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for

Installation Restoration Program Site 16

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North Kingstown, Rhode Island

Engineering Field Activity Northeast
Naval Facilities Engineering Command

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FOR

INSTALLATION RESTORATION PROGRAM SITE 16

FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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1.0 INTRODUCTION

This Supplemental Phase II Remedial Investigation (RI) Data Package report for Installation Restoration (IR) Program Site 16 at the Former Naval Construction Battalion Center (NCBC) at Davisville, North Kingstown, Rhode Island was prepared for the Navy [Engineering Field Activity Northeast (EFANE), Naval Facilities Engineering Command] by Tetra Tech NUS, Inc. (TtNUS) under Contract Task Order (CTO) 049 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N62472-03-D-0057. This document follows two previously published RI documents prepared for Site 16 by EA Engineering Science and Technology (EA):

- The Final Phase I Remedial Investigation Report for IR Program Site 16, Naval Construction Battalion Center Davisville, North Kingstown, Rhode Island (EA, August 2004).

- The Draft Phase II Remedial Investigation Report for IR Program Site 16, Naval Construction Battalion Center Davisville, North Kingstown, Rhode Island (EA, June 2003).

While the Phase I RI report has been finalized, the Navy indicates that the June 2003 Phase II RI report will not be finalized. Alternatively, as discussed below, the Navy will prepare and publish an RI report for Site 16 once all RI data gaps have been resolved.

Much of the site description, site history, and contaminant source area information contained within Sections 1.2, 1.3, and 1.4 was summarized based on or updated from information previously presented in the Phase I and II RI reports and the original Basewide Environmental Baseline Survey (EBS) reports (EA, October 1995). Section 2 of this report presents a brief summary of the environmental investigations conducted to date for Site 16. A description of the physical characteristics of the site (including the hydrogeological conditions) and a discussion of the environmental contamination detected to date are presented in Sections 3 and 4, respectively. Sections 5 and 6 update the fate and transport and conceptual model information, respectively, presented in the previous RI documents. A preliminary listing of data gaps derived based on the analyses presented in Sections 2 through 6 as well as preliminary recommendations to resolve those data gaps are presented in Section 7.

1.1 OBJECTIVES OF REPORT

The Supplemental Phase II RI Data Package report summarizes and evaluates, as necessary, the existing RI information and information collected in 2004 per investigations specified in the following quality assurance project plans (QAPPs):

- Addendum to Quality Assurance Project Plan for Supplemental Phase II Hydrogeological Investigation, IR Program Site 16, Naval Construction Battalion Center Davisville, North Kingstown, Rhode Island (EA, April 2004).

- Quality Assurance Project Plan for HRC Injection Pilot Study, IR Program 16, Naval Construction Battalion Center Davisville, North Kingstown, Rhode Island for Site 16 (EA, July 2004).

The data evaluation presented in this report was conducted for purposes of identifying data gaps in information necessary for completion of the RI for Site 16. As required, the RI will include both human health and ecological risk assessments of the contaminant concentrations in Site 16 environmental media. Consequently, a major objective of this report is the preliminary identification of data gaps in the information necessary for the completion of the RI risk assessments. For example, the nature and extent of contamination in the environmental media and the hydrogeological conditions at Site 16 must be characterized to the extent necessary to evaluate site-related current and potential future on-site and off-site human and ecological receptor risk. A second objective of this report is the preliminary identification of data gaps in contaminant source areas and information that may significantly impact the Site 16 risk assessment or feasibility study evaluations. This report provides:

- A brief summarization of the contaminant source area information and the investigative work conducted to date.

- An update to the existing site-wide analytical database for Site 16 based on environmental data collected in 2004.

- An update and evaluation of the available nature and extent of contamination and geological/hydrogeological information for purposes of determining if the vertical and horizontal extent of contamination has been determined to the extent necessary for completion of the RI (and associated risk assessments) for Site 16.

- An update to the Conceptual Site Model for Site 16.

- A brief summary of the human health and ecological risk assessments previously conducted for environmental media at Site 16.

- An update to the qualitative fate and transport evaluation presented in the aforementioned Phase I and Phase II RI reports.

The Supplemental Phase II RI Data Package report (subsequently referred to as the Data Package Report) also presents a preliminary list of recommendations for the resolving identified data gaps. The list of data gaps and recommendations for resolution of those data gaps will be refined in a Supplemental Phase III QAPP scheduled to be prepared in the Spring of 2006.

1.2 DESCRIPTION AND HISTORY OF NCBC DAVISVILLE

The former NCBC Davisville facility is located in the Town of North Kingstown, Rhode Island, approximately 18 miles south of the state capital, Providence. Construction of Naval facilities in the area began in 1939 (EA, October 1995). At the time of Base closure, NCBC Davisville (Figure 1-1) comprised three areas: the Main Center (839 acres, Zones 1 through 4), the West Davisville storage area (70 acres), and Camp Fogarty – a 375 acre training facility located approximately 4 miles west of the Main Center. Zones 1 through 4 were defined by the Navy in the 1970s and are described in the Final Basewide Environmental Baseline Survey (EA, October 1995). Camp Fogarty was transferred to the U.S. Department of the Army in December 1993 and is assigned to the Rhode Island Army National Guard. Adjoining the southern boundary of the Main Center is the decommissioned Naval Air Station (NAS) Quonset Point, which was transferred by the Navy to the Rhode Island Port Authority (RIPA) [currently named the Rhode Island Economic Development Corporation (RIEDC)] and others between 1975 and 1980. A portion of the former NCBC Davisville is contiguous with Narragansett Bay which is located generally to the east of the facility.

NCBC Davisville's mission was to provide mobilization support to the active Naval Construction Force; to act as a mobilization base for the rapid assembly outfitting and readying of Reserve Construction Battalions; to store, preserve, and ship advanced Base and mobilization stocks; and to procure, receive, pack, and ship collateral equipment for Atlantic, European, and Caribbean military construction projects. NCBC Davisville was comprised primarily of warehouse space and freight yards, most of which are currently demolished, redeveloped, or empty.

In 1974, the NAS and a Naval Air Rework Facility at Quonset Point were decommissioned, and operations at the Base were greatly reduced pursuant to the Shore Establishment Realignment Act of 1973. In 1989, NCBC Davisville was placed on the U.S. Environmental Protection Agency's (EPA) National Priorities List (NPL). In 1991, the closure of NCBC Davisville was announced, and operations were reduced to minimum staffing levels for public works, maintenance, security, and personnel. NCBC Davisville was decommissioned on March 25, 1994 and closed on April 1, 1994 under the Base Realignment and Closure (BRAC). NCBC Davisville was transferred to Northern Division, Naval Facilities Engineering Command, currently designated as EFANE, which has caretaker status pending disposal. EFANE is currently working closely with RIEDC and the Town of North Kingstown towards lease or

transfer of suitable parcels. A detailed description of the Base history can be found in the Final Basewide EBS (EA October, 1995).

1.3 SITE 16 DESCRIPTION AND HISTORY

Site 16 (initially designated as EBS Review Item 28 and then subsequently designated as Study Area 16) is located in the eastern portion of Zone 3 at NCBC Davisville as shown on Figures 1-1 and 1-2. The site investigation boundary as defined in the Draft Phase II RI report is also shown on Figure 1-2 and includes potential contaminant source areas (e.g., the former Building 41 area) in addition to EBS Review Item 28. Limited investigation (especially east of Site 16) has taken place to date.

The north central portion of Site 16 (generally the former EBS Review Item 28 area) is primarily wooded with the exception of an asphalt-paved area in the center. This area is generally bounded by Westcott Road (to the west), Davisville Road (to the south), Allens Harbor Road (to the east), and the Allen Harbor southern shoreline (Figure 1-2). An unnamed asphalt-paved road circles the outer perimeter in this portion of the site and was formerly used by the Navy for the purpose of training construction equipment operators. In the past, this area was extensively bulldozed and disrupted during training exercises, but now has a vegetative cover of trees, shrubs, and grasses. The north central portion of the site topography slopes from a height of approximately 33 feet above mean sea level (MSL) in the southwest corner down to MSL along the Allen Harbor shoreline in the northeastern portion of the site (Figure 1-3). Building E-107 is the only building within this portion of Site 16. The area immediately around Building E-107 is paved for parking. The area west of Building E-107 (east of Westcott Road) is grass covered.

The Site 16 area south of Davisville Road slopes gently from a height of approximately 30 feet MSL down to MSL along the Narragansett Bay shoreline toward the east and southeast. This area includes the former Building 41 area, an old railroad spur area (undeveloped), Building 318 to the south, and Building 39 to the west. The layout of former Building 41, demolished during October 2002, is shown on Figure 1-4. The area around former Building 41 was repaved during October 2002 and is currently being used for the temporary storage of cars delivered by ship pending delivery to dealers. The surface of the old railroad spur area includes railroad tracks, weathered asphalt paving of the old roads, and grasses and shrubs.

The portion of the Site 16 investigation area east of Allens Harbor Road is paved and includes a few buildings. This area is used for the temporary storage of cars delivered by ship pending delivery to dealers. The surface of most of this area slopes gently from a height of 15 feet MSL west to the Allen Harbor shoreline. The eastern portion of this area slopes gently toward the northeast and east to the Narragansett Bay shoreline.

The approximate location of four storm drain system components used historically by the Navy within the investigation area are shown in Figure 1-5, along with the available manhole invert elevation data in feet MSL.

Davol Pond is located southwest of the intersection of Marine and Davisville Roads. A stormwater detention pond is located between former Building 41 and Davisville Road.

Six EBS Review Items (Nos. 28, 29, 60, 81, 85, and 86) identified in the Basewide EBS report (EA, October 1995) are located within the Site 16 investigation area (Figure 1-2). Environmental investigations were initiated at Site 16 because the EBS identified these as potential contaminant release areas. Based on the environmental sampling conducted to date, at least two of these Review Items (Nos. 28 and 29) and associated areas are likely sources of chlorinated volatile organic chemicals (CVOCs), which are the primary environmental contaminants at Site 16. Four of the Review Items were determined to require No Further Action (NFA) at one point in time (Nos. 60, 81, 85, and 86. However, as discussed in subsequent sections, the on-going RI has included environmental investigations of these review items. Section 1.4 provides an overview of the original EBS Review Items within Site 16. The environmental investigations conducted for these areas are briefly described in Section 2.

During the Phase II RI, the investigation area expanded south to Building E-319 (Figure 1-2) to assess potential for CVOC impacts from the preservation and packaging activity that reportedly moved there when such operations ended at the former Building 41 in 1953. The Site 16 investigation area also expanded west to the Marine Road area (Figure 1-2) to assess the potential for CVOC impacts from the upgradient areas of the Navy's Site 03 (west of Building 224 on Figure 1-2) and the U.S. Army Corps of Engineers (USACE) former Nike PR-58 Site, a Formerly Used Defense (FUD) site, located west of the Navy's Site 03 area.

1.4 OVERVIEW OF EBS REVIEW ITEMS WITHIN SITE 16

The following subsections provide a brief overview of the information available for the EBS Review Items within the Site 16 investigation area. Most of the information was also presented in Section 1.1.2 of the Phase II RI report.

1.4.1 EBS Review Item No. 28 - Former Creosote Dip Tank Area, Suspected Former Fire Fighting Training Area (FFTA), and Two Suspected Underground Storage Tank (UST) Areas

Creosote dipping of wood pilings occurred during the late 1960s in the western portion of the north central section of the Site 16 investigation area (Figure 1-2). The wood pilings were dipped into tanks containing

creosote and staged in the area to dry before being loaded onto ships. In the early 1990s, an upended creosote dip tank was identified in the western portion of the site adjacent to the asphalt paved road. The location where the tank was found is the "original" Creosote Dip Tank Area and was first addressed by the Navy in 1992 (Halliburton NUS Corporation, December 1994) and then further investigated during the Phase II EBS. However, based on additional information provided by a former Seabee after the Phase II EBS fieldwork was completed, the Navy determined that past creosote dipping operations were likely conducted over a larger area than originally thought. That area comprised the land west of and adjacent to a wooden bermed structure which is still present at the site (Figure 1-2). The Phase II EBS Follow-On and Addendum II work investigated the "expanded" Creosote Dip Tank Area. Based on the results of related EBS investigations, study of this former area continued into the Phase I and II RIs, and during environmental investigations conducted in 2004.

A suspected former FFTA was reportedly located in an asphalt-paved area to the east of the former Creosote Dip Tank Area (Figure 1-2). Reportedly, structures were constructed, doused with flammable materials, set on fire, and extinguished as part of fire fighting training exercises during the late 1960s. Based on the results of related EBS investigations, study of the former FFTA continued into the Phase I and II RI and during environmental investigations conducted in 2004. Based on the groundwater data collected to date, one or more groundwater contaminant source areas may exist in the area to the east of the "expanded" Creosote Dip Tank Area which includes the location of the suspected former FFTA. A portion of this area is also downgradient of suspected source areas in the general vicinity of Building 41 located to the southwest.

During the EBS investigations, the reported UST located near the southeast corner of Building E-107 was identified as two septic tanks (buried and interconnected pontoon tanks) that were excavated and removed along with the related total petroleum hydrocarbons (TPH)-impacted soil [Foster Wheeler Environmental Corporation (FWENC), May 1998]. No further action (NFA) was recommended in the conclusions of the closure report prepared by FWENC.

1.4.2 EBS Review Item 29 - former Building 41

As stated in the Phase II EBS Report (EA, February 1998), this building was a preservation and packing shop, and a construction equipment and automotive parts storage building (Figure 1-4). Preservation and degreasing operations occurred within Building 41. Because Building 41 was demolished and the area paved by RIEDC during October 2002, the following descriptions are based on available information and observations prior to the demolition activity. Based on past activities, it is likely that petroleum products and solvents were used and stored within Building 41.

The preservation tanks used within Building 41 were remediated under the Navy's UST program. Stained asphalt floors observed during the Phase II EBS were not considered to be of concern during the EBS based on the limited extent of the staining, the sorptive ability of asphalt, and the lack of a direct pathway for exposure of humans or ecological receptors to associated contaminants (e.g., spill runoff from the concrete to a foundation wall or soil). No floor drains were located in Building 41. The floor staining was considered to be consistent with the previous use of the building as an equipment preservation and packing shop, and parts storage. Consequently, the Davisville BRAC Clean-up Team (BCT) recommended NFA following a review of available Phase II EBS information and site visits conducted by the BCT, the Town of North Kingstown, and RIEDC in September and October 1995. No field activities were conducted and no samples were collected during the EBS and EBS-follow-on activities for this Review Item based on the BCT recommendation for NFA.

Subsequent to the EBS, however, discussions occurred with a Seabee veteran (November 2000), who worked in Building 41 during 1951 to 1953, to improve the Navy's understanding of the historical use of the building. Additionally, Navy representatives accompanied the Seabee veteran on a visit to the building in February 2001. According to this veteran, rust removal (heated manganesed phosphoric acid, or Phospholene), metal preservation (Cosmolene – particularly for Quonset Huts), and degreasing (chlorinated solvent, including a solvent recovery still) operations in Building 41 may have begun and ended between 1951 and 1953. Waste solvent and sludge from the solvent recovery still were transported in drums to the Allen Harbor Landfill for disposal. After 1953, the preservation and degreasing operations were reportedly moved south to Building E-319.

Building 41 was reportedly divided into three sections as shown on Figure 1-4 which illustrates the Navy's current understanding of the historical use of the building during 1951 to 1953. Figure 1-4 is based on the Phase I RI discussions referenced in the preceding paragraph, and on historical floor plan drawings obtained from RIEDC. The following summarizes the activities that reportedly occurred in the three sections of the building:

- The northeastern third (bay) of the building was reportedly used for packing and storage of parts for shipment. The area was observed on February 15, 2001 to be a large room with a high ceiling and generally empty, except for piles of salted sand stored by RIEDC in part of the southwestern portion. This area would not typically be expected to be a significant chemical contaminant release area.

- The middle third of the building was used for at least two different processes. Quonset Huts were dipped into a large, partially in-ground tank(s) of Cosmolene (a grease used to prevent rusting of metallic surfaces) for preservation. The Cosmolene dipping appears to have involved a group of four tanks (Tanks 41-1 through 41-4) located in the northeastern section of the middle third of the building.

This northeastern area was observed in February 2001 to be a large room with a high ceiling and generally empty. Historically, rust was stripped from metal parts in an aboveground tank of Phospholene (manganesed phosphoric acid) located in the southwestern portion of the middle third of the building. This tank (Tank 41-5) was reportedly above floor grade. Based upon a related Tank Closure Assessment Report by HRP Associates, Inc. (HRP, March 1995), Tank 41-5 was a rectangular, open-top steel tank located along the east wall of the former restrooms area. An area of etching on the concrete floor surface, observed on February 15, 2001, may be evidence of its former location. The southwestern most portion of the middle third of the building was insulated and had a lowered ceiling, apparently to retain heat for the workers in that area. This area was reportedly used for the packing of preserved small metal parts for vehicles. The materials used in this part of Building 41 involved high molecular weight organic greases, and possibly semivolatile organic compounds (SVOCs), metals (especially iron or manganese), and solvents that may have been used to dilute or remove cosmolene from surfaces.

- The southwestern third of the building was used for degreasing activity that included a vapor degreasing unit and a solvent recovery still. The area was also used for packing and shipping of parts. The vapor degreasing tank (apparently Tank 41-6) and associated equipment were located in a pit (concrete vault) in the floor. Based upon a related Tank Closure Assessment Report by HRP Associates, Inc. (HRP, April 1995), Tank 41-6 was a 500-gallon rectangular steel tank. The concrete vault in the floor of the building "was 5 feet wide, 6 feet long, and 7 feet deep." After removal of the tank, the pit (vault) was filled with common fill consisting of a sand and gravel mix, and then completed with an asphalt surface at floor grade that was visible during the building walkover. This area of Building 41 was observed on February 15, 2001 to be a large room with a high ceiling and generally empty, except for the northeastern portion where the old solvent recovery still equipment was still present. There was reportedly also a locked cage area where tools were stored in this portion of the building. Degreasing operations as described here make use of large volumes of organic solvents, especially chlorinated organic solvents. Although the solvents were periodically or continually reclaimed, these operations may have yielded organic solvents (especially chlorinated solvents) as contaminants if released to the environment.

Based upon a related Tank Closure Assessment Report by HRP Associates, Inc. (HRP, June 1995), the Cosmolene dipping tanks (Tanks 41-1 through 41-4) were excavated in January 1995, cleaned, and disposed of as part of the Navy's UST program. A petroleum-based material was shoveled from the tanks before the units were steam cleaned. The metal tanks were reported to be in good condition (no rust or breaks) and there was no apparent leakage. Reportedly, petroleum odors or discernable staining were not observed during the excavation, and TPH was not detected [less than 21 milligrams per kilogram (mg/kg)] in the final soil samples collected from the base of the excavation [about 6 feet below

ground surface (ft bgs)]. Tank 41-1 was a 6,500-gal rectangular, open-top steel tank within which were three 900-gallon square, open-top steel tanks (41-2, 41-3, and 41-4). Based on the presence of an old steam pipe that entered near the base of the west end of Tank 41-1, this tank appears to have been used to heat the other three tanks. The excavation was backfilled to grade using the excavated soil and a common borrow fill consisting of a sand and gravel mix, and completed with an asphalt surface at floor grade that was visible during the building walkover.

Based on the Tank Closure Assessment Report by HRP Associates, Inc. (HRP, March 1995), Tank 41-5, apparently the phospholene (manganesed phosphoric acid) tank, was removed from the building in December 1994.

Tank 41-6 (the vapor degreasing unit) and equipment was removed in December 1994 as part of the Navy's UST program (HRP, April 1995). According to the closure report, the tank "was dry and required no cleaning prior to removal." Following removal from the vault, it was reported that "the tank appeared to be in generally good condition with some staining along the upper edge, around plumbing fixtures, and under small holes in the tank walls. The tank piping was constructed of steel and appeared to be in moderate condition. Pipe joints were secure with no visible signs of leakage. The floor and sidewalls of the vault were stained, especially in the east corner." Because the tank was removed from a concrete vault, there was no excavation. As noted above, after removal of the tank, the pit (vault) was filled with common fill consisting of a sand and gravel mix, and then completed with an asphalt surface at floor grade.

1.4.3 EBS Review Item 60 - Building E-107 Septic Tanks

This Review Item includes locations both within and beyond the Phase I and II RI area. However, as portrayed in Figure 1-3, the septic tank location within the Phase I and II RI area was reportedly located at the southeast corner of Building E-107. A geophysical survey was conducted to locate that tank. However, excavation and removal of the tank (actually two buried pontoons) was addressed under Review Item 28 (i.e., tanks and TPH-impacted soil were removed).

1.4.4 EBS Review Item 81 - Former Building 41 Septic Tanks

Three separate steel pontoon tanks connected by pipes were located on the northern side of the former Building 41. Available subsurface plans showed no leaching field connected to these structures. The tanks are rectangular-shaped structures constructed of steel with holes cut into the bottom and sides. The tanks were adapted from steel pontoons to act as a cesspool. The sludge was removed from the septic tanks, and the tanks were cleaned (March 7, 1997). The area was backfilled and capped (April 13,

1998) (FWENC, May 1998a). Based on EBS-related investigations and closure of the tanks, NFA was recommended by the BCT. During September 2002, this area was re-graded and paved by RIEDC.

1.4.5 EBS Review Item 85 - Former UST Area

One UST was removed from along the western portion of the south side of Building E-107 and, based on EBS-related investigations, NFA was recommended by the BCT.

1.4.6 EBS Review Item 86 - Building E-107 Floor Drains

Six floor drains were identified in Building E-107. Two of the floor drains were under floor tile and are not accessible. Four of the floor drains were visible and accessible. The four floor drains that were visible and accessible were closed by FWENC. Trenching activity was conducted by FWENC east of the building. However, no connecting piping was found between these floor drains and an outfall pipe located at the near shoreline of Allen Harbor. Subsurface investigations outside the building continued into the Phase I and II RI, including the installation of a monitoring well cluster east of the Building 107. Floor drains can be sources of chemical contaminants that are intentionally or unintentionally washed through the drains, especially if the drains had leaks.

2.0 SUMMARY OF ENVIRONMENTAL INVESTIGATIONS

This section describes the environmental investigations conducted to date for Site 16. The information presented was extracted, in part, from the following reports (particularly Section 1.2 of the Draft Phase II RI report):

- The Final Phase I RI Report for IR Program Site 16, Naval Construction Battalion Center Davisville, North Kingstown, Rhode Island (EA, August 2004).

- The Draft Phase II Remedial Investigation Report for IR Program Site 16, Naval Construction Battalion Center Davisville, North Kingstown, Rhode Island (EA, June 2003).

- The Addendum to Quality Assurance Project Plan for the Supplemental Phase II Hydrogeological Investigation, IR Program Site 16, Naval Construction Battalion Center Davisville, North Kingstown, Rhode Island (EA, April 2004).

- The Quality Assurance Project Plan for the HRC Injection Pilot Study, IR Program Site 16, Naval Construction Battalion Center Davisville, North Kingstown, Rhode Island (EA, July 2004).

- The Screening Level Ecological Risk Assessment at IR Program Site 16 (Former Creosote Dip Tank and Fire Fighting Training Area), Naval Construction Battalion Center, North Kingstown, Rhode Island (EA, July 2004).

- The Human Health Risk Assessment at IR Program Site 16 (Former Creosote Dip Tank and Fire Fighting Training Area), Naval Construction Battalion Center, North Kingstown, Rhode Island (EA, July 2004).

- Final Study Area 16 (Creosote Dip Tank and Fire Fighting Training Area) Comprehensive Report/ Study Area Screening Evaluation, Naval Construction Battalion Center, Davisville, Rhode Island (EA, December 1999).

Environmental data are available for Site 16 primarily as the result of information/samples collected during the following sampling events:

- The Phase II Environmental Baseline Survey
- The Phase II Environmental Baseline Survey Follow-on Investigation

- The Phase II Environmental Baseline Survey Follow-on Addendum Investigations
- The Phase I RI Investigation (Stage I and Stage II)
- The Phase II RI Investigation
- The Supplemental Sediment Investigation
- The Supplemental Phase II Investigation
- The HRC Injection Pilot Study

Table 2-1 presents a summary of the scope of work conducted for the investigations conducted to date. These investigations have focused primarily on the trichloroethene contamination in groundwater underlying Site 16 using a wide array of site characterization tools. Table 2-2 lists all of the groundwater monitoring wells installed to date as well as the screened interval for each well. Figures 2-1, 2-2, and 2-3 display the monitoring well locations, surface soil and soil boring locations, and surface water and sediment locations, respectively, which have been sampled to date.

2.1 1992 REMOVAL ACTION IN THE UPENDED CREOSOTE DIP TANKS AREA

Several removal actions have occurred within the Site 16 investigation area and are referenced in the Draft Phase II RI Report. Data for this particular removal action were discussed in the Draft Phase II RI Report summary of significant previous investigations (Section 1.2); a discussion of this removal action is included in this section for purposes of completeness and consistency with previous reports. The data associated with the removal action are not part of the RI dataset for Site 16.

In 1992, the Navy completed a soil removal action in a spill area around the upended creosote dip tank. The soil removal action was conducted in four phases and was intended to remove soil containing elevated concentrations of polycyclic aromatic hydrocarbons (PAHs). During the first three phases of the removal action, PAHs were detected in soil down to approximately 4 feet below ground surface (bgs). The final phase, Phase IV, consisted of the excavation of a PAH "hot spot" in soil (not considered to be part of the release) located in the area of the upended tank. At that time, a "hot spot" was defined by the Navy as soil boring sample concentrations that exceeded job-specific Resource Conservation and Recovery Act (RCRA) Media Cleanup Standards, based on a residential usage scenario. The conclusion of the report (Halliburton NUS, December 1994) was that, although some detectable PAHs remained, the associated human health risk under a residential usage scenario (1.3×10^{-5}) was within EPA's acceptable target risk range of 10^{-4} to 10^{-6}.

2.2 1995 BASEWIDE ENVIRONMENTAL BASELINE SURVEY

The Basewide EBS for the NCBC was prepared to evaluate and consolidate information regarding the environmental conditions and potential constraints for lease and/or transfer of land and structures at the

facility. The Final Environmental Baseline Survey report was issued in October 1995 (EA, October 1995). The EBS divided the facility into 47 sub parcels. Site 16 is located in sub parcels 26 and 28. The EBS identified the following six Review Items for Site 16 which were further evaluated in the Phase II EBS and/or Site 16 remedial investigations conducted to date:

- Review Item 28 – The creosote dip tank area. (Confirmatory soil sampling was not performed during EBS activities after the Phase IV removal action described above),
- Review Item 29 – Asphalt staining inside Building 41,
- Review Item 60 – An abandoned septic system at Building E-107,
- Review Item 81 – A suspected septic leach field at Building 41,
- Review Item 85 – VOCs in soils underlying a UST location at Building E-107, and;
- Review Item 86 – Floor drains in Building E-107.

Each of these EBS Review Items were previously described in preceding Section 1.4. The following sections (Sections 2.3, 2.4, and 2.5) summarize pertinent data collection activities for these areas conducted during the EBS-related sampling activities for Site 16.

2.3 PHASE II ENVIRONMENTAL BASELINE SURVEY INVESTIGATION (FEBRUARY – JUNE 1996)

The Phase II EBS investigated areas of environmental concern that were identified during the Basewide EBS to determine whether further investigation of the areas was warranted. The following narrative summarizes pertinent sampling activities (February – June 1996), data, and conclusions for the aforementioned EBS Review Items within Site 16 as described in the Final Phase II EBS report (EA, February 1998).

EBS Review Item 28 (Creosote Dip Tank Area)

The investigation of this area focused on the location of the previous excavation of the original creosote dip tank (see Section 2.1). Using maps from the previous report and field observations, the former Phase IV excavation area was located. On April 24, 1996, four soil borings were advanced in the four corners of the former Phase IV excavation (northwestern portion of the Cresote Dip Tank Area). Split-barrel sampling was conducted to a depth of 4 feet bgs at each location. The samples were collected and analyzed for PAHs.

The evaluation of the resulting data during the Phase II EBS confirmed the presence of low concentrations of PAH in soil. Benzo(a)pyrene (1,400 J µg/kg) in one surface soil sample was the only PAH detected at concentrations which exceeded the Rhode Island Environmental Management (RIDEM)

Residential and Industrial/Commercial Direct Exposure Criteria and EPA Region 3 Industrial risk-based concentration (RBC).

EBS Review Item 29 (Asphalt Staining inside Building 41)

Building 41 is a former degreasing and rust proofing facility located in the southeastern quadrant of Site 16 (Figure 1-4). Stained asphalt floors in the Building were determined not to be a concern, based on the limited extent of the staining, the sorptive ability of asphalt, and the lack of a direct migration pathway. No floor drains are located in Building 41 although floor drains may have been paved over with apshalt. The floor staining was considered to be consistent with the previous use of the building as an equipment preservation and packing shop, and parts storage. No Further Action was recommended for this Review Item. However, as will be noted in subsequent sections, the general Building 41 area continues to be an active area of investigation.

EBS Review Item 60 (Septic Tanks, Building E-107)

The locations of two septic tanks were identified by plan review and site inspection during the Review Item 60 investigation. An active tank is located northwest of Building E-107 beyond the Phase I RI area (Figure 1-2). However, a second septic tank was reportedly located at the southeast corner of the building within the Phase I RI area (Figure 1-2).

