.2 c		**1.4 J**	0.25 U	50.0 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	**0.25 J**
Bromodichloromethane	µg/l	2.0	1.3 c		1.30 U	0.25 U	50.0 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	70	1.1 c		0.70 U	0.14 U	28.0 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	--	--		**23.0 J**	**30.0 J**	**1,500 J**	**13.0 J**	**120 J**	**5.20**	**6.90**	**3.60 J**	**89.0**
Tetrachloroethene	µg/l	31	23 c		0.75 U	0.15 U	30.0 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	520	570 n		1.00 U	0.20 U	40.0 U	0.20 U	**1.60**	0.20 U	0.20 U	0.20 U	0.77 U
Trichloroethene	µg/l	2.0	1.8 c		**700 J**	**58.0 J**	**14,000 J**	**120 J**	**47.0 J**	0.13 U	**6.00**	**0.98 J**	**15.0**
Vinyl Chloride	µg/l	1.0	0.19 c		0.90 U	0.18 U	36.0 U	0.18 U	**6.60**	**0.92 J**	**0.38 J**	**3.40**	**4.20**

				Parcel:	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B	Parcel B
				Sample ID:	68 BR-A	68 BR-B	68 BR-C	68 BR-D	68 BR-F	74 BR	BRP 1	BRP 2	WDW
				Duplicate:	Duplicate								
				Sampled Interval:	0 - 53.5 ft	55.8 - 62.4 ft	> 62 ft, < 90 ft	90.8 - 100.1 ft	149.9 - 170.4 ft	63 - 88 ft	20.5 - 60 ft	25 - 45 ft	0 - 8 ft
				Sample Date:	10/24/2011	10/24/2011	10/24/2011	10/25/2011	10/25/2011	10/24/2011	5/10/2012	7/9/2013	5/8/2012
VOCs	**Units**	**NJ VISL**	**EPA VISL**										
1,1,1-Trichloroethane	µg/l	13000	12000 n		0.50 U	2.50 U	50.0 U	50.0 U	100 U	0.50 U	0.50 U	50.0 U	0.50 U
1,1-Dichloroethane	µg/l	50	10 c		**0.65 J**	1.30 U	25.0 U	25.0 U	50.0 U	**0.25 J**	**0.57 J**	25.0 U	0.25 UJ
1,1-Dichloroethene	µg/l	260	280 n		**0.77 J**	**2.30 J**	**29.0 J**	**39.0 J**	**51.0 J**	**1.10**	**0.54 J**	**36.0 J**	**0.35 J**
1,2-Dichloroethane	µg/l	3.0	3.2 c		0.10 U	0.50 U	0.10 U	10.0 U	20.0 U	0.10 U	0.10 U	10.0 U	0.10 U
Benzene	µg/l	20	2.2 c		0.25 UJ	1.30 U	25.0 U	25.0 U	50.0 U	0.25 U	0.25 U	25.0 U	0.25 U
Bromodichloromethane	µg/l	2.0	1.3 c		0.25 U	1.30 U	25.0 U	25.0 U	50.0 U	0.25 U	0.25 U	25.0 U	0.25 U
Chloroform	µg/l	70	1.1 c		0.14 U	0.70 U	14.0 U	14.0 U	28.0 U	0.14 U	0.14 U	14.0 U	0.14 U
cis-1,2-Dichloroethene	µg/l	--	--		**88.0**	**490**	**6,600**	**3,400**	**16,000**	**150**	**96.0**	**11,000 J**	**27.0**
Tetrachloroethene	µg/l	31	23 c		0.15 U	0.75 U	15.0 U	15.0 U	30.0 U	0.15 U	0.15 U	15.0 U	0.15 U
trans-1,2-Dichloroethene	µg/l	520	570 n		**0.76 J**	**2.50 J**	**69.0 J**	**29.0 J**	**180 J**	**1.00**	**0.75 J**	**43.0 J**	**0.51 J**
Trichloroethene	µg/l	2.0	1.8 c		**25.0**	**4.30 J**	**220**	**15,000**	**7,500**	**5.90**	**0.94 J**	**1,900 J**	**44.0**
Vinyl Chloride	µg/l	1.0	0.19 c		**4.20**	**260**	**240**	**140**	**650**	**100**	**45.0**	**2,500**	**0.42 J**

TABLE 2-10

MOST RECENT GROUNDWATER SAMPLING RESULTS EXCEEDING EPA OR NJDEP VISL CRITERIA
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

			Parcel:	Parcel A	Parcel A	Parcel A	Parcel A	Parcel A	Offsite Wells	Offsite Wells	Offsite Wells	Offsite Wells
			Sample ID:	02 BR	28 S	45 BR	51 BR-88	51 BR-93	33 BR	33 BR	33 BR-37	33 BR-42
			Duplicate:						Original	Duplicate		
			Sampled Interval:	40 - 59 ft	10 - 25 ft	185 - 210 ft	88 ft	86 - 96 ft	30 - 45 ft	30 - 45 ft	37 ft	42 ft
			Sample Date:	5/15/2012	10/25/2011	7/9/2013	7/26/2012	7/26/2012	5/14/2012	5/14/2012	5/14/2012	5/14/2012
VOCs	**Units**	**NJ VISL**	**EPA VISL**									
1,1,1-Trichloroethane	µg/l	13000	12000 n	0.50 U	0.50 U	13.0 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/l	50	10 c	0.25 U	0.25 U	6.30 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,1-Dichloroethene	µg/l	260	280 n	0.11 U	0.11 U	2.80 U	0.11 U	0.11 U	0.11 UJ	**0.11 J**	0.11 U	0.11 U
1,2-Dichloroethane	µg/l	3.0	3.2 c	0.10 U	0.10 U	2.50 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Benzene	µg/l	20	2.2 c	0.25 U	0.25 U	6.30 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Bromodichloromethane	µg/l	2.0	1.3 c	0.25 U	0.25 U	6.30 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chloroform	µg/l	70	1.1 c	0.14 U	0.14 U	3.50 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	µg/l	--	--	**16.0**	**8.90**	**1,400 J**	**3.90**	**4.40**	**3.60**	**3.70**	**1.00**	**1.50**
Tetrachloroethene	µg/l	31	23 c	0.15 U	0.15 U	3.80 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
trans-1,2-Dichloroethene	µg/l	520	570 n	0.20 U	0.20 U	5.00 U	**4.70**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	µg/l	2.0	1.8 c	**22.0**	**5.40**	**1,900 J**	**2.00**	**2.70**	**0.59 J**	**0.56 J**	**0.63 J**	**0.25 J**
Vinyl Chloride	µg/l	1.0	0.19 c	**0.54 J**	**1.40**	**41.0**	0.18 U	0.18 U	**0.57 J**	**0.59 J**	**0.49 J**	**0.53 J**

			Parcel:	Offsite Wells
			Sample ID:	50 BR
			Duplicate:	
			Sampled Interval:	60 - 80 ft
			Sample Date:	5/17/2012
VOCs	**Units**	**NJ VISL**	**EPA VISL**	
1,1,1-Trichloroethane	µg/l	13000	12000 n	0.50 U
1,1-Dichloroethane	µg/l	50	10 c	0.25 U
1,1-Dichloroethene	µg/l	260	280 n	0.11 U
1,2-Dichloroethane	µg/l	3.0	3.2 c	0.10 U
Benzene	µg/l	20	2.2 c	0.25 U
Bromodichloromethane	µg/l	2.0	1.3 c	0.25 U
Chloroform	µg/l	70	1.1 c	0.14 U
cis-1,2-Dichloroethene	µg/l	--	--	**3.10**
Tetrachloroethene	µg/l	31	23 c	0.15 U
trans-1,2-Dichloroethene	µg/l	520	570 n	0.20 U
Trichloroethene	µg/l	2.0	1.8 c	**5.40**
Vinyl Chloride	µg/l	1.0	0.19 c	0.18 U

TABLE 2-10

MOST RECENT GROUNDWATER SAMPLING RESULTS EXCEEDING EPA OR NJDEP VISL CRITERIA
FORMER NAVAL AIR STATION WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

Notes:
All results given in micrograms per liter (µg/L).
NJ VISL -- NJDEP Vapor Intrusion Screening Levels, 2013. From Table 1. NJDEP Master Table. Generic Vapor Intrusion Screening Levels.
Accessed from the Internet at http://www.state.nj.us/dep/srp/guidance/vaporintrusion/vig_tables.pdf, October 4.
EPA VISL -- Calculated EPA Vapor Intrusion Screening Level. Criteria based on cancer risk of 1E-6 or non-cancer hazard quotient of 1.0, Henry's Law adjusted to a groundwater temperature of 15° C
VISL calculator incorporates toxicity factors from the June 2013 EPA RSL table. Accessed from the Internet athttp://www.epa.gov/oswer/vaporintrusion/documents/VISL-Calculator.xlsm, November 1.
c - EPA VISL based on cancer risk; n - EPA VISL based on non-cancer hazard
Bold data indicates a detection.
Yellow shaded results indicate the concentration exceeds the NJDEP VISL and the EPA VISL
Orange indicates level exceeds only EPA VISL, but not NJDEP VISL.
J = estimated value
UJ = not detected, sample quantitation limit is estimated
U = compound analyzed but not detected at the stated detection limit
OH = open hole well construction

TABLE 2-11

FIVE-YEAR REVIEW ISSUES, RECOMMENDATIONS, AND FOLLOW-UP ACTIONS FOR GROUNDWATER
FORMER NAVAL AIR WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

Issue	Recommendations	Follow-Up Action	Responsible Party	Oversight Agency	Milestone Date
Site 1 plume infiltration of site-related contaminated groundwater into the existing Gold Run/storm water culvert collection system and discharge into the Gold Run/storm water culvert along Parkway Avenue and potential migration offsite.	Implement proposed replacement and repairs to West Ditch piping and structures to mitigate potential groundwater infiltration into Gold Run culvert system. Conduct optimization review of existing pump and treat remedy.	Replacement and repairs to the piping and structures in the vicinity of the West Ditch and Outfall 1 will be implemented by the Navy in 2014. Further investigation will be conducted to reduce and/or eliminate groundwater discharge to the culvert system. Continue operation of the groundwater pump-and-treat system and conduct long-term monitoring to determine plume extent and system performance. Conduct optimization review of existing pump and treat remedy.	Navy	NJDEP	2014
As noted in the 2008 review, the Navy has concluded that a portion of the Site 3 plume may be discharging into Gold Run at low levels. However, upon exiting the underground culvert system (where the culvert water starts to flow as a surface stream) the CVOC concentrations have reduced to less than the HHRA and Ecological Risk Assessment (ERA) concentrations. After addressing the Site 1 impact to the Gold Run/storm water culvert in the upstream area, the Navy will address the lesser plume at Site 3.	Investigate southern extent of Site 3 plume to determine if it is discharging into Gold Run.	Continue monitoring Gold Run/storm water culvert discharge and water chemistry data at the eight outfalls and in upstream culvert locations for Outfall 1.	Navy	NJDEP	Quarterly until SWQS are achieved.

TABLE 2-11

FIVE-YEAR REVIEW ISSUES, RECOMMENDATIONS, AND FOLLOW-UP ACTIONS FOR GROUNDWATER
FORMER NAVAL AIR WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

Issue	Recommendations	Follow-Up Action	Responsible Party	Oversight Agency	Milestone Date
Based on the most recent sampling events for the review period, TCE levels in the northeast corner of the site (MW-11BR and MW-50BR) and the southwest corner (MW-33BR, MW-40BR, and MW-60BR) were at or exceeded its current NJDEP GWQS. These wells are located a short distance outside or immediately adjacent to the established CEA boundary.	Continue long-term monitoring.	Implement long-term monitoring and conduct biennial certifications for groundwater CEA. Revise CEA if needed.	Navy	NJDEP	Quarterly per Long Term Monitoring SAP until GWQS are achieved or NJDEP determines technically impracticable.
Distance from impacted wells to off-site properties.	Determine actual measured distances from impacted site monitoring wells to off-site properties and determine if further action is required per NJDEP VI Technical Guidance (Version 3.1; March 2013).	Add monitoring well MW-33S to the list of wells included in the long-term monitoring program. Conduct physical measurements to determine actual distance. Continue to coordinate development activities with various parcel owners.	Navy	NJDEP	2014
Site-related contaminants remain in groundwater at levels that do not allow for unlimited use and unrestricted exposure.	Continue five-year reviews in accordance with the Decision Document.	Conduct five-year reviews until GWQS are achieved.	Navy	NJDEP	Next five-year review is due no later than December 31, 2018.

TABLE 3-1

SOIL CAPPED AREAS
FORMER NAVAL AIR WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

SITE	AREA (SQ. FT.)	CAP TYPE	PARCEL	CONTAMINANTS OF CONCERN	CRITERIA EXCEEDED
AOC 20b	1,043.47	ASPHALT	B	1,2-DCE	RESIDENTIAL
AOC 23	1,769.64	ASPHALT	B	ARSENIC	RESIDENTIAL NON-RESIDENTIAL
AOC 45	4,361	ASPHALT	A	ARSENIC (COAL ASH, ASPHALT USED AS HISTORIC FILL)	RESIDENTIAL NON-RESIDENTIAL
AOC 53 AOC 36 (CONCRETE APRON AREA)	946,530.43	CONCRETE	A/B	ARSENIC (COAL ASH USED AS HISTORIC FILL)	RESIDENTIAL NON-RESIDENTIAL
COOLING WATER SUMP	864	ASPHALT	B	ARSENIC, BARIUM, BERYLLIUM, BENZO(A)ANTHRACENE	RESIDENTIAL NON-RESIDENTIAL
IRP SITE 1	80,975.27	SOIL	B	See Parcel B Deed Notice	RESIDENTIAL NON-RESIDENTIAL
IRP SITE 4 AOC 20i AOC 30a	5,450.96	ASPHALT	B	BENZO(A)PYRENE BENZO(A)FLUORANTHENE BENZO(A)ANTHRACENE	RESIDENTIAL NON-RESIDENTIAL
IRP SITE 6	18,495.07	SOIL/CONCRETE	B	ARSENIC, ANTIMONY BERYLLIUM, CADMIUM	RESIDENTIAL NON-RESIDENTIAL
AREA BETWEEN SITES 4 and 8, ENCOMPASSING AOC 29	28,725.64	SOIL	B	See Parcel B Deed Notice	RESIDENTIAL NON-RESIDENTIAL
IRP SITE 9	5,531.0	SOIL	B	ARSENIC ANTIMONY CADMIUM	RESIDENTIAL NON-RESIDENTIAL
FORMER HEADER PIT UST	264	SOIL	B	BENZO(A)PYRENE BENZO(A)FLUORANTHENE BENZO(A)ANTHRACENE	RESIDENTIAL NON-RESIDENTIAL
JET FUEL STORAGE TANK AREA	25,367.59	FLEXIBLE MEMBRANE LINER	A	METHYLENE CHLORIDE	IMPACT TO GROUNDWATER

Source: DON, 2001. Final Cap Maintenance Plan. NAWC Trenton, NJ. April.
SQ. FT. = square feet
IR = Installation Restoration
UST = underground storage tank
AOC = Area of Concern

TABLE 3-2

FIVE-YEAR REVIEW ISSUES, RECOMMENDATIONS, AND FOLLOW-UP ACTIONS FOR CAPPED SOILS
FORMER NAVAL AIR WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

Issue	Recommendation and/or Follow-Up Action	Responsible Party	Oversight Agency	Milestone Date
Parcel A Deed needs to be filed by current property owner.	Continue to coordinate and request Mercer County to file deed.	Navy	NJDEP	2014
Maintain integrity of individual caps.	Continue to implement Cap Maintenance Plan and prepare NJDEP required biennial certification monitoring reports.	Navy	NJDEP	Twice a year until impacted soils are removed from site or parcel development is completed.
Monitor parcel development activities to maintain protectiveness.	Continue to coordinate and communicate with owners of the individual parcels	Navy	NJDEP	Until impacted soils are removed or parcel development is completed.
Site-related contaminants remain at the site at levels that do not allow for unlimited use and unrestricted exposure.	Conduct Five-Year Reviews.	Navy	Navy	Next five-year review is due no later than December 31, 2018.

TABLE 4-1

MERCURY CONCENTRATIONS (mg/kg) IN STORM SEWER SEDIMENT
FORMER NAVAL AIR WARFARE CENTER TRENTON
TRENTON, NEW JERSEY

Sample ID	Sediment Screening SEL for Mercury[1] (mg/kg)	2/25/2009	5/13/2009	9/2/2009	11/18/2009	2/3/2010	5/10/2010	8/27/2010	11/12/2010	3/9/2011	10/21/2011	12/20/2011	2/15/2012	5/7/2012	7/27/2012	10/23/2012	12/27/2012	7/9/2013
Outfall 1	2	1.6	1.7	3.3	1.5	1.4	0.88	2.8	1.1	2.2	2.1 J	--	1.5	0.54	--	0.069	NS	0.91 J
Outfall 1 (duplicate)	2	--	--	--	--	--	--	--	--	--	3.9 J	--	--	--	--	--	--	0.99 J
Outfall 2	2	NS	2.8	6.9	5.4	9.8	7.8	5.4	2.2	12	2.2 J	19	8	1.3	--	2.8	1.3 J	4.7 J
Outfall 2 (duplicate)	2	--	--	--	--	10.5	--	8.2	--	--	--	--	--	--	--	--	0.18 J	--
Outfall 3	2	0.12 U	0.12 U	0.017 J	0.025 J	0.024 J	0.09 J	0.039 J	0.12 U	0.097 J	0.022 J	0.048	0.017 J	0.013 J	0.031 J	0.017 J	0.035	0.014 J
Outfall 3 (duplicate)	2	0.2	0.029 J	--	--	--	0.035 J	--	--	0.12	--	--	--	--	0.015 UJ	0.013 J	--	--
Outfall 4	2	0.11 U	0.11 J	0.078 J	0.1 J	0.079 J	0.076 J	0.087 J	0.14	0.09 J	0.31 J	0.063 J	0.094	0.07	0.061	0.092	0.055	0.065 J
Outfall 4 (duplicate)	2	--	--	0.13 J	--	--	--	--	--	--	--	--	--	0.068	--	--	--	--

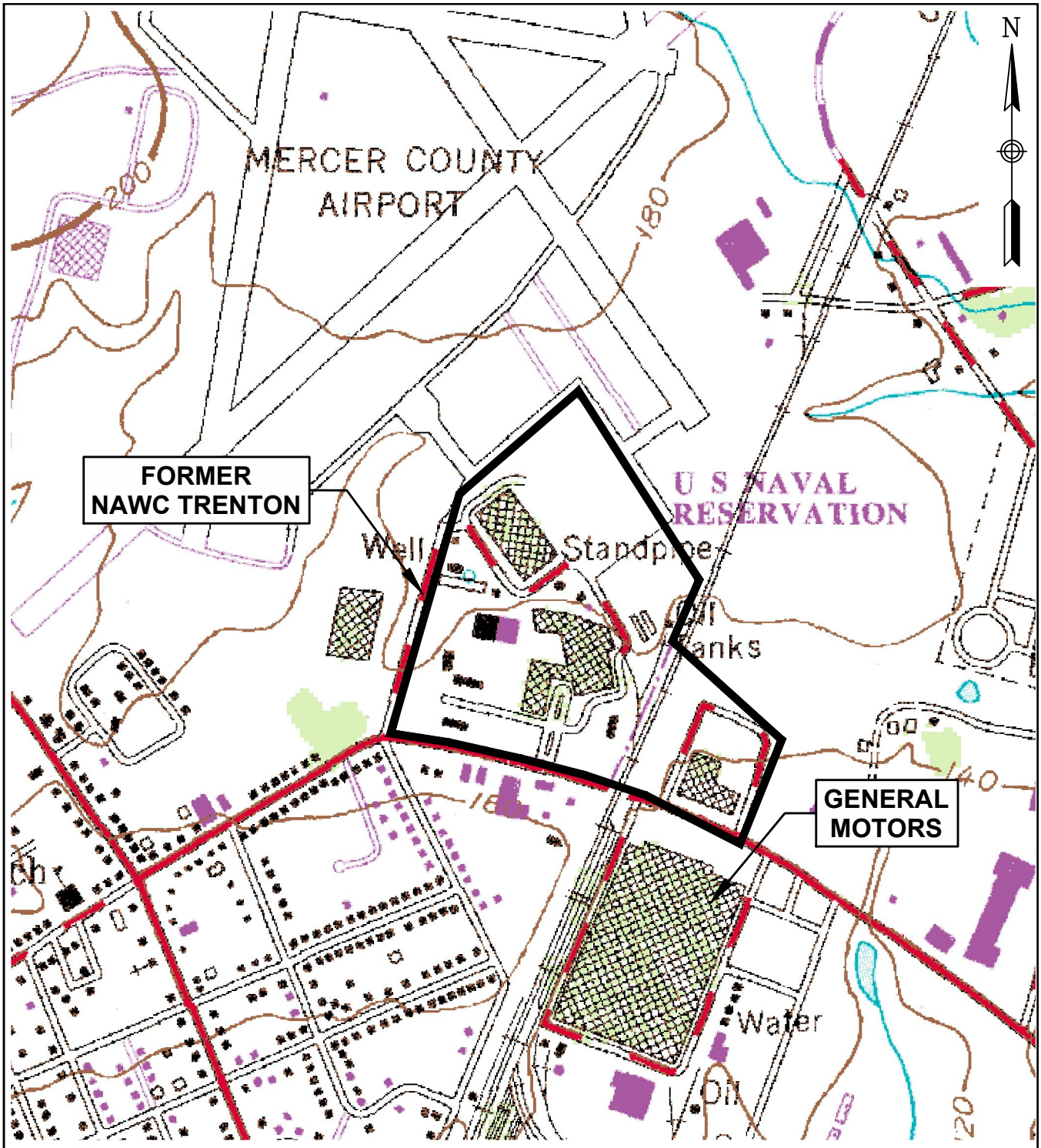
All results reported in milligram per kilogram (mg/kg)

Notes:

Sample exceeds Freshwater Sediment Screening Guidelines for Severe Effects Level (SEL) for Mercury (NJDEP, November 1998).
(1) New Jersey Department of Environmental Protection, 1998. Guidance for Sediment Quality Evaluations. Trenton, New Jersey. November.
-- Duplicate sample not collected; only one duplicate sample was collected per sampling event.
B Mercury found in the associated method blank as well as in the sample, indicating possible blank contamination.
J Estimated value.
U Mercury analyzed but not detected at the reported limit.
NS No Sample (No sediment available to sample).

FIGURES

112G02311\LT.FY.DR\112G02311BM01.DWG 12/24/13 MKB



SOURCE:
BASE MAP IS A PORTION OF THE PENNINGTON, NJ U.S.G.S. 7.5 MINUTE QUADRANGLE MAP, DATED 19543, PHOTOREVISED IN 1981.

QUADRANGLE LOCATION

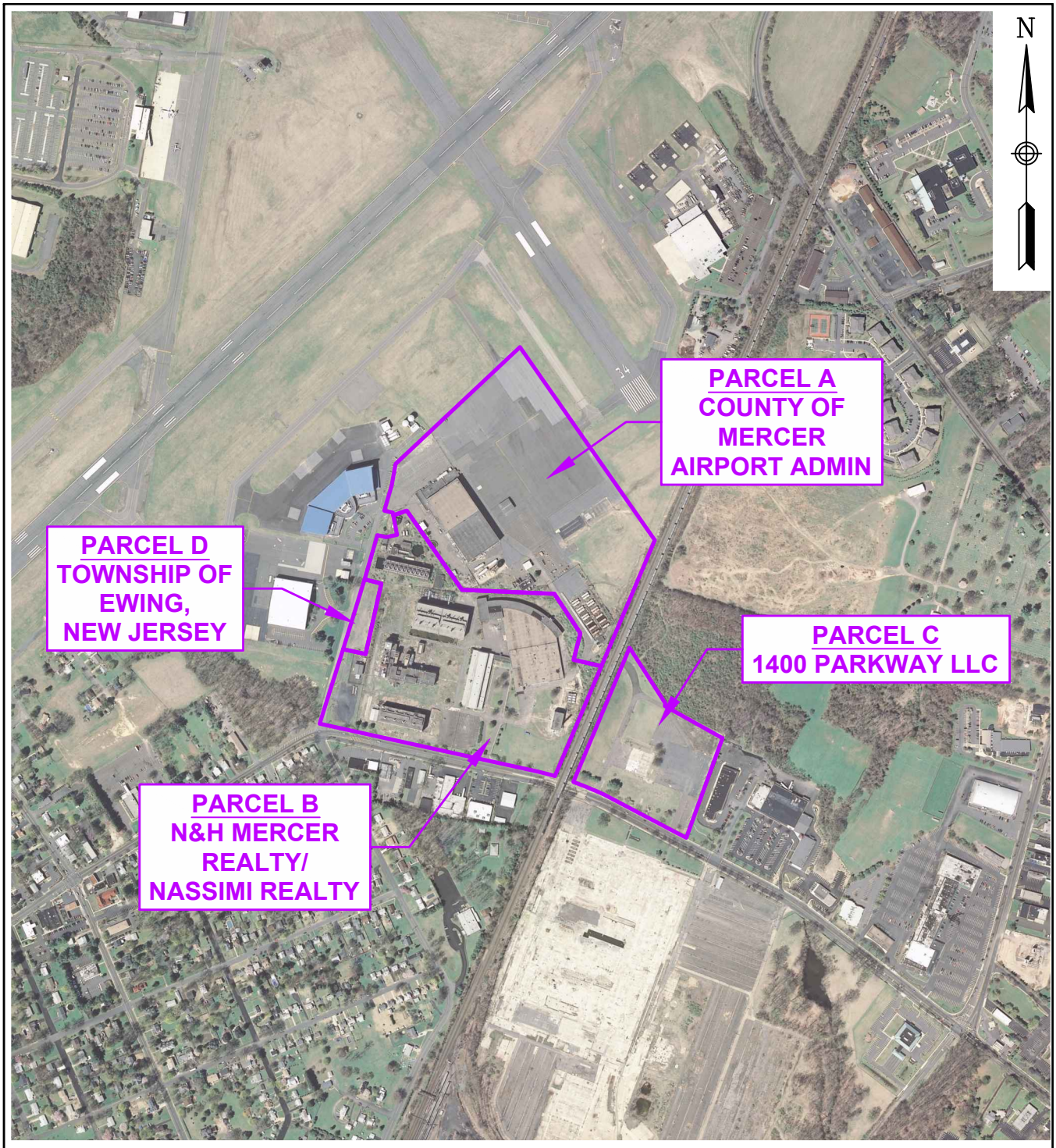
0 800 1,600
SCALE IN FEET

TETRA TECH

FACILITY LOCATION MAP
FORMER NAVAL AIR WARFARE CENTER
TRENTON, NEW JERSEY

SCALE	AS NOTED
FILE	112G02311BM01
REV	0
DATE	12/24/13
FIGURE NUMBER	FIGURE 1–1

112G02311\LT.FY.DR\112G02311BM01.DWG 12/24/13 MKB



LEGEND

PARCEL BOUNDARY

0 800 1,600

SCALE IN FEET

SOURCE:
NEW JERSEY 2007 – 2008 HIGH RESOLUTION ORTHOPHOTOGRAPHY, MRSID TILES F10C15, F10C16, F11A3 AND F11A4. NJ OFFICE OF INFORMATION TECHNOLOGY (NJOIT), OFFICE OF GEOGRAPHIC INFORMATION SYSTEMS (OGIS).

TETRA TECH

PARCEL BOUNDARIES LOCATION MAP
FORMER NAVAL AIR WARFARE CENTER
TRENTON, NEW JERSEY

SCALE	AS NOTED
FILE	112G02311BM01
REV	0
DATE	12/24/13
FIGURE NUMBER	FIGURE 1–2

112G02311\LT.FY.DR\112G02311GM02.DWG 12/24/13 MKB

MERCER COUNTY AIRPORT

DELAWARE & BOUND BROOK RAILROAD

N

COOLING TOWERS

SPRING

MERCER COUNTY AIRPORT HANGER

BAROMETRIC WELL

BRINE HANDLING AREA

GWTP BUILDING

WEST END DRAINAGE DITCH

ANCESTRAL GOLD RUN WEST BRANCH SPRING AREA

001 002 003 004

GOLD RUN STREAM (UNDER PARKWAY AVENUE)

PARKWAY AVENUE

LEGEND

- ④ IR PROGRAM SITE NUMBER
- 26 BUILDING NUMBER
- ▲ STORM SEWER OUTFALL
- WETLANDS
- CEA BOUNDARY
- PARCEL A: COUNTY OF MERCER AIRPORT ADMIN
- PARCEL B: N&H MERCER REALTY/NASSIMI REALTY
- PARCEL C: 1400 PARKWAY LLC
- PARCEL D: TOWNSHIP OF EWING, NEW JERSEY

0 250 500

SCALE IN FEET

TETRA TECH

INSTALLATION RESTORATION PROGRAM SITES FORMER NAVAL AIR WARFARE CENTER TRENTON, NEW JERSEY

FILE	SCALE
112G02311GM02	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 1–3	0 / 12/24/13

112G02311\LT.FY.DR\112G02311GM07.DWG 12/24/13 MKB

MW-18BR
MW-19BR
MW-10BR
MW-74BR
MW-14BR
MW-12BR
MW-11BR
MW-14-S
MW-13S
MW-51BR
MW-12S
MW-50BR
MW-11S
MW-2BR
MW-27S
MW-28S
MW-42S
MW-30S
MW-29S
MW-3BR
MW-35S
MW-32BR
12MW-1
MW-31BR
MW-54BR
11-MW-1
MW-37S
MW-37BR
MW-6BR
MW-43BR
MW-44BR
MW-48BR
MW-31S
MW-31S
MW-49BR
MW-53BR
MW-41BR
MW-16S
MW-1S
MW-8BR
MW-38BR
MW-29BR
BRP-1
MW-16BR
MW-17S
MW-47BR
MW-15S
MW-30BR
MW-17BR
MW-45BR
MW-61BR
MW-40S
WEST DITCH WELL
MW-62BR
MW-66BR
MW-36BR
MW56BR
MW-4BR
MW-7BR
MW-23BR
MW-42BR
MW-39BR
BRP-3
MW-40BR
MW-32S
MW-33BR
MW-57BR
MW-58BR
MW-59BR
MW-50BR
MW-54BR
MW-24BR
MW-15BR
MW-25BR
MW-41S
MW-63BR
MW-65BR
MW-52BR
OF-3/MH118.5
MW-22BR
MW-27BR
MW-28BR
OF-2/MH121.5
OF-4/MH117
MW-20BR
MW-34BR
MW-26BR
OF-1/MH125.9
MW-5BR
BRP-2
MW-4S
MW-35BR
MW-33S
GR-OF
GOLD RUN CREEK
GOLD RUN POND
MW-13BR
MW-23S
MW-36S
MW-26S
MW-55BR
MW-9BR
MW-46BR
MW-18S
35-MW-1
35-MW-2
MW-19S
MW-20S
MW-24S
MW-21BR
MW-25S
S-7
COOLING TOWERS
MERCER COUNTY AIRPORT
MERCER COUNTY AIRPORT HANGER
DELAWARE & BOUND BROOK RAILROAD
PARKWAY AVENUE
DECOU AVENUE
MICHELLE CT

N

LEGEND

- OVERBURDEN MONITORING WELL
- RECOVERY WELL
- BEDROCK MONITORING WELL
- MANHOLE AND/OR OUTFALL LOCATION
- CEA BOUNDARY

NOTE:
FOR COMPARISON WITH THE SAMPLING DATA, THE DESIGNATION OF THE 4 MANHOLES (OF-1/MH125.9, OF-2/MH121.5, OF-3/MH118.5, OF-4/MH117) IS AS FOLLOWS:
-ONE SAMPLE FROM THE OUTFALL DISCHARGE PIPE (DESIGNATED AS "N");
-ONE SAMPLE FROM THE UPSTREAM DISCHARGE IN THE OFFSITE STORMWATER LINE (DESIGNATED AS "T").