A geophysical survey used ground-penetrating radar (GPR) to locate the second septic tank, shown on plans to be in the southern portion of the eastern side of Building E-107. The GPR signal only penetrated 7 feet bgs because of the high water table and the proximity to Allen Harbor. The GPR survey identified subsurface utility lines and a structure at approximately 6 feet bgs. The subsurface structure was this tank (actually two buried pontoon tanks). The EBS recommended no further action for the septic tank. However, its excavation and removal was addressed under Review Item 28 during the Phase II EBS Follow-On Investigation (EA, March 1998).

EBS Review Item 81 (Septic Tanks, Building 41)

This septic system comprised three separate steel pontoon tanks connected by pipes was located on the northern side of Building 41 (Figure 1-2). The tanks were adapted from steel pontoons to act as a cesspool. The sludge was sampled in February 1996. Among other constituents detected, the combined TPH diesel and hydraulic range concentration detected was 3,500 J mg/kg. The sludge was removed and the tanks cleaned and backfilled in April 1998. The EBS recommended No Further Action for this Review Item.

EBS Review Item 85 (near the former UST south of E-107)

In 1992, Tank 68 (a 1,520-gallon UST) was removed from the south side of Building E-107 (Figure 1-2) (Halliburton NUS, December 1994). This UST was reportedly used to store No. 2 fuel oil. In 1994, a confirmatory sampling investigation was conducted by installing three borings in the vicinity of the former Tank 68. To collect a representative groundwater sample, one of these borings was completed as a monitoring well. Low TPH readings [65 parts per million (ppm)], were reported for soil samples from these borings however, high jar headspace total VOC readings (greater than 1,000 ppm) were also reported. Although no further action was recommended under the UST program, the location was designated for further investigation as EBS Review Item 85 in the Basewide EBS.

The focus of the Phase II EBS investigation of Review Item 85 was to evaluate potential VOCs in soil. Two soil borings were drilled and sampled in the approximate former location of Tank 68 on the southwest side of Building E-107, where previously elevated total VOC readings had been recorded. The samples were analyzed for Target Compound List (TCL) VOCs. The detected concentrations of acetone (63 µg/kg) and toluene (36 µg/kg) were less than the RIDEM Residential and Industrial/Commercial Direct Exposure Criteria. VOC concentrations were also less than EPA and RIDEM soil leachability criteria. No Further Action was recommended for EBS Review Item 85 in the Phase II EBS.

EBS Review Item 86 (Floor Drains, Building E-107)

Six floor drains identified in Building E-107 were examined as a portion of the Phase II EBS investigation conducted for Review Item 86. The floor drains were added to the investigation because of the potential threat of eventual discharge to the harbor. Public Works Drawing #594584 depicts three drain lines exiting the building at the southeast corner and into Allen Harbor. The positions of the floor drains with respect to these lines shown on the plan suggested the floor drains were connected to the drain lines. Test pits were excavated outside of the building to determine if there was a connection between the floor drains and the outfall in Allen Harbor. No connections between the floor drains and the outfall were found.

2.4 PHASE II ENVIRONMENTAL BASELINE SURVEY FOLLOW-ON INVESTIGATION (JUNE – AUGUST, 1997)

The objective of the Phase II EBS Follow-On Investigation (EA, March 1998) was to further evaluate Phase II EBS Review Items and to provide, to the extent possible, sufficient information to recommend no further action or further response action for each Review Item evaluated. The Follow-On Investigation considered information gathered by the Navy as a result of an interview with a former Seabee who participated in fire fighting training activities in the area in the 1960s. (The interview occurred subsequent

to the Phase II EBS investigation.) The veteran reported that fire fighting training was conducted in the area now paved with asphalt in the center of northern section of Site 16. The veteran also reported that the creosote dipping operations covered a larger area of the property (i.e., not just the location of the aforementioned upended dip tank). (Thus, as shown in Figure 1-2, an "expanded Creosote Dip Tank Area" was identified for Site 16.) He also recalled that three USTs were associated with a pump island area that is still visible west of Building E-107, as well as one on the southeast side of Building E-107. Consequently, the Phase II EBS Follow-On Investigation evaluated the expanded Creosote Dip Tank Area, the reported FFTA, and the reported UST areas in the vicinity of Building 107.

The Phase II EBS Follow-On Investigation also included a review of low altitude oblique angle aerial photographs, installation of soil borings and test pits in the expanded Creosote Dip Tank Area and the alleged FFTA, a magnetometer survey to assess whether USTs were still present in the ground west of and adjacent to Building E-107, test pit excavations to investigate the magnetic anomalies, and groundwater sampling from within the area of the former FFTA.

Field work for the Follow-On Investigation took place between June and August 1997. The following narrative only summarizes pertinent data and conclusions for Site 16 as presented in the Phase II EBS Follow-On Investigation report (EA, March 1998).

EBS Review Item 28 (Creosote Dip Tank Area)

Eleven soil borings were drilled and sampled between June 17 and 24, 1997 in the area identified as the location of the former creosote dip tanks. Two soil samples were collected from each boring, one at 0 to 2 feet bgs and one at the interval with the highest headspace PID reading. The soil samples were analyzed for target compound list (TCL) semivolatile organic compounds (SVOCs), TCL VOCs, and TPH (Method 418.1). Approximately 20 percent of the samples were also analyzed for purgeable [gasoline-range organics (GRO)] TPH by Method 8015M. One surface soil sample was collected from a gray soil horizon encountered in the wooden cribbing of the bermed structure (see Figure 2-2) and was analyzed for TCL SVOCs, TCL VOCs, and TPH (Method 418.1).

Based on the sampling results, the Phase II EBS Follow-On Investigation recommended no further action for the original Creosote Dip Tank Area. However, the Navy recommended the collection of additional soil samples from test pit locations where debris, porcelain shards, and glass were encountered, as well as the collection of shallow and deep groundwater samples. The additional sampling was planned and conducted as the Phase II EBS Follow-On Addendum II Investigation. No soil samples were collected during the excavation of the test pits during the EBS Follow-On Investigation.

Suspected Former Fire Fighting Training Area

Five soil borings were drilled and sampled between June 17 and 24, 1997 in the area of the suspected former FFTA. Two samples were collected from each boring, one at 0 to 2 feet bgs and one at the interval with the highest headspace PID reading. The soil samples were analyzed for TCL SVOCs, TCL VOCs, and TPH (Method 418.1). Approximately 20 percent of the samples were also analyzed for purgeable (GRO) TPH by Method 8015M. Wood, porcelain, and glass debris were observed in soil samples collected from three of the borings. One shallow groundwater sample was collected using direct-push sampling equipment. The sample was analyzed for TCL VOCs and TCL SVOCs.

Based on the sampling results, the Phase II EBS Follow-On Investigation recommended no further action for soil at the former FFTA. However, the Navy recommended the collection of samples from test pit locations were debris was encountered as well as additional shallow and deep groundwater samples during the Phase II EBS Follow-On Addendum II Investigation to further investigate the groundwater quality at Site 16.

Underground Storage Tank Investigation

A magnetometer survey was conducted in two areas identified by the Navy veteran as potential UST locations. The areas were west of, and at the southeast corner of, Building E-107. Areas where magnetic anomalies were detected within the grids were subsequently investigated in July 1997 with nine test pits in an attempt to identify the source of the anomalies. No tanks were discovered. Three soil samples were collected and analyzed for TPH (Methods 418.1 and 8015M), TCL VOCs, TCL SVOCs, pesticides, polychlorinated biphenyls (PCB), and the 8 RCRA metals. In August 1997, the Navy expanded the test pits in the two grid areas in an attempt to more fully assess the reported magnetic anomalies. In addition, a small test pit was also excavated across the asphalt-paved road in the area of the pipe from the pontoon septic tank. The pipe was found to continue under the road and approximately 50 feet into the wooded area south of Building E-107, where it ended.

The extensive excavations in the areas of detected anomalies uncovered no USTs. The Phase II EBS Follow-On Investigation recommended no further action for the UST area portion of Review Item 28. The data associated with the removal action are not part of the RI dataset for Site 16.

EBS Review Item 60 (Septic Tanks, Building E-107)

Two septic tanks were located as previously described for the Phase II EBS. These inactive septic tanks and a quantity of petroleum-impacted soil were found on the south side of the southeast corner of Building E-107. Based on the analytical data from the three soil samples (collected as part of the

underground storage tank investigation discussed above), it was recommended that additional soil be removed from one of these sample locations and that additional post-removal confirmatory samples be collected and analyzed for TPH (Method 418.1), SVOCs, and pesticides. The Navy removed the septic tanks and the associated petroleum-impacted soil in that area. On December 9, 1997, the two steel pontoon tanks (approximately 7 feet x 5 feet x 5 feet each) were cleaned and removed and 1 foot of soil beyond the gravel packing (FWENC, May 1998) was also removed. The inlet line to the septic tanks from Building E-107 was severed near the tank and sealed with grout. The excavation was extended to the south to remove petroleum-impacted soil that was encountered during test pit operations. Confirmatory samples were collected. Excavation continued until the confirmatory samples were below RIDEM Industrial/Commercial Direct Exposure Criteria. A total of 274 tons of petroleum-impacted soil was removed during excavation activities and the two pontoon tanks were sent offsite for metal recycling.

Also a single soil sample (EBS60-01) was collected from the located leach field to the northwest of the Building E-107 and analyzed for TPH, VOC, SVOCs, and metals. Detected concentrations of all chemicals were less than RIDEM's Industrial/Commercial Direct Exposure Criteria.

Summary of Phase II Environmental Baseline Survey Follow-On Investigation Analytical Results

As described above, twelve surface soil and eleven subsurface soil samples were collected from the Creosote Dip Tank Area, and five surface/subsurface soil samples and one groundwater sample were collected from the Former Fire Fighting Training Area during the Phase II Follow-On Investigation. The results were compared to applicable federal and state criteria to determine whether an unacceptable human health or ecological risk was present. The following items summarize the results as presented in the Phase II EBS Follow-On Investigation:

- Groundwater - VOCs were not detected in the groundwater sample collected from the suspected former FFTA. The concentration of bis(2-ethylhexyl)phthalate (the only SVOC detected) was below the federal maximum contaminant level (MCL), as well as the RIDEM Class GB groundwater criterion.

- Surface Soil Samples (0 to 2 feet bgs) - Constituent concentrations in surface soil samples were less than RIDEM's Industrial/Commercial Direct Exposure Criteria and the RIDEM Class GB Leachability Criteria. TPH concentrations in five surface soil samples exceeded the respective RIDEM Residential Direct Soil Exposure Criterion.

- Subsurface Soil Samples (greater than 2 feet bgs) - No constituents exceeded the RIDEM Industrial/Commercial Direct Exposure Criteria.

2.5 PHASE II ENVIRONMENTAL BASELINE SURVEY FOLLOW-ON ADDENDUM INVESTIGATIONS (WINTER OF 1997/FALL AND WINTER OF 1998)

The environmental investigations of Site 16 continued through the winter of 1997, and the fall and winter of 1998. The results of these investigations were reported in the Phase II Environmental Baseline Survey Follow-On Investigation Addendum (EA, May 1998). The following only summarizes pertinent data for Site 16 as presented in the Addendum report.

EBS Review Item 81 (Septic Tanks, Building 41)

At the time of the Phase II EBS (see Section 2.2), one septic tank at Building 41 was sampled. Two additional septic tanks were discovered when the Navy's remedial action contractor (RAC) conducted cleaning operations. The focus of the Follow-on Addendum Investigation was to confirm that soil and groundwater had not been impacted by releases from these septic tanks. Soil and groundwater samples were collected and analyzed in December 1997. The soil samples were collected from two locations adjacent to the downgradient (east) side of the tanks at a depth of 9 to 11 feet bgs. The soil samples were analyzed for TPH (Methods 418.1 and 8015M, Gasoline Range), TCL VOCs, TCL SVOCs, and 8 RCRA metals. Arsenic, barium, chromium, lead, and TPH were detected in the soil samples. Arsenic was the only inorganic detected at concentrations exceeding the RIDEM Residential Direct Contact criteria. The detected concentrations of TPH were less than the RIDEM Class GB Leachability criteria.

Shallow groundwater samples were collected at the same two locations at a depth of 17 to 19 feet bgs and were analyzed for TCL VOCs (unfiltered samples), TCL SVOCs (unfiltered samples), and the eight RCRA metals (filtered samples). VOCs were not detected in the shallow groundwater samples. The concentration of bis(2-ethylhexyl)phthalate (the only SVOC detected) exceeded the federal drinking water MCL and RIDEM GA groundwater objectives, although the septic tank is located in an area where the groundwater is classified GB by RIDEM. The detected concentration of bis(2-ethylhexyl)phthalate was less than the RIDEM GB groundwater objectives. No further action was recommended for this Review Item. All sludge had been removed from the tanks and the tanks were cleaned by the RAC. The tanks were backfilled in April 1998; a contaminant source no longer exists in this area.

Study Area 16

Based on the data from the Phase II EBS (EA, February 1998) and the Phase II EBS Follow-On Investigation (EA, March 1998), the BCT recommended further investigation and sampling of the north-central portion of the area now designated as Site 16. This additional fieldwork at Study Area 16 was conducted during Fall/Winter 1998 in accordance with the Phase II Follow-On Investigation Work Plan

Addendum II (EA, September 1998). The objectives of the Study Area 16 portion of the investigation were to:

- further evaluate groundwater quality beneath the former Creosote Dip Tank Area, the former FFTA, the septic tank formerly located at the southeast corner of Building E-107, and the earth ramp structure southeast of Building E-107,

- evaluate subsurface soil contamination beneath debris layers observed in test pits in the Creosote Dip Tank Area during the Phase II EBS Follow-On Investigation, and

- evaluate the quality of water discharging from a seep near Building E-107 into Allen Harbor.

These objectives were addressed by the collection of 4 subsurface soil samples, 1 surface soil sample, 16 groundwater samples from 8 locations, and 1 sample of a seep on the shore of Allen Harbor in the area of Building E-107.

Soil Sampling

In October/November 1998, the Navy collected 4 subsurface soil samples from the 2-foot interval beneath the observed or reported layer of debris described previously. The subsurface soil samples were analyzed for TPH (Method 418.1), TPH GRO (Method 8015M), TCL VOC, TCL SVOC, pesticides, polychlorinated biphenyls (PCB) (Method OLM03.2), and Target Analyte List (TAL) Metals (ILM04.0). Additionally, 1 surface soil sample (location selected by EPA) was collected at the northern end of a drain pipe near a swale located southeast of the concrete ramp and bermed structure.

Concentrations of analytes detected in the soil samples collected at Study Area 16 during the Phase II EBS Follow On Addendum II investigation were compared to federal and state criteria and are summarized below.

- Various inorganics and SVOCs were detected in the 1 surface soil sample. VOCs, pesticides, and PCB were not detected in the surface soil sample.

- No analytes were detected in the surface soil sample at concentrations exceeding the RIDEM Industrial/Commercial Direct Exposure Criteria.

- Only arsenic (2.2 mg/kg) in surface soil slightly exceeded its RIDEM Residential Direct Soil Exposure Criterion (1.7 mg/kg). The detected concentrations of SVOCs in surface soil did not exceed RIDEM Residential Direct Exposure Criteria.

- Various inorganics (4 of 4 samples), VOCs (1 of 4 samples), and TPH (1 of 4 samples) were detected in subsurface soil samples. SVOCs, pesticides, and PCBs were not detected in the subsurface soil samples. Of the VOC target analytes, only a low concentration of acetone (20 µg/kg) was detected in 1 sample.

- No analytes were detected in subsurface soil samples at concentrations exceeding RIDEM Industrial/Commercial Direct Exposure Criteria.

- Arsenic (3 of 4 samples), beryllium (2 of 4 samples), and lead (1 of 4 samples) exceeded their respective RIDEM Residential Direct Exposure Criteria. The detected concentrations of VOCs (acetone) and TPH did not exceed RIDEM Residential Direct Exposure Criteria.

Ground-Water Sampling

In October/November 1998, 16 groundwater samples were collected at the following 8 locations using hydraulically driven sampling equipment:

- Original Creosote Dip Tank Area – Three sample locations were selected along a line perpendicular to the inferred groundwater flow direction and downgradient of the Former Creosote Dip Tank operations area and the location of the test pits excavated during the Phase II EBS Follow-On Investigation conducted in June 1997.

- Former FFTA – Two groundwater sample locations were selected to further evaluate the former FFTA.

- South of Building E-107 – One groundwater sample location was selected on the downgradient side of the trench that was excavated during the removal of the pipe that discharged from the septic tank at the southeast corner of Building E-107.

- Allen Harbor Shoreline – One groundwater sample location was collected between the seep observed at the shore of Allen Harbor (Figure 2-1) and the septic tank found at the southeast corner of Building E-107.

- Earth Ramp Structure – One groundwater sample location was selected on the downgradient side of the earthen ramp structure southeast of Building E-107.

At each sampling location, 1 groundwater sample was collected from the shallow interval (near the water table) and 1 sample was collected at the 2-foot interval above refusal. The groundwater samples were analyzed for TCL VOCs, TCL SVOCs, pesticides (Method OLM03.2), and dissolved (filtered) TAL metals (Method ILM04). Concentrations of analytes detected in the groundwater samples collected at Study Area 16 during the Phase II EBS Follow-On Addendum Investigation were compared to federal and state criteria and results are summarized below.

- Various VOCs (13 of 16 samples), SVOCs (4 of 16 samples), pesticides (8 of 16 samples), and inorganics (16 of 16 samples) were detected in the groundwater samples.

- The maximum detected concentration of trichloroethene (TCE) (570 J µg/L) slightly exceeded the RIDEM GB groundwater criteria (540 µg/L) in only 1 of 16 samples.

- TCE and vinyl chloride (VC) concentrations exceeded the MCL in 4 of 16 samples and 5 of 16 samples, respectively. TCE concentrations ranged from non-detect (at approximately 1 µg/L or less) to 570 µg/L (as compared to an MCL of 5 µg/L). VC concentrations ranged from non-detect (at approximately 2 µg/L) to 10 µg/L (as compared to an MCL of 2 µg/L).

Seep Sampling

On October 15, 1998, a sample was collected from the groundwater seep identified at the shore of Allen Harbor adjacent to the east side of Building E-107 (Figure 2-3). The grab sample was collected at the time of the lowest tide. The seep sample was analyzed for TCL VOCs, TCL SVOCs, pesticides (Method OLM03.2) and dissolved (filtered sample) target analyte list (TAL) metals (Method ILM04.0). Concentrations of analytes detected in the seep samples were compared to federal and state criteria and results are summarized below:

- Various inorganics, SVOCs, and pesticides were detected in the seep sample. VOCs were not detected in the seep sample.

- Lead (29.3 µg/L), dieldrin (0.2 µg/L), endrin (0.0039 J µg/L), heptachlor epoxide (0.2 J µg/L), and phenanthrene (7 µg/L) were detected at concentrations exceeding the Marine Chronic Ambient Water Quality Criteria (AWQC).

2.6 STUDY AREA 16 COMPREHENSIVE REPORT/STUDY AREA SCREENING EVALUATION REPORT

Environmental samples were not collected specifically for the Study Area 16 Comprehensive Report/Study Area Screening Evaluation (SASE) report (EA, December 1999). The report was prepared to summarize the findings of the four Navy investigations previously described: the 1992 removal action at an upended tank located where creosote dipping reportedly took place, the Phase II EBS, the Phase II EBS Follow-On, and the Phase II EBS Follow-On Addendum II investigations. Data were compared to risk-based and regulatory screening criteria to determine whether the property could be approved for unrestricted residential or commercial/industrial use. The following items summarize the conclusions presented in the SASE report:

Soil

- Various SVOCs (primarily PAHs) and inorganic constituents (arsenic, lead, and beryllium) were detected in soil samples at concentrations exceeding the RIDEM Residential Direct Exposure Criteria or EPA Region 9 Residential PRGs. The PAHs were detected in soil at the original Creosote Dip Tank Area (located in the northwestern portion of the Phase I RI Stage I area). The inorganics were detected in 4 samples (2 located in the asphalt patch area, and 2 in the northwestern portion of the Phase I RI Stage I area).

- Only 1 constituent [benzo(a)pyrene – maximum concentration of 2,700 µg/kg] was detected in soil samples at concentrations exceeding the RIDEM Industrial/Commercial Direct Exposure Criteria or EPA Region 9 Industrial PRGs. The elevated concentrations of benzo(a)pyrene were detected at two locations within the original Creosote Dip Tank Area.

- Three constituents were detected in soil samples at concentrations exceeding the RIDEM GB soil screening level (SSL) Leachability Criteria or SSL DAF-20 criteria. This included benzo(a)anthracene (2,700 J µg/kg) and acetone (75,000 J µg/kg) in the Creosote Dip Tank Area, and antimony (6.4 J mg/kg) in the asphalt patch area.

- Analytical results for soil samples collected at test pit or soil boring locations containing solid waste-type debris were comparable to analytical results for soil samples collected from other study area locations. Consequently, the debris does not appear to have significantly impacted the soil.

Groundwater

- TCE was the only 1 VOC (1 location only) detected in the deep groundwater at concentrations exceeding the RIDEM GB Groundwater Objective. The sample containing the TCE was collected in the vicinity of the asphalt patch area.

- Five of the 8 groundwater sampling locations included within the Phase II EBS Follow On Addendum II investigation contained TCE and/or VC at concentrations exceeding the federal MCL (5 µg/L). Concentrations of both TCE and VC were highest (570 J and 10 µg/L, respectively) within the paved area suspected to be the location of the former FFTA. Given the variations in the elevations at which groundwater samples were collected, however, the SASE report did not delineate the shape or extent of the area impacted by CVOC.

Seep

- Lead, dieldrin, endrin, heptachlor epoxide, and phenanthrene were detected in the seep sample collected east of Building E-107 at concentrations above Marine Chronic AWQC. Except for phenanthrene, the concentrations were higher in the seep sample than in the sample from the upgradient groundwater location. Therefore, the SASE report concluded that the constituents detected in the seep sample may be from a source other than Study Area 16 groundwater. Based on the Draft Final Marine Ecological Risk Assessment (EA, February 1996) for Allen Harbor, potential offsite sources may exist including the two marinas and storm-water outfalls from nearby parking lots.

Und rground Storage Tank Area/Septic Tanks

- In the former UST area west and south of Building E-107, an extensive program of excavation in the areas of detected magnetic anomalies uncovered no evidence of remaining USTs.

- The two steel pontoon tanks adjacent to Building E-107 were cleaned and removed. TPH-impacted soil surrounding the pontoon tanks was also removed. A total of 274 tons of soil was removed during excavation activities and the two pontoon tanks were sent offsite for metal recycling. Final confirmatory samples in this area were below RIDEM Industrial Direct Exposure Criteria. Closure reports have been finalized for the UST area and the pontoon tanks (FWENC, May1998).

Based on the findings of the Final SASE (EA, December 1999), an RI focused on groundwater was recommended for Site16 to address the following objectives:

- The characterization of the hydrogeology (stratigraphy and groundwater flow conditions) at Site 16.
- The further evaluation of the horizontal and vertical extent of the CVOC contamination in groundwater.
- The identification of sources of CVOC contamination in groundwater.
- The evaluation risk to human health from site constituents.

2.7 PHASE I REMEDIAL INVESTIGATION (DECEMBER 1999 THROUGH MARCH 2001)

The Phase I RI for Site 16 was performed in accordance with the Final Work Plan (EA, March 2000) and Work Plan Addendum (EA, November 2000). The objectives of the Phase I RI of Site 16 were to provide:

- An assessment of potential contaminant source areas impacting the site.
- An assessment of the nature and extent of soil contamination at the site.
- An assessment of the nature and extent of groundwater contamination at the site.
- A screening level ecological risk assessment (SLERA) (EA, July 2004).
- A human health risk assessment (HHRA) (EA, July 2004).

Field work for the Phase I RI was completed between December 1999 and March 2001. The final RI report was issued in August, 2004.

2.7.1 Potential Contaminant Source Areas Investigated

The Site 16 Phase I RI area included the six EBS Review Items (potential sources for contamination) previously described. Additional potential source areas investigated during the Phase I RI include the old railroad spur area south and east of Former Building 41, and historical Navy activity in Building E-319.

2.7.2 Phase I RI Field Investigation

As detailed in Table 2-1, the following investigation activities were completed during Stage I of the Phase I RI investigation:

- Subsurface screening for VOC contamination at 28 locations (including 3 locations in the vicinity of Building E-107) using a membrane interface probe (MIP). Screening-level groundwater samples were collected from 15 MIP locations using push-probes.

- A surface geophysical survey was conducted in the Stage I area of investigation using seismic refraction profiling.

- 14 groundwater monitoring wells (7 shallow and 7 deep) were installed. Soil samples were also collected from the screened interval of each well as the monitoring well was installed.

- Surface and subsurface soil samples were collected from eight soil boring locations.

These investigation activities were completed primarily in the vicinity of EBS Review Item 28.

The investigation activities conducted during Stage II of the Phase I RI were based on the results of the Stage I activities and are also detailed in Table 2-1:

- Subsurface screening for VOC contamination at 31 locations using a MIP. The areas investigated were west of Westcott Road, east of Allens Harbor Road, and south of Davisville Road. Screening-level groundwater samples were collected from 15 MIP locations using push-probes.

- A surface geophysical survey was conducted in the Stage II area of investigation using seismic refraction profiling. Geophysical logging of the open borehole portion of the five bedrock wells was conducted.

- Installation of two shallow, 22 deep, and five bedrock groundwater monitoring wells. The shallow wells installed were replacement wells for Stage I monitoring wells which were dry. Soil samples were also collected from the screened interval of each of five wells as the monitoring well was installed. Groundwater samples were collected from all Phase I RI monitoring wells.

- Surface and subsurface soil samples were collected from one soil boring location advanced southeast of former Building 41.

- Collection and analysis of two seep and two sediment samples at the Allen Harbor shoreline.

- Collection and analysis of 1 water and 1 sediment sample at the drainage outfall pipe located on the northeast corner of the site near Allen Harbor.

A summary of the results of the Phase I RI *as presented in the EA Phase I RI report* (EA, August 2004) is provided in Table 2-3.

2.8 PHASE II REMEDIAL INVESTIGATION (FEBRUARY THROUGH DECEMBER 2002)

This Phase II RI for Site 16 was performed in accordance with the Work Plan Addendum No. 02 (EA, February 2002) and the Final QAPP (EA, November 2002). The objectives of the Phase II RI of Site 16 were to provide:

- Additional characterization of the CVOC potential source areas (former Building 41, old railroad spur, and EBS Review Item No. 28 areas).
- Assessment of the potential for the Building E-319 and former PR-58 Nike Site to be contributing source areas for the detected CVOC at Site 16.
- Additional assessment of the extent of the dissolved CVOC plume in deep groundwater.
- Assessment of the viability of subsurface conditions to support natural biodegradation of the CVOC plume to support the feasibility study for this site in addressing potential alternatives to remedy the CVOC source area and for selection of appropriate site long-term monitoring components and institutional controls.

Field work for the Phase II RI took place between February 2002 and December 2002. The draft Phase II RI report was issued in June, 2003.

2.8.1 Potential Contaminant Source Areas

The following potential source areas and EBS Review Items (potential sources for contamination) previously described were investigated during the Phase II RI:

- **EBS Review Item 28** – This area was previously used for purposes of training construction equipment operators. The area includes the Creosote Dip Tank Area and the suspected FFTA.
- **EBS Review Item 29** – The Former Building 41 area located to the south of EBS Review Item 28.
- **EBS Review Item 60** - Building E-107 Septic Tanks.
- **EBS Review Item 81** - Former Building 41 Septic Tanks.
- **EBS Review Item 85** - Former UST Area.

- **EBS Review Item 86** - Building E-107 Floor Drains

- **Old Railroad Spur Area** – Located south of former Building 41

- **Building E-319** – The preservation and packaging activities were reportedly moved to this area when such operations ended at former Building 41 in 1953.

- **Former PR-58 Nike Site** – The Site 16 investigation area was expanded west to the Marine Road area to assess the potential for CVOC impacts from the upgradient areas of the Navy's Site 03 and the USACE former Nike PR-58 Site, a FUD site, located west of the Navy's Site 03 area.

2.8.2 Phase II RI Field Investigation

As detailed in Table 2-1, the following investigation activities were completed during the Phase II RI investigation:

- Three soil borings were advanced within the former Building 41 to investigate the possible sources of TCE detected in the groundwater at the northeastern corner of the former building. Twelve relatively shallow subsurface soil samples were collected.

- Sixteen shallow overburden, 28 intermediate overburden, 23 deep overburden, 8 shallow bedrock, and 3 deep bedrock monitoring wells were installed during the Phase II RI. Groundwater samples were collected from all Site 16 groundwater monitoring wells (Phase I RI wells and Phase II RI wells) during the Phase II RI.

- A seismic refraction survey consisting of 20,700 linear feet of profiling was completed.

- Slug testing was conducted for the 64 monitoring wells installed in the overburden.

- Water level measurements were collected from all 117 Site 16 monitoring wells and 75 select wells in adjacent areas.

- Geophysical logging was completed for the open rock portions of the monitoring wells completed in the approximately upper 25 feet of the competent bedrock.

- The water level of Phase II RI wells located relatively close to Allen Harbor was monitored to assess the impact of the harbor tides on groundwater levels beneath Site 16.

A summary of the results of the Phase II RI *as presented in the Draft EA Phase II RI report* (EA, June 2003) is provided in Table 2-3.

2.8.3 Recommendations of the Draft Phase II RI Report

Based on the results of the Phase II RI, the following recommendations were provided in the Draft Phase II RI Report:

- Additional sampling and analysis of soil to include in a Phase II ecological risk assessment and Phase II human health risk assessment of Site 16.
- Installation of an intermediate and deep monitoring well pair about 200 ft east of MW16-39D to assess the eastern extent of the TCE plume.
- Installation of two monitoring wells in the shallow bedrock zone adjacent to MW16-01S/D and MW16-03S/D to assess the western and northwestern extent of the TCE plume in the upper bedrock groundwater zone.
- Installation of a deep overburden and shallow bedrock well pair approximately 250 ft east of MW16-02R to assess the eastern extent of the TCE plume in the deep overburden and upper bedrock groundwater zones.
- Installation of two deeper rock well (R2) adjacent to MW16-05R and MW16-44R to assess the vertical extent of the TCE plume in the bedrock groundwater zone.
- Sampling and analysis for TCL VOC of the recommended new monitoring wells.

2.9 PHASE II SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT OF IR PROGRAM SITE 16 (MARCH 2004)

The Navy initiated this investigation to collect additional sediment data to characterize potential ecological risks for the area of Allen Harbor adjacent to the Creosote Dip Tank area at Site 16. The investigation also provided information on the influence of other possible non-Navy contaminant sources, which exist in close proximity to the site. In addition to collecting 51 surface sediment samples (0 to 6 – 12 inches deep depending on nature of sediment) immediately adjacent to the site, sediment samples were collected from three local reference stations to provide an indication of background levels, and six soil samples and one sediment sample were collected from potential Site 16 source areas and submitted for chemical

analysis and forensic analysis. Two three foot long core samples were also collected. Field work for the investigation was completed in March 2004. All data collected are presented and evaluated in the Phase II SLERA for IR Program Site 16 (EA, November 2004). The following narrative summarizes the major conclusions presented in the Phase II SLERA.

The reference area sediments sampled for this study were dissimilar from Allen Harbor sediments adjacent to Site 16. Concentrations of all classes of chemicals were found to be higher in Allen Harbor compared to the reference areas; however, Allen harbor has restricted flow with Narragansett Bay and is intensively used when compared to the reference areas. The forensic analysis indicate that the PAH profile for the sediments of Allen Harbor is similar to the profile noted in sediments from reference areas.

Concentrations of metals in Allen Harbor sediment adjacent to Site 16 were fairly homogenous. The spatial distribution of metals concentrations appears to be random, suggesting that that Site 16 has not contributed measurable quantities of metals contamination to Allen Harbor sediments.

There are many potential sources of PAHs to the sediments along the Allen Harbor Shoreline, including boat traffic, storm water runoff, vehicular emissions, and other ubiquitous sources of PAHs that could account for the sporadic, random detection of metals in sediments along the shoreline.

Advanced forensics chemical analyses (PAH/hydrocarbon source fingerprinting) were performed on sediment samples collected from Allen Harbor, selected Site 16 hydrocarbon source areas, reference areas in Narragansett Bay, and forensic reference materials representative of fire training fuels. The following items summarize the result of the analysis:

- The distillate petroleum PAH signatures (primarily petrogenic 2- and 3-ring PAHs) indicate that the origin of PAHs in Allen Harbor sediments was not attributable to the middle distillate releases for Site 16 or the marina.

- The hydrocarbon signatures of creosote and heavy residual petroleum in soils from the former creosote dipping tank and pole drying/storage areas at Site 16 were not observed in Allen Harbor sediments.

- Some hydrocarbon impacts to sediments arising from the drainage of Allen's Harbor Road have been demonstrated. Sediment samples collected near drains from this road (AH-49 and AH-28) exhibited elevated PAHs. The heavy residual petroleum in sediments from the storm drain associated with Allen's Harbor Road (Source 4-1) matched that found in the outfall (AH-49) and neighboring (AH-28) sediments. The source of this heavy residual petroleum was attributed to typical components of

urban runoff (e.g., abraded petroleum asphalt and motor oils). Although not observed in the storm drain sample, low levels of diesel range hydrocarbons in AH-28 and AH-49 were consistent with runoff from streets and parking lots.

- Two Allen Harbor sediment samples (AH-03 and AH-29) collected adjacent to marina dock pilings in Allen Harbor contained refined tar consistent with creosote. It is likely that the creosote leached from the marina dock pilings.

As detailed in the Phase II SLERA, thirteen metals, PAHs (with the exception of naphthalene), PCBs, and ten pesticides were identified as chemicals of potential concern (COPCs) for sediments in Allen Harbor. VOCs, the primary Site 16 contaminants of concern, were not identified as COPCs. The SLERA concluded that, based on the Step 3a food web analysis, risks to mammals (raccoon) and the avian species (herring gull) were found to be acceptable. Simultaneously extracted metals/acid volatile sulfide (SEM/AVS) ratios were all less than 1.0, indicating that divalent metals would not be bioavailable to benthic invertebrates or upper trophic receptors. Only two chemicals had Effects Range-Medium (ERM) quotients that exceeded 1 (phenanthrene at 1.22 and gamma-chlordane at 1.02). The average ERM quotient for Allen Harbor was 0.6. These sediments can be classified as "medium-low priority", indicating that there is a small potential of risk to benthic invertebrates from chemicals such as PAHs and pesticides.

In summary, the data evaluated in the Phase II SLERA indicated that the Allen Harbor sediments collected adjacent to Site 16 exhibited localized PAH impacts from dock pilings and storm water runoff. The Phase II SLERA concluded that there is no strong evidence that Site 16 source areas contributed significant amounts of chemicals to Allen Harbor sediments. Chemical concentrations in the harbor sediments are relatively homogenous, indicating the absence of a point contaminant source, yet at higher concentrations than the reference areas because of restricted flow into and out of the harbor. Risks to avian and mammalian receptors were acceptable. Benthic invertebrates were found to have a slight potential of risk from exposure to PAHs and pesticides. It should be noted that few sediments were collected at locations beyond the immediate dock area of Allen Harbor. No surface water samples were collected during the Phase II SLERA field investigation.

2.10 SUPPLEMENTAL PHASE II HYDROGEOLOGIC INVESTIGATION (FALL 2004)

The Supplemental Phase II Hydrogeological Investigation was performed in accordance with the Final Addendum to the Quality Assurance Project Plan for the Supplemental Phase II Hydrogeological Investigation for IR Site Program Site 16 (EA, April 2004). The Supplemental Phase II Hydrogeologic Investigation was conducted, in part, to implement the recommendations of the Phase II RI. The objectives of the Supplemental Phase II Investigation were:

- Assessment of the western and northwestern hydrogeology and the extent of CVOCs in the upper bedrock zone.

- Assessment of the eastern hydrogeology and the extent of CVOCs in the intermediate, deep overburden, and upper bedrock zones.

- Assessment of the hydrogeology and vertical extent of the CVOCs in the deeper bedrock groundwater zone beneath the northeastern portion of the main CVOC plume.

- Assessment of the hydrogeology and vertical extent of CVOCs in the vicinity of a potential release source area at the previous MIP16-24 location (described in the Final Phase I RI).

- Additional assessment of the groundwater flow direction and extent of the CVOCs within the Site 16 investigation area.

- Additional assessment of the bedrock surface in the Site 16 investigation area.

- Additional assessment of potential soils contamination areas identified during the Phase II RI field investigation. (Areas were targeted primarily as a result of elevated FID/PID readings.)

The scope of work completed to date includes the following:

- The installation of 19 new groundwater monitoring wells in the Site 16 area of investigation: one shallow overburden, nine intermediate overburden (I1 and I2 at MW16-58), four deep overburden, four shallow bedrock, and one deep bedrock. The monitoring wells installed are listed in Table 2-2; locations are displayed on Figure 2-1.

- The advancement of soil borings at seven locations to further investigate potential soil contamination areas identified during the RI field investigations. As detailed on Table 2-1, all samples were collected from the relatively shallow subsurface soils zone (i.e., at depths of 25 feet bgs or less). The subsurface soil samples were analyzed for TCL VOCs (EPA SW 846 8260B), TCL SVOCs (EPA SW 846 8270), oil and grease (9071B), TPH-DRO (8015B/3550B), TCL PAHs (EPA SW 846 8310), and total organic carbon (9060). The soil borings installed during this investigation are listed in Table 2-1; locations are displayed on Figure 2-2.

- Four (4) 250-feet seismic refraction lines were completed to aid in the assessment of the eastward extent of the interpreted elongate depression in the competent bedrock surface oriented along and beneath the north side of Davisville road northwest of the former Building 41 area, plus assessment of the potential intersection area of that interpreted depression with another interpreted lesser depression trending approximately east-west beneath the former Building 41. The locations of the four seismic refraction lines and their interpretated results are provided in Appendix D.

- Borehole geophysical logging of the 5 new bedrock wells (four shallow bedrock 'R' wells being MW16-01R, MW16-03R, MW16-56R and MW16-58R; one deep bedrock 'R2" well MW16-05R2) was completed to identify total number of fractures, intervals where 'open' fractures occur, and determine if groundwater is flowing within these zones. The borehole geophysical logging results are provided in Appendix D.

- Slug testing was performed at all of the overburden wells (shallow 'S', intermediate 'I', and deep 'D' overburden zones) in order to provide additional hydraulic conductivity data. Slug test data is discussed in Section 3.7.5.4 and slug test results are presented in Appendix D.

- The collection of groundwater samples from all wells installed per the QAPP and select groundwater monitoring wells installed per the HRC Pilot Study (discussed below), and the analysis of those samples for TCL VOCs [EPA SW 846 8260B and 8260B selective ion monitoring (SIM)], and natural attenuation parameters [alkalinity (EPA 310.1), sulfate (EPA 300), total chloride (EPA 300), nitrate (EPA 300), nitrite (EPA 300), ammonia (EPA 350.2), dissolved organic and inorganic carbon (EPA 415.2), hydrogen sulfide (EPA 376.2), methane (USEPA SW 846 3810), and ethane/ethane (EPA SW 846 3810)] and TAL inorganics (EPA SW 846 6010B).

The rationale for specific monitoring well and soil boring locations was provided in Table 2-1 of the QAPP (incorporated into Appendix A of this report). The field work for this investigation took place September through November 2004. All analytical data collected during the Supplemental Phase II Hydrogeological Investigation were validated in accordance with EPA Region I Laboratory Data Validation, Functional Guidelines for Evaluating Organic and Inorganic Analyses modified to fit the non-CLP methods (e.g., SW 846 methods), using a Tier II validation approach. Such modification of the Guidelines included, for example, comparing the analytical results to the quality control acceptance limits and calibration requirements of the SW846 analytical methods which are different from the CLP analytical methods for which the EPA validation guidelines were developed. The Tier II validation was performed in accordance with the most recent EPA Region I data validation guidelines. The results of this investigation are presented and discussed in this Sections 3 and 4 of this report.

The staff gauge installation recommended in the QAPP for: 1) the pond southwest of the intersection of Marine and Davisville Roads, and 2) the storm water detection pond located between Davisville Road and the location of former Building 41 has not been completed due to site access problems.

The comprehensive round of water level gauging as described in the QAPP was performed; however, additional wells were included as described in the next section.

2.11 HRC INJECTION PILOT STUDY (FALL 2004)

The components of the HRC Injection Pilot Study conducted to date were performed in accordance with the Final Quality Assurance Project Plan for the HRC Injection Pilot Study for IR Site Program Site 16 (EA, July 2004). The stated purpose of the HRC Injection Pilot Study (the Pilot Study) was to test the general feasibility and overall applicability of in situ HRC® injection within a pilot scale field test located near the southwestern (upgradient) extent of the greater than 1000 ug/L portion of the detected chlorinated VOC plume in the deep overburden (vicinity of former Building 41) to enhance biodegradation of the chlorinated VOCs. The scope of work completed to date includes the following:

- The installation of sixty one monitoring wells (49 groundwater monitoring wells and 12 deep HRC injection wells) in two stages. Stage one of the study consisted of the installation of 25 monitoring wells, which are also used for groundwater monitoring purposes as detailed in the QAPP for the Supplemental Phase II Hydrogeologic Investigation described in the preceding section. Stage II consisted of the installation of an additional 24 monitoring wells and 12 deep HRC injection wells. The monitoring and injection wells installed during the HRC Injection Pilot Study are listed in Table 2-1; locations are displayed on Figure 2-1.

- The collection of subsurface soil samples during the installation of the 12 deep HRC injection wells, one intermediate-depth monitoring well, and 14 deep monitoring wells. As detailed on Table 2-1, all subsurface soil samples were collected at a depth of 40 feet bgs or greater. The subsurface soil samples were analyzed for TCL VOCs (EPA SW 846 8260B) and total organic carbon (EPA 415.1).

- Borehole geophysical logging of the 11 new bedrock wells (all shallow bedrock 'R' wells, being MW16-14R, MW16-32R, MW16-59R, MW16-60R, MW16-65R, MW16-66R, MW16-67R, MW16-68R, MW16-69R, MW16-70R, MW16-71R) was completed to identify total number of fractures, intervals where 'open' fractures occur, and determine if groundwater is flowing within these zones. The borehole geophysical logging results are provided in Appendix D.

- Slug testing was performed at all of the overburden wells (shallow 'S', intermediate 'I', and deep 'D' overburden zones) in order to provide additional hydraulic conductivity data. Slug test data is discussed in Section 3.7.5.4 and slug test results are presented in Appendix D.

- Water level measurements from 50 established monitoring wells at Site 16 prior to implantation of the drilling portion of the pilot study as agreed during the BCT Meeting on March 30, 2004. This work was completed from April 7 to 9 2004 following a significant rain event on March 31 and April 1, 2004 (approximately 3.4 inches of rain was measured at the Providence T F Green State AR station). This water level data is provided on Table 3-3.

- The comprehensive synoptic round of water level gauging described in the QAPP was performed; however, additional wells were included. One comprehensive synoptic round of water levels was collected and included all Site 16 wells (including both the recently installed Supplemental Phase II wells and the wells installed as part of the HRC Injection Pilot Study) and wells to the west (part of Site 03/Nike area). Water level gauging occurred from November 9 through 15, 2004 with water levels being recorded at 266 well locations (198 wells at Site 16).

- The collection of groundwater samples from all of the HRC injection wells and select groundwater monitoring wells installed and the analysis of those samples for TCL VOCs (EPA SW 846 8260B) and natural attenuation parameters [alkalinity (EPA 310.1), sulfate (EPA 300), total chloride (EPA 300), nitrate (EPA 300), nitrite (EPA 300), iron (EPA SW 846 6010B), manganese (EPA SW 846 6010B), ammonia (EPA 350.2), dissolved organic carbon (EPA 415.2), hydrogen sulfide (EPA 376.2), methane (USEPA SW 846 3810), and ethane/ethane (EPA SW 846 3810)].

The field work for the Pilot Study occurred September through November 2004. All analytical data collected for the Pilot Study were validated as described in the preceding section. The results of this investigation are presented and discussed in this Sections 3 and 4 of this report. However, the actual injection of the HRC® compound and the follow-up groundwater monitoring described in the HRC Pilot Study QAPP has not yet taken place.

TABLE 2-1

SUMMARY OF ENVIRONMENTAL INVESTIGATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Area of Investigation	Description/Scope of Work	Sample Locations	Overview of Results
Phase II Environmental Baseline Survey, Field Program - February through June 1996, Final Report - February 1998			
EBS Review Item No. 28 Creosote Dip Tank Area	Four soil borings collected in the four corners of the former Phase IV excavation. Samples were collected at depths of 0 - 2 ft and 2 - 4 ft.	28-SB-01A 28-SB-01B 28-SB-01C 28-SB-01D	Low levels of PAHs were detected. BaP in one sample (1.4 mg/kg) exceeded the RIDEM Industrial criteria (0.8 mg/kg); all others were less than criteria.
EBS Review Item No. 60 Septic Tanks, Building E-107	Ground penetrating radar (GPR) was used to locate underground tanks.		Two underground tanks were located on the northeastern and southeastern side of Building E-107.
EBS Review Item No. 81 Septic Tanks, Building 41	Sludge in tanks was sampled.		Among other constituents, the combined TPH diesel and hydraulic range was detected at 3,500 J mg/kg. Tsanks were cleaned and backfilled to result in a need for no further action.
EBS Review Item No. 85 Tank 68, Former No. 2 Fuel Oil UST south of Building E-107	After tank removal two soil borings in area yielded elevated total VOC readings and minimal TPH concentrations were recorded.	EBS-85-SB-01 EBS-85-SB-02	Acetone and toluene were detected at concentrations which were less than the RIDEM residential and industrial direct exposure criteria.
EBS Review Item No. 86 Floor Drains, Building E-107	Test pits were excavated outside of the building to determine if there was a connection between the floor drains and the outfall in Allen Harbor.		No connection between the floor drains and the outfall were found.
Phase II Environmental Baseline Survey Follow-On Investigation, Field Program - June through August 1997, Final Report - March 1998			
EBS Review Item No. 28 Creosote Dip Tank Area	Eleven soil borings were advanced in the area identified as the location of the former dip tanks. Two samples were collected from each boring, one at 0 - 2 ft bgs and one at the interval with the highest headspace PID reading. One surface soil sample was also collected in this area. Three test pits were excavated although no samples were collected from the excavated areas.	28-SB-01, 28-SB-02, 28-SB-03, 28-SB-04, 28-SB-05, 28-SB-06, 28-SB-11, 28-SB-12, 28-SB-13, 28-SB-15, 28-SB-16 28-SS-01	NFA was recommended for the site based on the sampling results. However, the Navy recommended the collection of additional samples from test pit locations where debris was encountered, as well as shallow and deep groundwater samples. Investigation of these areas continued through the Phase II RI.
Former Fire Fighting Training Area	Five soil borings were advanced in this area. Two samples were collected from each boring, one at 0 - 2 ft and one at the interval with the highest headspace PID reading. One shallow groundwater sample was collected adjacent to 28-SB-14.	28-SB-07, 28-SB-08, 28-SB-09, 28-SB-10, 28-SB-14 28-GW-01A	NFA was recommended for the site based on the sampling results. However, the Navy recommended the collection of samples from test pit locations where debris was encountered as well additional shallow and deep groundwater samples during the Phase II EBS Follow-On Addendum II Investigation to further investigate the groundwater quality at Site 16. Investigation of the area continued through the Pnase II RI.
Underground Storage Tank Investigation (west of and at southeast corner of Building E-107)	A magnetometer survey was conducted in two areas where USTs were reportedly located. Areas where anomalies were detected were investigated with nine test pits. Three soil samples were collected.	EBS28-P03 (Excavated), EBS28-P45 (Excavated), EBS28-P40-2 (Excavated)	No USTs were found.

TABLE 2-1

SUMMARY OF ENVIRONMENTAL INVESTIGATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Area of Investigation	Description/Scope of Work	Sample Locations	Overview of Results
EBS Review Item No. 60 Septic Tanks, Building E-107	TPH impacted soil and two steel pontoon tanks were removed. Confirmational samples were collected. One soil sample was collected from the leach field located northwest of Building E-107.	EBS60-01	A total of 274 tons of TPH-impacted soil was removed during excavation activities and the two pontoon tanks were sent offsite for metal recycling. Confirmatory samples were collected to verifiy that residual concentrations were below RIDEM Industrial/Commercial Direct Exposure Criteria
Phase II Environmental Baseline Survey Follow-On Addendum Investigations - Field Program - Winter 1997 - 1998, Final Report - May, 1998			
EBS Review Item No. 81 Septic Tanks, Building 41	Samples were collected to determine whether unacceptable risks could be present from exposure of various receptors to soil and groundwater. Two soil samples were collected adjacent to the east side of the tanks at a depth of 9 to 11 ft bgs. Shallow groundwater samples were also collected from same locations at a depth of 17 to 19 feet.	EBS81-RSPT-01S, EBS81-RSPT-02S EBS81-RSPT-01W, EBS81-RSPT-02W	VOCs were not detected in groundwater. Bis(2-ethylhexyl)phthalate was the only SVOC detected. The detected concentration was below the RIDEM GB groundwater objectives. All constituent concentrations in surface soil samples were less than RIDEM's Industrial/Commercial Direct Exposure Criteria and the RIDEM Class GB Leachability Criteria. TPH concentrations in five surface soil samples exceeded the respective RIDEM Residential Direct Soil Exposure Criterion. No contaminant source remains.
Site 16	The objectives were to further evaluate groundwater quality beneath the former Creosote Dip Tank Area, the former FFTA, the septic tank formerly located at the southeast corner of Building E-107, and the earth ramp structure southeast of Building E-107; and to evaluate subsurface soil contamination beneath debris observed in test pits in the Creosote Dip Tank Area during the Phase II EBS Follow-On Investigation; and to evaluate the quality of water discharging from a seep near Building E-107 into Allen Harbor. These objectives were addressed by collecting 1 surface soil sample, 4 subsurface soil samples, 16 groundwater samples (8 locations), and 1 sample of a seep along the shore of Allen Harbor.	Surface Soil: 28-SS-21 Subsurface Soil: 28-SB-17, 28-SB-18, 28-SB-19, 28-SB-20 Groundwater: Creosote Dip Tank Area 28-GW-01, 28-GW-02, 28-GW-03 Former FFTA 28-GW-04, 28-GW-05 South of Building E-107 28-GW-06 Allen Harbor Shoreline 28-GW-07 Earth Ramp Structure 28-GW-08 Seep: 28-SP-01	SVOCs and inorganics were detected in the one surface soil sample. Arsenic was the only chemical detected at a concentration which exceeded the RIDEM Residential Direct Exposure Criteria. Acetone, inorganics, and TPH were detected in the subsurface soil samples. Concentrations of arsenic, beryllium, and lead exceeded the RIDEM Residential Direct Contact Exposure Criteria. VOCs, SVOCs, pesticides, and inorganics were detected in groundwater samples. TCE exceeded the RIDEM GB groundwater criteria in one sample. TCE and vinyl chloride exceeded MCLs in 4 of 16 samples and 5 of 16 samples, respectively. SVOCS, pesticides, and inorganics were detected in the seep sample. Lead, dieldrin, endrin, heptachlor epoxide, and phenanthrene exceeded the Marine AWQC.

TABLE 2-1

SUMMARY OF ENVIRONMENTAL INVESTIGATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Area of Investigation	Description/Scope of Work	Sample Locations	Overview of Results
Phase I Remedial Investigation Report of IR Program Site 16 - Stage I, Field Program - December 1999 through March 2001, Final Phase I RI Report - August 2004			
Site 16	Seismic Refraction Profiling was used to investigate the upper bedrock surface and to assist in the placement of monitoring wells.		Please see summary presented in Table 2-3.
	MIP Screening was conducted at 28 of 30 planned locations to assess the relative concentrations of VOCs in soil beneath the site. Groundwater samples were collected from 16 locations/depth intervals to provide quantification of the MIP results in units of concentration that are comparable to numerical criteria.		Please see summary presented in Table 2-3.
	14 monitoring wells, as 7 pairs of shallow and deeps wells, were installed to further characterize the groundwater. Also one soil sample was collected from the shallow wells.	MW16-01S/D, MW16-02S/D, MW16-03S/D, MW16-04S/D, MW16-05S/D, MW16-06S/D, MW16-07S/D	Please see summary presented in Table 2-3.
	At eight soil boirng locations, one surface soil (0 - 2 ft) and one subsurface soil sample (2 foot interval just above water table) were collected. Samples were collect from previous sample locations at the Former Creosote Dip Area and FFTA and analyzed for dioxin/furans. Also samples from borings SB16-25 through SB16-28 were analyzed for dioxins/furans.	SB16-21, SB16-22, SB16-23, SB16-24, SB16-25, SB16-26, SB16-27, SB16-28	Please see summary presented in Table 2-3.

TABLE 2-1

SUMMARY OF ENVIRONMENTAL INVESTIGATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Area of Investigation	Description/Scope of Work	Sample Locations	Overview of Results
Phase I Remedial Investigation Report of IR Program Site 16 - Stage II, Field Program - December 1999 through March 2001, Final Phase I RI Report - August 2004			
Site 16	Based on the results of the Stage I sampling the Stage II RI area was extended west, south, and east of the Stage I area.		Please see summary presented in Table 2-3.
	Seismic Refraction Profiling was used to investigate the upper bedrock surface in the Stage II area.		
	MIP Screening was conducted at 31 locations to assess the relative presence of VOCs in soil beneath the Stage II area.		
	22 deep (D) and 5 bedrock (R) monitoring wells were installed along with 1 soil boring. Soil samples were also collected from 5 deep monitoring wells. Two shallow monitoring wells were installed to replace MW16-05S and MW16-01S (originally installed during Stage 1), which were dry and subsequently abandoned. All Site 16 monitoring wells were sampled during the Stage II investigation. Two seep/sediment samples were collected along the shore of Allen Harbor. One seep/sediment sample was collected beneath the drainage outfall pipe located on the northeast corner of the site near Allen Harbor. A preliminary tidal study was performed on 15 monitoring wells located on the northern section of the site in close proximity to the Allen Harbor Shoreline to determine if the water level in these wells was effected by tides. Geophysical logging was conducted on the open rock portions of the monitoring wells completed in the shallow bedrock (R) zone.	Groundwater MW16-08D, MW16-09D, MW16-10D/R, MW16-11D, MW16-12D, MW16-13D, MW16-14D, MW16-15D/R, MW16-16D, MW16-17D, MW16-18D, MW16-19D, MW16-20D, MW16-21D, MW16-22D, MW16-23D, MW16-24D, MW16-25D/R, MW16-26D, MW16-27D/R, MW16-28D/R, MW16-29D Soil SB16-29 (20-22 ft), SB16-29 (32-34 ft), MW16-13D, MW16-14D, MW16-15R, MW16-22D MW16-23D Seeps SEEP16-01, SEEP16-02 OPW16-01	

TABLE 2-1

SUMMARY OF ENVIRONMENTAL INVESTIGATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Area of Investigation	Description/Scope of Work	Sample Locations	Overview of Results
Phase II Remedial Investigation Report of IR Program Site 16, Field Program - February through December 2002, Draft Phase II RI Report - June 2003			
Study Area 16	Surface geophysical logging and seismic refraction profiling. 16 shallow (S), 28 intermediate (I), 23 deep overburden (D), 8 shallow bedrock (R), and 3 deep bedrock (R2) monitoring wells were installed. 3 of the deep wells were installed within former Building 41 area and 12 soil samples were collected during installation of these wells. Slug testing of the 64 monitoring wells screened in the overburden was conducted. Sampling of all Site 16 Phase I and II RI monitoring wells for VOCs and assessment of the viability of the subsurface conditions for natural biodegradation of the CVOC. Two rounds of water level measurements from 117 monitoring wells at Site 16, plus 75 monitoring wells in adjacent areas.	Groundwater MW16-02I/R2, MW16-04I, MW16-05I/R, MW16-06R MW16-11S, MW16-13I, MW16-14I, MW16-15R2 MW16-16I, MW16-17S/I/R, MW16-18I, MW16-19I, MW16-20I, MW16-21I, MW16-22I, MW16-24I, MW16-25I, MW16-30D, MW16-31D, MW16-32D, MW16-33S/I/D, MW16-34S/I/D, MW16-35S/I/D, MW16-36D/R, MW16-37S/I/D, MW16-38I, MW16-39I/D, MW16-40S, MW16-41S/I/D, MW16-42S/I/D, MW16-43S/I/D, MW16-44S/I/D/R, MW16-45S/I/D, MW16-46S/I/D, MW16-47S/D, MW16-48S/I/D, MW16-49D, MW16-50D, MW16-51D/R, MW16-52D/R, MW16-53S, MW16-54D, MW16-55D/R/R2 Soil SB16-30 (34-36 ft), SB16-30 (44-46 ft), SB16-30 (57-59 ft) SB16-31 (8-10 ft), SB16-31 (14-16 ft), SB16-31 (36-38 ft), SB16-31 (56-58 ft) SB16-32 (10-12 ft), SB16-32 (36-38 ft), SB16-32 (56-58 ft)	Please see summary presented in Table 2-3.

TABLE 2-1

SUMMARY OF ENVIRONMENTAL INVESTIGATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Area of Investigation	Description/Scope of Work	Sample Locations	Overview of Results
Phase II Screening Level Ecological Risk Assessment of IR Program Site 16, Field Work - March 2004, Final Report - November 2004			
Allen Harbor	51 surface sediment samples and 1 core sample were collected from Allen Harbor and 5 surface samples were collected in each of three reference areas. Rapid Sediment Characterization (RSC) screening for selected metals (Cu, Ni, Pb, and Zn) and PAHs were performed on all the collected samples. Based on the RSC results 18 Allen Harbor sediment samples and 9 reference samples were submitted for quantitative analysis and 9 Allen Harbor and 3 reference samples were submitted for advanced chemical analysis to determine the hydrocarbon composition of the samples. Six soil samples and one sediment sample were collected from potential on-site source areas and submitted for chemical and forensic analysis.	Samples Submitted for Quantitative Analysis Sediment: AH-03, AH-06, AH-08, AH-11, AH-51, AH-17, AH-23, AH-26, AH-28, AH-29, AH-32, AH-33, AH-35, AH-40, AH-42, AH-45, AH-47, AH-49, AH-51, REF1-1, REF1-2, REF1-4, REF2-1, REF2-3, REF2-5, REF3-1, REF3-2, REF3-4, Core 1-top, Core 1-bot, SOURCE4-1 Soil: SOURCE1-1, SOURCE1-2, SOURCE2-1, SOURCE2-2, SOURCE3-1, SOURCE3-2 Samples Submitted for Forensic Analysis: Sediment AH-03, AH-06, AH-17, AH-26, AH-28, AH-29, AH-40, AH-45, AH-49, REF1-4, REF2-1, REF3-2, SOURCE4-1 Soil SOURCE1-1, SOURCE1-2, SOURCE2-1, SOURCE2-2, SOURCE3-1, SOURCE3-2	The Allen Harbor sediment samples exhibited localized PAH impacts from dock pilings and roadway runoff. There was no evidence suggesting that the PAH impacts to Allen Harbor sediments were attributable to historic activities represented by the Site 16 source areas studied. Chemical concentrations in the harbor are homogeneous, but are detected at higher concentrations than the reference areas presumably because of the restricted flow of water into and out of the harbor and higher marine traffic and industrial use in Allen Harbor relative to the reference areas. The Phase II SLERA indicated that risks to the food web were acceptable, and that benthic organisms have a slight potential of risk from exposure to PAHs and pesticides.
Supplemental Phase II Hydrogeologic Investigation/HRC Pilot Study, Field Work - September - November 2004			
Site 16	Supplemement Phase II Hyrdogeologic Investigation Four seismic refraction lines were used to investigate the bedrock surface. 18 additional monitoring wells and seven soil borings were installed. All existing 117 wells plus the new 18 monitoring wells and 12 of the monitoring wells installed during the HRC Pilot test were sampled. 8 soil samples were collected from the 7 soil borings.	Groundwater MW16-01R, MW16-03R, MW16-05R2, MW16-27I, MW16-28I, MW16-40I/D, MW16-49I, MW16-50I, MW16-56I/D/R, MW16-57I/D, MW16-58S/I/D/R, MW16-59I/D/R, Soil SB16-07, SB16-41, SB16-44, SB16-45, SB16-46, MW16-49I, MW16-50I	The results of this investigation are presented and discussed in Sections 3 and 4 of this report.