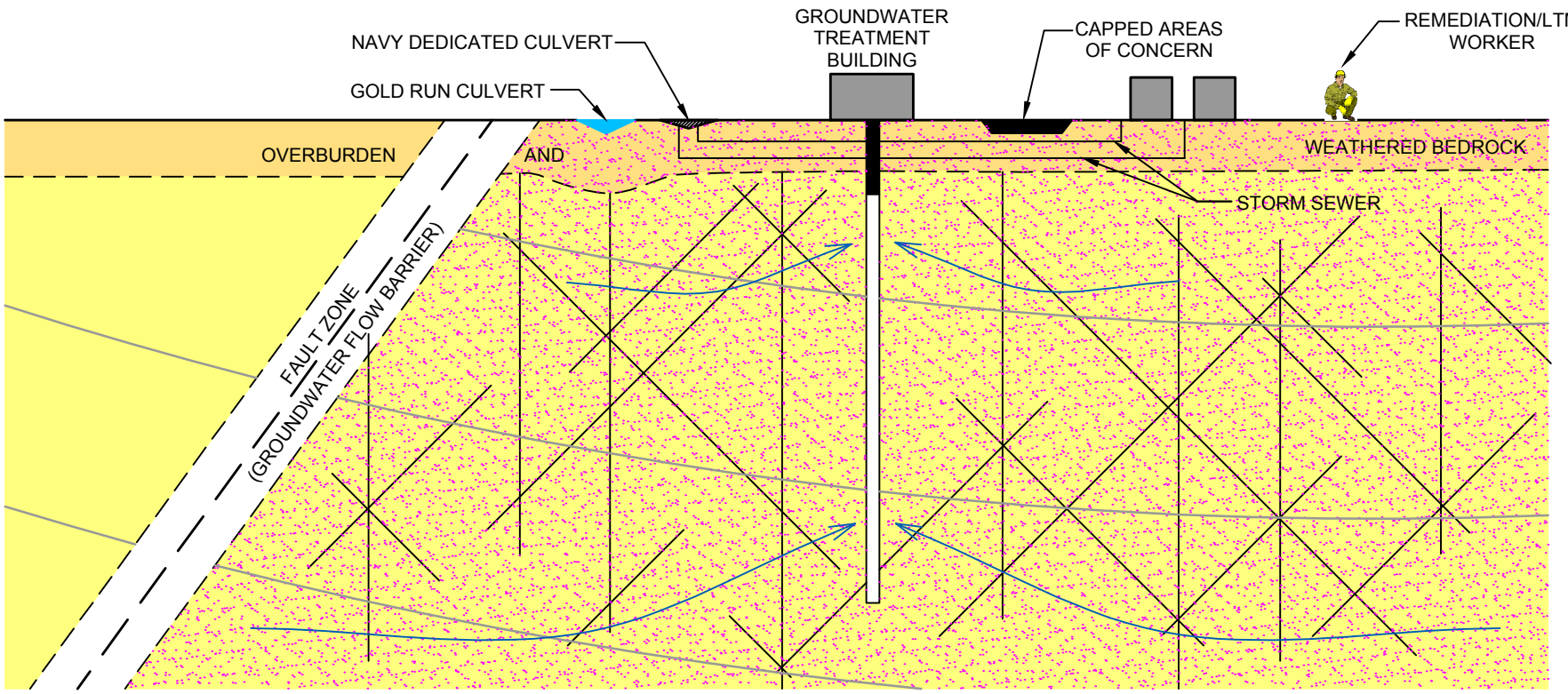
0 320 640
SCALE IN FEET

TETRA TECH

WELL AND OUTFALL LOCATION MAP
NAVAL AIR WARFARE CENTER
TRENTON, NEW JERSEY

FILE	SCALE
112G02311GM07	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 2-1	0 / 12/24/13

112G02311\LT.FY.DR\112G02311GM08.DWG 12/24/13 MKB



LEGEND

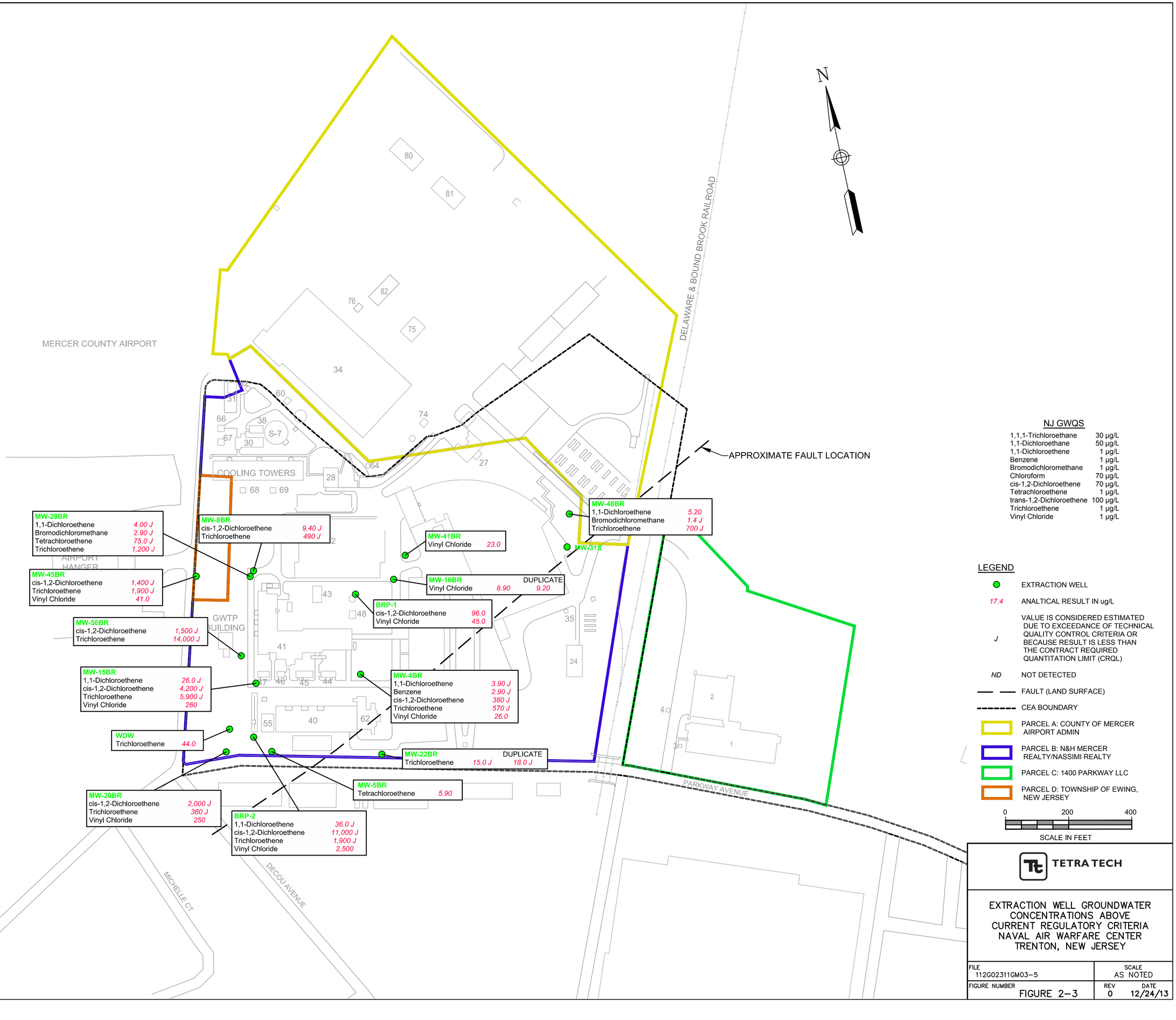
- FRACTURED BEDROCK
- GROUNDWATER FLOW DIRECTION
- BEDDING PLAN
- CONTAMINATION
- BUILDINGS (NOT USED; TO BE DEMOLISHED)
- EXTRACTION WELL

SCHEMATIC, NOT TO SCALE

TETRA TECH

CONCEPTUAL SITE MODEL
NAVAL AIR WARFARE CENTER
TRENTON, NEW JERSEY

SCALE	NOT TO SCALE
FILE	112G02311GM08
REV	0
DATE	12/24/13
FIGURE NUMBER	FIGURE 2–2



NJ GWQS

1,1,1-Trichloroethane	30 µg/L
1,1-Dichloroethane	50 µg/L
1,1-Dichloroethene	1 µg/L
Benzene	1 µg/L
Bromodichloromethane	1 µg/L
Chloroform	70 µg/L
cis-1,2-Dichloroethene	70 µg/L
Tetrachloroethene	1 µg/L
trans-1,2-Dichloroethene	100 µg/L
Trichloroethene	1 µg/L
Vinyl Chloride	1 µg/L

LEGEND

- EXTRACTION WELL
- 17.4 — ANALTICAL RESULT IN ug/L
- J — VALUE IS CONSIDERED ESTIMATED DUE TO EXCEEDANCE OF TECHNICAL QUALITY CONTROL CRITERIA OR BECAUSE RESULT IS LESS THAN THE CONTRACT REQUIRED QUANTITATION LIMIT (CRQL)
- ND — NOT DETECTED
- FAULT (LAND SURFACE)
- CEA BOUNDARY
- PARCEL A: COUNTY OF MERCER AIRPORT ADMIN
- PARCEL B: N&H MERCER REALTY/NASSIMI REALTY
- PARCEL C: 1400 PARKWAY LLC
- PARCEL D: TOWNSHIP OF EWING, NEW JERSEY

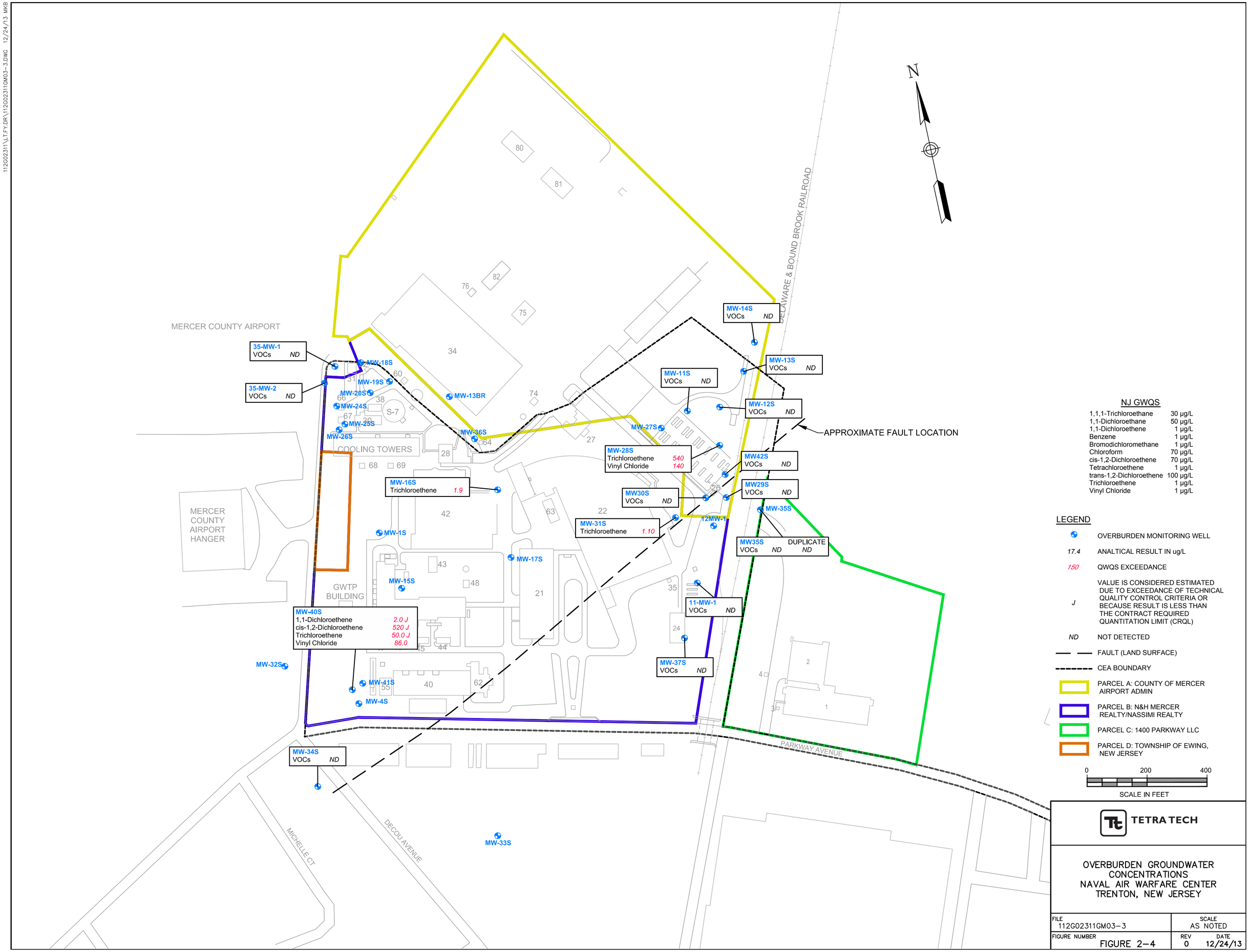
0 200 400

SCALE IN FEET

TETRA TECH

EXTRACTION WELL GROUNDWATER CONCENTRATIONS ABOVE CURRENT REGULATORY CRITERIA NAVAL AIR WARFARE CENTER TRENTON, NEW JERSEY

FILE	SCALE
112G02311GM03-5	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 2-3	0 / 12/24/13



NJ GWQS

1,1,1-Trichloroethane	30 µg/L
1,1-Dichloroethane	50 µg/L
1,1-Dichloroethene	1 µg/L
Benzene	1 µg/L
Bromodichloromethane	1 µg/L
Chloroform	70 µg/L
cis-1,2-Dichloroethene	70 µg/L
Tetrachloroethene	1 µg/L
trans-1,2-Dichloroethene	100 µg/L
Trichloroethene	1 µg/L
Vinyl Chloride	1 µg/L

LEGEND

- OVERBURDEN MONITORING WELL
- *17.4* — ANALTICAL RESULT IN ug/L
- *150* — QWQS EXCEEDANCE
- *J* — VALUE IS CONSIDERED ESTIMATED DUE TO EXCEEDANCE OF TECHNICAL QUALITY CONTROL CRITERIA OR BECAUSE RESULT IS LESS THAN THE CONTRACT REQUIRED QUANTITATION LIMIT (CRQL)
- *ND* — NOT DETECTED
- FAULT (LAND SURFACE)
- CEA BOUNDARY
- PARCEL A: COUNTY OF MERCER AIRPORT ADMIN
- PARCEL B: N&H MERCER REALTY/NASSIMI REALTY
- PARCEL C: 1400 PARKWAY LLC
- PARCEL D: TOWNSHIP OF EWING, NEW JERSEY

0 200 400

SCALE IN FEET

TETRA TECH

OVERBURDEN GROUNDWATER CONCENTRATIONS NAVAL AIR WARFARE CENTER TRENTON, NEW JERSEY

FILE	SCALE
112G02311GM03-3	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 2-4	0 / 12/24/13