TABLE 2-1

SUMMARY OF ENVIRONMENTAL INVESTIGATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Area of Investigation	Description/Scope of Work	Sample Locations	Overview of Results
	HRC Pilot Study The stated purpose of the HRC Injection Pilot Study was to test the general feasibility and overall applicability of in situ HRC® injection within a pilot scale field test located near the southwestern (upgradient) extent of the greater than 1000 ug/L portion of the detected chlorinated VOC plume in the deep overburden (vicinity of former Building 41) to enhance biodegradation of the chlorinated VOCs. 61 monitoring wells (49 groundwater monitoring wells and 12 deep HRC injection wells) were installed in two stages. Stage one consisted of the installation of 25 monitoring wells. Stage II consisted of the installation of an additional 24 monitoring wells and 12 deep HRC injection wells. Subsurface soil samples were collected during the installation of the 12 deep HRC injection wells, one intermediate-depth monitoring well, and 14 deep monitoring wells	Groundwater M16-15S, MW16-08S, MW16-12S, MW16-14R, MW16-32R, MW16-59/I/D/R, MW16-60D/R, MW16-61I/D, MW16-62I/D, MW16-63I/D, MW16-64I/D, MW16-65S/I/D/R, MW16-66S/I/D/R, MW16-67S/I/D/R, MW16-68S/I/D/R, MW16-69S/I/D/R, MW16-70S/I/D/R, MW16-71S/I/D/R INJ16-01D, INJ16-02D, INJ16-03D, INJ16-04D, INJ16-05D, INJ16-06D, INJ16-07D, INJ16-08D INJ16-09D, INJ16-10D, INJ16-11D, INJ16-12D Soil INJ16-01D-48-50, INJ16-01D-56-57.4, INJ16-06D-50-52, INJ16-06D-58-60, INJ16-02D-44-46, INJ16-02D-52-54, INJ16-03D-46-48, INJ16-03D-52-54, INJ16-04D-44-46, INJ16-04D-46-48, INJ16-05D-44-46, INJ16-05D-46-48, INJ16-07D-54-56, INJ16-07D-60-62, INJ16-08D-56-56.8, INJ16-08D-62-64, INJ16-09D-54-55.9, INJ16-09D-58-58.4, INJ16-10D-51-53, INJ16-10D-57-59, INJ16-11D-56-58, INJ16-11D-58-60, INJ16-12-D (52'-54'), INJ16-12D (48'-50'),	The field work for the Pilot Study occurred September through November 2004. However, the actual injection of the HRC® compound and the follow-up groundwater monitoring described in the HRC Pilot Study QAPP has not yet taken place. The results of this investigation are presented and discussed in Sections 3 and 4 of this report.

TABLE 2-1

SUMMARY OF ENVIRONMENTAL INVESTIGATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Area of Investigation	Description/Scope of Work	Sample Locations	Overview of Results

AWQC - Ambient Water Quality
BaP - Benzo(a)pyrene
bgs - below ground surface
Cu - Copper
CVOC - Chlorinated volatile organic compounds
EBS - Environmental Baseline Survey
FFTA - Fire Fighting Trainign Area
HRC - Hydrogen Reducing Compound
J - Detected concentrtion is estimated
MIP - membrane Interface probe
NFA - No Further Action
Ni - Nickel
PAHs - Polycyclic Aromatic Hydrocarbons
Pb - lead
PID - Photon Ioniazation Detector
QAPP - Quality Assurance Project Plan
RI - Remedial Investiga8iton
RIDEM - Rhode Island Department of Environmental Management
SLERA - Screening Level Ecological Risk Assessment
SVOC - Semivolatile organic compounds
TCE - Trichloroethene
TPH - Total Petroleum Hydrocarbons
UST - Underground Storage Tanks
VOCs - Volatile orgnaic compounds
Zn - Zinc

TABLE 2-2

SITE 16 MONITORING WELLS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

cluster	Shallow Wells	Intermediate Wells	Deep Wells	Shallow Bedrock Wells	Deep Bedrock Wells
28-GW-01	28-GW-01S (10 - 12)	28-GW-01I (23 - 25)			
28-GW-01A	28-GW-01A				
28-GW-02	28-GW-02S (8 - 10)	28-GW-02I (31 - 33)			
28-GW-03	28-GW-03S (7 - 9)		28-GW-03D (40 - 42)		
28-GW-04	28-GW-04S (7 - 9)	28-GW-04I (42 - 44)			
28-GW-05	28-GW-05S (8 - 10)	28-GW-05I (44 - 46)			
28-GW-06	28-GW-06S (7 - 9)	28-GW-06I (35 - 37)			
28-GW-07	28-GW-07S (6 - 8)	28-GW-07I (27 - 29)			
28-GW-08	28-GW-08S (8 - 10)	28-GW-08I (29 - 31)			
EBS81-01	EBS81-01 (17 - 19)				
EBS81-02	EBS81-02 (17 - 19)				
INJ16-01D			INJ16-01D (47.5 - 57.5)		
INJ16-02D			INJ16-02D (44.5 -55.5)		
INJ16-03D			INJ16-03D (46 - 56)		
INJ16-04D			INJ16-04D (42.5 - 52.5)		
INJ16-05D			INJ16-05D (44 - 54)		
INJ16-06D			INJ16-06D (50.5 - 60.5)		
INJ16-07D			INJ16-07D (51.5 - 61.5)		
INJ16-08D			INJ16-08D (54 - 64)		
INJ16-09D			INJ16-09D (48.5 - 58.5)		
INJ16-10D			INJ16-10D (49.5 - 59.5)		
INJ16-11D			INJ16-11D (50.5 - 60.5)		
INJ16-12D			INJ16-12D (48 - 58)		
MIP16-03	MIP16-03 (16 - 16)		MIP16-03 (39 - 39)		
MIP16-06			MIP16-06 (36 - 36)		
MIP16-07	MIP16-07 (15 - 15)				
MIP16-09		MIP16-09 (31 - 31)			
MIP16-10		MIP16-10 (26 - 26)			
MIP16-12	MIP16-12 (17 - 17)		MIP16-12 (48 - 48)		
MIP16-15	MIP16-15 (17 - 17)				
MIP16-17	MIP16-17 (12 - 12)		MIP16-17 (49 - 49)		
MIP16-22			MIP16-22 (45.5 - 45.5)		
MIP16-24		MIP16-24 (47 - 47)			
MIP16-26			MIP16-26 (58 - 58)		
MIP16-29			MIP16-29 (33 - 33)		
MW16-01	MW16-01S (17.5 - 27.5)		MW16-01D (48.5 - 58.5)	MW16-01R (60 - 85)	
MW16-02	MW16-02S (5 - 15)	MW16-02I (32 - 37)	MW16-02D (56.5 - 66.5)	MW16-02R (70 - 95)	MW16-02R2 (96 - 121)
MW16-03	MW16-03S (3 - 13)		MW16-03D (38.5 - 48.5)	MW16-03R (52 - 77)	
MW16-04	MW16-04S (3 - 13)	MW16-04I (22 - 32)	MW16-04D (43 - 53)		
MW16-05	MW16-05S (8 - 18)	MW16-05I (22 - 36)	MW16-05D (42 - 52)	MW16-05R (66 - 91)	MW16-05R2 (91 - 116)
MW16-06	MW16-06S (7 - 17)		MW16-06D (38.5 - 44.5)	MW16-06R (49 - 74)	
MW16-07	MW16-07S (7 - 17)		MW16-07D (27.5 - 37.5)		
MW16-08	MW16-08S (16 - 26)		MW16-08D (40 - 55)		
MW16-09			MW16-09D (57.02 - 67.02)		
MW16-10			MW16-10D (48.5 - 58.5)	MW16-10R (66 - 91)	
MW16-11	MW16-11S (10 - 20)		MW16-11D (53.5 - 63.5)		
MW16-12	MW16-12S (14.4 - 24.4)		MW16-12D (52 - 62)		
MW16-13		MW16-13I (24 - 34)	MW16-13D (57 - 67)		
MW16-14		MW16-14I (26 - 36)	MW16-14D (52 - 62)	MW16-14R (65 - 90)	
MW16-15	MW16-15S (16 - 26)		MW16-15D (46 - 56)	MW16-15R (60.5 - 86)	MW16-15R2 (86 - 111)
MW16-16		MW16-16I (32 - 42)	MW16-16D (54 - 64)		
MW16-17	MW16-17S (6 - 16)	MW16-17I (28 - 40)	MW16-17D (57 - 67)	MW16-17R (73 - 98)	
MW16-18		MW16-18I (22 - 34)	MW16-18D (42.5 - 52.5)		
MW16-19		MW16-19I (30 - 40)	MW16-19D (45.5 - 54.5)		
MW16-20		MW16-20I (24 - 34)	MW16-20D (39.5 - 49.5)		
MW16-21		MW16-21I (26.5 - 36.5)	MW16-21D (51 - 61)		
MW16-22		MW16-22I (34 - 44)	MW16-22D (52 - 62)		
MW16-23	MW16-23S (14 - 24)		MW16-23D (50 - 65)		
MW16-24		MW16-24I (18 - 28)	MW16-24D (50 - 62)		
MW16-25	MW16-25S (9 - 19)	MW16-25I (32 - 42)	MW16-25D (46 - 58)	MW16-25R (61 - 86)	
MW16-26			MW16-26D (40 - 49)		
MW16-27		MW16-27I (34 - 44)	MW16-27D (54 - 64)	MW16-27R (66.5 - 92)	
MW16-28		MW16-28I (22.5 - 32.5)	MW16-28D (54.5 - 64.5)	MW16-28R (68 - 93)	
MW16-29			MW16-29D (44.5 - 54.5)		
MW16-30			MW16-30D (55 - 62.9)		
MW16-31			MW16-31D (54 - 64)		
MW16-32			MW16-32D (50 - 62)	MW16-32R (68 - 93)	
MW16-33	MW16-33S (6.5 - 16.5)	MW16-33I (34 - 44)	MW16-33D (61 - 71)		
MW16-34	MW16-34S (5 - 15)	MW16-34I (25 - 35)	MW16-34D (44 - 58)		
MW16-35	MW16-35S (6 - 16)	MW16-35I (28 - 38)	MW16-35D (51.5 - 61.5)		
MW16-36			MW16-36D (39.5 - 49.5)	MW16-36R (53.5 - 78.5)	
MW16-37	MW16-37S (7 - 22)	MW16-37I (24 - 38)	MW16-37D (44.7 - 54.7)		

TABLE 2-2

SITE 16 MONITORING WELLS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

cluster	Shallow Wells	Intermediate Wells	Deep Wells	Shallow Bedrock Wells	Deep Bedrock Wells
MW16-38		MW16-38I (29 - 39)			
MW16-39		MW16-39I (45 - 55)	MW16-39D (64 - 74)		
MW16-40	MW16-40S (6 - 22)	MW16-40I (35 - 45)	MW16-40D (54 - 64)		
MW16-41	MW16-41S (7.5 - 17.5)	MW16-41I (19.5 - 29.5)	MW16-41D (51 - 61)		
MW16-42	MW16-42S (5.5 - 15.5)	MW16-42I (20 - 30)	MW16-42D (58 - 68)		
MW16-43	MW16-43S (6 - 21)	MW16-43I (25.5 - 33.5)	MW16-43D (37 - 43)		
MW16-44	MW16-44S (6 - 21)	MW16-44I (23 - 33)	MW16-44D (49.6 - 59.6)	MW16-44R (62 - 87)	
MW16-45	MW16-45S (6 - 21)	MW16-45I (32 - 42)	MW16-45D (48 - 58)		
MW16-46	MW16-46S (6 - 21)	MW16-46I (22 - 32)	MW16-46D (50.5 - 59)		
MW16-47	MW16-47S (4 - 14)		MW16-47D (26.3 - 36.3)		
MW16-48	MW16-48S (4 - 14)	MW16-48I (20 - 30)	MW16-48D (35.4 - 45.4)		
MW16-49		MW16-49I (37 - 47)	MW16-49D (62 - 76)		
MW16-50		MW16-50I (24 - 34)	MW16-50D (78 - 88)		
MW16-51			MW16-51D (65.5 - 75.5)	MW16-51R (78.5 - 103.5)	
MW16-52			MW16-52D (60 - 74)	MW16-52R (93 - 118)	
MW16-53	MW16-53S (4 - 14)				
MW16-54			MW16-54D (64 - 74)		
MW16-55			MW16-55D (90 - 105)	MW16-55R (108 - 133)	MW16-55R2 (133 - 158)
MW16-56		MW16-56I (33 - 43)	MW16-56D (59 - 66)	MW16-56R (69 - 94)	
MW16-57		MW16-57I (43 - 53)	MW16-57D (66.5 - 76..5)		
MW16-58	MW16-58S (6 - 16)	MW16-58I2 (36 - 46)	MW16-58D (51 - 62)	MW16-58R (66 - 91)	
MW16-59	MW16-59S (14 - 24)	MW16-59I (38 - 48)	MW16-59D (64 - 74)	MW16-59R (75 - 100)	
MW16-60			MW16-60D (51 - 61)	MW16-60R (64 - 89)	
MW16-61		MW16-61I (28 - 38)	MW16-61D (44 - 53)		
MW16-62		MW16-62I (27.5 - 37.5)	MW16-62D (47.5 - 57.5)		
MW16-63		MW16-63I (31 - 41)	MW16-63D (47 - 55)		
MW16-64		MW16-64I (30 - 37.5)	MW16-64D (46.5 - 56.5)		
MW16-65	MW16-65S (27 - 37)	MW16-65I (37 - 44)	MW16-65D (70 - 75)	MW16-65R (77 - 102)	
MW16-66	MW16-66S (18 - 28)	MW16-66I (30.5 - 40.5)	MW16-66D (46 - 57)	MW16-66R (60 - 85)	
MW16-67	MW16-67S (14 - 24)	MW16-67I (28 - 38)	MW16-67D (51.5 - 61.5)	MW16-67R (64 - 89)	
MW16-68	MW16-68S (15 - 25)	MW16-68I (28 - 38)	MW16-68D (48.5 - 58.5)	MW16-68R (61.5 - 86.5)	
MW16-69	MW16-69S (15 - 25)	MW16-69I (39 - 49)	MW16-69D (51.5 - 61.5)	MW16-69R (64.5 - 89.5)	
MW16-70	MW16-70S (10 - 25)	MW16-70I (28 - 38)	MW16-70D (46 - 56)	MW16-70R (61 - 86)	
MW16-71	MW16-71S (15 - 25)	MW16-71I (28 - 38)	MW16-71D (46 - 57)	MW16-71R (59.5 - 84.5)	

Notes:
The screened interval of the well is presented in parenthesis.

TABLE 2-3

SUMMARY OF PHASE I AND PHASE II RI RESULTS/CONCLUSIONS
SUPPLEMENTAL PAHSE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Phase I RI Results/Conclusions	Phase II RI Results/Conclusions
• Based on the Phase I RI data, groundwater is the primary environmental medium demonstrating environmental contamination. The predominant contamination identified in groundwater is a plume of dissolved CVOC, particularly TCE, in the deep overburden and upper competent bedrock groundwater zones. • A preliminary tidal study was performed on monitoring wells located in close proximity to the Allen Harbor shoreline to determine if the water level in these monitoring wells is affected by the tides. The data indicate that the extent of tidal influence on the potentiometric water surface is between 175 and 250 feet inland from the shoreline. This influence, which is observed as fluctuations in groundwater levels with the tide, decrease with distance inland from the shoreline. • Based on the detected salinity concentrations of groundwater samples from the Phase I RI monitoring wells, a denser-than-fresh-water salt-wedge (i.e., saline; greater than 10 ppth) is not present under the Site. Analytical results for the seep samples indicate that there is no mixing of the saline Allen Harbor water with the shallow groundwater located adjacent to the Allen Harbor shoreline. • Based on the Phase I RI data, detected concentrations of VOCs, SVOCs, pesticides, and PCBs in ***soils*** do not exceed the RIDEM Residential Direct Exposure Criteria. However, there were a few PAHs (three locations) and a TAL metal (lead, one location), detected at concentrations exceeding both the RIDEM Residential and the Commercial/Industrial Direct Exposure Criteria. The samples associated with these exceedances are generally located within the vicinity of the former EBS Review Item 28 activities.	• The tidal study performed on monitoring wells located in close proximity to the Allen Harbor shoreline indicated that the largest tidal impact on groundwater appears to be within 65 feet of the harbor shoreline. Beyond 320 feet from the shoreline, the tidal impact was observed to be negligible; i.e., typically less than 0.1 feet. • The Phase II RI sample results of salinity analyses indicate that a denser-than-fresh-water salt-wedge is not present beneath the Site 16 Phase II RI area. These results are consistent with the data obtained previously for the Phase I RI. The eastern and northeastern areas are slightly brackish, up to approximately 6 ppth salinity in samples from MW16-28R and MW16-52D. • CVOC releases may have occurred at three general locations within north-central portion of the Site 16 area bounded by Westcott, Davisville, and Allen's Harbor Roads; i.e., in the vicinity of MW16-05, MW16-40S, and MW16-45 (the alleged former FFTA). • Twelve subsurface soil samples were collected during the installation of soil borings SB16-30D, SB16-31D, SB16-32D located within the footprint of former Building 41. Oil and grease was detected at MW16-31D (8-10 feet bgs). VOCs (TCE) were detected in only the 56–58 feet bgs samples from MW16-31D (830 µg/kg) and MW16-32D (4,000 µg/kg). These borings are located downgradient of the suspected TCE source area in the southwestern most portion of Building 41. However, TCE was not detected in the boring installed in the ***immediate*** vicinity of the suspected source area. The Phase II RI did not determine the source CVOC concentration in the deep zones just outside the footprint of the former Building 41 (e.g., MW16-14D and MW16-15D/R and beneath the northeast end of the building in samples from MW16-32D).

TABLE 2-3

SUMMARY OF PHASE I AND PHASE II RI RESULTS/CONCLUSIONS
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Phase I RI Results/Conclusions	Phase II RI Results/Conclusions
• Trace concentrations of VOCs, SVOCs, PAHs, and TAL metals were detected in the Phase I RI samples collected from the ***shallow groundwater zone***; however, only bis(2-ethylhexyl)phthalate was detected at concentrations (7–18 µg/L) above a related RIDEM GA groundwater objective (6 µg/L). Although the groundwater beneath Site 16 is classified as GB, there is no RIDEM GB groundwater objective for this compound. TCL pesticide compounds were not detected in the samples collected from this zone. • A plume of CVOCs, especially TCE, exists in the ***deep overburden groundwater zone*** of the Phase I investigation area. The Phase I RI data indicate the presence of CVOCs in the area between at least the northeastern corner of Former Building 41 and MW16-05D near the northeast corner of the Phase I RI area (near Allen Harbor). Additionally, the western and northwestern (MW16-01D, MW16-03D, MW16-06D, and MW16-26D), southwestern (MW16-09D, MW16-10D, MW16-11D, and MW16-13D), southern (MW16-17D and MW16-18D), and part of the eastern (MW16-20D) extent of the Phase I monitoring well network appear to be at or beyond the fringe of the CVOC plume in the deep groundwater zone. However, total CVOC concentrations were greater than 100 µg/L in ground-water samples collected from Phase I RI monitoring wells MW16-27D and MW16-28D (northeastern edge of the Phase I RI area), MW16-05D and MW16-04D (northern edge of the Phase I RI area), and MW16-19D (part of the eastern edge of the Phase I RI area). These analytical results indicated that the CVOC plume in the ***deep overburden groundwater zone*** extends beyond the limits of the Phase I RI monitoring well network. • A plume of CVOCs, specifically TCE, exists in the ***bedrock groundwater zone*** of the Phase I investigation area. In general, the highest total CVOC and TCE concentrations were detected in	• The analytical results reported for Phase II RI well cluster MW16-48S/I/D were concluded not to suggest the presence of a contaminant source between Building E-107 and the Allen Harbor shoreline. • The analytical results reported for Phase I and Phase II groundwater samples from MW16-11D supported the NFA decision previously discussed for EBS Review Item No. 81. The Phase I RI and Phase II RI total CVOC results for this location were 0.4 µg/L and 4.94 µg/L, respectively. • The analytical results for the Phase I and II groundwater samples from MW16-03S/D supported the NFA decision previously discussed for EBS Review Item No. 85. (However, it should be noted that TCE was detected in the shallow bedrock well installed at this location in 2004. These data are further discussed in Section 4.) • The Phase II RI results suggest the presence of additional, potential CVOC release areas in the old railroad spur area in the vicinity of MW16-37I and MW16-38I. • Based on the Phase II RI data for MW16-54D there does not appear to be a contributing contaminant source between Site 16 and Building E-319. This conclusion is based on the detected total CVOC of 0.16 µg/L in the sample from that well and an interpreted southeasterly direction of groundwater flow. • An analysis of the hydraulic gradients for the Site 03 and Nike Site wells located upgradient of Site 16 and the Site 16 wells suggests that there are not consistent strong downward gradients across both the former Nike site and Site 03 to cause the Nike site CVOC plume beneath the deep overburden and bedrock zone wells at Site 03 to resurface in deep wells at Site 16. • Based on the Phase I and II RI data, the predominant contamination identified in groundwater is a plume of dissolved

TABLE 2-3

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Phase I RI Results/Conclusions	Phase II RI Results/Conclusions
the sample collected from MW16-15R (northeast end of Former Building 41) followed by the concentrations reported for a sample collected from MW16-02R. These two samples are from wells constructed deeper than the related deep overburden (D) wells MW16-15D and MW16-02D, respectively, and located directly beneath the CVOC (predominantly TCE) plume described for the overlying deep groundwater zone. These results indicate that that the plume has migrated vertically downward from the deep groundwater zone through fractures into at least the upper 25–30 ft of competent bedrock and is at concentrations similar to those detected in the overlying deep overburden zone. Southwest and east from MW16-15R, the total CVOC concentrations decrease to less than 1 µg/L (MW16-10R and MW16-25R). To the northeast beyond MW16-02R, detected total CVOC concentrations decrease substantially to 2 µg/L (MW16-27R) and 0.9 µg/L (MW16-28R). However, the Phase I RI concluded that these two wells may be located east of a northeast trending fracture zone along which there may be preferential migration of the CVOC, perhaps beneath MW16-05D. The western and northern extents of the plume in the upper bedrock zone were not determined in the Phase I RI. • No light (LNAPL) or dense non-aqueous phase liquid (DNAPL) were observed (as a separate-phase liquid) in the Phase I RI monitoring wells. The CVOC concentrations detected in subsurface soil and groundwater samples did not indicate the current presence of residual dense, non-aqueous phase liquid (DNAPL) at the Phase I sampled locations. • Based on the Phase I RI data, the historical use of the EBS Review Item 28 area appears to be a source for the detected localized PAH contamination in soil and the trace concentrations of petroleum hydrocarbons, VOC, SVOC, and PAH detected in the shallow groundwater during the Phase I RI. The potential	CVOC, particularly TCE, in the overburden and upper competent bedrock groundwater zones. Preliminary indications of biochemical degradation of TCE was evident from the presence of biodegradation products in the groundwater and the presence of areas conducive to biodegradation (i.e., low oxidation potential). • The highest total CVOC concentrations in Phase II ***shallow overburden groundwater*** samples were detected at MW16-37S (841.19 µg/L) located east of former Building 41. This appears to be a localized "hot spot" in the shallow zone because CVOC concentrations in the nearest wells (MW16-35S and MW16-34S) do not exceed 1µg/L (0.35 µg/L and 0.94 µg/L, respectively). North of Davisville Road, the highest total CVOC was detected at MW16-40S (127.58 µg/L), with concentrations decreasing to the north to concentrations ranging from 'not detected' to only 3 µg/L at MW16-05S, MW16-46S, MW16-48S, and MW16-53S. SVOC, PAH, and TAL metals were detected in the Phase II RI samples collected from the shallow overburden zone; however, only bis(2-ethylhexyl)phthalate, naphthalene, manganese, and arsenic were detected at concentrations exceeding the related Project Action Levels (PAL). TCL pesticide compounds were not detected in the groundwater samples collected from the shallow overburden zone. • Three areas of elevated CVOC concentrations in the ***intermediate overburden groundwater*** were identified and discussed in the Draft Phase II RI report: 1. The old railroad spur area just east of former Building 41 which includes MW16-37I (1101.74 µg/L total CVOC) and MW16-38I (1204.35 µg/L total CVOC). [CVOC concentrations at well node MW16-37 increase with depth from MW16-37S (841 µg/L) to MW16-37I (1,102 µg/L) and decrease again in the deep overburden zone (MW16-37D) at 23 µg/L].