112G02311\LT.FY.DR\112G02311GM03-1.DWG 12/24/13 MKB

MW-18BR

MW-19BR
VOCs ND

MW-10BR

MW-74BR
1,1-Dichloroethene 1.10
cis-1,2-Dichloroethene 150
Trichloroethene 5.90
Vinyl Chloride 100

MW-11BR
Trichloroethene 1.3 | 11BR-57 ND | 11BR-62 1.10 | 11BR-67 ND | 11BR-72 1.0

MW-12BR
Vinyl Chloride ND | 12BR-59 ND | 12BR-64 ND | 12BR-69 ND

MW-14BR
VOCs ND

MW-02BR
Trichloroethene 22.0 | 02BR-42 ND | 02BR-47 1.2 | 02BR-52 ND | 02BR-57 ND

MW-50BR
Trichloroethene 5.4

APPROXIMATE FAULT LOCATION

MW-21BR
Trichloroethene 2.4 | 21BR-52 2.0 | 21BR-57 1.9 | 21BR-62 1.9

MW-23S

MW-44BR

MW-43BR

MW-51BR
Trichloroethene 1.8 | 51BR-88 2.0 | 51BR-93 2.7

MW-53BR
VOCs ND | 53BR-97 ND | 53BR-102 ND | 53BR-107 ND | 53BR-112 ND | 53BR-117 ND

MW-55BR
VOCs ND | 55BR-137 ND | 55BR-142 ND | 55BR-147 ND | 55BR-152 ND | 55BR-157 ND

MW-09BR
Trichloroethene 6.10

MW-46BR
Trichloroethene 1,800 J

MW-31BR
Trichloroethene 10

MW-68BR
	DUPLICATE	68BR-A	68BR-B	68BR-C	68BR-F
1,1-Dichloroethene	ND	ND	2.30 J	29.0 J	39.0 J	51.0 J
cis-1,2-Dichloroethene	89.0	88.0	490	6,600	3,400	16,000
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	180 J
Trichloroethene	15.0	25.0	4.30 J	220	15,000	7,500
Vinyl Chloride	4.2	4.20	260	240	140	650

MW-49BR
VOCs ND

MW-38BR
cis-1,2-Dichloroethene 200
Trichloroethene 1.5 J
Vinyl Chloride 180

MW-30BR
Vinyl Chloride 6.7

MW-3BR

MW-32BR
VOCs ND

MW-54BR
Trichloroethene 58.0 J

MW-61BR
1,1-Dichloroethene 2.8
cis-1,2-Dichloroethene 120 J
Trichloroethene 47.0 J
Vinyl Chloride 6.6

MW-17BR
Trichloroethene 4.2 J

MW-39BR
VOCs ND

MW-42BR
VOCs ND

MW-47BR
Trichloroethene 2.20 J

MW-36BR
		DUPLICATE
cis-1,2-Dichloroethene	34,000 J	34,000 J
Trichloroethene	230 J	33.0 J
Vinyl Chloride	12,000	13,000

MW-56BR

MW-62BR

MW-66BR

MW-25BR
cis-1,2-Dichloroethene 570
Trichloroethene 400 J
Vinyl Chloride 330

MW-37BR

MW -23BR
1,1-Dichloroethene 1.20 J | 23BR-67 1.20 J | 23BR-72 1.20 J | 23BR-77 1.20 J | 23BR-82 1.20 J | 23BR-87 ND
cis-1,2-Dichloroethene 170 | 160 | ND | 160 | 160 | 190
Trichloroethene 540 J | 560 | 560 | 550 | 530 | 150
Vinyl Chloride 3.90 J | 3.80 J | 3.50 J | 2.90 J | 3.80 J | 2.4

BRP-3
VOCs ND

MW-65BR
Vinyl Chloride 3.4

MW-58BR

MW-57BR

MW-26BR

MW-28BR
VOCs ND

MW-59BR

MW-33BR
		DUPLICATE	33BR-32	33BR-37	33BR-42
VOCs	ND	ND	ND	ND	ND

MW-64BR
VOCs ND

MW-52BR
VOCs ND

MW-6BR
VOCs ND

MW-60BR
Trichloroethene 120 J

MW-27BR
VOCs ND

MW-40BR
		DUPLICATE
Trichloroethene	5.30 J	7.30 J

MW-34BR

MW-07BR
1,1-Dichloroethene 42.0 J
cis-1,2-Dichloroethene 8,600 J
Trichloroethene 6,100 J
Vinyl Chloride 1,400 J

MW-63BR
Trichloroethene ND | 63BR-17 6.0 | 63BR-22 ND | 63BR-27 ND | 63BR-32 ND | 63BR-37 ND

MW-35BR

MW-24BR
cis-1,2-Dichloroethene 2,600 J
Trichloroethene 14,000 J
Vinyl Chloride 250

MERCER COUNTY AIRPORT

GWTP BUILDING

PENNSYLVANIA & BOUND BROOK RAILROAD

PARKWAY AVENUE

HELLE CT

N

NJ GWQS

1,1,1-Trichloroethane	30 µg/L
1,1-Dichloroethane	50 µg/L
1,1-Dichloroethene	1 µg/L
Benzene	1 µg/L
Bromodichloromethane	1 µg/L
Chloroform	70 µg/L
cis-1,2-Dichloroethene	70 µg/L
Tetrachloroethene	1 µg/L
trans-1,2-Dichloroethene	100 µg/L
Trichloroethene	1 µg/L
Vinyl Chloride	1 µg/L

LEGEND

- BEDROCK MONITORING WELL
- *17.4* ANALTICAL RESULT IN ug/L
- *150* QWQS EXCEEDANCE
- *J* VALUE IS CONSIDERED ESTIMATED DUE TO EXCEEDANCE OF TECHNICAL QUALITY CONTROL CRITERIA OR BECAUSE RESULT IS LESS THAN THE CONTRACT REQUIRED QUANTITATION LIMIT (CRQL)
- *ND* NOT DETECTED
- FAULT (LAND SURFACE)
- CEA BOUNDARY
- PARCEL A: COUNTY OF MERCER AIRPORT ADMIN
- PARCEL B: N&H MERCER REALTY/NASSIMI REALTY
- PARCEL C: 1400 PARKWAY LLC
- PARCEL D: TOWNSHIP OF EWING, NEW JERSEY

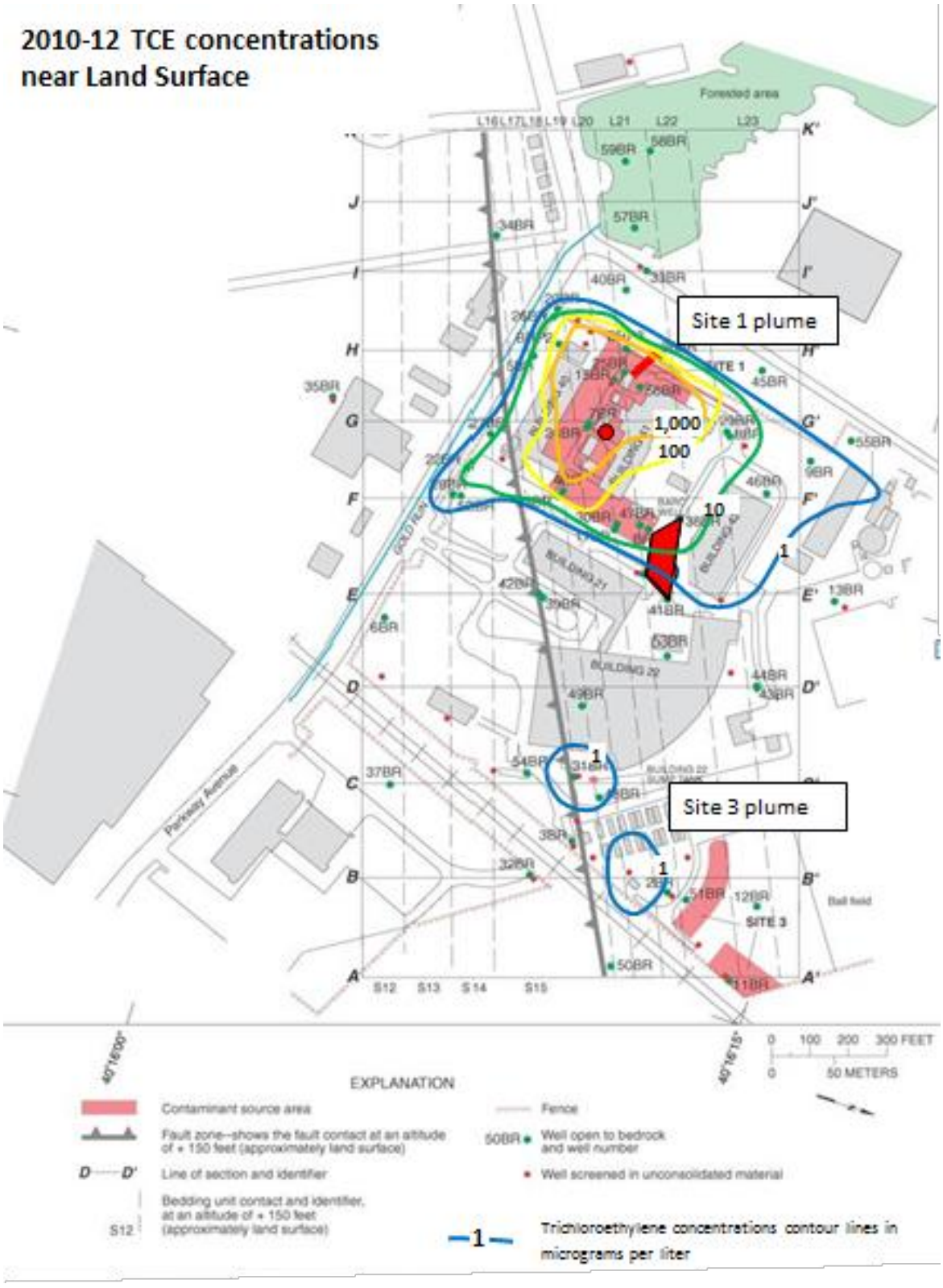
0 200 400
SCALE IN FEET

TETRA TECH

BEDROCK GROUNDWATER CONCENTRATIONS NAVAL AIR WARFARE CENTER TRENTON, NEW JERSEY

FILE	SCALE
112G02311GM03-1	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 2-5	0 / 12/24/13

112G02311\LT.FY.DR\112G02311GM04-5.DWG 12/24/13 MKB



SOURCE: USGS, "CHLORINATED SOLVENTS CONCENTRATIONS IN MONITORING WELLS, NAVAL AIR WARFARE CENTER, WEST TRENTON, NJ, 1992–2012". DRAFT REPORT 2013

TETRA TECH

TCE CONCENTRATIONS IN GROUNDWATER
NEAR LAND SURFACE
(OVERBURDEN AND SHALLOW BEDROCK)
2010 – 2012
FORMER NAVAL AIR WARFARE CENTER
TRENTON, NEW JERSEY

SCALE	AS NOTED
FILE	112G02311GM04-5
REV	0
DATE	12/24/13
FIGURE NUMBER	FIGURE 2-6

112G02311\LT.FY.DR\112G02311GM04-6.DWG 12/24/13 MKB

SOURCE: USGS, "CHLORINATED SOLVENTS CONCENTRATIONS IN MONITORING WELLS, NAVAL AIR WARFARE CENTER, WEST TRENTON, NJ, 1992–2012". DRAFT REPORT 2013

TETRA TECH

TCE CONCENTRATIONS IN GROUNDWATER
ABOUT 100 FEET BELOW LAND SURFACE
(DEEP BEDROCK)
2010 – 2012
FORMER NAVAL AIR WARFARE CENTER
TRENTON, NEW JERSEY

SCALE	
AS NOTED	
FILE	
112G02311GM04-6	
REV	DATE
0	12/24/13
FIGURE NUMBER	
FIGURE 2-7	

112G02311\LT.FY.DR\112G02311GM04-1.DWG 12/24/13 MKB

SOURCE: UNITED STATES GEOLOGICAL SURVEY (USGS), WEST TRENTON, NEW JERSEY

TETRA TECH

POTENTIOMETRIC SURFACE OVERBURDEN AND SHALLOW BEDROCK 2010 MONITORING FORMER NAVAL AIR WARFARE CENTER TRENTON, NEW JERSEY

SCALE	AS NOTED
FILE	112G02311GM04-1
REV	0
DATE	12/24/13
FIGURE NUMBER	FIGURE 2-8

112G02311\LT.FY.DR\112G02311GM04-2.DWG 12/24/13 MKB

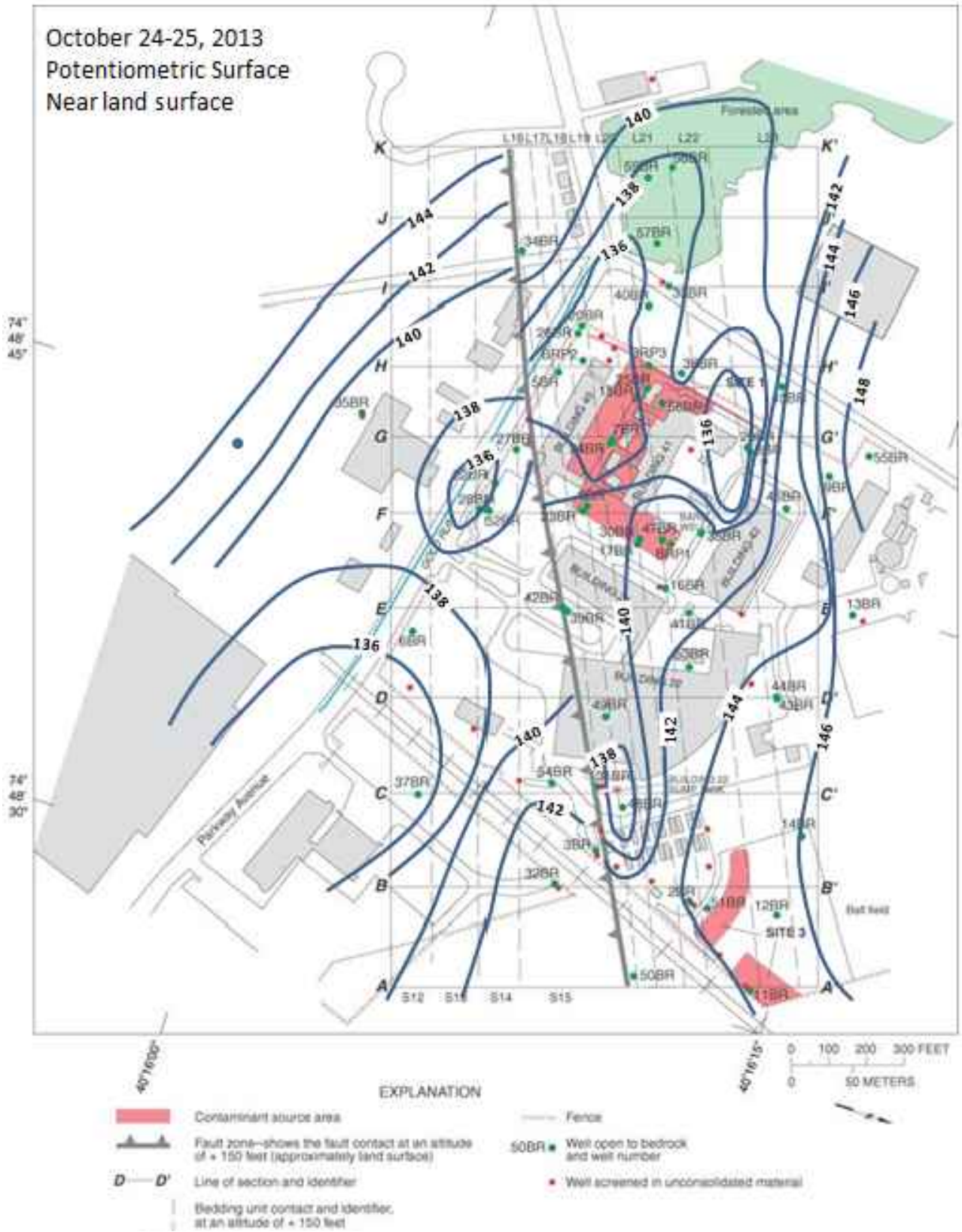
SOURCE: UNITED STATES GEOLOGICAL SURVEY (USGS), WEST TRENTON, NEW JERSEY

TETRA TECH

POTENTIOMETRIC SURFACE
DEEP BEDROCK
2010 MONITORING
FORMER NAVAL AIR WARFARE CENTER
TRENTON, NEW JERSEY

SCALE	AS NOTED
FILE	112G02311GM04-2
REV	0
DATE	12/24/13
FIGURE NUMBER	FIGURE 2-9

112G02311\LT.FY.DR\112G02311GM04-3.DWG 12/24/13 MKB



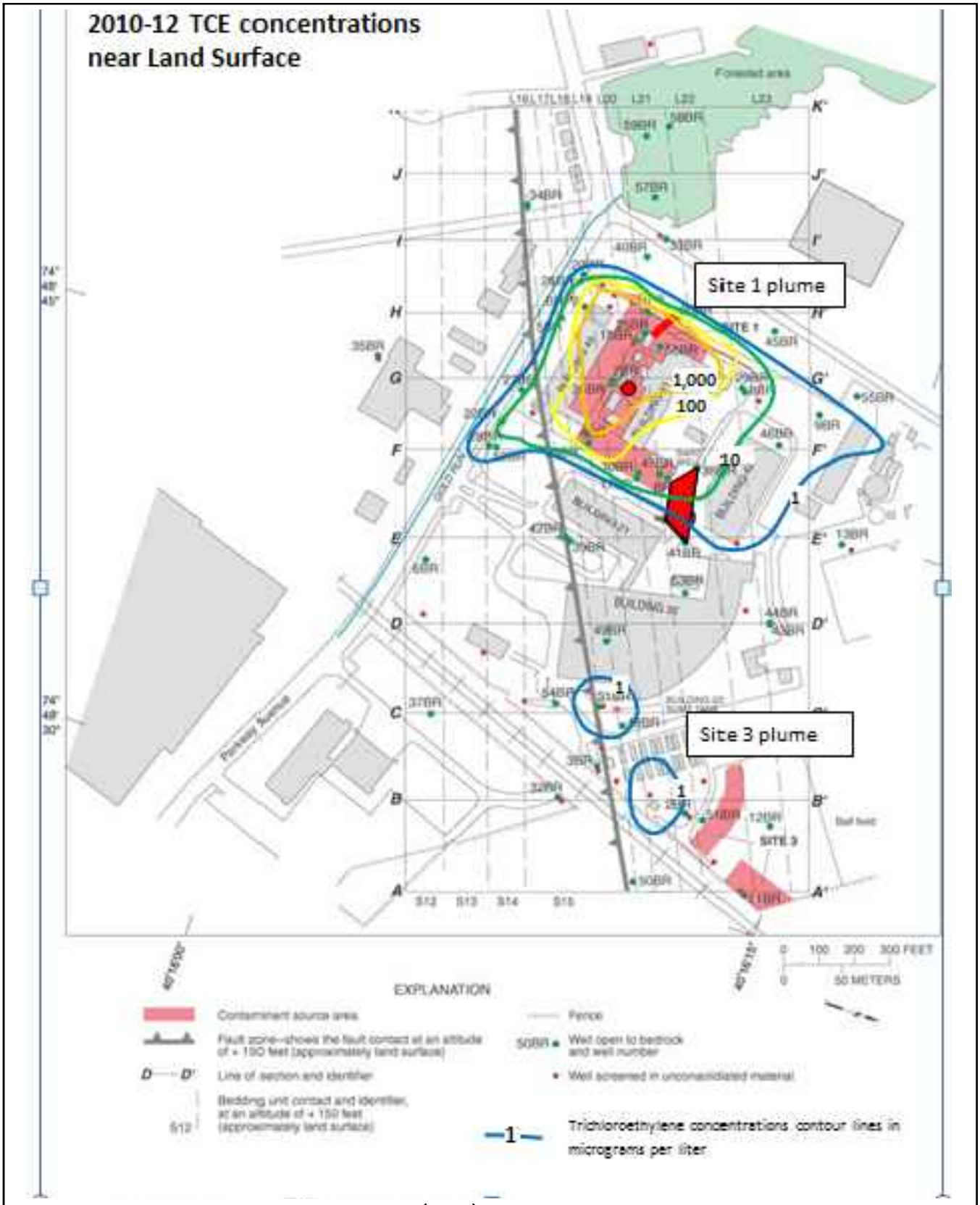
SOURCE: UNITED STATES GEOLOGICAL SURVEY (USGS), WEST TRENTON, NEW JERSEY

TETRA TECH

POTENTIOMETRIC SURFACE
OVERBURDEN AND SHALLOW BEDROCK
2013 MONITORING
FORMER NAVAL AIR WARFARE CENTER
TRENTON, NEW JERSEY

SCALE	AS NOTED
FILE	112G02311GM04-3
REV	0
DATE	12/24/13
FIGURE NUMBER	FIGURE 2-10

112G02311\LT.FY.DR\112G02311GM04-4.DWG 12/24/13 MKB



SOURCE: UNITED STATES GEOLOGICAL SURVEY (USGS), WEST TRENTON, NEW JERSEY

TETRA TECH

POTENTIOMETRIC SURFACE
DEEP BEDROCK
2013 MONITORING
FORMER NAVAL AIR WARFARE CENTER
TRENTON, NEW JERSEY

SCALE	
AS NOTED	
FILE	
112G02311GM04-4	
REV	DATE
0	12/24/13
FIGURE NUMBER	
FIGURE 2-11	

112G02311\LT.FY.DR\112G02311GM05.DWG 12/24/13 MKB

MERCER COUNTY AIRPORT

DELAWARE & BOUND BROOK RAILROAD

N

COOLING TOWERS

MERCER COUNTY AIRPORT HANGER

OF-2/MH121.5

OF-4/MH117

OF-3/MH118.5

OF-1/MH125.9

APPROXIMATE LOCATION OF MUNICIPAL SEWER (SOUTHERN BRANCH)

APPROXIMATE LOCATION OF NAVY DEDICATED MUNICIPAL SEWER (NORTHERN BRANCH)

PARKWAY AVENUE

MICHELLE CT

DECOU AVENUE

GR-OF

GOLD RUN CREEK

GOLD RUN POND

LEGEND

- MANHOLE/OUTFALL LOCATION
- CEA BOUNDARY
- PARCEL A: COUNTY OF MERCER AIRPORT ADMIN
- PARCEL B: N&H MERCER REALTY/NASSIMI REALTY
- PARCEL C: 1400 PARKWAY LLC
- PARCEL D: TOWNSHIP OF EWING, NEW JERSEY

NOTE:
FOR COMPARISON WITH THE SAMPLING DATA, THE DESIGNATION OF THE 4 MANHOLES (OF-1/MH125.9, OF-2/MH121.5, OF-3/MH118.5, OF-4/MH117) IS AS FOLLOWS:
- ONE SAMPLE FROM THE OUTFALL DISCHARGE PIPE (DESIGNATED AS "N");
- ONE SAMPLE FROM THE UPSTREAM DISCHARGE IN THE OFFSITE STORMWATER LINE (DESIGNATED AS "T").

0 250 500

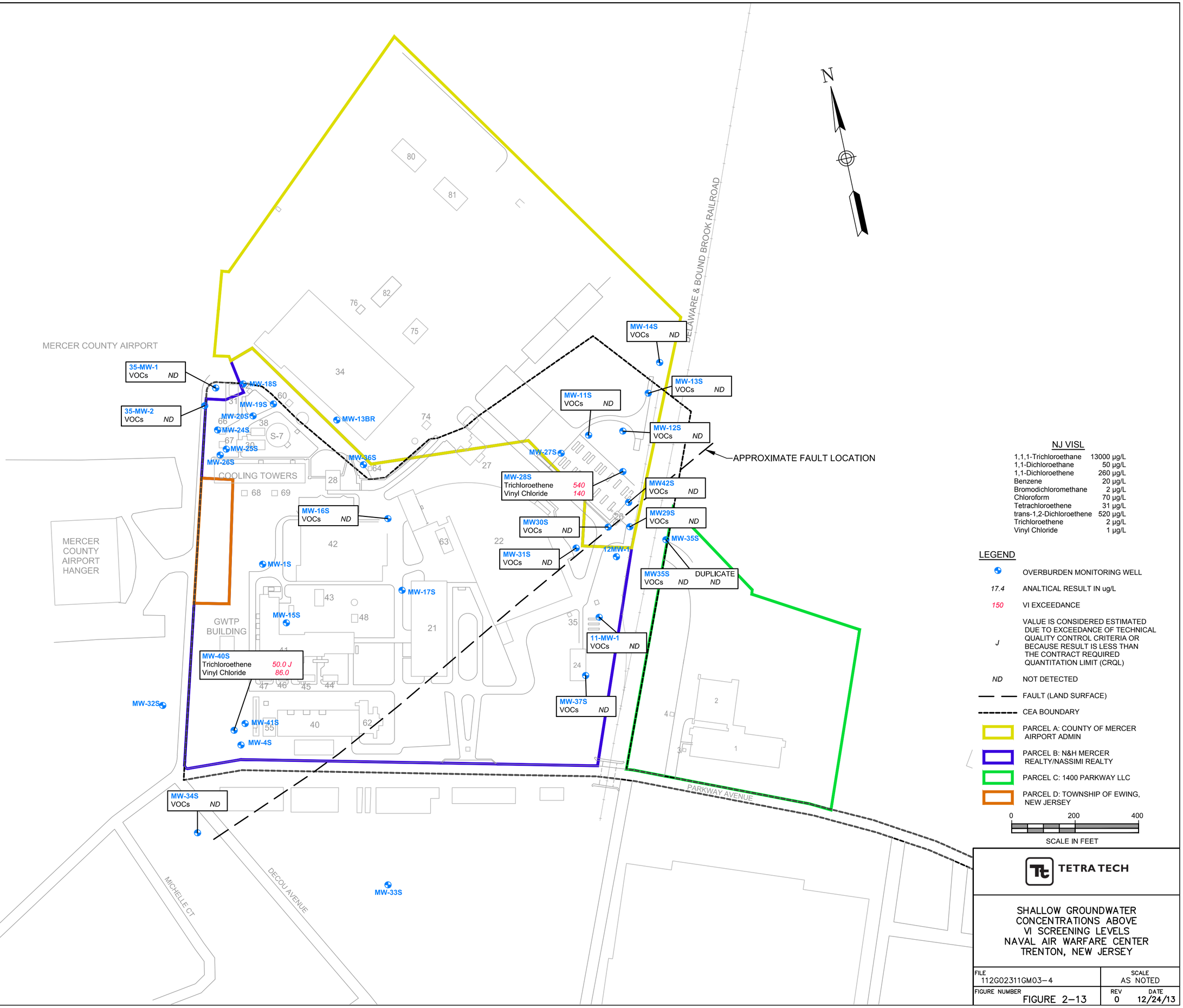
SCALE IN FEET

TETRA TECH

STORM WATER LINE AND SAMPLING LOCATIONS FORMER NAVAL AIR WARFARE CENTER TRENTON, NEW JERSEY

FILE	SCALE
112G02311GM05	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 2-12	0 / 12/24/13

112G02311\LTFY.DR\112G02311GM03-4.DWG 12/24/13 MKB



NJ VISL

1,1,1-Trichloroethane	13000 µg/L
1,1-Dichloroethane	50 µg/L
1,1-Dichloroethene	260 µg/L
Benzene	20 µg/L
Bromodichloromethane	2 µg/L
Chloroform	70 µg/L
Tetrachloroethene	31 µg/L
trans-1,2-Dichloroethene	520 µg/L
Trichloroethene	2 µg/L
Vinyl Chloride	1 µg/L

LEGEND

- OVERBURDEN MONITORING WELL
- *17.4* ANALTICAL RESULT IN ug/L
- *150* VI EXCEEDANCE
- *J* VALUE IS CONSIDERED ESTIMATED DUE TO EXCEEDANCE OF TECHNICAL QUALITY CONTROL CRITERIA OR BECAUSE RESULT IS LESS THAN THE CONTRACT REQUIRED QUANTITATION LIMIT (CRQL)
- *ND* NOT DETECTED
- FAULT (LAND SURFACE)
- CEA BOUNDARY
- PARCEL A: COUNTY OF MERCER AIRPORT ADMIN
- PARCEL B: N&H MERCER REALTY/NASSIMI REALTY
- PARCEL C: 1400 PARKWAY LLC
- PARCEL D: TOWNSHIP OF EWING, NEW JERSEY

0 200 400

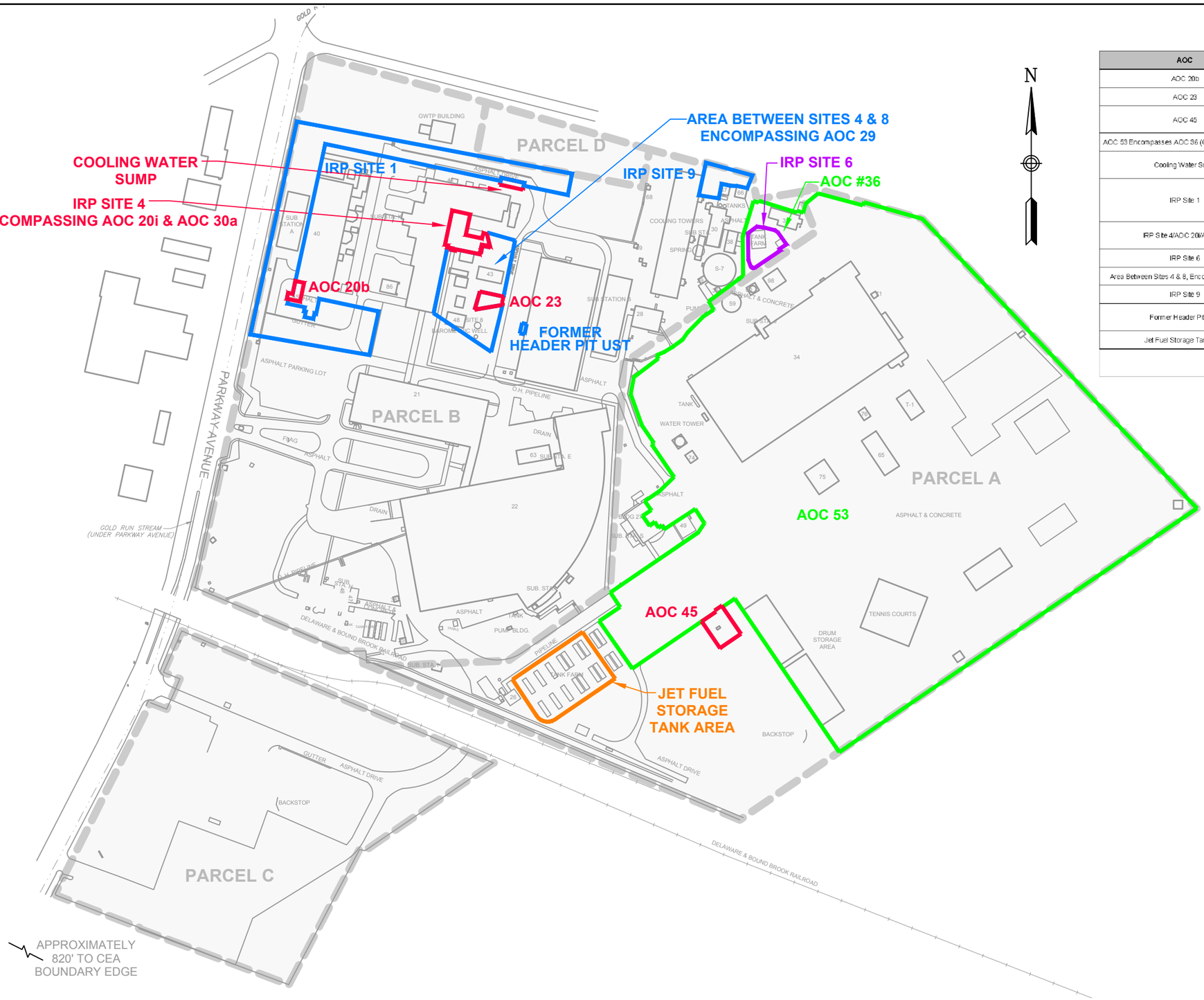
SCALE IN FEET

TETRA TECH

SHALLOW GROUNDWATER CONCENTRATIONS ABOVE VI SCREENING LEVELS NAVAL AIR WARFARE CENTER TRENTON, NEW JERSEY

FILE	SCALE
112G02311GM03-4	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 2-13	0 / 12/24/13