TABLE 2-3

SUMMARY OF PHASE I AND PHASE II RI RESULTS/CONCLUSIONS
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Phase I RI Results/Conclusions	Phase II RI Results/Conclusions
contribution of this area to the CVOC concentrations detected in deep groundwater was not definitively determined and was further investigated during the Phase II RI. • Somewhere beneath the former Building 41 area appears to be the present location of at least a portion of the source area(s) for the CVOC plume detected in the deep overburden groundwater zone and the upper bedrock groundwater zone at Site 16. However, the actual surface or subsurface CVOC release area was not identified during the Phase I RI. • The Phase I RI data confirms the no further action decision previously reported for the EBS Review Item 85 (a former UST area). During September 2002, this area was re-graded and paved by RIEDC. • During the Phase I RI, MIP screening was performed at a location between Building E-107 and the harbor shoreline, but was not adequate to confirm the presence or absence of VOC at low concentrations in the subsurface. This potential source area was recommended for further investigation during a Phase II RI. • The CVOC detected in the Site 16 groundwater is almost entirely TCE and is a result of releases that probably occurred in three areas: 1) Somewhere within the former Building 41 area, perhaps in the vicinity of the former vapor degreasing unit, 2) the Phase I Stage I area of investigation (i.e., the EBS Review Item 28 area), and the 3) old railroad spur area located to the south of the former Building 41 area. The Phase I RI concluded that the TCE plume is about 35 to 50 feet bgs and does not discharge to the southern portion of Allen Harbor. • The HHRA conducted as part of the Phase I RI evaluated exposures to surface soil, subsurface soil, seep water, and groundwater. Based on the shallow and intermittent nature of the seeps at Site 16, sediment was not addressed as a medium of	2. The former FFTA in the vicinity of MW16-45I (830.19 µg/L): This area may be a localized release area; samples from the intermediate zone wells located around this well decrease in concentration to less than 10 µg/L at MW16-43I, MW16-46I and MW16-44I. Total CVOC concentrations at MW16-45I increase with depth from the shallow zone (5.06 µg/L) to 830.19 µg/L in the intermediate zone. If this was a surface release area, the shallow zone may have been well flushed by precipitation. Total CVOC concentrations are similar in the deep zone at 790.79 µg/L. 3. The intermediate zone located in the vicinity of MW16-05I (total CVOC 770.89 µg/L). Total CVOC concentrations at this well node increase from the shallow to intermediate overburden zone and are the highest concentrations in the deep overburden zone well (1,508.95 µg/L) • In general, the extent of the CVOC plume(s) detected in the ***deep overburden groundwater*** during the Phase II RI is very similar to that discussed in the Phase I RI except for some refinement within the plume areas by the additional Phase II wells. When samples for wells located at the same well node location are compared, detected CVOC concentrations are generally highest in the samples from wells in the deep overburden zone when compared to samples from the intermediate overburden and bedrock wells. The six highest CVOC results reported for samples from the deep overburden wells during the Phase II RI include results for five of the wells also demonstrating elevated CVOC results during Phase I RI: MW16-14D at 3,004 µg/L, MW16-15D at 2,703 µg/L, and MW16-32D at 2,700 µg/L near former Building 41, and MW16-02D at 1,708 µg/L, MW16-29D at 1,269 µg/L, and MW16-05D at 1,509 µg/L in the north central section of Site 16 (the EBS Review Item 28 area). Based on the Phase II RI results, total CVOC concentrations ranged from 'not detected' to 2.3 µg/L in the

TABLE 2-3

SUMMARY OF PHASE I AND PHASE II RI RESULTS/CONCLUSIONS
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Phase I RI Results/Conclusions	Phase II RI Results/Conclusions
concern, and instead seep water was evaluated. Potential receptors evaluated in the HHRA included construction workers, commercial workers, child and adult recreational users, and child and adult residents. Hazard indices (HI) (an indicator of the potential for non-carcinogenic risk) for exposures to groundwater by construction workers and child and adult residents exceeded acceptable levels (HI greater than 1). TCE and manganese were the major contributors to the unacceptable hazard indices. Cancer risks for exposures to groundwater by child and adult residents exceeded acceptable levels (i.e., the one-in-ten-thousand cancer risk level, 1×10^{-4}). TCE was the major contributor to the unacceptable cancer risks. Hazard indices and cancer risks for exposures to soil and seeps were within acceptable levels (HI less than or equal to 1; cancer risk estimates less than or within 1×10^{-4} to 1×10^{-6}). • The results of the SLERA indicated that exposures to contaminants detected in surface soil reflected some potential unacceptable risk to terrestrial plants and invertebrates and, based on a conservative food web risk evaluation, to terrestrial mammals and birds. There are a number of hazard quotients (HQs, an indicator of the potential for risk) greater than 1 for terrestrial plants and invertebrates, although none are very high, suggesting a low potential for risk to these receptors. However, soil-based risks to terrestrial mammals and birds, potentially significant based on the conservative food web, virtually disappeared with the application of the refined food web in the SLERA. • The SLERA for the aquatic environment indicated a potential for unacceptable risk to fish and plankton in Allen Harbor from seep water and to benthos from seep sediment. Relatively few HQs in seep water exceeded 1, but HQs for barium and manganese were relatively high. The seep sediment results represent	samples from the deep overburden zone investigation area perimeter wells. The only SVOC detected in the deep groundwater zone was bis(2-ethylhexyl)phthalate at MW16-31D (46 µg/L) and at MW16-36D (1 J µg/L). One PAH was detected in the deep overburden zone (phenanthrene) at MW16-52D (0.04 J µg/L). • A deep plume of CVOC contamination, specifically trichloroethene, exists in the ***shallow bedrock groundwater*** beneath portions of the Phase II investigation area and is generally located beneath the CVOC plume in the overlying deep overburden zone. In general, the highest trichloroethene concentrations were detected in the sample collected from MW16-15R (northeast end of former Building 41), followed in concentration by the sample collected from MW16-02R (located in the north-central portion of Site 16 just north of Davisville Road). Analytical results for these samples indicate that the CVOC plume has migrated vertically downward from the deep overburden through fractures into the upper 25–30 feet of competent bedrock. Vertically, CVOC concentrations generally decrease from the deep overburden zone to the shallow bedrock zone, except for at location MW16-44D/R, where the concentration is slightly higher in the sample from the bedrock. Southwest and south from MW16-15R, the total CVOC concentrations are less than 1 µg/L (MW16-10R and MW16-17R). To the southeast, concentrations are less than 2 µg/L (MW16-25R). North beyond MW16-02R, the elevated total CVOC concentrations are similar at MW16-44R (956 µg/L) and further northeast toward MW16-05R (762 µg/L). Concentrations are less than 2 µg/L to the west at MW16-06R and MW16-55R. Concentrations are less than 1 µg/L along the eastern boundary from MW16-52R to MW16-28R. The Phase II RI concluded that potential data gaps existed in the shallow bedrock zone in the vicinity of MW16-01, MW16-03, and east-southeast of MW16-02R. • CVOCs were detected in the samples collected from each of three

TABLE 2-3

SUMMARY OF PHASE I AND PHASE II RI RESULTS/CONCLUSIONS
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Phase I RI Results/Conclusions	Phase II RI Results/Conclusions
potential risk to marine invertebrates in the benthic community, particularly from manganese and several PAH and pesticide compounds. However, the Phase I RI did not determine whether the seep sediment areas represented localized concentrations of constituents of potential concern, or whether the data reflect general sediment conditions throughout the Site 16 shoreline area (approximately 350 feet in length). The shoreline area was described as dynamic and impacted by the cyclic tidal fluctuations in Allen Harbor.	deep bedrock wells (R2) installed at Site 16 (completed in the 25-30 feet of competent bedrock below the adjacent shallow bedrock (R) well was constructed). The total CVOC concentrations detected in the samples from MW16-02R2 (125.97 µg/L) and MW16-15R2 (182.42 µg/L) are six to seven times lower than the related samples collected from the overlying shallow competent bedrock zone (MW16-02R, 847.58 µg/L; and MW16-15R, 1,354.2 µg/L). TCE was not detected in the sample from MW16-55R2 and the total CVOC was only 0.2 µg/L. • No NAPL (LNAPL or DNAPL) has been measured (observed as a separate phase liquid) in the Phase II RI monitoring wells. Based on indirect criteria, the presence of NAPL may be suspected (perhaps as residual NAPL as a coating on soil particles or as ganglia between soil particles or in bedrock fractures) in the vicinity of the Building 41 and FFTA source areas. However, no compounds were detected in excess of 1 percent of their solubility.

3.0 PHYSICAL CHARACTERISTICS

3.1 INTRODUCTION

This section describes the local and regional physical characteristics of Site 16. Descriptions of subsurface physical features (both geology and hydrogeology) are based upon all available field investigation tasks performed to date (various RI phases and HRC injection pilot study, see Sections 1 and 2), including but not limited to monitoring well installations, seismic refraction surveys, and borehole geophysical logging. Supporting data used in the preparation of this chapter includes data from the EBS investigations at the Site (EA, October 1995, February 1998, March 1998, December 1999). A description of the regional geologic and hydrogeologic setting is provided below, along with specific characteristics pertaining to the Site.

3.2 PHYSIOGRAPHY

NCBC Davisville is located on the Seaboard Lowland coastal belt of the New England physiographic province (Fenneman, 1938), and within the Narragansett Basin of metamorphosed sedimentary rocks of Pennsylvanian age. The surface topography near NCBC Davisville (from Quonset Point to a point approximately 5 miles west of Quonset Point) exhibits over 150 ft of relief in a series of north-south trending valleys and ridges. These valleys were developed by river and stream erosion and deepened by glacial activity. Surface drainage is not well developed, and swamps and marshes are extensive. Streams are small and, in most places, bordered by swamps.

Nearly all the surficial deposits are of glacial origin deposited during the Wisconsinan Glacial Stage of the Pleistocene Epoch. The glacial deposits record a single invasion of the ice sheet and are only slightly modified by post-glacial weathering and erosion (Schafer, 1961). Portions of the land surface at NCBC Davisville have undergone significant man-made modification; e.g., hills were leveled and depressions filled in, as part of the original construction of the Base, as well as, during military training operations.

The boundary of the Site 16 Phase II RI area is shown on Figure 1-2. The north central portion of Site 16 (generally the former EBS Review Item 28 area) is primarily wooded with the exception of an asphalt-paved area in the center. This area is generally bounded by Westcott Road, Davisville Road, Allens Harbor Road, and the Allen Harbor southern shoreline (Figure 1-2). Allen Harbor is connected with Narragansett Bay approximately 1,800 ft north of Site 16.

An unnamed asphalt-paved road circles the outer perimeter in this portion of the Site and was formerly used by the Navy for the purpose of training construction equipment operators. In the past, this area was

extensively bulldozed and disrupted during training exercises, but now has a vegetative cover of shrubs and grasses. Within this road-encircled area are two small paved areas, a wooden-bermed structure and an earthen ramp structure. Apparently, these were used during the historical Navy training activities. The topography in this area slopes from a height of approximately 33 ft above MSL in the southwest corner down to MSL along the Allen Harbor shoreline in the northeastern portion of the Site (Figure 1-3). The area immediately around Building E-107 is also paved for parking. The area west of Building E-107 (east of Westcott Road) is grass covered. North of Davisville Road and west of its intersection with Westcott Road (Figure 1-2), the land surface slopes downward from approximately 34 ft above MSL into an old overgrown gravel pit area (approximately 17 ft above MSL at MW16-26D) that has a thick vegetative cover of bushes and trees. The area south of Davisville Road (old railroad spur area [undeveloped] and the former Building 41 area) slopes gently eastward and southeastward from a height of approximately 30 ft MSL down to MSL along the Narragansett Bay shoreline. Narragansett Bay is located approximately 2,300 ft east of the former Building 41.

The area around former Building 41 was paved during Fall 2002 and is currently used for the temporary storage of cars delivered by ship pending delivery to dealers. The surface of the old railroad spur area includes railroad tracks, weathered asphalt paving of the old roads, and grasses and shrubs. The portion of the investigation area east of Allen Harbor Road is paved and includes a few buildings. This area is also used for the temporary storage of cars delivered by ship pending delivery to dealers. The surface of most of this area slopes gently from a height of 15 ft MSL west to the Allen Harbor shoreline. The eastern portion of this area slopes gently toward the northeast and east to the Narragansett Bay shoreline.

Overall, there are four relatively large paved areas within the investigation area: the area around former Building 41, the area between Davisville Road and the northern track of the old railroad spur area (east of Building 41), the area east of Allens Harbor Road, and the area adjacent to Building E-107.

3.3 METEOROLOGY

Given the coastal proximity of NCBC Davisville, weather patterns are continuously modified by the dynamic effects of the Narragansett Bay and the Atlantic Ocean. The average annual wind speed over the area is 10.6 miles per hour (mph) with a prevailing southwesterly direction. In the winter, the average temperature is 30°F and average daily minimum temperature is 20°F. In the summer, the average temperature is 70°F and average daily maximum is 80°F.

The average annual precipitation for the area is 45.32 in., as measured for the period of 1951 through 1980. Historically, June has been the driest month with an average of 2.79 in. of precipitation; whereas December, averaging 4.47 in., has been the wettest.

Meteorological data were obtained from the National Weather Service Station, located at T.F. Green Airport, Warwick, Rhode Island, and the National Climatic Center, Asheville, North Carolina. The airport is located approximately 6.5 miles north of NCBC Davisville.

In Rhode Island, both winters and summers are influenced by the moderating effect of the Atlantic Ocean. The ocean effect is apparent by the higher winter temperatures and the lower summer temperatures, as compared to inland areas. In the winter, the average temperature is 30°F and the average daily minimum temperature is 20°F. In the summer, the average temperature is 70°F and the average daily maximum is 80°F.

The average annual precipitation for the area is 45.32 in., as measured for the period of 1951 through 1980. In 1989, total precipitation was 56.06 in. June has been the driest month historically with an average of 2.79 in. of precipitation, whereas December, averaging 4.47 in., has been the wettest. In 1989, the driest month on record was January with 1.17 in. of total precipitation; the wettest month was October with 8.37 in.

3.4 SURFACE WATER HYDROLOGY

There are no streams located within the investigation area. However, a portion of the northern central boundary is adjacent to Allen Harbor. Overland runoff from the area south of Davisville Road would flow generally eastward toward Narragansett Bay. Overland runoff from the area north of Davisville Road and west of the intersection with Westcott Road would be west to northwest into an old overgrown gravel pit. Overland runoff from the area north of Davisville Road and east of the intersection with Westcott Road is to the northeast toward Allen Harbor.

The approximate location of the four storm drain system components used historically by the Navy within the investigation area are shown in Figure 1-5, along with the available manhole invert elevation data in ft MSL. Runoff from at least a portion of the paved area east of Allens Harbor Road is drained via a storm drain (near MW16-28D/R) that discharges near the southeast corner (shoreline) of Allen Harbor (Figure 1-5). Runoff from the area around the former Building 41 was historically collected in a series of catch basins located just north and east of the building. These were connected to a storm drain system that flowed east, then southeast and discharged into Narragansett Bay between the two piers (Figure 1-5). Runoff from the old railroad spur area was collected and also discharged to Narragansett Bay via a storm drain system that began over 400 ft east of the former Building 41.

Runoff from the area around Building E-319 (southernmost building on Figure 1-5) is collected via two storm drain lines that both discharge just southeast of the building. In addition, there is a series of three ponds (including Davol Pond) located on the southwest side of Buildings 319 and 39 that may be receiving

surface runoff and storm water from the buildings. Davol Pond drains via Hall Creek southeastward into Frys Pond, which is located on the west side of the runways. Presumably, water in Frys pond is routed eastward into Narragansett Bay via culverts and/or drainage ditches.

3.5 SOIL

Soil development generally refers to the first five feet of material underlying the ground surface. The soil surface of Site 16 is classified as Urban Land. By definition, this unit consists of areas of paved roads, buildings, and paved parking lots, with slopes generally 0 to 5 percent. The northwestern portion of the Site along the western boundary is mapped as gravel pits, which are described as areas that have been excavated for sand or gravel. These areas are located on glacial outwash plains and terraces, where vegetation is sparse and drought resistant. Permeability of this unit is rapid to very rapid due to a high sand and gravel content (U.S. Department of Agriculture [USDA], 1981).

3.6 GEOLOGY

3.6.1 Regional Geology

The investigation area is located within the Narragansett Basin, a complex north-south trending structural syncline, which is approximately 12 miles wide and up to 12,000 ft deep. The Narragansett Basin's western limit is approximately 4 miles west of Site 16, and its eastern edge is close to Fall River, Massachusetts. Based upon the bedrock geological maps for the Wickford Quadrangle (Williams, 1964) and the East Greenwich Quadrangle (Quinn, 1952), there are no mapped faults in the vicinity of the investigation area. However, the bedrock is typically obscured from view by thick and extensive overburden deposits.

According to Williams (1964) and Quinn (1952), the principal bedrock unit in the vicinity of the investigation area is the Pennsylvanian-age, undifferentiated Rhode Island Formation. The original sedimentary rocks were fine- to coarse-grained sandstone and shale. Throughout the Rhode Island Formation, these sedimentary rocks have been metamorphosed into various types of meta-sandstone (quartzite), phyllite, gneiss, and schist. The amount of metamorphism increases from north to south across the formation. The color of the rock varies from light to dark gray, and greenish. The Rhode Island Formation is further characterized by cross-bedding and irregular, discontinuous beds.

The unconsolidated Quaternary sediments overlying bedrock were deposited by glacial activity during the Pleistocene Epoch. During the last ice age, the glacier scraped, ground, and crushed the bedrock surface as it advanced. The soil and rock material were gradually distributed in the glacial ice. As the glacier front melted and receded at the end of the Wisconsinan ice age, unconsolidated glacial till, glacio-

fluvial deposits, and glacio-lacustrine sediments were deposited. Till is a dense, non-stratified, heterogeneous mixture of sand, silt, clay, and gravel that was dropped in place on the bedrock surface from the melting ice (ablation till). As streams of melt water flowed from the retreating glaciers, sediment from the melting ice was entrained, transported downstream, and deposited as well-sorted sand or gravel (glacio- fluvial deposits). Fine-grained silt and clay were transported by the streams into small glacial lakes, where they were settled on the lake bottom (glacio-lacustrine deposits). The overall thickness of the glacial deposits is quite variable, although generally thin. Within the region, they range from less than 10 ft in thickness at the higher elevations (nonexistent where bedrock is exposed) to more than 100 ft thickness in portions of the bedrock valleys (Rosenshein et al., 1968).

3.6.2 Site 16 Geology

The results of the Site 16 field investigations show that the subsurface geology at the Site is characterized by Quaternary glacial deposits mantling the quartzitic and phyllitic bedrock (weathered and competent zones), with occasional conglomerate deposits, of the Rhode Island Formation. Based upon boring logs for the Site, the unconsolidated sedimentary (fill, intertidal, and glacial) deposits consist of the following units, presented in order from the ground surface downward:

1) Reworked soil and fill material and recent harbor and adjacent deposits
2) Glacio-fluvial, glacio-lacustrine, and lower sand deposits, and
3) Sandy silty gravel to gravelly sand to sandy gravelly silt (possibly till).

The subsurface geology at the Site is based on boring logs from the 199 monitoring wells (includes the 12 HRC injection wells), seismic refraction surveys and borehole geophysics. Table 3-1 presents well construction information. The locations of all monitoring wells at the Site are shown in Figure 2-1. Boring and well completion logs are provided in Appendix D.

Figure 3-1 shows the location of the 4 geologic cross sections. Figure 3-2 through 3-5 are geologic cross sections A-A' through D-D', respectively, which present the interpreted generalized distribution and thickness of the geological units from selected borings. These cross sections have been prepared to illustrate the geology beneath the Site. Cross section A-A' trends approximately northeast-southwest and cross sections B-B' through D-D' trend approximately northwest-southeast. Cross section A-A' is oriented approximately parallel to the direction of groundwater flow and the CVOC plume migration in the deep overburden groundwater, while cross sections B-B' through D-D' are oriented approximately perpendicular to the direction of groundwater flow and the CVOC plume in the deep overburden groundwater.

Based on the cross sections (and other data available – boring logs, seismic refraction data, and borehole geophysics results), there are three main lithologic units encountered in the unconsolidated sedimentary

deposits at the Site. The uppermost unit consists of reworked soil and fill material and in some locations, recent harbor and adjacent deposits. The thickness of the uppermost zone ranges from 4 feet (MW16-10) to 26 feet (MW16-22) across the area; however, the thickness is typically between 10 and 18 feet. The reworked soil and/or fill material is generally a mix of variable sand sizes (usually fine- to coarse-grained), with lesser portions of silt and gravel. Silt and gravel content varies spatially throughout the area. At some locations, particularly in the north-central portion of the Site, trace fragments of wood, glass, metal, and charcoal have been observed in soil borings. Also in the north-central portion of the Site and toward Allen Harbor, relatively recent (post glacial) material was deposited on top of the glacial deposits, but below the reworked soil and fill material These deposits include peat-like material, organic material, seagrass, peat moss, and silt and/or sand with organic material, which are generally laterally discontinuous and thin, ranging from 0.25 ft (MW16-46D) to 3.3 ft (MW16-45D).

The middle lithological unit consists of glacio-fluvial, glacio-lacustrine, and sand deposits. The overall thickness of the middle unit is variable, but approximately 30 to 40 feet thick. Fairly sharp distinctions between lithologies are typically encountered in this intermediate stratum. The uppermost portion of the intermediate unit is typically a very fine to fine gray to brown sand. These glacio-fluvial deposits are typically sand with varying amounts of silt and/or gravel while the glacio-lacustrine deposits are typically dark gray silt, sandy silt, very fine sands, and silt and clayey silts. Throughout this intermediate unit, the individual lithologies are interbedded and often pinch out or grade into another lithology over short lateral and vertical distances. Many deposits are observed to be discontinuous lenses. The lower sand deposits of the intermediate unit are typically very fine to fine sands with varying amounts of silt. These deposits are also present as discontinuous layers and lenses beneath Site 16.

The lowermost lithological unit consists of variable grained sands with gravel, with lesser amounts of sandy, silty gravel to gravelly sand to sandy gravelly silt. Based on the wide range of grain-sizes observed and general unsorted nature of this deposit, this unit most likely represents a glacial till deposit. This unit ranges in thickness from approximately 2 feet (MW16-68) to approximately 21.5 feet (MW16-05). In general, the thickness increases from the southwest side of Site 16 (near MW16-68) to the northeast toward Allen Harbor. This lowermost unit was not encountered at all locations of the site, particularly in the southwest portions of the site where bedrock elevations were the highest.

Cross section A-A' is presented on Figures 3-2A and 3-2B, which is oriented northeast-southwest, parallel to the direction of groundwater flow and the CVOC plume in the deep overburden groundwater. In general, the uppermost unit of reworked soil and fill material and recent harbor and adjacent deposits is relatively thin (10 feet thick or less) in the southwestern portion of A-A' near the center of former Building 41. The thickness increases up to about 26 feet in an area 200 feet northeast of former building 41. The shallow overburden unit then thins in a northeasternly direction toward Allen Harbor, where it is only about 10 feet thick. No recent harbor deposits were observed in the borings located along this cross section.

In general, the middle unit is fairly thick throughout the cross section and has more occurrences of interbedded silt based deposits (silt, sandy silt, very fine sands, and silt and clayey silts) in the northern portion of the section. Though variable in thickness, a laterally extensive silt deposit (which also contains gravel and sandy silt in some areas) extends from MW16-10 to just beyond MW16-02 (approximately half of the length of the cross section). It ranges in thickness from 1 foot at MW16-70 to 18.2 feet at MW16-31. The average thickness most commonly observed was about 4 feet. The thickest portions of this laterally extensive silt deposit is observed under the former Building 41 at MW16-31 and MW16-32. In addition, several other silt, silty clay, clayey silt, and sandy silt lenses occur, but are not observed to be as laterally extensive (most are around 150 feet or less in extent) and are generally 2 to 6 feet thick. Beyond MW16-05, only minor to trace silt was observed at any portion in the unconsolidated material, with the dominant material being sand.

With the exception of some minor thinning in thickness at MW16-58, the lowermost unit of dominantly variable grained sands with gravel (glacial till) first occurs at MW16-68 and generally increases in thickness toward the northeastern portion of the section.

Figures 3-3 through 3-5 present cross sections B-B' through D-D', which are oriented northwest to southeast and are perpendicular to the direction of groundwater flow and the CVOC plume in the deep overburden groundwater. In general, the uppermost unit of reworked soil and fill material and recent harbor and adjacent deposits is relatively uniform in thickness throughout each section, but do vary from the southwest toward the northeast (Allen Harbor). In cross sections B-B' and C-C', thicknesses average approximately 14 feet, while thinning to around 10 feet in cross section D-D'. Laterally extensive lenses of peat and silt are shown in cross section C-C', with thicknesses of 2 to 4 feet. In general, the middle unit is fairly thick throughout the sections and has more occurrences of interbedded silt based deposits (silt, sandy silt, very fine sands, and silt and clayey silts) in the southeast sections. Moderately thick (approximately 10 feet or more) and laterally extensive (over 100 feet) silt lenses occur along each of the cross sections. However, these silty lenses do not appear to be laterally extensive in a southwest-northeast direction, based on the fact that these deposits are not typically observed at the same elevations in adjacent cross sections. For instance, the silt deposit between 0 and -20 feet MSL in cross section B-B' near MW16-01 and MW-66 does not extend to the same relative position on cross section C-C'. Some southwest-northeast lateral continuity is evident, as observed in the silt layer overlying the lowermost lithological unit in C-C' and D-D' at monitoring wells MW16-02, MW16-24, MW16-05, and MW16-27. In general, the lowermost unit of variable-grained sands with gravel (glacial till) is fairly uniform in thickness, being approximately 10 to 15 feet thick, throughout each cross section. The thickest till was observed at MW16-05, which is located adjacent to Allen Harbor. On cross section C-C', the basal till unit was not encountered, which may be due to the fact that bedrock elevations are generally higher in this area.

Based on boring logs and Table 3-1, weathered bedrock separates the underlying competent (coreable) bedrock from the overlying unconsolidated glacial deposits at 27 locations. At 11 of the 27 locations, the thickness of the weathered rock is greater than 5 feet (ranging from 5.3 feet at MW16-55 to over 20 feet at MW16-42. At the remaining 16 locations, the thickness of the weathered rock is less than or equal to 5 feet, ranging from 0.3 feet at MW16-25 to 5 feet at MW16-40, with most being less than 2 feet. The borings where weathered bedrock is thinnest were generally located in the north through the south central portion of the investigation area. The weathered bedrock is generally dark gray, platy, blocky and highly fractured. Interbedded clay, silt and sand layers are often present within this zone and between fractured sections, suggesting that the weathered bedrock may have been transported by glacial action rather than weathered in place. Rock fragments obtained from samples in the weathered zone range from approximately 0.5 to 2 in. and break in planar blocky sections (typically phyllite) or angular fragments (typically quartzite).

Competent (coreable) bedrock was encountered in all but 5 of the "D" monitoring well borings, at depths ranging from approximately 36.3 ft bgs (MW16-47D) to 105.3 ft bgs (MW16-55D) (see Table 3-1). Elevations of the competent bedrock surface were posted on a site map and, in combination with results obtained from several seismic refraction surveys, an irregular shaped bedrock elevation map was developed (Figure 3-6). The report summarizing the recent seismic refraction study is provided in Appendix D. Within the investigation area, the bedrock surface elevations range from the highest interpreted elevation of approximately -5 ft MSL (west of Building E-107, near Westcott Road) to the lowest elevation of -79.3 ft MSL (northeastern portion of the area, MW16-49). Figure 3-6 was intentionally extended westward beyond the Site 16 area in order to include the area around Building 224, where another area of high bedrock surface elevation (up to -5 ft MSL) exists. In general, the area around Westcott Road and the southwestern portion of the investigation area (particularly immediately south and southwest of former Building 41) are areas of relatively higher elevations in the bedrock surface. The northeast and eastern portions of the investigation area are areas of relatively lower bedrock surface elevations (less than -40 ft MSL southwest of Allen Harbor and generally decreasing eastward). Additionally, there are two 'valleys' or depressions in the bedrock surface. One of the valleys begins just east of former Building 41 and extends northeastward to MW16-05 This valley may be due to a northeast-trending structural feature, such as a fracture zone, that resulted in preferential glacial erosion where the valley is now located. The other 'valley' in the bedrock surface trends approximately east-west along Davisville Road between Marine and Sanford Roads and may also be due to an east-west trending structural feature, such as a fracture zone. In the southwestern portion of the area, there are four isolated areas of relatively higher elevations (greater than -20 ft MSL) in the bedrock surface.

The bedrock underlying the investigation area consists of alternating layers of quartzite and phyllite, which can vary considerably over short horizontal distances. The boring logs appear to show either horizontal facies changes between quartzite and phyllite over relatively short distances, localized faulting, and/or the

layers of this rock are sloping (tilted, not horizontal) and/or folded. As a result, it is impossible to try and correlate individual rock units between boreholes. The quartzite bedrock typically includes significant amounts of quartz veins and near vertical and horizontal fractures. Where encountered, the quartzite is generally massive and the color ranges from light to dark gray with occasional banding and mottling. Fractures were often observed to be filled with quartz, chlorite and pyrite. The phyllite is typically dark gray to black metamorphosed shale with fractures. Although these fractures are typically not 'healed' (filled) with mineralization, they are typically filled with silt.

Bedrock core recoveries were generally greater than 90 percent within the upper 4.3 to 10 ft of competent bedrock cored for each deep ('D') well (see Table 3-1). This coring was performed to confirm the presence and type of competent coreable bedrock. Rock quality designation (RQD) is the percentage of recovered core that contains core pieces that are 4 inches or more in length. In the five borings where competent rock was not encountered, the recovered core of the weathered rock zone was of very poor quality: 0% RQD for MW16-03D, MW16-52D, and MW16-54D; only 7% RQD for MW16-42D; and only 8% RQD for MW16-70D. RQDs ranged from 0 to 100 percent; 41 percent (33 borings) of the RQD values were less than 50 percent and 59 percent (48 borings) were greater than or equal to 50 percent. Although originated for geotechnical use to aid in assessment of rock quality for construction, RQD provides a good indication of how solid or massive versus broken, bedded, or fractured the rock core interval is. Groundwater flowing through the rock beneath Site 16 primarily is along interconnected fractures in the rock, such as along bedding planes, fractures, and joints. RQD values provide a general index of whether the rock core interval (typically 5 ft in length) is solid (high RQD) with little potential for groundwater flow versus fractured/bedded (low RQD) with higher potential for groundwater flow. Note that a low RQD only indicates a relatively higher potential for groundwater flow; it does not reflect whether or not the openings are interconnected or are filled with silt or clay, which could substantially decrease the rate at which groundwater will actually flow. In general, the bedrock with lower RQDs (<50 percent) were found in two general areas (Figure 3-7). The first area of low RQDs follows the same general path as the interpreted 'valley' in the bedrock surface that extends from the southeast side of Building 41 northeastward toward Allen Harbor (Figure 3-6). This supports the argument that a fracture zone is located along the same path as the bedrock valley and may be the root cause for the valley's existence. Note that RQD values represent only the upper 4.3 to 10 feet of bedrock, so the low RQD values do not provide conclusive proof that a fracture zone is present in the bedrock. The second primary area of low RQD values was found near the eastern edge of Site 16 (Figure 3-7).

The results of the borehole geophysical logging (specifically the acoustic televiewer [ATV] and heat pulse flow meter logs) of the monitoring wells completed in bedrock ('R' and 'R2' wells) indicate that there are three main fracture orientations (northeast-southwest, northwest-southeast and north-south) that have the greatest number of 'open fractures' . The ATV logs provide the interpreted strike and dip of fractures that cross a borehole and fractures that are interpreted to be 'open features' through which groundwater may

flow. The heat pulse flow meter logs provide interpreted depths below ground surface of the main zones of groundwater flow penetrated by a well boring in rock. The number of fractures interpreted from the ATV logs were grouped into five trend (strike) categories for each well (northeast-southwest, northwest-southeast, east-west, north-south, and horizontal). Additionally, the depth (ft bgs) of those fractures interpreted to be 'open features' is provided for each well. Table 3-2 presents these data. These data indicate that for the Site 16 wells in the EBS 28/FFTA and former Building 41/old railroad spur areas, the three main fracture orientations (northeast-southwest, northwest-southeast and north-south) have a nearly identical number of the fractures that are interpreted to be 'open features'. Depths of the 'open features' vary considerably (ranging from approximately the bedrock surface to approximately 30 feet below the bedrock surface), but in general, more 'open features' are located in the upper portions with fewer 'open features' observed with depth. For MW16-51R, MW16-55R, and MW16-55R2, there were no fractures that were interpreted to be 'open features.' Additionally, the data for MW16-02R/R2 and MW16-15R/R2 show that there are considerably fewer fractures with greater depth that were interpreted to be 'open features.' Overall, the geophysical log data suggest that groundwater flow in bedrock (particularly the upper bedrock) beneath much of the Site 16 investigation area may be along northeast-southwest, northwest-southeast, and north-south trending fractures with only relatively few cross cutting fractures. The reports for the geophysical logging completed in competent bedrock are provided as Appendix D.