112G02311/LT.FY.DR/112G02311GM06.DWG 12/24/13 MKB



AOC	Area	Cap Type	Parcel	Contaminant(s)	Criteria Exceeded
AOC 20b	1,043.47ft²	Asphalt	B	1,2 – DCE	R
AOC 23	1,769.64ft²	Asphalt	B	Arsenic	R, NR
AOC 45	4,361ft²	Asphalt	A	Arsenic in Coal Ash/Asphalt/Historic Fill	R, NR
AOC 53 Encompasses AOC 36 (Concrete Apron Area)	946,530.43ft²	Concrete	A/B	Arsenic in Coal Ash Historic Fill	R, NR
Cooling Water Sump	864 ft²	Asphalt	B	Arsenic, Barium Beryllium, Benz(a)anthracene	R, NR
IRP Site 1	80,975.27ft²	Soil	B	See Exhibit B, Parcel B Deed Notice	R, NR
IRP Site 4/AOC 20i/AOC30a	5,450.96ft²	Asphalt	B	Benz(a)pyrene, Benzo(a)fluoranthen, Benzo(a)anthracene	R, NR
IRP Site 6	18,495.07ft²	Soil/Concrete	B	Arsenic, Antimony, Beryllium, Cadmium	R, NR
Area Between Sites 4 & 8, Encompassing AOC 29	28,725.64ft²	Soil	B	See Exhibit B, Parcel B Deed Notice	R, NR
IRP Site 9	5,591.01ft²	Soil	B	Arsenic, Antimony, Cadmium	R, NR
Former Header Pit UST	264ft²	Soil	B	Benz(a)pyrene, Benzo(a)fluoranthen, Benzo(a)anthracene	R, NR
Jet Fuel Storage Tank Area	25,367.59ft²	Flexible Membrane Liner	A	Methylene chloride	IGW

R – Residential Direct Contact Soil Cleanup Criteria
NR – Non-Residential Direct Contact Soil Cleanup Criteria
GW – Impact to Groundwater Soil Cleanup Criteria

N

LEGEND

IRP	INSTALLATION RESTORATION PROGRAM
	CONCRETE CAPPED AREA
	ASPHALT CAPPED AREA
	SOIL CAPPED AREA
	SOIL/CONCRETE CAPPED AREA
	FLEXIBLE MEMBRANE LINER CAPPED AREA

REFERENCE:
U.S. NAVY, ENGINEERING FIELD ACTIVITY – NORTHEAST, FINAL CAP MAINTENANCE PLAN, APRIL 2001

0 240 480
SCALE IN FEET

TETRA TECH

CAPPED AREAS LOCATION MAP
FORMER NAVAL AIR WARFARE CENTER
TRENTON, NEW JERSEY

FILE 112G02311GM06	SCALE AS NOTED
FIGURE NUMBER FIGURE 3–1	REV 0 DATE 12/24/13

112G02311\LT_FY.DR\112G02311GM01-1.DWG 12/24/13 MKB

ANCESTRAL GOLD RUN WEST BRANCH SPRING AREA

APPROXIMATE LOCATION OF MUNICIPAL SEWER AND ANCESTRAL WEST BRANCH (GOLD RUN LINE)

APPROXIMATE LOCATION OF NAVY DEDICATED SEWER (NAVY LINE)

DECOU AVENUE

PARKWAY AVENUE

JACK STEPHANS WAY

WOODED AREA

GWTP BUILDING

PARKING

OIL/WATER SEPARATOR

PORT 001

JET FUEL TANK PAD

REFRIGERATOR PITS

ROOF DRAIN

TO BARO WELL

COOLING TOWERS

GRASS

STORAGE BASIN

SKIMMER CLARIFIER

ROOF DRAINS

TO BARO WELL

CHILLER

BAROMETRIC WELL

SUMP

DETONATION SPRAY PUMP

SEAL WATER DRAIN LINE ABOVE GRADE

STEAM TRENCH

STEAM FIELD

WATER TOWER

WASH SINK

INTERIOR WALL

CONCRETE AND PAVEMENT

DRUM

PAVEMENT

CONCRETE

STORAGE

ABOVE GROUND TANK FARM

DELAWARE & BOUND BROOK RAILROAD

4.7 J mg/kg

APPROXIMATE FAULT LOCATION

0 200 400

SCALE IN FEET

LEGEND

- STORMWATER OUTFALL
- 34 BUILDING NUMBER
- STORM SEWER LINE
- 36" CMP STORM SEWER LINE
- STORM SEWER MANHOLE
- STORM SEWER CATCH BASIN
- 60 MANHOLE NUMBER
- LINES REPAIRED BY CIPP
- SEGMENT OF 36" CMP THAT WAS REPLACED BY THE NAVY
- FAULT (LAND SURFACE)
- WETLANDS
- PARCEL A: COUNTY OF MERCER AIRPORT ADMIN
- PARCEL B: N&H MERCER REALTY/NASSIMI REALTY
- PARCEL C: 1400 PARKWAY LLC
- PARCEL D: TOWNSHIP OF EWING, NEW JERSEY

TETRA TECH

STORM SEWERS AND OUTFALL LOCATIONS FORMER NAVAL AIR WARFARE CENTER TRENTON, NEW JERSEY

FILE	SCALE
112G02311GM01-1	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4-1	0 / 12/24/13

112G02311\LT-FY.DR\112G02311GM01-2.DWG 12/24/13 MKB

ANCESTRAL GOLD RUN WEST BRANCH SPRING AREA

APPROXIMATE LOCATION OF MUNICIPAL SEWER AND ANCESTRAL WEST BRANCH (GOLD RUN LINE)

APPROXIMATE LOCATION OF NAVY DEDICATED SEWER (NAVY LINE)

DECOU AVENUE

PARKWAY AVENUE

JACK STEPHANS WAY

WOODED AREA

OIL/WATER SEPARATOR

GWTP BUILDING

PARKING

PORT 001

JET FUEL TANK PAD

REFRIGERATED PITS

ROOF DRAIN

TO BARO WELL

COOLING TOWERS

GRASS

STORAGE BASIN

SKIMMER CLARIFIER

TO BARO WELL

ROOF DRAINS

CHILLER

BAROMETRIC WELL

SUMP

DETONATION SPRAY PUMP

SEAL WATER DRAIN LINE ABOVE GRADE

STEAM TRENCH

STEAM FIELD

WATER TOWER

WASH SINK

INTERIOR WALL

CONCRETE AND PAVEMENT

DRUM

PAVEMENT

CONCRETE

STORAGE

ABOVE GROUND TANK FARM

DELAWARE & BOUND BROOK RAILROAD

4.7 J mg/kg

APPROXIMATE FAULT LOCATION

0 200 400

SCALE IN FEET

N

LEGEND

- STORMWATER OUTFALL
- 34 BUILDING NUMBER
- STORM SEWER LINE
- 36" CMP STORM SEWER LINE
- STORM SEWER MANHOLE
- STORM SEWER CATCH BASIN
- 60 MANHOLE NUMBER
- LINES REPAIRED BY CIPP
- SEGMENT OF 36" CMP THAT WAS REPLACED BY THE NAVY
- 4.7 MERCURY RESULT ABOVE SEL

NJDEP SEDIMENT CRITERIA FOR MERCURY

LEL	0.2 mg/kg*
SEL	2.0 mg/kg*

*ONTARIO MINISTRY OF THE ENVIRONMENT

- FAULT (LAND SURFACE)
- WETLANDS
- PARCEL A: COUNTY OF MERCER AIRPORT ADMIN
- PARCEL B: N&H MERCER REALTY/NASSIMI REALTY
- PARCEL C: 1400 PARKWAY LLC
- PARCEL D: TOWNSHIP OF EWING, NEW JERSEY

TETRA TECH

JULY 2013 MERCURY STORM SEWER SEDIMENT SAMPLING RESULTS ABOVE REGULATORY CRTITERIA FORMER NAVAL AIR WARFARE CENTER TRENTON, NEW JERSEY

FILE	SCALE
112G02311GM01-2	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4-2	0 / 12/24/13

APPENDIX A

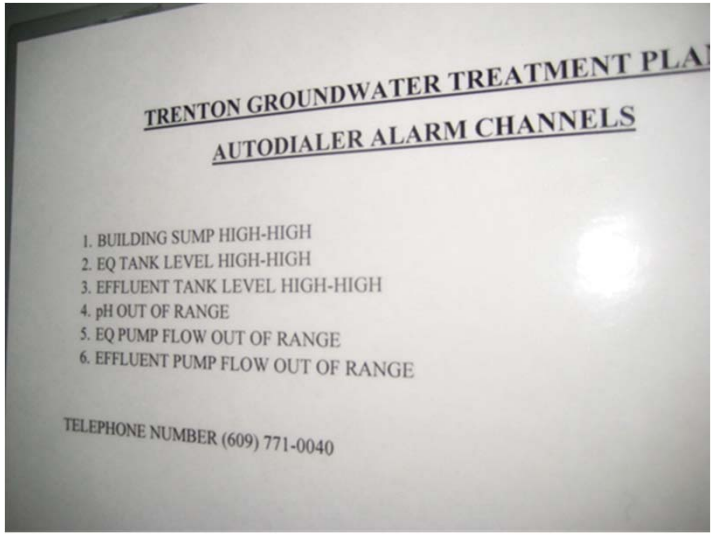
FIVE-YEAR PHOTO LOG

2013 LGAC Units

Extraction Well Control Panel

Control Panel

Bag Filters



Level Indicator Alarm

AOC_20b

AOC_23

AOC_45_Southeast

AOC_53_North

AOC_53_West

Area Between Sites 4 & 8 - Northeast

Area Between Sites 4 & 8 - Southeast

Bioaugmentation Test Area_Sites 4 & 8

Bioaugmentation Test Area -Site 1

Cooling Water Sump - South

Cooling Water Sump - North

Former Header Pit UST

IRP Site 1 - Northwest

IRP Site 4 - South

IRP Site 4 - Southeast

IRP Site 9

Jet Fuel Storage Tanks - West

Parcel D

APPENDIX B

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST (GROUNDWATER TREATMENT SYSTEM)

Site Inspection Checklist

I. SITE INFORMATION	
Site name: Former NAWC Trenton	**Date of inspection:** 9/17/2013
Location and Region: New Jersey (Region 2)	**EPA ID:**
Agency, office, or company leading the five-year review: U.S. Navy	**Weather/temperature:** Sunny, Clear/65°-70°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Other Soil, asphalt, and concrete caps at various impacted soil sites
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Jeffery Dale (Name) Navy RPM (Title) 9/17/2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached Navy Remedial Project Manager oversees environmental activities at site.

2. **O&M staff** Watermark Environmental (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☒ Report attached Reviewed various operating and monitoring reports.

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 _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

4. **Other interviews** (optional) ☐ Report attached.

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

1. **O&M Documents**
   - ☒ O&M manual — ☒ Readily available — ☐ Up to date — ☐ N/A
   - ☒ As-built drawings — ☒ Readily available — ☐ Up to date — ☐ N/A
   - ☒ Maintenance logs — ☒ Readily available — ☐ Up to date — ☐ N/A

   Remarks_____

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks_____

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks_____

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☒ Effluent discharge — ☒ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks_____

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks_____

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks_____

7. **Groundwater Monitoring Records** — ☒ Readily available — ☐ Up to date — ☐ N/A

   Remarks_____

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks_____

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☒ Water (effluent) — ☒ Readily available — ☐ Up to date — ☐ N/A

   Remarks_____

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☐ N/A

    Remarks Groundwater Treatment Plant located within fenced area with locked access gates. O&M site visits average 2-3 days per week

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other_____
_____

2. **O&M Cost Records**

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

Note: O&M costs for review period included in site-wide groundwater section of report.

Total annual cost by year for review period if available

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

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

Describe costs and reasons: See site-wide groundwater section of report.
_____
_____
_____
_____
_____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

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

Remarks Secure fencing in place around groundwater treatment plant; remaining parcels not under Navy control.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks Signage is present on fencing at access to groundwater treatment plant; remaining parcels not under Navy control.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) CEA, Well Restriction; Deed Notices in place.

Frequency Biennial Certifications required by NJDEP.

Responsible party/agency _____

Contact Jeffrey Dale (Name) RPM (Navy) (Title) 9/17/2013 (Date) _____ (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A

Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A

Violations have been reported ☐ Yes ☐ No ☐ N/A

Other problems or suggestions: ☐ Report attached

Biennial Certifications for Groundwater and Soil submitted to NJDEP in December 2012. *See note below.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks_____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☐ 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 ☐ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A

Remarks_____

*C.1 Note: Navy has easements for treatment plant, extraction system piping network, and monitoring wells. Property sub-divided into four parcels and ownership transferred 2000-2002. Individual parcel owners responsible for site control/access. Navy maintains fencing/locked gates in immediate proximity of treatment plant.

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A ***see below**

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 ☐ 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_____
   _____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____
   _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks_____
   _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent_____ Height_____
   Remarks_____
   _____

*Note: No landfills at site. Areas of soil impacted by previous site operations have been capped (soil, asphalt, or concrete). Inspections conducted on biannual basis. Inspection results and repair log provided in 2012 Biennial Certification - Soil.

8. **Wet Areas/Water Damage** ☐ Wet areas/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 ☐ No evidence of slope instability
Areal extent_____
Remarks_____
_____

B. Benches ☐ Applicable ☒ N/A
(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 ☐ N/A or okay
Remarks_____
_____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

C. Letdown Channels ☐ Applicable ☒ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____
_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____
_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____
_____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____
_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____
_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____
_____

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks_____
_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked G Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

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

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks_____
_____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____
   _____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____
   _____

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

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks_____
   _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks_____
   _____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
   ☐ Siltation not evident
   Remarks_____
   _____

2. **Erosion** Areal extent_____ Depth_____
   ☐ Erosion not evident
   Remarks_____
   _____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks_____
   _____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks_____
   _____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____
   _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks_____
   _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

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

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

4. **Discharge Structure** ☐ Functioning ☐ N/A
   Remarks_____
   _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Performance Monitoring** Type of monitoring_____
   ☐ Performance not monitored
   Frequency_____ ☐ Evidence of breaching
   Head differential_____
   Remarks_____
   _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☒ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks Wells inspected on annual basis; inspection logs and repair information provided in 2012 Biennial Certification.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☒ Good condition ☐ Needs Maintenance
Remarks Maintenance or repairs conducted on as needed basis; included in monthly O&M reports.

3. **Spare Parts and Equipment**
☒ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks O&M staff at site 2 - 3 days per week.

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A *See Note

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition ☐ Needs Maintenance
Remarks

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks

IX.B. Note: Existing storm sewer remains in place. Navy conducts quarterly outfall monitoring. System to be replaced as part of future site development.

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
   ☐ Metals removal ☐ Oil/water separation ☒ Bioremediation *Pilot Testing
   ☐ 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)
   ☐ N/A ☒ Good condition ☐ Needs Maintenance
   Remarks_____
   _____

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

4. **Discharge Structure and Appurtenances**
   ☐ N/A ☒ Good condition ☐ Needs Maintenance
   Remarks_____
   _____

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

6. **Monitoring Wells** (pump and treatment remedy)
   ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks Wells inspected 1 - 2x per year; repairs conducted as needed. Last inspection/repairs Fall 2013.

D. Monitoring Data

1. Monitoring Data
   ☒ Is routinely submitted on time ☒ Is of acceptable quality

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

D. Monitored Natural Attenuation *Applies only to portion of Site 3 plume.

1. **Monitoring Wells** (natural attenuation remedy)
   ☒ 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.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).
The objective of the groundwater pump and treat remedy is to contain and remediate the Site 1 and Site 3 contaminated plumes. The Navy and USGS are working together to monitor and evaluate the effectiveness of the groundwater remedy. Both groups are also evaluating and conducting pilot tests of other potential technologies to enhance the remedy.

Long-term monitoring is conducted on a regular basis.

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.
Operation & Maintenance of treatment plant appears to be adequate. Navy implemented changes to treatment process due to operational problems with vapor phase treatment during review period. Regular monitoring and reporting are conducted. Monitoring indicates that discharge limits are being met.

Routine operations monitoring reports are prepared and submitted in timely manner.

C.	Early Indicators of Potential Remedy Problems
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. No early indicators identified.

D.	Opportunities for Optimization
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Navy is working with USGS to evaluate emerging technologies to optimize or enhance treatment remedy.

APPENDIX C

USGS RESEARCH PROJECT LISTING 2008-2013
(Source: USGS, 2013)

Summary of Research Projects ongoing and completed at the Naval Air Warfare Center during 2008-13.

The US Geological Survey in cooperation with the US Navy, academia, and private industry has been researching multiple facets of recalcitrant contamination in fractured bedrock at the former Naval Air Warfare Center (NAWC) near Trenton, New Jersey since 1995. Below is a list of research activities by major research groups during 2008-2013. In addition to the following research efforts and major publications outlined below, research has spawned scores of presentations at professional conferences and more than 10 field trips by universities, professional organization, and governmental agencies. Both the USEPA and the NJDEP have used research generated at the NAWC to develop best practices for investigation and remediation of contamination sites.

A. USGS research:

Research Title: A Comparison of Pump-and-Treat, Natural Attenuation, and Enhanced Biodegradation to Remediate Chlorinated Ethene-Contaminated Fractured Rock Aquifers

Principal investigator: Allen Shapiro, USGS

Funding: SERDP: ER-1555

Reports: A Comparison of Pump-and-Treat, Natural Attenuation, and Enhanced Biodegradation to Remediate Chlorinated Ethene-Contaminated Fractured Rock Aquifers

Web page: http://www.serdp.org/Program-Areas/Environmental-Restoration/Contaminated-Groundwater/Persistent-Contamination/ER-1555/ER-1555

Research Title: Mass of TCE removed via P&T and via Ground water discharge to Surface water

Principal investigator: Pierre Lacombe, USGS

Funding: NavFac

Report 1: Mass of chlorinated volatile organic compounds removed by Pump-and-Treat, Naval Air Warfare Center, West Trenton, New Jersey, 1996-2010.

Web page: http://pubs.er.usgs.gov/publication/sir20115003

Report 2: Chlorinated Volatile Organic Compounds and Stream Flow in Gold Run, Ewing, New Jersey, 1984-2012

Web page: non available

Report 3: Hydrogeologic Framework of Fractured Sedimentary Rock, Newark Basin, New Jersey
Web page: http://onlinelibrary.wiley.com/doi/10.1111/j.1745-6592.2010.01275.x/full

Research Title: Trichloroethene transformation rates due to naturally occurring biodegradation in a fractured Rock Aquifer
Principal investigator: Francis Chapelle, USGS
Funding: USGS

Report 1: Estimated Trichloroethene transformation rates due to naturally occurring biodegradation in a fractured Rock Aquifer
Web page:
http://onlinelibrary.wiley.com/doi/10.1002/rem.21307/abstract;jsessionid=AE80FD070B755FB5160204C3FF4C06FB.f01t02

Report 2: Biochemical indicators for the bioavailability of organic carbon in ground water:
Web page: http://onlinelibrary.wiley.com/doi/10.1111/j.1745-6584.2008.00493.x/full

Research Title: Natural Attenuation of Trichloroethene in fractured bedrock aquifers
Principal investigator: Paul Bradley,
Funding: USGS

Report 1: Microbial mineralization of cis-dichloroethene and vinyl chloride as a component of natural attenuation of chloroethene contaminants under conditions identified in the field as anoxic:
Web page: http://pubs.usgs.gov/sir/2012/5032/

Report 2: Enhanced dichloroethene biodegradation in fractured rock under biostimulated and bioaugmented conditions:
Web page: http://onlinelibrary.wiley.com/doi/10.1002/rem.21308/abstract

Report 3: Flowpath independent monitoring of reductive dechlorination potential in a fractured rock aquifer:
Web page: http://onlinelibrary.wiley.com/doi/10.1111/j.1745-6592.2009.01255.x/full

Research Title: Surface geophysics and hydrogeologic framework invetigations
Principal investigator: Karl Ellefsen,
Funding: USGS

Report 1: A comparison of phase inversion and traveltime tomography for processing near-surface refraction traveltimes
Web page: http://library.seg.org/doi/full/10.1190/1.3196857#_i1

Report 2: Integrated characterization of the geologic framework of a contaminated site in West Trenton, New Jersey
Web page: http://www.sciencedirect.com/science/article/pii/S0926985111002898

Research Title: Biodegradation of CVOC
Principal investigator: Laurence Miller
Funding: USGS

Report 1: A Biogeochemical and Genetic Survey of Acetylene Fermentation by Environmental Samples and Bacterial Isolates
Web page: http://www.tandfonline.com/doi/full/10.1080/01490451.2012.732662

Research Title: Hydraulic testing of monitoring wells
Principal investigator: Claire Tiedeman
Funding: USGS

Report 1: Multiple Well-Shutdown Tests and Site-Scale Flow Simulation in Fractured Rocks
Web page: http://onlinelibrary.wiley.com/doi/10.1111/j.1745-6584.2009.00651.x/full

Research Title: Diffusion and Adsorption of CVOC into fractured bedrock
Principal investigator: Dan Goode
Funding: USGS Toxic Substances Hydrology Program

Report 1: in review

B. US Navy Research

Research Title: Thermal Conductive heating to remediate contaminated fractured bedrock
Principal investigator: Carmen Lebron, US Navy
Funding: SERDP

Report 1: Final Report- Dense non aqueous phase liquid (DNAPL) removal from fractured rock using thermal conductive heating (TCH):
Web page: http://www.serdp.org/content/download/18746/206355/file/ER-200715-FR.pdf

Report 2: Cost and Performance Report- Dense non aqueous phase liquid (DNAPL) removal from fractured rock using thermal conductive heating (TCH):
Web page: http://www.serdp.org/content/download/19901/213499/file/ER-200715-C&P.pdf
Report 3: Simulating remediation of trichloroethylene in fractured bedrock by thermal conductive heating using the numerical model TMVOC (Master's thesis at Queens University, Canada)
http://qspace.library.queensu.ca/bitstream/1974/7723/1/McKenzie_Ashley_M_20130 1_MASC.pdf

Report 4: Specification of Matrix Cleanup Goals in Fractured Porous Media
http://onlinelibrary.wiley.com/doi/10.1111/j.1745-6584.2012.00918.x/full

Report 5: Assessment of thermal heating for the removal of chlorinated solvents from fractured bedrock: PhD Thesis Queens University Canada
Web page: link broken

C. Academia Research

A. Rutgers University Research

Research Title: Using Electrical Resistivity Tomography to map fractures in bedrock
Principal investigator: Lee Slater,
Funding: SERDP andESTCP
Report 1 Demonstration of a Fractured Rock Geophysical Toolbox for Characterization and Monitoring of DNAPL Biodegradation in Fractured Rock Aquifers
Webpage: http://www.serdp.org/Program-Areas/Environmental-Restoration/Contaminated-Groundwater/Persistent-Contamination/ER-201118/ER-201118

B. Clemson University Research

Research Title: Measuring the dilation of fractures and the borehole during well injections
Principal investigator: Larry Murdoch,
Funding: Clemson University

Abstract 1: Analysis of hydromechanical well tests in fractured sedimentary rock at the NAWC site, New Jersey
Full report in progress

C. University of Florida Research

Research Title: Evaluating the Passive flux meter tool in boreholes
Principal investigator: Kirk Hatfield,
Funding: SERDP & ESTCP

Report 1: Demonstration and Validation of a Fractured Rock Passive Flux Meter

http://www.serdp.org/Program-Areas/Environmental-Restoration/Contaminated-Groundwater/Persistent-Contamination/ER-200831/ER-200831/

D. Private Industry Research

Research Title: Diffussion of CVOC into the Rock Matrix
Principal investigator: Charles Schaefer, Shaw Environmental and CB&I Environmental
Funding: SERDP and ESTCP

Report 1: Diffusive flux and pore anisotropy in sedimentary rocks
http://www.sciencedirect.com/science/article/pii/S016977221200006X

Report 2; Coupled Diffusion and Abiotic Reaction of Trichlorethene in Minimally Disturbed Rock Matrices
http://pubs.acs.org/doi/abs/10.1021/es400457s

Prepared by: Pierre Lacombe, USGS, October 24, 2013

APPENDIX D

APRIL 2013 - JULY 2013 EFFLUENT SELF-MONITORING REPORTS
(Source: Watermark Environmental, Inc.; Various 2013 Reports)

Attachment A

NAVAL AIR WARFARE CENTER - TRENTON
SELF-MONITORING REPORT
TRANSMITTAL SHEET

Reporting Period: 1 April 2013 through 30 April 2013

Permittee: Name: Jeffrey Dale

Address: BRAC Program Management Office Northeast
4911 South Broad Street
Philadelphia, PA 19112

Telephone No: (215) 897-4914

OPERATING EXCEPTION

	Yes	No
Temporary Bypassing		X(1)
Monitoring Malfunctions		X
Units Out of Operation		X
Other		X

Parameter	Effluent Measurement	Units	Permit Limitations	Sampling Type	Sampling Frequency	No. of Days Exceeding Permit Limits
Flow	78,271	gal/day	Reported	Flow Meter	Continuous	0
pH (minimum)	6.62	s.u.	---	Grab	Daily	0
pH (maximum)	7.01	s.u.	---	Grab	Daily	0
pH (lab sample)	7.60	s.u.	6.0 – 9.0	Grab	Monthly	0
Total Suspended Solids	ND	mg/L	40.0	Grab	Monthly	0
Chronic Toxicity (IC_{25})(2)	> 100	%	> 61%	Composite	Quarterly	0
Bis (2-Ethylhexyl) Phthalate	ND	ug/L	36.0	Grab	Monthly	0
Benzo (a) Pyrene	ND	ug/L	20.0	Grab	Monthly	0
Benzo (a) Anthracene	ND	ug/L	10.0	Grab	Monthly	0
3,4 Benzo fluoranthene	ND	ug/L	10.0	Grab	Monthly	0
Chrysene	ND	ug/L	20.0	Grab	Monthly	0
Trichloroethene	1.7	ug/L	5.4	Grab	Monthly	0
Total Recoverable Copper	ND	ug/L	100.0	Grab	Monthly	0

Notes:
ND = Not Detected
(1) System upgrades were completed from November 2012 through January 2013 including removal of the inactive air stripper and VGAC units that were previously being bypassed since 8 March 2011 and installation of two additional LGAC units. The system resumed full active status on 1 February 2013 with all influent groundwater being processed directly through the four LGAC units.
(2) Chronic Toxicity data is collected on a quarterly basis. The most recent collection occurred on 18 March 2013. Results meet permit requirements.

Laboratory Name: TestAmerica, Inc.
NJDEP Laboratory Certification No: GA769

Attachment A

NAVAL AIR WARFARE CENTER - TRENTON
SELF-MONITORING REPORT
TRANSMITTAL SHEET

Reporting Period: 1 May 2013 through 31 May 2013

Permittee: Name: Jeffrey Dale

Address: BRAC Program Management Office Northeast
4911 South Broad Street
Philadelphia, PA 19112

Telephone No: (215) 897-4914

OPERATING EXCEPTION

	Yes	No
Temporary Bypassing		X(1)
Monitoring Malfunctions		X
Units Out of Operation		X
Other		X

Parameter	Effluent Measurement	Units	Permit Limitations	Sampling Type	Sampling Frequency	No. of Days Exceeding Permit Limits
Flow	74,829	gal/day	Reported	Flow Meter	Continuous	0
pH (minimum)	6.91	s.u.	---	Grab	Daily	0
pH (maximum)	7.20	s.u.	---	Grab	Daily	0
pH (lab sample)	7.80	s.u.	6.0 – 9.0	Grab	Monthly	0
Total Suspended Solids	ND	mg/L	40.0	Grab	Monthly	0
Chronic Toxicity (IC_{25})(2)	> 100	%	> 61%	Composite	Quarterly	0
Bis (2-Ethylhexyl) Phthalate	ND	ug/L	36.0	Grab	Monthly	0
Benzo (a) Pyrene	ND	ug/L	20.0	Grab	Monthly	0
Benzo (a) Anthracene	ND	ug/L	10.0	Grab	Monthly	0
3,4 Benzo fluoranthene	ND	ug/L	10.0	Grab	Monthly	0
Chrysene	ND	ug/L	20.0	Grab	Monthly	0
Trichloroethene	2.8	ug/L	5.4	Grab	Monthly	0
Total Recoverable Copper	ND	ug/L	100.0	Grab	Monthly	0

Notes:
ND = Not Detected
(1) System upgrades were completed from November 2012 through January 2013 including removal of the inactive air stripper and VGAC units that were previously being bypassed since 8 March 2011 and installation of two additional LGAC units. The system resumed full active status on 1 February 2013 with all influent groundwater being processed directly through the four LGAC units.
(2) Chronic Toxicity data is collected on a quarterly basis. The most recent collection occurred on 21 May 2013. Results meet permit requirements.