3.7 HYDROGEOLOGY

3.7.1 Regional Hydrogeology

The State of Rhode Island is divided into five drainage basins: the Narragansett Bay Basin (NBB), the Pawtucket River Basin, the Rhode Island Coastal Basin, the Thames River Basin, and the Massachusetts Coastal Basin. The site lies within the NBB, the largest and most hydrogeologically significant basin in the state. The NBB covers approximately two-thirds of the state and includes a system of waterways that discharge into the Atlantic Ocean between Point Judith and Sakonnet Point. The NBB includes Narragansett Bay and its entire shoreline, the drainage system of three major rivers (Taunton, Blackstone, and Pawtuxet), and a number of small rivers and streams that drain into Narragansett Bay (USDA, 1981). Within each drainage basin, smaller sub-basins may be defined based on significant streams, tributaries, and reservoirs.

Rhode Island's abundant precipitation, numerous perennial streams, lakes, and reservoirs provide a significant surface supply of fresh water for the states' industry and domestic consumption. Additionally, three primary aquifers provide fresh groundwater for the state. In 1985, the total freshwater withdrawals in Rhode Island were 147 million gallons per day (MGD). Of this, approximately 69 percent was for domestic and commercial use, 27 percent was for industrial and mining use, and 4 percent was for agricultural use. Eighty-one and a half percent of the fresh water was obtained from surface water sources and the

remaining 18.5 was from groundwater. The Scituate Reservoir in Providence County accounts for more than 80 percent of the reservoir storage capacity in Rhode Island. Approximately 76 percent of the State's population receives its drinking water from the Rhode Island reservoir system. Approximately 24 percent obtain potable water from public supply wells (U.S. Geological Survey [USGS] 1989). There are also an unknown number of private residential water supply wells.

3.7.2 Regional Surface Water Quality

Annual precipitation in the State of Rhode Island ranges from approximately 42 to 48 in. Approximately one-half of the annual precipitation runs off to streams and lakes of the State. Approximately 81.5 percent of the fresh water used in Rhode Island is drawn from surface water sources. The quality of Rhode Island's surface water is affected primarily by land use and commercial factors such as urban runoff, point-source discharge, and municipal/ industrial wastewater discharge (USGS 1993).

In sparsely populated areas, stream water quality is affected mainly by impurities in precipitation and by constituents released from the soil and rock. Because the bedrock, glacial deposits and soil in Rhode Island are composed largely of insoluble silica minerals, concentrations of dissolved inorganic constituents in surface water are low. Surface water in Rhode Island is soft [hardness less than 60 milligrams per liter (mg/L) of calcium carbonate] and slightly acidic (pH values less than 7.0).

No fresh surface water bodies are present within Site 16. The nearest surface water bodies include a series of three ponds (including Davol Pond) that are located approximately 1,500 ft to the southwest, Narragansett Bay, located approximately 2,000 ft east, and Allen Harbor located along the northern perimeter of Site 16. A wetland area is located adjacent to the Site, west of Westcott Road.

3.7.3 Regional Groundwater Quality

Groundwater in Rhode Island is present in two types of aquifers: unconsolidated Pleistocene glacial deposits and consolidated Paleozoic bedrock. The groundwater within the glacial deposits is divided into two hydrologic units: the fill and stratified drift unit (glacio-fluvial deposits) and the basal till unit. The stratified drift unit consists of interbedded lenses of gravel, sand and silt. The till unit consists of boulders, gravel, sand, silt and clay. Both aquifers constitute important water resources for the State. Most domestic wells in Rhode Island obtain water from the bedrock aquifer (USGS, 1988).

The quality of groundwater in most of Rhode Island is suitable for human consumption with little or no treatment. Typically, the groundwater has total dissolved solids (TDS) concentrations less than 200 mg/L, is soft (hardness less than 60 mg/L of calcium carbonate), is slightly acidic (pH 5.5–7.0), and is relatively cold (10–12°Celsius). The percentage of the State's land with non-potable groundwater is relatively small.

Although many areas have measurable degradation of water quality, the amount of degradation has not impaired the water quality for human consumption and other major uses. Because the groundwater occurs mostly under unconfined conditions with a depth to water less than 20 ft bgs, the groundwater in Rhode Island is often vulnerable to contamination and quality degradation (USGS, 1988).

In localized situations, specific effects from waste disposal, agricultural, and urbanization have caused significant water quality degradation. The principal sources for groundwater contamination are waste disposal sites, underground storage tanks (USTs) containing fuels, surface impoundments of liquid waste, solid waste landfills, septic systems and cesspools, storage areas for highway deicing salts, and oil and chemical spills. The principal groundwater contaminants derived from these sources are VOCs, pesticides, metals, nitrate, sodium and chloride (USGS 1988).

3.7.4 Regional Aquifer Characteristics

USGS Water Supply Paper 1779 (Rosenshein, 1968) describes the aquifer characteristics of the Potowomut-Wickford area of south central Rhode Island. That study area comprises approximately 60 square miles from East Greenwich to the southern tip of North Kingstown and west into parts of West Greenwich, Rhode Island. Site 16 is located in the east-central part of that area. The Potowomut-Wickford area comprises parts of five river basins; however, only three basins display major hydrogeological significance. The three primary basins include; the Potowomut River Basin, the Annaquatucket River Basin, and the Pettaquamscutt River Basin. All three basins are situated west and/or southwest of Site 16.

The primary aquifer of the Potowomut-Wickford area is the Potowomut-Wickford Aquifer, producing water primarily from stratified drift. That area of groundwater supply production is located generally within a northeast-trending valley in the bedrock surface about 2 miles northwest of Site 16.

The transmissivity of the Potowomut-Wickford aquifer ranges from 0 to greater than 40,107 ft^2/day. The areas of highest transmissivity are concentrated around the three primary river basins. The transmissivity decreases outward from each river basin toward till and bedrock boundaries.

Recharge to the Potowomut-Wickford Aquifer occurs primarily from October through April. Under natural conditions, recharge is effectively equal to the discharge plus the change in subsurface storage. Natural discharge from the aquifer occurs as flow to surface water and movement away from source areas. Most of the discharge occurs as a component of stream flow; however, some discharge occurs as subsurface underflow and discharges into Greenwich Bay and the west passage of Narragansett Bay.

3.7.5 Site Hydrogeology

The RIDEM has classified the groundwater at this location as "GB" (assumed to require treatment prior to drinking).

3.7.5.1 Hydrogeologic Zones

The previously described geological units underlying the site have been divided into the following four hydrogeological zones (beginning with the uppermost zone):

(1) Shallow groundwater zone ('S' wells) -- consists of reworked soil and fill material and recent harbor and adjacent deposits and/or glacio-fluvial sand deposits (generally a very fine to fine sand) overlying the glacio-lacustrine deposits (silts and silty sands) or lower sand deposits or directly overlying the silty gravelly sand to sandy gravelly silt (glacial till) where the glacio-lacustrine deposits are not present. This zone occurs under unconfined conditions.

(2) Intermediate groundwater zone ('I' wells) – consists of sand to silty sand and silt lenses within the glacio-lacustrine deposits, which are also interbedded with some glacio-fluvial sand deposits. This layer overlies the silty gravelly sand to sandy gravelly silt (glacial till). This zone occurs under partially confined conditions.

(3) Deep overburden groundwater zone ('D' wells) -- consists of the silty gravelly sand to sandy gravelly silt (glacial till) unit and/or the weathered bedrock zone (which may be glacial till with scoured bedrock cobbles). These two types of geologic materials are considered as a similar groundwater zone because of the wide variability in composition of these materials. The deep overburden groundwater zone occurs primarily under partially confined conditions.

(4) Competent bedrock groundwater zone ('R' and 'R2' wells) -- includes the upper approximately 25 to 30 ft of competent bedrock ('R' wells) and the bedrock ('R2') 25 ft below the termination of the 'R' wells which was investigated, but may extend deeper. The 'R' wells are typically in direct hydraulic connection with the overlying deep groundwater zone, though the extent of hydraulic connection is unknown (based on analyses of RQDs and borehole geophysics). The bedrock groundwater zone occurs primarily under partially confined conditions.

3.7.5.2 Interpreted Groundwater Flow Directions

Depths to groundwater were measured in Site 16 and Site 03 monitoring wells and piezometers during seven different events and are summarized in Table 3-3. During three events (November 18-20, 2002,

March 25-28, 2003, and November 9-15, 2004), synoptic groundwater elevations were measured at the same time that groundwater samples from Site wells were collected. The four other sets of groundwater elevations listed in Table 3-3 were compiled from other field events. Data from monitoring wells in the area of Building 224 and Site 03, plus an area approximately 1,000 ft further west, have been included to show the relationship between groundwater flow from the Navy's Site 03 and USACE's former PR-58 Nike Site areas (located just west of Site 16) and the Site 16 area. Groundwater elevations were calculated for all wells based on surveyed elevations for the top of each well riser. It should be noted that the measuring point elevation for RMW-02S/D was incorrect in previous reports. The correct top-of-riser elevations were determined to be 22.15 feet MSL and 22.26 feet MSL for RMW-02S and RMW-02D, respectively, which are approximately 3.5 feet lower than previously reported. It was also determined that the worksheet formulas were incorrect in calculating the groundwater elevations at wells MW16-29 through MW16-32. As seen in Table 3-3, the range in groundwater elevations at each well was relatively small over the time frame measured, with an average range of 1.57 feet. At many locations, a range of less than 1.0 foot was observed.

Groundwater potentiometric surface maps for the shallow (S), intermediate (I), deep overburden (D), and bedrock (R and R2 combined) groundwater zones are presented in Figures 3-8 through 3-11, respectively, for data collected on November 9-15, 2004 (the most recent and most comprehensive synoptic event). Potentiometric surface maps were not created for other measurement dates, since the observed range in water levels over time is quite small.

Shallow Groundwater Zone

Based on Figure 3-8, groundwater in the shallow zone flows northeast towards Allen Harbor. A potentiometric high is located southwest (and potentially west) of former Building 41 while low groundwater elevations were measured near the shoreline of Allen Harbor. Some minor deflections in groundwater flow occur near former Building 41 and the EBS 28/FFTA area. In general, the gradient from the former Building 41 to approximately 200 feet northeast of Davisville Road is approximately one third of the gradient from that point to the shoreline of Allen Harbor, being 0.006173 ft/ft and 0.01905 ft/ft, respectively. Thus, groundwater velocities may be speeding up as groundwater approaches Allen Harbor.

On the eastern side of Building 41, the potentiometric contours start to curve southward. This may indicate that shallow groundwater in this area is flowing more toward the east toward Narragansett Bay, rather than toward Allen Harbor.

Intermediate Groundwater Zone

Based on Figure 3-9, groundwater in the intermediate zone generally flows toward the northeast beneath the former Building 41 and the EBS 28/FFTA area (with some minor localized deflection of flow). A potentiometric high is located southwest (and potentially west) of former Building 41, while potentiometric lows are located near MW16-05, near the shoreline of Allen Harbor. In general, the horizontal hydraulic gradient from the former Building 41 to Davisville Road (near MW16-40 and MW16-02) is approximately half of the hydraulic gradient from that point to the southeastern shoreline of Allen Harbor, being 0.0066 ft/ft and 0.0139 ft/ft, respectively.

On the eastern side of Building 41, the potentiometric contours for the intermediate zone start to curve southward. This may indicate that intermediate groundwater in this area (like the shallow groundwater) is flowing more toward the east toward Narragansett Bay, rather than toward Allen Harbor.

Deep Groundwater Zone

The spatial coverage of wells screened in the deep zone is more complete than any other groundwater zone (Figures 3-10A and 3-10B). Based on the groundwater contours observed, a potentiometric high is located west of the former Building 41 while the potentiometric low is located just east of the southeastern shoreline of Allen Harbor (MW16-28 and MW16-51). In general, groundwater flow is toward the northeast from the former Building 41 to Allen Harbor with minor localized deflections of groundwater flow. The horizontal hydraulic gradient from the former Building 41 to Davisville Road (near MW16-40 and MW16-02) is approximately half of the gradient from that point to the southeastern shoreline of Allen Harbor (MW16-28 and MW16-51), being 0.004916 ft/ft and 0.0107 ft/ft, respectively.

On the eastern side of Building 41, the potentiometric contours for the deep overburden zone start to curve southward. This indicates that groundwater in this area (like the shallow and intermediate zones) is flowing more toward the east toward Narragansett Bay, rather than toward Allen Harbor.

Around former Building 318 and Building 319, the potentiometric contours bend toward the southwest. Groundwater flow in the vicinity of these two buildings is more toward the southeast and possibly southward.

In the western portion of the site (Site 03 and the western vicinity area), groundwater flow is more to the east and northeast (Figure 3-10B). West of the former Building 41, the horizontal hydraulic gradient is significantly lower than values calculated for the Site 16 area (calculated to be 0.0018215 ft/ft).

Shallow Rock and Deep Rock Groundwater Zone

Based upon Figure 3-11, the groundwater in the competent bedrock zone is interpreted to flow toward the northeast from the former Building 41 toward Allen Harbor. Some minor deflections of groundwater flow occur near the former Building 41. As observed in the deep groundwater zone, a potentiometric high is located west of the former Building 41 while the potentiometric low is located just east of the southeastern shoreline of Allen Harbor (MW16-28 and MW16-51). In general, the gradient from the former Building 41 to Davisville Road (near MW16-59) is approximately half of the gradient from that point to the southeastern shoreline of Allen Harbor (MW16-05R and MW16-05R2), being 0.004566 ft/ft and 0.0122 ft/ft, respectively. Only four wells occur in the deep rock groundwater zone and based on their groundwater elevations with respect to their shallow rock zone groundwater elevation, a nearly identical groundwater flow pattern would be expected within this zone as well.

Summary of Groundwater Flow

As seen in Figures 3-8 through 3-11, groundwater flow is generally northeast from the former Building 41 towards Allen Harbor for each of the monitored groundwater zones. Potentiometric highs are consistently observed west to southwest of former Building 41 and potentiometric lows were observed around the southeastern shoreline of Allen Harbor (MW-05, MW16-28, and MW16-51). Minor deflections to overall groundwater flow are observed within each zone are most likely due to variances in lithologies (presence of lower and higher permeable lenses within primary deposits). These deflections can cause more northerly and easterly flow components over a short distance. On a larger scale, however, groundwater flow consistently flows northeast. The gradients observed are also very similar, where the gradients observed near the former Building 41 to approximately Davisville Road (minor variance based on monitored zone) are one half to one third of the gradient from that point (Davisville Road) to Allen Harbor. In general, the horizontal hydraulic gradients near the former Building 41 to approximately Davisville Road decreases with depth., The hydraulic gradient from Davisville Road to Allen Harbor is generally similar for the intermediate, deep, and rock zones; however, the hydraulic gradient observed in the shallow zone in that same area was significantly less.

The observed groundwater flow at the Site in each monitored zone is consistent with what is expected based on the site geology as presented in section 3.6.2. It was shown that most deposits at the Site are sands with some silts (interbedded with sands in the intermediate zone) and gravels (mostly observed in the shallow zones and deep zones) overlying a fractured bedrock surface that exhibits a paleovalley oriented approximately northeast. Analysis of RQD values for the upper bedrock shows that fractured rock is found in the same general locations as the bedrock valley, which suggests that the bedrock valley may have resulted from preferential weathering and erosion along a fracture zone oriented northeast-southwest where the valley is now located.. Hydraulic connection between the overburden zones

(shallow, intermediate and deep) appear to be strong since the groundwater flow directions are essentially identical (in this case, the shallow zone does not mimic the topography as closely as it mimics the bedrock surface). Hydraulic connection between the unconsolidated overburden and upper rock zone also appears to be strong, at least along the bedrock valley.

3.7.5.3 Vertical Hydraulic Gradients

Because of the relatively strong connection of the monitored groundwater zones at the Site, an extensive vertical hydraulic gradient analysis was performed. The calculated vertical hydraulic gradients are provided in Tables 3-4A and 3-4B, where results for each monitoring event are presented as well as long-term summaries of consistent directions observed, respectively. It should be noted that the vertical hydraulic gradients were incorrectly calculated in previous reports (the difference between the centers of the respective well screens was not used in the calculation). The current calculations are based on all available well gauging data. A summary of the long-term observed vertical hydraulic gradients for each well pair is graphically illustrated on Figures 3-12 through 3-15 for the various well clusters in the Site 16 investigation area. For each well where a consistent upward gradient occurred for all gauging events, the well is designated with an upward arrow. A well with a vertical gradient that was consistently downward across all gauging events has been designated with an downward arrow. A sideways arrow has been used to designate a well when both upward and downward gradients (considered variable) have been observed over time.

The following summarizes the vertical gradients observed between shallow (S) and intermediate (I) overburden groundwater zones, as shown on Figure 3-12:

- Upward gradients were observed at 3 locations (MW16-25, MW16-40 and MW16-48), downward gradients were observed at 18 locations, and variable gradients (both upward and downward gradients through time) were observed at 7 locations (MW16-05, MW16-37, MW16-41, MW16-45, MW16-46, MW16-59 and RMW-01).

- Most wells displaying upward and variable gradients are located in the central and northern portions of Site 16.

- Downward gradients are observed all around former Building 41, except at the MW16-37 well cluster, where a variable gradient was observed over time.

- The largest upward gradient was 0.1165 ft/ft, observed at the MW16-25 well cluster, while the largest downward gradient was 0.45 ft/ft, observed at MW16-33.

The following summarizes the vertical gradients calculated for the intermediate (I) and deep (D) overburden groundwater zones, as shown in Figure 3-13:

- Upward gradients were observed at 7 locations (MW16-01, MW16-04, MW16-05, MW16-22, MW16-41, MW16-45 and MW16-61), downward gradients were observed at 33 locations, and variable gradients (both upward and downward gradients through time) were observed at 6 locations (MW16-19, MW16-27, MW16-39, MW16-58, MW16-65 and RMW-01).

- Upward gradients are generally observed in a north-south trend from the southwestern corner of Allen Harbor to the east side of former Building 41, though downward gradients are also observed along this trend line.

- Variable gradients are generally observed in the eastern and western portions of the Site.

- Except for three well clusters (MW16-65, MW16-22, and MW16-61), downward gradients have been consistently observed all around former Building 41.

- The largest upward gradient (0.062 ft/ft) was observed at MW16-02, while the largest downward gradient (0.1355 ft/ft) was observed at MW16-20.

The following summarizes the vertical gradients calculated for the shallow (S) and deep (D) overburden groundwater zones, as presented in Figure 3-14:

- Upward gradients were observed at 7 locations (MW16-01, MW16-08, MW16-40, MW16-48, PGU-Z4-04, MW01-13 and MW01-14), downward gradients were observed at 32 locations, and variable gradients (both upward and downward gradients through time) were observed at 15 locations.

- Upward gradients are generally observed just north of Davisville Road, near the southwestern edge of Allen Harbor, and in the western portions of the investigation area (Site 03).

- Variable gradients have been observed to the west and southwest of the EBS 28/FFTA area and in two well clusters on the eastern side of former Building 41.

- Downward gradients were generally observed around former Building 41.

- The largest upward gradient was 0.0938 ft/ft, observed at MW16-05, while the largest downward gradient was 0.2336 ft/ft, observed at MW16-33.

The following summarizes the vertical gradients calculated for the deep overburden (D) and the rock (R) groundwater zones, as presented in Figure 3-15:

- Upward gradients were observed at 13 locations, though only 7 occurred in the primary study area (MW16-03, MW16-17, MW16-27, MW16-56, MW16-59, MW16-68 and MW16-70), downward gradients were observed at 17 locations, and variable gradients (both upward and downward gradients through time) were observed at 6 locations (MW16-05, MW16-15, MW16-44, MW16-60, EA-110 and MW07-32).

In general, the distribution of the three types of vertical gradients analyzed show no distinguishable trends. For instance, several upward trends are observed in the northeastern portion of the former Building 41 and are adjacent to downward trends over a short horizontal distance.

- The largest upward gradient was 0.0538 ft/ft, observed at MW16-03 while the largest downward gradient was 0.0756 ft/ft, observed at MW16-51.

The following summarizes the vertical gradients calculated for the rock (R) and deep rock (R2) groundwater zones:

- Upward gradients were observed at MW16-02 and MW16-05, while a downward gradient was observed at MW16-15.

- At each of these three locations (MW16-02, MW16-05 and MW16-15), the vertical gradient between the rock and deep rock wells do not match the vertical gradients between the deep overburden and rock wells.

Summary of Vertical Hydraulic Gradients

As seen in Table 3-4 and Figures 3-12 through 3-15, most calculated vertical gradients between various monitored zones are downward. An elongate, north-south trending area which extends from the southwestern corner of Allen Harbor (near well cluster MW16-48) due south to well clusters MW16-59 and MW16-25 includes many of the well clusters which exhibit upward and variable gradients. Although downward gradients are observed in some well clusters within this elongated area. The largest upward gradient was observed at MW16-25 in the shallow to intermediate zone analyses and is nearly twice as large as the largest upward gradient in the intermediate to deep zone analyses.

Areas around the former Building 41, northeast of this former building, and in the northeastern portion of the site (south of Allen Harbor) exhibit downward gradients. The magnitude of the largest downward gradients are nearly twice (or higher) the largest upward gradient. Based on the analysis of vertical gradients between the deep overburden and shallow rock, there are no clear trends

3.7.5.4 Hydraulic Testing

Slug tests were performed at all overburden wells (shallow, intermediate and deep) in various field activities/investigations at Site 16. The data were used to calculate the estimated hydraulic conductivity for the material screened by each well. During a recent review of previous work performed at Site 16 (Phase I and Phase II RI Reports), it was discovered that the slug test data were inappropriately processed and analyzed. Specifically, the curve shapes between the falling and rising head tests for the same well were significantly different, with displacements of over 10 feet observed in most falling head tests and some initial displacements in the rising head tests greater than 5 feet. Additionally, total time of tests analyzed was variable between the rising and falling head tests. Other general concerns of data input were also present, specifically, the same value of saturated thickness was used on all wells within a well cluster (typically a uniform value of 10 or 15 feet was used) and the well and wellbore radius was set to be the same value (equal to the physical well diameter, which ignores the gravel pack diameter).

In order to evaluate the hydraulic conductivity from the slug tests performed at the Site, selected slug test data from Phase I, Phase II, and the HRC Injection Pilot Study were re-analyzed. Slug test data from Phase I and Phase II wells that coincide with the geological cross sections (Figures 3-2 through 3-5) wells were selected to be reanalyzed, as well as wells where either upward or variable vertical gradients were observed. All slug tests were reanalyzed with the appropriate data input parameters, specifically, well diameter, well bore radius, and screened length were based on their respective well completion logs, and saturated thickness was based on water level data collected when the slug test was performed, where available. For Phase I and Phase II slug tests, slug test field forms were not available in order to determine the saturated thickness when the test was run. However, since it has been observed that the groundwater elevations do not fluctuate very much through time on a well by well basis, the average groundwater elevation was calculated and the saturated thickness for each Phase I and Phase II well was determined from the averaged data. All slug tests were analyzed utilizing the Bouwer-Rice slug test solution method for unconfined aquifers (1976). Data was processed in the Windows-based software package AQTESOLV for Windows, version 3.5 professional.

Table 3-5 summarizes the results of the 241 slug test analyses performed (24 shallow (S) zone wells, 35 intermediate (I) zone wells, and 58 deep (D) zone wells). Monitoring wells at Site 16 were typically screened across several lithologic lenses. Hence, hydraulic conductivity values calculated for most wells are not representative of single type of geological material, but represent instead a composite of the

material types (refer to the "Description of Material Screened" column of Table 3-5). The monitoring wells have all been categorized as being screened in the shallow (S), intermediate (I), or deep (D) overburden (Table 3-5).

For the shallow (S) zone, the calculated hydraulic conductivities ranged from 1.00 ft/day (falling head test at MW16-45S) to 96.16 ft/day (rising head test at MW16-25S). An average value of 23.01 ft/day and a geometric mean of 13.23 ft/day were calculated. In general, most wells were screened in sandy units (either the lower portions of the reworked soil and fill material or upper portion of the very fine to fine sands of the glacio-fluvial deposits).

For the intermediate (I) zone, the calculated hydraulic conductivities ranged from 0.1417 ft/day (falling head test at MW16-67I) to 29.75 ft/day (rising head test at MW16-05I). An average value of 3.16 ft/day and a geometric mean of 2.13 ft/day were calculated. Most hydraulic conductivity values were less than 5 ft/day, with only 4 locations (MW16-05I, MW16-28I, MW16-63I, and MW16-69I) where results exceeded 5 ft/day. At these four locations, sands were commonly encountered in the screened interval.

For the deep (D) zone, the calculated hydraulic conductivities ranged from 0.00338 ft/day (falling head test at MW16-32D) to 82.09 ft/day (rising head test at MW16-52D). An average value of 10.03 ft/day and a geometric mean of 4.40 ft/day were calculated. The low calculated hydraulic conductivity at MW16-32D is due to the dominantly silty nature of the overburden material and competent bedrock at this and adjacent locations. Overall, the range in calculated hydraulic conductivities is high, which would be expected due the material being a glacial till that ranges in grain sizes and generally not well sorted.

The widest ranges in calculated hydraulic conductivities occurred in the shallow (S) and deep (D) zones, which is reflected in greater differences between the computed average and geometric means for these zones. The spatial variability of the hydraulic conductivity values was also evaluated for cross section A-A' (Figure 3-2) for each of the overburden zones, since this cross section is parallel to groundwater flow. The purpose of this analysis was to determine if variances in hydraulic conductivities could account for the changes in horizontal gradient calculated from the groundwater elevation maps shown on Figures 3-8 through 3-11 (see Section 3.7.5.2). Based on the calculated hydraulic conductivities for each overburden zone, there is no variance in calculated hydraulic conductivity values that would account for the change in horizontal gradients since the general range of hydraulic conductivities for each area (from MW16-10 to MW16-02 and MW16-02 to MW16-05) are nearly identical.

The slug test data are provided in Appendix D and includes a table presenting the calculated saturated thickness values used for Phase I and II slug test analyses.

3.7.5.5 Groundwater Velocities

Based on the data presented previously in sections 3.7.5.2 and 3.7.5.4, average groundwater velocities ($\bar{v}$) in each overburden hydrostratigraphic zone was estimated. To be conservative, the arithmetic average of the hydraulic conductivity was used since it is the greater of the arithmetic average versus geometric mean and will result in a higher groundwater velocity. Porosities of 0.25 for the shallow (S) and deep (D) zones were used and a porosity of 0.30 for the intermediate (I) zone was used, based on reference values for representative lithologies (Freeze & Cherry, 1979). The results of the groundwater velocity calculations are summarized below:

- Shallow (S) zone
  - From former Building 41 to approximately 200 feet northeast of Davisville Road: $\bar{v}$ = 207.5 feet/year (0.568 feet/day)
  - From approximately 200 feet northeast of Davisville Road to Allen Harbor: $\bar{v}$ = 640 feet/year (1.753 feet/day)
- Intermediate (I) zone
  - From the former Building 41 to Davisville Road (near MW16-40 and MW16-02): $\bar{v}$ = 25.5 feet/year (0.0699 feet/day)
  - From Davisville Road (near MW16-40 and MW16-02) to the southeastern shoreline of Allen Harbor: $\bar{v}$ = 53.4 feet/year (0.146 feet/day)
- Deep (D) zone
  - From the former Building 41 to Davisville Road (near MW16-40 and MW16-02): $\bar{v}$ = 72.0 feet/year (0.197 feet/day)
  - From Davisville Road (near MW16-40 and MW16-02) to the southeastern shoreline of Allen Harbor (MW16-28 and MW16-51): $\bar{v}$ = 157 feet/year (0.431 feet/day)

Since horizontal distances were determined for individual flowlines in each zone, the total travel time from the former Building 41 to Allen Harbor along the primary groundwater flow pathway can be determined, and summarized as follows:

- Shallow (S) zone
  - From the former Building 41 to approximately 200 feet northeast of Davisville Road – 4.68 years
  - From approximately 200 feet northeast of Davisville Road to Allen Harbor – 0.49 years

- Total travel time is 5.17 years

- Intermediate (I) zone
  - From the former Building 41 to Davisville Road (near MW16-40 and MW16-02) – 23.6 years
  - From Davisville Road (near MW16-40 and MW16-02) to the southeastern shoreline of Allen Harbor – 10.8 years
  - Total travel time is 34.4 years

- Deep (D) zone
  - From the former Building 41 to Davisville Road (near MW16-40 and MW16-02) – 14 years
  - From Davisville Road (near MW16-40 and MW16-02) to the southeastern shoreline of Allen Harbor (MW16-28 and MW16-51)– 5 years
  - Total travel time is 19 years

3.7.5.6 Tidal Impacts on Water Level in Selected Monitoring Wells

A tidal study was performed on monitoring wells that are located in close proximity to the Allen Harbor shoreline to determine if the water levels in these monitoring wells are affected by diurnal tidal cycles. During October 23-28, 2002, water levels were recorded for an approximately 24-hour period in each of the following 26 monitoring wells: MW16-04I, MW16-05I/R, MW16-06R, MW16-39I, MW16-43D, MW16-44D/R, MW16-45S/I/D, MW16-46S/I/D, MW16-47S/D, MW16-48S/I/D, MW16-49D, MW16-50D, MW16-51D/R, MW16-52D/R and MW16-53S; and during June 3, 2004, water levels were recorded for an approximately 24-hour period in each of the following wells: MW16-03R, MW16-05R2, MW16-58S, MW16-58I1, MW16-58I2, MW16-58D and MW16-58R.