Laboratory Name: TestAmerica, Inc.
NJDEP Laboratory Certification No: GA769

Attachment A

NAVAL AIR WARFARE CENTER – TRENTON
SELF-MONITORING REPORT
TRANSMITTAL SHEET

Reporting Period: 1 June 2013 through 30 June 2013

Permittee: Name: Jeffrey Dale

Address: BRAC Program Management Office Northeast
4911 South Broad Street
Philadelphia, PA 19112

Telephone No: (215) 897-4914

OPERATING EXCEPTION

	Yes	No
Temporary Bypassing		X[1]
Monitoring Malfunctions		X
Units Out of Operation		X
Other		X

Parameter	Effluent Measurement	Units	Permit Limitations	Sampling Type	Sampling Frequency	No. of Days Exceeding Permit Limits
Flow	68,984	gal/day	Reported	Flow Meter	Continuous	0
pH (minimum)	6.74	s.u.	---	Grab	Daily	0
pH (maximum)	7.61	s.u.	---	Grab	Daily	0
pH (lab sample)	7.50	s.u.	6.0 – 9.0	Grab	Monthly	0
Total Suspended Solids	ND	mg/L	40.0	Grab	Monthly	0
Chronic Toxicity (IC_{25})[2]	> 100	%	> 61%	Composite	Quarterly	0
Bis (2-Ethylhexyl) Phthalate	ND	ug/L	36.0	Grab	Monthly	0
Benzo (a) Pyrene	ND	ug/L	20.0	Grab	Monthly	0
Benzo (a) Anthracene	ND	ug/L	10.0	Grab	Monthly	0
3,4 Benzo fluoranthene	ND	ug/L	10.0	Grab	Monthly	0
Chrysene	ND	ug/L	20.0	Grab	Monthly	0
Trichloroethene	ND	ug/L	5.4	Grab	Monthly	0
Total Recoverable Copper	ND	ug/L	100.0	Grab	Monthly	0

Notes:
ND = Not Detected
(1) System upgrades were completed from November 2012 through January 2013 including removal of the inactive air stripper and VGAC units that were previously being bypassed since 8 March 2011 and installation of two additional LGAC units. The system resumed full active status on 1 February 2013 with all influent groundwater being processed directly through the four LGAC units.
(2) Chronic Toxicity data is collected on a quarterly basis. The most recent collection occurred on 21 May 2013. Results meet permit requirements.

Laboratory Name: TestAmerica, Inc.
NJDEP Laboratory Certification No: GA769

Attachment A

NAVAL AIR WARFARE CENTER - TRENTON
SELF-MONITORING REPORT
TRANSMITTAL SHEET

Reporting Period: 1 July 2013 through 31 July 2013

Permittee: Name: Jeffrey Dale

Address: BRAC Program Management Office Northeast
4911 South Broad Street
Philadelphia, PA 19112

Telephone No: (215) 897-4914

OPERATING EXCEPTION

	Yes	No
Temporary Bypassing		X(1)
Monitoring Malfunctions	X(2)	
Units Out of Operation		X
Other		X

Parameter	Effluent Measurement	Units	Permit Limitations	Sampling Type	Sampling Frequency	No. of Days Exceeding Permit Limits
Flow	52,704	gal/day	Reported	Flow Meter	Continuous	0
pH (minimum)	6.89	s.u.	---	Grab	Daily	0
pH (maximum)	7.63	s.u.	---	Grab	Daily	0
pH (lab sample)	8.00	s.u.	6.0 – 9.0	Grab	Monthly	0
Total Suspended Solids	ND	mg/L	40.0	Grab	Monthly	0
Chronic Toxicity (IC_{25})(3)	> 100	%	> 61%	Composite	Quarterly	0
Bis (2-Ethylhexyl) Phthalate	ND	ug/L	36.0	Grab	Monthly	0
Benzo (a) Pyrene	ND	ug/L	20.0	Grab	Monthly	0
Benzo (a) Anthracene	ND	ug/L	10.0	Grab	Monthly	0
3,4 Benzo fluoranthene	ND	ug/L	10.0	Grab	Monthly	0
Chrysene	ND	ug/L	20.0	Grab	Monthly	0
Trichloroethene	52	ug/L	5.4	Grab	Monthly	23
Total Recoverable Copper	ND	ug/L	100.0	Grab	Monthly	0

Notes:

ND = Not Detected

(1) System upgrades were completed from November 2012 through January 2013 including removal of the inactive air stripper and VGAC units that were previously being bypassed since 8 March 2011 and installation of two additional LGAC units. The system resumed full active status on 1 February 2013 with all influent groundwater being processed directly through the four LGAC units.

(2) Trichloroethene was detected in the effluent at levels greater than permit limitations. In response to the exceedences the system was shut down on 23 July 2013. Groundwater was recirculated from the effluent tank to the influent tank and resent through the carbon units. Samples were taken from the discharge ports of the new carbon units to determine if the trichloroethene exceedences were caused by fouled carbon. Analytical results determined that the new carbon units contained foul media and were the source of elevated TCE concentrations in the effluent.

(3) Chronic Toxicity data is collected on a quarterly basis. The most recent collection occurred on 21 May 2013. Results meet permit requirements.

Laboratory Name: TestAmerica, Inc.

NJDEP Laboratory Certification No: GA769

APPENDIX E

CORRESPONDENCE U.S. NAVY TO MERCER COUNTY (JULY 2012)

Preston, Elaine M CIV NAVFACHQ, BRAC PMO

From: Preston, Elaine M CIV NAVFACHQ, BRAC PMO
Sent: Monday, July 09, 2012 2:49 PM
To: 'asypek@mercercounty.org'
Cc: Dale, Jeffrey M CIV NAVFAC MIDLANT, EV
Subject: Request for Copy of a Recorded Quitclaim Deed
Attachments: Quitclaim Deed Btwn USA & County of Mercer.PDF
Signed By: elaine.preston@navy.mil

Hello Mr. Sypek,

Thank you for taking my call today.

As discussed, the following information is provided in order that a recorded copy of the below Quitclaim Deed can be furnished for Navy records.

Date of Deed Execution: May 29, 2001

Parties: United States of America (Grantor) and County of Mercer, New Jersey (Grantee)

Property Address: Portion of Lot 4 and all of Lot 5, Block 374 Township of Ewing, Mercer County, New Jersey. Approximately 28.608 acres (known as Parcel A) located at the former Naval Air Warfare Center (NAWC), Trenton, New Jersey.

To date, there is no record that the Quitclaim Deed and its associated "Declaration of Environmental Restriction", (Exhibit D to the deed), has been filed with the Registry of Deeds for Mercer County. Also, please be advised that Paragraph XI. of the deed requires that the declaration be signed and filed by the County of Mercer with the State of New Jersey.

The Navy is required to furnish a copy of the recorded deed and declaration to the State of New Jersey, Department of Environmental Protection in accordance with the Biennial Certification Monitoring Reports for the former NAWC Trenton.

I've attached for your info the first page of the Quitclaim, along with Exhibit A (Legal Description).

I appreciate all your help in this matter. Please do not hesitate to contact me if you have any questions.

R,
Elaine

Elaine Preston
Realty Specialist
BRAC Program Management Office Northeast
4911 South Broad Street
Philadelphia, PA 19112-1303
Phone: (215) 897-4906; DSN 443-4906
Fax: (215) 897-4902
email: Elaine.Preston@navy.mil
http://www.bracpmo.navy.mil/

APPENDIX F

2010-2011 CAP INSPECTION, MAINTENANCE, AND REPAIR LOGS

Naval Air Warfare Center
Trenton, NJ
Cap Inspection Checklist
May 2010

Capped Area	Area (ft^2) / Cap Type	Changed since Spring 2009 Inspection	No Potential Concern Observed	Potential Concern Observed	Description and Explanation of Potential Concern with Recommended Action
AOC 23	1,770 / Asphalt	No	x		None
AOC 45	4,361 / Asphalt	No	x		None
AOC 53 Encompasses AOC 36 (Concrete Apron Area)	946,530 / Concrete	No	x		None
Cooling Water Sump	864 / Asphalt	No	x		None
IRP Site 1	80,975 / Soil	No	x		None
IRP Site 4 / AOC 20i / AOC30a	5,451 / Asphalt	No	x		Asphalt repair and seal around storm drain ok
IRP Site 6	18,495 / Soil/Concrete	No	x		None
Area Between Sites 4 & 8, Encompassing AOC 29	28,726 / Soil	No	x		None
IRP Site 9	5,535 / Soil	No	x		None
Former Header Pit UST	264 / Soil	No	x		None
Jet Fuel Storage Tank Area	25,368 / Flexible Membrane Liner	No	x		None

Notes:
Bold highlight indicates action required

Cap Inspection Checklist
Naval Air Warfare Center
West Trenton, NJ
December 2010

Capped Area	Area (ft^2) / Cap Type	Changed since Spring 2010 Inspection	No Potential Concern Observed	Potential Concern Observed	Description and Explanation of Potential Concern with Recommended Action
AOC 23	1,770 / Asphalt	No	X		None
AOC 45	4,361 / Asphalt	No	X		None
AOC 53 Encompasses AOC 36 (Concrete Apron Area)	**946,530 / Concrete**	**Yes**		**X**	**Vegetation growing through cracks. Recommend removing vegetation and sealing cracks.**
Cooling Water Sump	864 / Asphalt	No	X		None
IRP Site 1	80,975 / Soil	No	X		None
IRP Site 4 / AOC 20i / AOC30a	**5,451 / Asphalt**	**Yes**		**X**	**Vegetation growing through cracks. Recommend removing vegetation and sealing cracks.**
IRP Site 6	**18,495 / Soil/Concrete**	**Yes**		**X**	**Animal burrows near 35MW-1. Recommend filling in holes.**
Area Between Sites 4 & 8, Encompassing AOC 29	28,726 / Soil	No	X		None
IRP Site 9	**5,535 / Soil**	**Yes**		**X**	**Animal burrows. Recommend filling in holes.**
Former Header Pit UST	264 / Soil	No	X		None
Jet Fuel Storage Tank Area	25,368 / Flexible Membrane Liner	No	X		None

Notes:
Bold highlight indicates action required

Capped Area	Area (ft^2) / Cap Type	Changed Since Fall 2010 Inspection	No Potential Concern Observed	Potential Concern Observed	Description and Explanation of Potential Concern with Recommended Action
AOC 23	1,770/asphalt	Yes		X	Minor vegetation growing through cracks. Recommend continued observation to see if it becomes an issues.
AOC 45	4,361/asphalt	Yes		X	Minor vegetation growing through cracks. Recommend continued observation to see if it becomes an issues.
AOC 53 Encompasses AOC 36 (Concrete Apron Area)	946,930/concrete	No		X	Minor vegetation growing through cracks. Recommend continued observation to see if it becomes an issues.
Cooling Water Sump	864/asphalt	Yes	X	X	None
IRP Site 1	80,975/soil	No	X		None
IRP Site 4/AOC 20I/AOC 30a	5,451/asphalt	No		X	Minor vegetation growing through cracks. Recommend continued observation to see if it becomes an issues.
IRP Site 6	18,495/soil/ concrete	No	X		Animal burrows observed near 35MW-1. Recommend filling in holes.
Area Between Sites 4 & 8, Encompassing AOC 29	28,726/soil	Yes		X	Minor vegetations observed. Recommend cutting in Fall.
IRP Site 9	5,535/soil	Yes		X	Minor vegetations observed. Recommend cutting in Fall.
Former Header Pit UST	264/soil	Yes		X	Minor vegetations observed. Recommend cutting in Fall.
Jet Fuel Storage Tank Area	25,368/flexible membrane liner	No	X		None

Capped Area Inspection Checklist / Record of Repairs
Naval Air Warfare Center
West Trenton, NJ
March 2011 / July 2011

Capped Area	Area (ft^2) / Cap Type	Changed since Spring 2010 Inspection (March 2011)	No Potential Concern Observed (March 2011)	Potential Concern Observed (March 2011)	Description and Explanation of Potential Concern with Recommended Action (March 2011)	Repair Completed (July 2011)
AOC 23	1,770 / Asphalt	No	X		None	NA
AOC 45	4,361 / Asphalt	No	X		None	NA
AOC 53 Encompasses AOC 36 (Concrete Apron Area)	**946,530 / Concrete**	**Yes**		**X**	**Vegetation growing through cracks. Recommend removing vegetation and sealing cracks.**	**No (1)**
Cooling Water Sump	864 / Asphalt	No	X		None	NA
IRP Site 1	80,975 / Soil	No	X		None	NA
IRP Site 4 / AOC 20i / AOC30a	**5,451 / Asphalt**	**Yes**		**X**	**Vegetation growing through cracks. Recommend removing vegetation and sealing cracks.**	**Yes**
IRP Site 6	**18,495 / Soil/Concrete**	**Yes**		**X**	**Animal burrows near 35MW-1. Recommend filling in holes.**	**Yes**
Area Between Sites 4 & 8, Encompassing AOC 29	28,726 / Soil	No	X		None	NA
IRP Site 9	**5,535 / Soil**	**Yes**		**X**	**Animal burrows. Recommend filling in holes.**	**Yes**
Former Header Pit UST	264 / Soil	No	X		None	NA
Jet Fuel Storage Tank Area	25,368 / Flexible Membrane Liner	No	X		None	NA

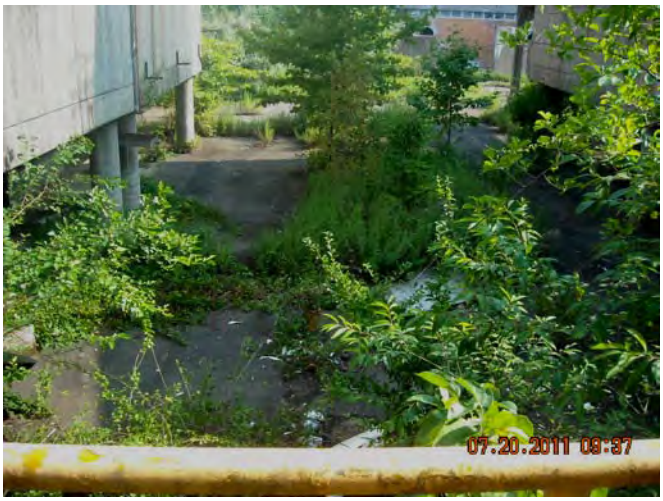
Notes:
NA = Not Applicable
Bold highlight indicates action required.
(1) Removal of vegetation and sealing was determined by the Navy not to be necessary at the time as the cap was still performing its intended purpose.

PHOTOGRAPHIC JOURNAL
FORMER NAWC TRENTON CAP AND WELL REPAIRS
JULY 2011

Capped Area IRP Site 4 / AOC 20i / AOC30a

Vegetation - Before

Vegetation - After



Vegetation - Before

Vegetation - After

PHOTOGRAPHIC JOURNAL
FORMER NAWC TRENTON CAP AND WELL REPAIRS
JULY 2011

Capped Area IRP Site 6

Animal Burrow - Before

Animal Burrow - After

Capped Area IRP Site 9

Animal Burrow - Before

Animal Burrow - After

Table 6-1
Summary of Inspection of Capped Areas
Former NAWC, Trenton, New Jersey

Capped Area	Area (ft^2) / Cap Type	Changed Since Spring 2011 Inspection	No Potential Concern Observed	Potential Concern Observed	Description and Explanation of Potential Concern with Recommended Action
AOC 23	1,770/asphalt	Yes		X	Vegetation growing through cracks. Recommend removing vegetation and sealing cracks.
AOC 45	4,361/asphalt	Yes		X	Vegetation growing through cracks. Recommend removing vegetation and sealing cracks.
AOC 53 Encompasses AOC 36 (Concrete Apron Area)	946,930/concrete	No		X	Vegetation growing through cracks. Recommend removing vegetation and monitor for increase in size of cracks.
Cooling Water Sump	864/asphalt	Yes		X	Excessive vegetation growth over asphalt. Recomment removing vegetation.
IRP Site 1	80,975/soil	No	X		None
IRP Site 4/AOC 20I/AOC 30a	5,451/asphalt	No		X	Vegetation growing through cracks in areas; excessive vegetation growth over asphalt in other areas. Recommend removing vegetation and sealing cracks.
IRP Site 6	18,495/soil/ concrete	No	X		Animal burrows observed near 35MW-1. Recommend filling in holes.
Area Between Sites 4 & 8, Encompassing AOC 29	28,726/soil	Yes		X	Tall vegetation observed. Recommend cutting.
IRP Site 9	5,535/soil	Yes		X	Tall vegetation observed. Recommend cutting.
Former Header Pit UST	264/soil	Yes		X	Tall vegetation observed. Recommend cutting.
Jet Fuel Storage Tank Area	25,368/flexible membrane liner	No	X		None