The water levels were recorded using *In-situ ®* transducers and dataloggers. Graphs of the water levels recorded during the approximately 24-hr period for the June 3, 2004 wells are provided in Appendix D. The related results for each well and data obtained during the tidal studies are summarized in Table 3-6. The data shows the nearly inverse relation between the distance of the well from the shoreline and the magnitude of water level fluctuation observed. The largest amount of cyclic water level fluctuation (0.76-1.9 ft) was observed for the MW16-04 well cluster located within 50 ft of the harbor shoreline. The only other well cluster with an observed cyclic water level greater than 1.0 ft was MW16-48 (0.8–1.3 ft), which is located approximately 65 ft from the shoreline. At distances greater than 105 ft from the shoreline, the fluctuations of groundwater were observed to be minor; i.e., typically less than 0.5 ft. Beyond 320 ft from the shoreline, the tidal impact was observed to be negligible; i.e., typically less than 0.1 ft of cyclic water level fluctuation. As also seen in Table 3-6, in general, the maximum groundwater fluctuations are observed in the deeper hydrostratigraphic zones, typically the deep (D) overburden and

upper bedrock (R) and deep bedrock (R2) zones. This shows that Allen Harbor is in direct contact with the deeper hydrostratigraphic zones.

3.8 LAND AND RESOURCE USE

The historic land use of the site area has included the training of Naval Seabee (construction battalions) staff in the use of heavy construction from approximately the early 1940s to the mid-1970s, former warehouses, and some preservation activities.

Currently, the site ranges from undeveloped property with forest and grass cover to redeveloped buildings (for commercial use) to large paved areas used for parking new cars until they are delivered to dealers.

The RIDEM groundwater classification for the property is GB. GB designates groundwater that is presumed to require treatment before it is consumed. Future environmental covenants for this parcel will provide a groundwater use restriction to prevent the installation of water supply wells within the property.

The Navy's Land-Use Control Implementation Plan (LUCIP) (EA, January 2002) describes the program that the Navy is utilizing to ensure and document compliance with the land-use controls and/or Deed Covenants placed by the Navy on transferred or planned to be transferred Navy property, which includes Parcel 7 within which the northern portion of Site 16 is located. In accordance with the LUCIP (EA, January 2002), Parcel 7 includes the following environmental land-use restrictions:

- No construction of buildings for residential use
- Water supply wells shall not be installed, nor shall groundwater be utilized except for sampling or other remedial purposes.

Currently, LUCIP inspections of Parcel 7 are performed in conjunction with each Site 03 Interim Groundwater Sampling Event, but no less frequently than annually, to document that there has been no variance from the environmental land-use restrictions stated above. Site 03 is located within the western portion Parcel 7. After completion of the Records of Decision for the sites in this parcel, the LUCIP inspections of Parcel 7 would continue in conjunction with each site monitoring event, but no less frequently than annually.

The purpose of the environmental land-use restriction is to ensure:

- That the entire parcel shall not be used for residential purposes as required for property under a Maritime Administration transfer.

- That groundwater for the entire parcel shall not be withdrawn or utilized except for sampling or other remedial purposes.

The initial annual LUCIP (Institutional Control) inspection of Parcel 7, which includes Site 16, occurred on November 20, 2001, followed by a second inspection on December 13, 2002. Based on these Institutional Control Inspections, there was compliance with the institutional controls stated in the LUCIP (EA, January 2002) placed on this parcel.

TABLE 3-1

MONITORING WELL CONSTRUCTION DATA
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Number	Date Installed	Rhode Island Grid NAD 1927		Ground Elevation (ft msl)	PVC Elevation	Screen or Open Borehole Depth (ft bgs)		Screen Elevation (ft msl)		Depth of Pump Intake (ft bgs)	Elevation of Pump Intake (ft msl)	Depth to Top of Weathered Rock (ft bgs)	Depth to Top of Competent Bedrock (ft bgs)	Elevation to Top of Weather Bedrock (ft msl)	Elevation to Top of Competent Bedrock (ft msl)	Bedrock Core Data (depths in ft bgs, elevations in ft msl)						Geologic Deposits Screened
		Easting	Northing		Elevation (ft msl)	Top	Bottom	Top	Bottom							Depth to top of core	Depth to bottom of core	Elevation of top of core	Elevation of bottom of core	% Recovery	% RQD	
MW16-01S	12/20/2000	522726.76	194083.34	33.9	35.9	17.5	27.5	16.4	6.4	25.5	8.4											Sand (10)
MW16-01D	5/16/2000	522730.2	194076.72	33.9	36.04	48.5	58.5	-14.6	-24.6	56	-22.1		57.2		-23.3	62.5	67.5	-28.6	-33.6	99	63	Silt and Sand (3), Sandy cobbly gravel (5.7), rock (1.3)
MW16-01R	5/19/2004	522733.52	194082.36	33.4	35.21	60	85	-26.6	-51.6	61	-27.6											Quartzite (based on drill cuttings) (25)
MW16-02S	5/23/2000	523216.01	194168.74	20.9	23.72	5	15	15.9	5.9	13.5	7.4											Sand (10)
MW16-02I	8/30/2002	523199.24	194170.937	21.1	23.17	32	37	-10.9	-15.9	36	-14.9											Gravelly Sand (4), silty clay (1)
MW16-02D	5/25/2000	523223.44	194168.33	20.9	23.05	56.5	66.5	-35.6	-45.6	58.5	-37.6		66.7		-45.8	71	75.3	-50.1	-54.4	88	41	Gravelly Sand (1.5); sand (1), sandy silt (1), gravelly sand (6.5)
MW16-02R	2/1/2001	523209.07	194170.21	21.2	22.99	70	95	-48.8	-73.8	80	-58.8											Quartzite (6), phyllite (19)
MW16-02R2	9/18/2002	523191.035	194172.152	21.2	22.78	96	121	-74.8	-99.8	105	-83.8											Bedrock (25)
MW16-03S+	6/12/2000	523084.24	194663.16	11.2	14.14	3	13	8.2	-1.8	8	3.2											Silty Sand (9), sandy silt (1)
MW16-03D+	6/1/2000	523089.62	194663.39	11.1	13.47	38.5	48.5	-27.4	-37.4	43	-31.9	37.5	48.5	-26.4	-37.4	51.5	56.5	-40.4	-45.4	100	0	Weathered bedrock (10)
MW16-03R+	5/10/2004	523078.27	194658.53	11.5	13.68	52	77	-40.5	-65.5	64	-52.5											Phyllite (10.5), quartzite (14.5) (based on drill cuttings)
MW16-04S+	6/14/2000	523273.79	194651.42	10.3	9.92	3	13	7.3	-2.7	11.5	-1.2											Fill (5.2), boulder (4.8)
MW16-04I+	9/6/2002	523270.814	194654.178	10.1	11.76	22	32	-11.9	-21.9	29	-18.9											Silty sand (10)
MW16-04D+	6/13/2000	523267.82	194649.28	10.4	11.91	43	53	-32.6	-42.6	50	-39.6	51.5	53	-41.1	-42.6	56	61	-45.6	-50.6	92	63	Silty Sand (1), sand (3), boulder (2), silty gravelly sand (2.5), weathered bedrock (1.5)
MW16-05S+	12/20/2000	523570.1	194557.8	13.8	15.78	8	18	5.8	-4.2	16	-2.2											Fill (2.5), silty sand (1), sandy silt (2.5), sand (0.5), sandy silt (1), sand (2.5)
MW16-05I+	9/5/2002	523566.001	194558.83	13.9	15.78	22	36	-8.1	-22.1	34.5	-20.6											Sand (1), silty sand (1), sand (2.5), sandy silt (0.5), sand (3.5), sandy silt (0.5), sand (5)
MW16-05D+	5/26/2000	523571.17	194563.14	13.7	16.2	42	52	-28.3	-38.3	46	-32.3	62	62.5	-48.3	-48.8	65.5	70.5	-51.8	-56.8	99	88	Sand (2.5), sandy silt (1), sand (0.5), sandy silt (1.5), sand (1.5), silty sand (1), silty gravelly sand (2)
MW16-05R+	8/20/2002	523566.549	194563.556	14	15.96	66	91	-52.1	-77.1	69	-55											Phyllite (25)
MW16-05R2+	5/25/2004	523583.498	194563.696	13.2	15.04	91	116	-77.8	102.8	113.5	-100.3											Quartzite (1), phyllite (24) (based on drill cuttings)
MW16-06S	6/21/2000	522779.69	194453.16	25.2	27.43	7	17	18.2	8.2	16	9.2											Sand (1), silty sand (2), sandy silt (1.25), gravel (0.25), sandy silt (2.5), silt (2), gravel (1)
MW16-06D	6/22/2000	522780.44	194457.78	25.2	27.75	38.5	44.5	-13.3	-19.3	41.5	-16.3		44.5		-19.3	47.5	52.5	-22.3	-27.3	98	79	silty gravelly sand (3.5), gravelly sandy silt (2.5)
MW16-06R	8/16/2002	522776.543	194457.606	25.6	27.43	49	74	-23.4	-48.4	58	-32.4											Quartzite (based on drill cuttings) (25)
MW16-07S	6/19/2000	522907.22	194424.67	19.6	22.27	7	17	12.6	2.6	12	7.6											Fill and/or reworked soil (9.5), sandy silt (0.5)
MW16-07D	6/16/2000	522907.67	194418.16	19.5	22.37	27.5	37.5	-8	-18	35	-15.5	28	38	-8.5	-18.5	41	46	-21.5	-26.5	98	78	Silt (0.5), weathered rock (sandy silt with rock fragments) (2), weathered rock (silty sandy gravel)(2), weathered rock (sandy silt and gravel) (5.5)
MW16-08S	8/9/2004	522908.83	194124.85	27.2	29.22	16	26	11.2	1.2	22	5.2											Sand (6.5), silty sand (2), sand (0.5), sandy silt (1)
MW16-08D	2/5/2001	522905.26	194122.39	28	30.39	40	55	-12.1	-27.1	42	-14		55.1		-27.2	58.5	63.5	-30.6	-35.6	95	88	Sand to silty sand (8), silty sand and gravel (6), sand and gravel (1)

TABLE 3-1

MONITORING WELL CONSTRUCTION DATA
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Number	Date Installed	Rhode Island Grid NAD 1927		Ground Elevation (ft msl)	PVC Elevation	Screen or Open Borehole Depth (ft bgs)		Screen Elevation (ft msl)		Depth of Pump Intake (ft bgs)	Elevation of Pump Intake (ft msl)	Depth to Top of Weathered Rock (ft bgs)	Depth to Top of Competent Bedrock (ft bgs)	Elevation to Top of Weather Bedrock (ft msl)	Elevation to Top of Competent Bedrock (ft msl)	Bedrock Core Data (depths in ft bgs, elevations in ft msl)						Geologic Deposits Screened
		Easting	Northing		Elevation (ft msl)	Top	Bottom	Top	Bottom							Depth to top of core	Depth to bottom of core	Elevation of top of core	Elevation of bottom of core	% Recovery	% RQD	
MW16-09D	12/6/2001	522373.19	193746.72	34.4	33.9	57	67	-22.7	-32.7	61.8	-27.4		64.8		-32.4	68.1	73.1	-33.8	-38.8	97	90	Gravel (2), sandy silt and gravel (3), gravelly sand (4.75), bedrock (0.25)
MW16-10D	12/6/2001	522317.19	193518.62	31.6	31.4	48.5	58.5	-16.9	-26.9	52.5	-20.9	50	59	-18.4	-27.4	62	67	-30.4	-35.4	93	91	Silt (1.5), weathered rock (silt with rock fragments) (4), rock (1), weathered rock (silty sand and gravel) (3.5)
MW16-10R	12/15/2001	522320.01	193512.66	31.6	31.38	66	91	-34.4	-59.4	69.5	-37.9											Phyllite (8), quartzite (17)
MW16-11S	9/11/2002	522535.988	193782.64	29.8	29.43	10	20	19.8	9.8	18.5	11.3											Sand (10)
MW16-11D	12/8/2001	522544.61	193786.47	29.8	29.57	53.5	63.5	-23.7	-33.7	58	-28.2		62.4		-32.6	66	70.8	-36.2	-41	93	95	Silty sand and gravel (4.5), gravel (2), sand (2.5), rock (1)
MW16-12S	8/9/2004	522666.07	193643.43	29	31.18	14.4	24.4	14.6	4.6	20	9											Sand (7.5), silt (1), sand (1.5)
MW16-12D	12/20/2001	522663.42	193640.08	29.2	31.55	52	62	-22.8	-32.8	57	-27.8		62		-32.8	66	71	-36.8	-41.8	95	88	Sandy silt (2), sand (4), silty sand and gravel (2), sand (1), sandy gravel (1)
MW16-13I	9/11/2002	522480.305	193724.804	29.9	29.71	24	34	5.9	-4.1	29	0.9											Sand (2), silty sand (2), sand (2), silty sand (4)
MW16-13D	1/17/2001	522489.3	193724.69	30	29.4	57	67	-27	-37	62	-32		66.8		-36.8	70	75	-40	-45	98	78	Sand (1), sand and gravel (4), gravelly sand (1.25), sand and gravel (0.75), sandy gravel (2.75), rock (0.25)
MW16-14I	9/13/2002	522789.241	193743.301	30	29.8	26	36	4	-6	31	-1											Sand (6.5), silty sand (1.5), sand (2)
MW16-14D	1/30/2001	522795.16	193747.24	30	29.7	52	62	-22	-32	60.5	-30.5		62.7		-32.7	66	71	-36	-41	88	60	Gravelly sand (4), boulder (1.5), gravelly sand (4.5)
MW16-14R	8/6/2004	522800.29	193751.09	29.5	29.25	65	90	-35.5	60.5	77	-47.5											Phyllite (5.5), quartzite (19.5) (based on drilling cuttings)
MW16-15S	8/2/2004	522874.89	193831.72	29.1	28.97	16	26	13.1	3.1	22	7.1											Sand (1), sandy silt (0.5), sand (8.5)
MW16-15D	1/17/2001	522878.72	193832.21	29.3	28.87	46	56	-16.7	-26.7	52	-22.7		56.3		-27	61	66	-31.7	-36.7	98	60	Silty sand (1), sand and gravel (9)
MW16-15R	1/26/2001	522881	193834.64	29.3	28.64	60.5	86	-31.2	-56.7	62.5	-33.2											Quartzite (25.5)
MW16-15R2	9/18/2002	522875.78	193827.734	29.4	28.72	86	111	-56.6	-81.6	108.5	-79.1											Quartzite and Phyllite (25)
MW16-16I	9/9/2002	522962.969	193768.907	23.5	25.67	32	42	-8.5	-18.5	40	-16.5											Sand (2) and Silty sand (8)
MW16-16D	1/9/2001	522982.2	193783.07	23.4	25.51	54	64	-30.6	-40.6	59	-35.6	61	64	-37.6	-40.6	67	72	-43.6	-48.6	95	68	Boulder (0.5), silty gravelly sand (1), boulder (2.5), silty sand (3), weathered rock (3)
MW16-17S	9/18/2002	522900.902	193436.627	23.9	26.08	6	16	17.9	7.9	14	9.9											Sand (2), silty sand (6), sand (2)
MW16-17I	9/19/2002	522895.015	193433.64	24.1	25.72	28	40	-3.9	-15.9	30	-5.9											Silty sand (4.5), sandy silt (2), silty sand (5.5)
MW16-17D	1/4/2001	522897.97	193445.24	23.9	26.41	57	67	-33.1	-43.1	64.5	-40.6		66		-42.1	70	75	-46.1	-51.1	78	19	Boulder (1), sand (0.5), gravel (1.5), silty sand (1), boulder (1), silty sand (4), phyllite (1)
MW16-17R	9/18/2002	522896.316	193438.382	24.1	26.07	73	98	-48.9	-73.9	82	-57.9											Phyllite (25)
MW16-18I	9/4/2002	523169.986	193650.376	21.6	24.05	22	34	24	-12.4	24	-2.4											Sand (8), Silty sand (4)
MW16-18D	1/4/2001	523164.82	193652.48	21.6	23.85	42.5	52.5	-21	-31	47.5	-25.9		52.5		-31	56	61	-34.5	-39.5	95	46	Gravelly sand (10)
MW16-19I	9/5/2002	523311.315	193773.825	20.3	22.78	30	40	-9.7	-19.7	34	-13.7											Silt and sand (6), silt (4)
MW16-19D	1/11/2001	523318.49	193772.66	20	22.59	45.5	54.5	-25.5	-34.5	47	-27	46.5	48.8	-26.5	-28.7	55	60	-35	-40	98	86	Silt (1), weathered phyllite (3), phyllite (5)
MW16-20I	9/6/2002	523483.505	193958.062	18	17.67	24	34	-6	-16	29	-11											Sand (2), sand and gravel (1), sand (5.5), sand and gravel (1.5)

TABLE 3-1

MONITORING WELL CONSTRUCTION DATA
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Number	Date Installed	Rhode Island Grid NAD 1927		Ground Elevation (ft msl)	PVC Elevation	Screen or Open Borehole Depth (ft bgs)		Screen Elevation (ft msl)		Depth of Pump Intake (ft bgs)	Elevation of Pump Intake (ft msl)	Depth to Top of Weathered Rock (ft bgs)	Depth to Top of Competent Bedrock (ft bgs)	Elevation to Top of Weather Bedrock (ft msl)	Elevation to Top of Competent Bedrock (ft msl)	Bedrock Core Data (depths in ft bgs, elevations in ft msl)						Geologic Deposits Screened
		Easting	Northing		Elevation (ft msl)	Top	Bottom	Top	Bottom							Depth to top of core	Depth to bottom of core	Elevation of top of core	Elevation of bottom of core	% Recovery	% RQD	
MW16-20D	1/9/2001	523487.01	193964.53	18	17.66	39.5	49.5	-21.5	-31.5	44.5	-26.5	48	48.8	-30	-30.8	52	57	-34	-39	100	93	Sand & silt (4.5),gravelly sand and silt (4), weathered rock (1.5)
MW16-21I	9/11/2002	523070.185	193920.997	22.5	22.16	26.5	36.5	-4	-14	34.5	-12											Sand (1.5), sandy silt (0.5), sand (8)
MW16-21D	1/8/2001	523072.13	193916.05	22.6	22.22	51	61	-28.5	-38.5	54	-31.4		60.8		-38.3	65	70	-42.5	-47.5	98	87	Sand to gravelly sand (10)
MW16-22I	9/10/2002	522941.333	193984.479	30.1	29.77	34	44	-3.9	-13.9	43	-12.9											Sand (9), sandy silt (1)
MW16-22D	1/16/2001	522941.53	193984.78	30	29.73	52	62	-22	-32	58	-28		62		-32	66	71	-36	-41	99	40	Silty sand (1), sand and gravelly sand (3.5), sandy silt (0.5), silty gravelly sand (5)
MW16-23S	7/19/2004	523098.18	194018.45	25.1	24.62	14	24	11.1	1.1	20	5.1											Sand (10)
MW16-23D	1/12/2001	523094.55	194017.91	25.5	25.32	50	65	-24.5	-39.5	52	-26.5	60.5	64.9	-35	-39.4	69	74	-43.5	-48.5	98	45	Sand (5.5), weathered phyllite (gravelly sand) (4.5)
MW16-24I	9/11/2002	523257.066	194039.437	21.4	21.22	18	28	3.4	-6.6	23	-1.6											Gravelly sand (3), silty sand (1), sand (6)
MW16-24D	1/22/2001	523252.17	194037.58	21.3	20.96	50	62	-28.8	-40.8	51	-29.7	58.5	62.4	-37.3	-41.2	65	70	-43.8	-48.8	93	67	Sand (2.5), sandy gravel (5.5), sand (0.5), weathered phyllite (3.5)
MW16-25S	8/2/2004	523156.55	193802.74	21.4	23.23	9	19	12.4	2.4	17.5	3.9											
MW16-25I	9/12/2002	523153.955	193805.294	21.7	23.57	32	42	-10.3	-20.3	40	-18.3											Silty sand (9), gravelly sand (1)
MW16-25D	1/12/2001	523142.36	193805.42	21.8	24.42	46	58	-24.3	-36.3	47	-25.2	58	58.3	-36.3	-36.5	61	66	-39.3	-44.3	87	20	Silty sand (4), sand (2), gravelly sand (6)
MW16-25R	1/18/2001	523149.02	193805.75	21.6	23.01	61	86	-39.4	-64.4	80	-58.4											Phyllite (16.5), Quartzite (8.5) (based on drill cuttings)
MW16-26D	1/25/2001	522449.58	194301.88	16.8	19.2	40	49	-23.3	-32.3	44.5	-27.7		49		-32.3	53	58	-36.3	-41.3	97	88	Silty sand (1), sand (5.5), gravelly sand and silt (2.5)
MW16-27I	8/9/2004	523700.52	194366.89	13.3	13.06	34	44	-20.7	-30.7	39	-25.7											Silty sand (2), sand (8)
MW16-27D	12/12/2000	523694.31	194369.16	13.2	12.96	54	64	-40.8	-50.8	55.5	-42.3		64		-50.8	66	71	-52.8	-57.8	100	92	Layers of sand and silty gravel (2), boulder (3), gravelly sand (2), silty gravelly sand (3)
MW16-27R	12/18/2000	523705.2	194364.2	13.2	12.9	66.5	92	-53.3	-78.8	79	-65.8		61.5		-48.3							Quartzite (25.5) (based on drill cuttings)
MW16-28I	8/10/2004	523792.13	194576.65	12.5	12.27	22.5	32.5	-10	-20	28.5	-16											Sand (9), silty sand (1)
MW16-28D+	12/13/2000	523783.01	194581.15	12.4	12.02	54.5	64.5	-42.1	-52.1	57	-44.6		65		-52.6	69	74	-56.6	-61.6	97	93	Gravelly sand (10)
MW16-28R+	12/21/2000	523789.49	194578.2	12.5	12.02	68	93	-55.6	-80.6	82.5	-70		65		-52.6							Quartzite (8), phyllite (17) (based on drill cuttings)
MW16-29D	1/31/2001	523410.79	194441.7	14.4	16.12	44.5	54.5	-30.1	-40.1	51	-36.6		54.4		-40	57	62	-42.6	-47.6	62	16	Silty sand (3.5), sand to gravelly sand (6.5)
MW16-30D	2/20/2002	522483.868	193681.298	30.5	30.22	55	62.9	-24.5	-32.4	62	-31.5		65.1		-34.6	68	73	-37.5	-42.5	90	75	Sand (2), gravelly silt (8)
MW16-31D	2/28/2002	522637.057	193743.687	30.9	30.29	54	64	-23.1	-33.1	56	-25.1	58.9	62.2	-28	-31.3	67	71.8	-36.1	-40.9	97	72	Gravelly silt (2), silt (3), weathered rock (5)
MW16-32D	2/14/2002	522736.452	193770.184	30.6	30.14	50	62	-19.4	-31.4	51	-20.4	60	61.8	-29.4	-31.2	66	71.2	-35.4	-40.6	102	100	Sand (10) weathered Rock (2)
MW16-32R	8/5/2004	522750.63	193756.37	30.2	30.06	68	93	-37.8	-62.8	77	-46.8											Quartzite (4), phyllite (14), quartzite (4), phyllite (3) (based on drilling cuttings)
MW16-33S	9/12/2002	522519.898	193400.133	28.4	28.12	6.5	16.5	21.9	11.9	15.5	12.9											Sand (10)
MW16-33I	10/3/2002	522514.939	193405.705	28.6	28.29	34	44	-5.4	-15.4	42	-13.4											Sand (10)
MW16-33D	8/30/2002	522515.185	193398.862	28.4	27.85	61	71	-32.6	-42.6	66	-37.6		69		-40.6	74	79	-45.6	-50.6	100	35	Gravelly sand (5), boulder (2), gravel (1), weathered rock (2)
MW16-34S	9/13/2002	522727.814	193554.855	26.8	29.06	5	15	21.8	11.8	14.5	12.3											Sand (10)
MW16-34I	10/7/2002	522731.594	193550.684	26.2	29.21	25	35	1.2	-8.8	30	-3.8											Sand (10)
MW16-34D	8/22/2002	522732.359	193554.994	26.5	29.33	44	58	-17.5	-31.5	51	-24.5	52	58	-25.5	-31.5	61	66	-34.5	-39.5	97	75	Sand (8), weathered rock (6)
MW16-35S	8/20/2002	522966.183	193560.188	23.7	26.22	6	16	17.7	7.7	14	9.7											Sand (10)
MW16-35I	10/1/2002	522967.026	193555.384	23.6	25.82	28	38	-4.5	-14.5	34	-10.4											Sand (10)

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SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Number	Date Installed	Rhode Island Grid NAD 1927 Easting	Rhode Island Grid NAD 1927 Northing	Ground Elevation (ft msl)	PVC Elevation Elevation (ft msl)	Screen or Open Borehole Depth (ft bgs) Top	Screen or Open Borehole Depth (ft bgs) Bottom	Screen Elevation (ft msl) Top	Screen Elevation (ft msl) Bottom	Depth of Pump Intake (ft bgs)	Elevation of Pump Intake (ft msl)	Depth to Top of Weathered Rock (ft bgs)	Depth to Top of Competent Bedrock (ft bgs)	Elevation to Top of Weather Bedrock (ft msl)	Elevation to Top of Competent Bedrock (ft msl)	Bedrock Core Data (depths in ft bgs, elevations in ft msl) Depth to top of core	Depth to bottom of core	Elevation of top of core	Elevation of bottom of core	% Recovery	% RQD	Geologic Deposits Screened
MW16-35D	8/15/2002	522969.87	193560.305	23.6	25.79	51.5	61.5	-27.9	-37.9	55	-31.4		61.4		-37.8	66	71	-42.4	-47.4	100	15	Sand (6.5), gravelly sand (3.5)
MW16-36D	8/15/2002	523077.903	193203.57	20.4	23.6	39.5	49.5	-19.1	-29.1	48	-27.6	47	54	-26.6	-33.6	54.5	59.5	-34.1	-39.1	100	87	Sand (4.5), silty gravelly sand (3), weathered phyllite (2.5)
MW16-36R	8/30/2002	523072.137	193203.003	20.5	22.51	53.5	78.5	-33	-58	63.5	-43											Quartzite and phyllite (25) (based on drill cuttings)
MW16-37S	8/13/2002	522866.342	193662.735	25.3	27.53	7	22	18.3	3.3	20	5.3											Gravelly sand (5), sand (10)
MW16-37I	8/13/2002	522863.175	193664.484	25.5	27.72	24	38	1.5	-12.6	37	-11.5											Sand (6.5), silty sand (1.5), sand (2), silty sand (4)
MW16-37D	8/12/2002	522867.109	193664.391	25.4	27.73	44.7	54.7	-19.3	-29.3	46	-20.6		54.7		-29.3	57.7	62.1	-32.3	-36.7	94	40	Boulder (0.3), sand (9.7)
MW16-38I	9/17/2002	523056.172	193801.841	22.6	24.94	29	39	-6.4	-16.4	34	-11.4											Sand (9), Silt (1)
MW16-39I	10/8/2002	523824.613	193750.161	15.8	15.25	45	55	-29.2	-39.2	51	-35.2											Sand (10)
MW16-39D	8/5/2002	523830.427	193755.024	15.6	15.4	64	74	-48.4	-58.4	69	-53.4	74	74.5	-58.4	-58.9	77	82	-61.4	-66.4	93	33	Silty sand (2), Boulder (2), silty sand (2), gravelly sand (3.5), boulder (0.5)
MW16-40S	9/23/2002	523071.685	194178.508	23.7	26.06	6	22	17.7	1.7	19	4.7											Sand (12), sand with trace organics (2), sand (2)
MW16-40I	4/29/2004	523074.58	194186.74	22.6	25.24	35	45	-12.4	-22.4	43	-20.4											Sand (10)
MW16-40D	4/28/2004	523074.04	194181.69	23.4	25.93	54	64	-30.6	-40.6	57	-33.6	58	63	-34.6	-39.6	67	72	-43.6	-48.6	93	51	Sand (2), till (2), boulders/cobbles (6)
MW16-41S	9/6/2002	523090.314	194236.573	20.7	22.66	7.5	17.5	13.2	3.2	16.5	4.2											Sand (6.5), Silty sand (2.5), silt (0.5), Peat (0.5)
MW16-41I	9/9/2002	523084.877	194232.692	20.8	22.73	19.5	29.5	1.3	-8.7	24	-3.2											Sand (10)
MW16-41D	8/7/2002	523089.143	194242.501	20.6	22.25	51	61	-30.4	-40.4	57	-36.4		61		-40.4	64	69	-43.4	-48.4	100	58	Gravelly sand (10)
MW16-42S	9/6/2002	523239.273	194280.996	18	20.15	5.5	15.5	12.5	2.5	14.5	3.5											Sandy fill (6.5), sand (2.5), silty with organic material (0.5), silt (0.5)
MW16-42I	9/9/2002	523241.39	194275.62	18.1	19.91	20	30	-1.9	-11.9	27	-8.9											Sand (10)
MW16-42D	8/8/2002	523090.314	194236.573	18	21.11	58	68	-40	-50	63	-45	58	(78+)	-40	(-60+)	73	78	-55	-60	85	7	Weathered / fractured rock and silt (10)
MW16-43S	8/7/2002	523035.33	194408.097	17.8	20.14	6	21	11.8	-3.2	17	0.8											Sandy fill (8), sand (3), peat (1), sand (3)
MW16-43I	8/15/2002	523037.822	194416.126	17.1	18.98	25.5	33.5	-8.4	-16.4	32	-14.9											Sand (2.5), gravelly sand (4), sand (1.5)
MW16-43D	7/17/2002	523032.746	194416.224	17.1	20.31	37	43	-19.9	-25.9	40.5	-23.4		43.3		-26.2	46	51	-28.9	-33.9	95	95	Sand (6)
MW16-44S	8/5/2002	523150.531	194409.371	16.7	19.73	6	21	10.7	-4.4	16	0.7											Sandy fill (8), silt? (2), peat (0.5), sand (1.5), silty sand (3)
MW16-44I	9/25/2002	523144.948	194417.183	16.4	18.78	23	33	-6.7	-16.7	28	-11.6											Silty sand (7), sand (3)
MW16-44D	7/23/2002	523148.185	194406.106	16.8	18.89	49.6	59.6	-32.8	-42.8	54.7	-37.9		59.6		-42.8	62.6	67.6	-45.8	-50.8	73	30	Gravelly sand (5.2), boulder (4.2), sand (0.6)
MW16-44R	8/28/2002	523150.154	194413.961	16.4	19.17	62	87	-45.6	-70.6	65	-48.6											phyllite? (25) (based on drill wash)
MW16-45S	8/5/2002	523069.934	194469.7	14.8	18.1	6	21	8.8	-6.2	19	-4.2											Gravelly sandy fill (10.5), Peat (1.5), Sand (3)
MW16-45I	9/30/2002	523074.061	194474.438	14.7	17.35	32	42	-17.3	-27.3	33	-18.3											Sand (10)
MW16-45D	7/22/2002	523068.144	194474.196	14.7	17.64	48	58	-33.3	-43.3	51	-36.3		56.3		-41.6	61	66	-46.3	-51.3	96	87	Gravelly sand (3.8), boulders/cobbles (2.2), sandy silt (2.3), rock (1.7)
MW16-46S	8/8/2002	523141.706	194528.156	14.3	16.49	6	21	8.3	-6.7	16.5	-2.2											Fill (sand, rock fragments, wood, glass) (10.5), peat (0.5), silty sand (1), sand (3)
MW16-46I	9/26/2002	523135.559	194531.072	13.8	16.16	22	32	-8.2	-18.2	27	-13.2											Gravelly sand (2), sand (6), silty sand (2)

TABLE 3-1

MONITORING WELL CONSTRUCTION DATA
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Number	Date Installed	Rhode Island Grid NAD 1927		Ground Elevation (ft msl)	PVC Elevation	Screen or Open Borehole Depth (ft bgs)		Screen Elevation (ft msl)		Depth of Pump Intake (ft bgs)	Elevation of Pump Intake (ft msl)	Depth to Top of Weathered Rock (ft bgs)	Depth to Top of Competent Bedrock (ft bgs)	Elevation to Top of Weather Bedrock (ft msl)	Elevation to Top of Competent Bedrock (ft msl)	Bedrock Core Data (depths in ft bgs, elevations in ft msl)						Geologic Deposits Screened
		Easting	Northing		Elevation (ft msl)	Top	Bottom	Top	Bottom							Depth to top of core	Depth to bottom of core	Elevation of top of core	Elevation of bottom of core	% Recovery	% RQD	
MW16-46D	7/18/2002	523141.746	194536.457	14.3	16.79	50.5	59	-36.2	-44.7	52	-37.7	52.2	59	-37.9	-44.7	62	67	-47.7	-52.7	95	25	Gravelly sand (2), weathered rock (6.5)
MW16-47S	9/17/2002	522900.603	194570.995	18.3	20.45	4	14	14.3	4.3	12.5	5.8											Gravelly sandy fill (0.5), sand (9.5)
MW16-47D	7/19/2002	522906.531	194569.272	18.2	20.5	26.3	36.3	-8.1	-18.1	32	-13.8		36.3		-18.1	39.3	44.3	-21.1	-26.1	100	90	Sand (1.8), silt (0.5), silty sand / sandy silt (3), silty gravelly sand (4.5), sandy silt (0.2)
MW16-48S	9/5/2002	523173.391	194726.274	8.7	8.37	4	14	4.7	-5.3	9	-0.3											Sandy fill (4), sand with organic material and seagrass (1.5), sandy silt (0.2), sand (4.5),
MW16-48I	9/5/2002	523173.24	194724.497	8.6	8.33	20	30	-11.4	-21.4	27	-18.4											Sand (4) gravel (2.5), sand (3.5)
MW16-48D	9/5/2002	523171.983	194720.268	8.7	8.34	35.4	45.4	-26.7	-36.7	40.5	-31.8		45.4		-36.7	48.4	53.4	-39.7	-44.7	100	65	Sand (4.6), gravelly sand (5.4)
MW16-49I	8/4/2004	524093.53	194210.88	13.8	13.46	37	47	-23.2	-33.2	42	-28.2											Sand (10)
MW16-49D	8/1/2002	524094.735	194212.901	13.7	13.13	62	76	-48.3	-62.3	70.5	-56.8	76	93	-62.3	-79.3	96	101	-82.3	-87.3	80	30	Sand (1), boulder (1), sand (2), boulder (2), sand (3.9), boulder (2.1), sand (2)
MW16-50I	8/5/2004	524264.02	194531.86	13.7	13.33	24	34	-10.3	-20.3	25	-11.3											Sand (4), silty sand (4), sand (2)
MW16-50D	7/25/2002	524267.379	194529.516	13.7	13.47	78	88	-64.3	-74.3	86.5	-72.8		87.4		-73.7	91	96	-77.3	-82.3	100	40	Gravelly sand (3), boulder (3), gravelly sand (3.5), rock (0.5)
MW16-51D	8/8/2002	523889.248	194980.542	13.1	15.62	65.5	75.5	-52.4	-62.4	70.5	-57.4		75.5		-62.4	78.6	83.6	-65.5	-70.5	100	92	Gravelly sand (2), boulder (1.5), gravelly sand (6.5)
MW16-51R	8/28/2002	523896.394	194978.687	12.9	14.92	78.5	103.5	-65.6	-90.6	81.5	-68.6											Phyllite and quartzite (25) (based on drilling fluid)
MW16-52D	7/25/2002	524405.588	195066.044	12.9	12.7	60	74	-47.1	-61.1	63	-50.1		74		-61.1	78	83	-65.1	-70.1	40	0	Gravelly sand (8), sandy silt (2), silty gravelly sand (2), gravelly sand (2)
MW16-52R	8/2/2002	524399.691	195069.189	12.9	12.54	93	118	-80.1	-105.1	112	-99.1											Bedrock (25)
MW16-53S	8/1/2002	523509.915	194449.036	15	16.99	4	14	11	1	12	3											Sandy fill (2), sand and organic material (1), sand (7)
MW16-54D	8/13/2002	522461.712	192946.43	27.8	27.57	64	74	-36.2	-46.2	72.5	-44.7	73.3	74.2	-45.5	-46.4	77	82	-49.2	-54.2	93	0	Sand (9.25), weathered / fractured phyllite (0.75)
MW16-55D	9/24/2002	521552.972	193791.688	42.5	44.78	90	105	-47.5	-62.5	92	-49.5	100	105.3	-57.5	-62.8	103.3	108.3	-60.8	-65.8	100	32	Gravelly sand (10), weathered phyllite (5)
MW16-55R	9/30/2002	521548.552	193795.939	42.7	44.56	108	133	-65.3	-90.3	121.5	-78.8											Phyllite and some quartzite (25) (based on drill cuttings)
MW16-55R2	10/10/2002	521545.992	193791.88	42.5	44.08	133	158	-90.5	-115.5	146	-103.5											Phyllite and quartzite (25) (based on drilling cuttings)
MW16-56I	7/28/2004	523566.43	194176.8	16.6	16.37	33	43	-16.4	-26.4	38	-21.4											Sand (10)
MW16-56D	7/27/2004	523562.79	194178.81	16.7	16.43	59	66	-42.3	-49.3	64.5	-47.8		66		-49.3	69	74	-52.3	-57.3	98	48	Gravelly sand (4), sand (1), gravelly sand (2)
MW16-56R	8/2/2004	523570.65	194174.93	16.6	16.37	69	94	-52.4	-77.4	69.5	-52.9											Quartzite (3), phyllite (7), quartzite (9), phyllite (5) (based on drill cuttings)
MW16-57I	7/22/2004	524042.09	193740.19	13.3	13	43	53	-29.7	-39.7	48	-34.7											Sand (10)
MW16-57D	7/21/2004	524039.6	193742.13	13.3	12.97	66.5	76.5	-53.2	-63.2	75	-61.7	72.5	78	-59.2	-64.7	79	84	-65.7	-70.7	98	85	Sand (3.5), silty sand (2.5), weathered phyllite (4)
MW16-58S	5/10/2004	523390.78	194289.83	17.3	19.87	6	16	11.3	1.3	13	4.3											Sand (5), silt (1), sand (1), silt (3)
MW16-58I1+	5/7/2004	523389.99	194291.64	17.3	19.93	21	31	-3.7	-13.7	27	-9.7											Sandy silt (1), Silty sand (8), sand (1)
MW16-58I2+	5/6/2004	523393.46	194290.32	17.3	19.97	36	46	-18.7	-28.7	39	-21.7											Sand (10)

TABLE 3-1

MONITORING WELL CONSTRUCTION DATA
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Number	Date Installed	Rhode Island Grid NAD 1927		Ground Elevation (ft msl)	PVC Elevation	Screen or Open Borehole Depth (ft bgs)		Screen Elevation (ft msl)		Depth of Pump Intake (ft bgs)	Elevation of Pump Intake (ft msl)	Depth to Top of Weathered Rock (ft bgs)	Depth to Top of Competent Bedrock (ft bgs)	Elevation to Top of Weather Bedrock (ft msl)	Elevation to Top of Competent Bedrock (ft msl)	Bedrock Core Data (depths in ft bgs, elevations in ft msl)						Geologic Deposits Screened
		Easting	Northing		Elevation (ft msl)	Top	Bottom	Top	Bottom							Depth to top of core	Depth to bottom of core	Elevation of top of core	Elevation of bottom of core	% Recovery	% RQD	
MW16-58D+	5/5/2004	523393.2	194292.89	17.2	19.98	51	62	-33.8	-44.8	60.5	-43.3	55	63	-37.8	-45.8	58	68	-40.8	-50.8	98	90	Gravelly sand (2), boulder (1), gravelly sand (1), fractured phyllite (7)
MW16-58R+	5/21/2004	523397.26	194291.68	17.3	18.98	66	91	-48.7	-73.7	87.5	-70.2											Phyllite (25) (based on drilling cuttings)
MW16-59S	7/26/2004	522998.85	194017.03	28.4	27.79	14	24	14.4	4.4	22.5	5.9											Sand (10)
MW16-59I	7/26/2004	522999.903	194014.595	28.4	27.87	38	48	-9.6	-19.6	46.5	-18.1											Silty sand (2), sand (2), silty sand (4), sand (1), silty sand (1)
MW16-59D	7/22/2004	523000.964	194011.097	28.2	28.1	64	74	-35.8	-45.8	67	-38.8		68.75		-40.55	72	77	-43.8	-48.8	84	46	Sand (4), gravel and silt (1), fractured quartzite (5)
MW16-59R	8/6/2004	523003.84	194015.38	28.2	28	75	100	-46.8	-71.8	91.5	-63.3											Quartzite (25) (based on drilling cuttings)
MW16-60D	8/2/2004	522936.043	193932.443	28.3	28.06	51	61	-22.7	-32.7	59.5	-31.2		61		-32.7	64	69	-35.7	-40.7	95	32	Sand (10)
MW16-60R	8/17/2004	522931.71	193934.51	28.5	28.35	64	89	-35.5	-60.5	74	-45.5											Quartzite (25) (based on core data)
MW16-61I	7/30/2004	522945.24	193829.16	23.9	23.66	28	38	-4.1	-14.1	31	-7.1											Sand (10)
MW16-61D	8/2/2004	522941.529	193825.557	23.9	23.68	44	53	-20.1	-29.1	47	-23.1		52.75		-28.85	56	61	-32.1	-37.1	94	52	Silty sand (3), sand (6)
MW16-62I	8/5/2004	522897.25	193872.44	29	28.48	27.5	37.5	1.5	-8.5	35	-6											Sand (10)
MW16-62D	8/3/2004	522900.547	193873.895	23.9	23.68	47.5	57.5	-23.6	-33.6	52.5	-28.6		57.5		-33.6	57.5	65.5	-33.6	-41.6	80	40	Sand (10)
MW16-63I	7/29/2004	522855.86	193914.92	30.4	30.18	31	41	-0.6	-10.6	37.5	-7.1											Sand (10)
MW16-63D	7/28/2004	522856.944	193911.433	30.3	30.04	47	55	-16.7	-24.7	54	-23.7		54.5		-24.2	57.5	62.5	-27.2	-32.5	100	79	Sand (7), gravelly sand (1)
MW16-64I	7/29/2004	522866.74	193973.97	31.7	31.49	30	37.5	1.7	-5.8	34	-2.3											Silt (7.5)
MW16-64D	7/28/2004	522864.991	193979.696	31.8	31.51	46.5	56.5	-14.7	-24.7	55	-23.2		56.5		-24.7	59.5	64.5	-27.5	-32.5	92	61	Sand (0.5), silt (0.5), sand (4), silt (0.5), sand (4.5)
MW16-65S	8/24/2004	522582.19	193898.28	36.7	39.06	27	37	9.7	-0.3	32	4.7											Sand (10)
MW16-65I	8/19/2004	522583.97	193894.41	36.2	38.68	37	44	-0.8	-7.8	40.5	-4.3											Sand (4), gravelly sand (3)
MW16-65D	8/13/2004	522572.92	193899.76	37	39.66	70	75	-33	-38	73.5	-36.5		65.5		-28.5	70	80	-33	-43	100	55	Fractured quartzite (5)
MW16-65R	8/23/2004	522579.93	193900.48	36.9	39.2	77	102	-40.1	-65.1	90	-53.1											Quartzite (25) (based on drilling cuttings)
MW16-66S	8/25/2004	522712.23	193879.47	29.7	29.37	18	28	11.7	1.7	26.5	3.2											Sand (10)
MW16-66I	8/25/2004	522706.85	193881.23	29.6	29.26	30.5	40.5	-0.9	-10.9	38	-8.4											Sand (10)
MW16-66D	8/11/2004	522712.075	193872.673	29.7	29.44	46	57	-16.3	-27.3	48	-18.3		56.8		-27.1	60	65	-30.3	-35.3	86	47	Silt (0.5), sand (10.5)
MW16-66R	8/25/2004	522707.49	193876.49	29.6	29.22	60	85	-30.4	-55.4	76.5	-46.9											Quartzite (25) (based on drilling cuttings)
MW16-67S	9/3/2004	522761.98	193853.64	30.4	30.27	14	24	16.4	6.4	22	8.4											Sand (10)
MW16-67I	9/3/2004	522770.64	193857.29	30.4	30	28	38	2.4	-7.6	36.5	-6.1											Sand (10)
MW16-67D	9/1/2004	522760.95	193850.33	30.4	30.17	51.5	61.5	-21.1	-31.1	56.5	-26.1		61.25		-30.85	64.5	69.5	-34.1	-39.1	100	37	Sand (1), gravelly sand (1.5), gravel (2), sand (0.5), gravelly sand (1.5), sand (3.5)
MW16-67R	9/7/2004	522758.59	193853.86	30.4	30.08	64	89	-33.6	-58.6	83	-52.6											Phyllite (3), quartzite (12), phyllite (3.5), quartzite (6.5) (based on drilling cuttings)
MW16-68S	8/13/2004	522793.57	193803.92	30.3	30.03	15	25	15.3	5.3	23.5	6.8											Sand (10)
MW16-68I	8/12/2004	522791.52	193802.25	30.3	30.02	28	38	2.3	-7.7	36	-5.7											Sand (2), silty sand (2), sand (6)
MW16-68D	8/10/2004	522792.802	193798.016	30.1	30.32	48.5	58.5	-18.4	-28.4	55.5	-25.4		58.25		-28.15	61.5	66.5	-31.4	-36.4	81	54	Sand (7.5), silt (2.5)
MW16-68R	8/17/2004	522798.84	193800.98	30.2	29.93	61.5	86.5	-31.3	-56.3	77.5	-47.3											Quartzite (14.5), quartzite and phyllite (2.5), quartzite (8) (based on drilling cuttings)
MW16-69S	8/17/2004	522796.47	193867.3	30.4	30.15	15	25	15.4	5.4	23	7.4											Sand (10)
MW16-69I	8/19/2004	522793.12	193872.53	30.4	30.1	39	49	-8.6	-18.6	47	-16.6											Sand (4), sandy gravel (0.5), sand (4.5), sandy gravel (1)
MW16-69D	8/16/2004	522798.605	193872.33	30.4	29.98	51.5	61.5	-21.1	-31.1	54.5	-24.1	61	61.5	-30.6	-31.1	64.5	70	-34.1	-39.6	100	33	Gravel (2.5), gravelly sand (2), gravel (5.5)

TABLE 3-1

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SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Number	Date Installed	Rhode Island Grid NAD 1927		Ground Elevation (ft msl)	PVC Elevation	Screen or Open Borehole Depth (ft bgs)		Screen Elevation (ft msl)		Depth of Pump Intake (ft bgs)	Elevation of Pump Intake (ft msl)	Depth to Top of Weathered Rock (ft bgs)	Depth to Top of Competent Bedrock (ft bgs)	Elevation to Top of Weather Bedrock (ft msl)	Elevation to Top of Competent Bedrock (ft msl)	Bedrock Core Data (depths in ft bgs, elevations in ft msl)						Geologic Deposits Screened
		Easting	Northing		Elevation (ft msl)	Top	Bottom	Top	Bottom							Depth to top of core	Depth to bottom of core	Elevation of top of core	Elevation of bottom of core	% Recovery	% RQD	
MW16-69R	8/19/2004	522803.95	193868.57	30.4	30.14	64.5	89.5	-34.1	-59.1	76.5	-46.1											Quartzite and phyllite (3), phyllite (2.5), quartzite (2), phyllite and quartzite (2), phyllite (15.5)
MW16-70S	8/11/2004	522822.3	193834.16	30.1	29.93	10	25	20.1	5.1	23	7.1											Sand (15)
MW16-70I	8/12/2004	522824.69	193830.23	30.2	29.89	28	38	2.2	-7.8	36	-5.8											Sand (10)
MW16-70D	8/10/2004	522821.427	193839.671	30.2	29.55	46	56	-15.8	-25.8	54	-23.8		58.3		-28.1	61.3	66.3	-31.1	-36.1	100	8	Sand (10)
MW16-70R	8/12/2004	522818.62	193838.19	30.2	29.88	61	86	-30.8	-55.8	81	-50.8					61	70	-28.8	-39.8	98	76	Quartzite (1), phyllite (0.5), quartzite (5), phyllite (1.5), quartzite (2), phyllite (2.5), quartzite and phyllite (1.5), quartzite (11)
MW16-71S	8/24/2004	522841.87	193805.85	29.9	29.63	15	25	14.9	4.9	23	6.9											Sand (10)
MW16-71I	8/24/2004	522843.62	193802.53	29.9	29.42	28	38	1.9	-8.1	36	-6.1											Silty sand (1), sand (4), silty sand (1), sand (3), silty sand (0.5), silt (0.5)
MW16-71D	8/19/2004	522838.46	193799.51	29.9	29.77	46	57	-16.1	-27.1	56	-26.1		57.3		-27.4	60.5	65.5	-30.6	-35.6	96	52	Sand (7.5), boulders (2.5), gravelly sand (1)
MW16-71R	8/25/2004	522841.01	193801.19	29.9	29.75	59.5	84.5	-29.6	-54.6	70.5	-40.6											Quartzite (25) (based on drilling cuttings)
INJ16-01D	9/9/2004	522760.07	193874.18	30.2	29.98	47.5	57.5	-17.3	-27.3	55.5	-25.3		59		-28.8	62.5	67.5	-32.3	-37.3	100	48	Sand (6.5), gravelly sand (2), sand (1), gravelly sand (0.5)
INJ16-02D	8/26/2004	522747.69	193854.05	30.3	30.18	44.5	54.5	-14.2	-24.2	48.7	-18.4		55.6		-25.3	59	64	-28.7	-33.7	85	41	Sand (10)
INJ16-03D	9/13/2004	522779.75	193862.74	30.4	29.95	46	56	-15.6	-25.6	54	-23.6		61		-30.6	65	75	-34.6	-44.6	95	53	Sand (3), silt (0.5), sand (0.5), gravel (4), sand (2)
INJ16-04D	9/8/2004	522759.2	193836.9	30.4	30.07	42.5	52.5	-12.1	-22.1	50.5	-20.1	59.7	61	-29.3	-30.6	64	69	-33.6	-38.6	96	43	Sand (4), silt (6?)
INJ16-05D	9/9/2004	522761.03	193840.67	30.5	29.82	44	54	-13.5	-25.5	52	-21.5		61.5		-31	64.5	69.5	-34	-39	96	48	Sand (6.5), gravelly sand (2.5), sand (0.5), gravelly sand (0.5)
INJ16-06D	8/30/2004	522769.81	193819.39	30.5	30.3	50.5	60.5	-20	-30.5	59	-28.5		64		-33.5	64	69	-33.5	-38.5	93	27.5	Sand (0.5), gravelly sand (1), sand (5), gravelly sand (1), sand (2.5)
INJ16-07D	9/2/2004	522791.96	193823.68	30.4	29.75	51.5	61.5	-21.1	-31.1	59.5	-29.1		61.5		-31.1	64.5	69.5	-34.1	-39.1	88	83	Gravel (1), sandy gravel (2.5), boulder (3), sand (0.5), sandy gravel (2.5), sand (0.5)
INJ16-08D	8/20/2004	522781.14	193801.81	30.4	29.77	54	64	-23.6	-33.6	62	-31.6		64.6		-34.2	68	78	-37.6	-47.6	100	70	Sand (2.9), boulder (3.1), sand (4)
INJ16-09D	8/25/2004	522803.21	193807.38	30.3	29.79	48.5	58.5	-18.2	-28.2	56.5	-26.2		58.4		-28.1	62	67	-31.7	-36.7	95	80	Sand (7.5), boulder (1), gravelly sand (1.5)
INJ16-10D	8/30/2004	522792.36	193784.28	30.2	29.92	49.5	59.5	-19.3	-29.3	57.5	-27.3	59	59.5	-28.8	-29.3	62.5	67.5	-32.3	-37.3	94	74.5	Boulder (1), gravel (1), sand (0.5), gravel (1), sand (2), sandy gravel (2), sandy silt (0.5), sand (1.5), gravelly sand (0.5)
INJ16-11D	9/3/2004	522813.3	193789.39	30.1	30.04	50.5	60.5	-20.4	-30.4	59	-28.9		60.5		-30.4	63.3	68.3	-33.2	-38.2	97	44	Sand (6), gravelly sand (4)
INJ16-12D	8/31/2004	522803.02	193767.84	29.9	29.41	48	58	-18.1	-28.1	55	-25.1		61.3		-31.4	64.5	69.5	-34.6	-39.6	93	79	Gravelly sand (1), sand (2), gravelly sand (5.75), boulder (1.25)

NOTES:
ft bgs = Feet below ground surface.
msl = Mean sea level.
+ = Monitoring well that is tidally influenced.
RQD = Rock Quality Designation.
Recovery = Percent of rock core.
NAD = North American Datum.

TABLE 3-2

SUMMARY OF BOREHOLE FRACTURE AND GROUNDWATER FLOW DATA INTERPRETED FROM GEOPHYSICAL LOGS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

	Fracture Trend from Acoustic Televiewer Log								Depth of GW Flow Zones Interpreted from Heat Pulse Flow Meter Log (ft bgs)	
	NE-SW		NW-SE		E-W		N-S			
Well Number	Number of Fractures	Depth of Open* Fractures (ft bgs)	Number of Fractures	Depth of Open* Fractures (ft bgs)	Number of Fractures	Depth of Open* Fractures (ft bgs)	Number of Fractures	Depth of Open* Fractures (ft bgs)	Ambient Conditions	Pumped Conditions**
MW16-01R	4	60.54, 72.32	3				1	81.99	NVFA	Most inflow between casing bottom and 69 ft, weak inflow between 69 to 79 ft
MW16-02R	7	71.5, 72.5, 76.3, 78.3, 79.5, 86.5			2	70.3, 87	3	75.8, 81.5, 87.5	downward flow from 74 to 80 ft	upward flow from 74 to bottom of casing (70 ft), and from 80 to 75
MW16-02R2	4	111	1		1		2	100.5	NVFA	upward flow from 98 to 96 and 102.5 to 100.5
MW16-03R			10	58.61	3				NVFA	Inflow increased between 58 to 66 ft, inflow originated between 66 to 73 ft
MW16-05R	4	58.2, 71	2	56.9	3		7	68.8, 71.3	NVFA	upward from 69 to 66 ft (BOC)
MW16-05R2			8	114.76			5		NVFA	Most inflow originated between 109 to 115 ft, inflow while pumping increased between casing bottom to 97 ft, 97 to 103 ft, and 103 to 109 ft
MW16-06R	2						1	50.8	NVFA	upward flow from 73 to 71 ft, 69 to 60 ft, 59 to 57 ft, and 60 to 55.5 ft
MW16-10R					1		4	70, 70.5	NVFA	upward flow from 70 to 66 ft and 76.4 to 72 ft
MW16-14R	1		4	69.27, 76.17, 76.24	1		2		upward flow from below 78.5 to between 71 to 78.5 ft	Most inflow originated greater than 89 ft, inflow increased between 78.5 to 84 ft
MW16-15R			1	72	2	62.3	2	69.7, 74	NVFA	upward flow from 67 to 61
MW16-15R2	1	98	1	108.5	1		2		NVFA	most upward flow from 109.5 to 106.5, minor flow from 99.5 to 96.5
MW16-17R	4				5	76.2, 81	9	73.5, 74.5, 79.2, 89	NVFA	weak upward flow from 87 and 82 ft to 72 ft
MW16-25R	5	66.4, 68, 81.4					1	69.8	minor downward movement from 62.5 and 69 ft to 85 ft (BOH)	upward flow from 77 and 82.5 ft to 65 and 70 ft
MW16-27R	4	85.8	3		6		4	78, 88.8	NVFA	upward flow from 76.5 and 83 ft to 73 ft
MW16-28R			1	82.2					upward flow from 81 and 85 ft to 67 ft (BOC)	upward flow from 75 to 71 ft, 81 to 75 ft, and 84 to 82 ft
MW16-32R	3		3				2		NVFA	Most inflow originated between 73 to 79 ft, additional weak inflow between 67.5 to 73 ft
MW16-36R	3	63.3			1		1		NVFA	minor upward flow from 65 to 61 ft
MW16-44R	5	64.2, 83	6	64.2, 71.8, 72.1	2	70	9	63.5, 63.8, 66.1, 71.8, 76.5	NVFA	most upward flow from 62.5 to62 (BOC), minor flow from 68.5 to 62.5, 75.3 to 71, and from bottom of hole reading at 84.5 ft
MW16-51R	1						4		NVFA	weak upward flow from 83 to 78 ft
MW16-52R	5	110.3, 114.3					4	101.8	NVFA	upward flow from 105 to 98 ft, and 117 to 112 ft
MW16-55R	9				1				minor downward movement at 132 ft	minor upward flow from 125 to 118
MW16-55R2	1		1				2		NVFA	most upward flow from 150 to 142 ft, minor upward flow from 135 to 132.5 and 142 to 135 ft
MW16-56R	3	82.2	4				1		NVFA	Weak inflow originated between casing bottom and 75 ft, most inflow between 75 to 82.5 ft and 82.5 to 87ft
MW16-58R	2		4				1		NVFA	Most inflow originated between 85 to 90 ft, weak inflow between casing bottom to 72 ft, 72 to 80 ft, and 80 to 85 ft
MW16-59R	1	94.03	17	81.06, 81.67, 83.00, 85.93	7				NVFA	Inflow originated between 93 to 97 ft, inflow increased between 81 to 88 ft and 88 to 93 ft
MW16-60R	4		13	86.02	3		1		hydraulically active near 74 ft though no direction apparent	
MW16-65R	3	79.59	3	80.37, 86.93	2	80.56			NVFA	
MW16-66R	5	60.47, 62.28, 76.06	6	62.49			2	62.93, 63.17	NVFA	Most inflow originated between casing bottom to 65 ft, inflow originated between 71 to 77 ft
MW16-67R	1		10	65.19, 65.66, 79.04			2		NVFA	Inflow originated between 79 to 87 ft, most inflow between 58 to 66 ft and slight increase in inflow between 66 to 72 ft
MW16-68R	2	64.44	2				1		NVFA	Most inflow originated between casing bottom to 66 ft, inflow may have increased between 66 to 72 ft and 78 to 84 ft
MW16-69R	6		4				3		NVFA	Most inflow originated between 75 to 81, minor inflow occurred between casing bottom and 70 ft and between 70 to 75 ft
MW16-70R	2	61.99	9	65.01, 65.90	1				NVFA	Weak inflow originated between 78 to 84 ft
MW16-71R	2	73.6	25	61.14, 61.33, 66.33	1		2			

Notes:
1) * - Features interpreted to be open fractures from the plots of the Acoustic Televiewer Log.
2) ** - Depth from which most of the groundwater flow was interpreted to have come is listed first for each well where more than one depth interval is listed.
ft bgs = Feet below ground surface
NVFA = No Vertical flow apparent.

TABLE 3-3

SUMMARY OF DEPTH TO GROUNDWATER AND GROUNDWATER ELEVATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

W II Number	Stickup* (Feet Above Ground Surface)	Measuring Point (feet Mean Seal Level)	Depth to groundwater (ft below measuring point)								Elevation of groundwater surface (ft Mean Sea Level)							
			10/04/00	03/29/01	05/02/01	11/20/02	03/24/03	4/7/2004 (shallow wells 4/9/04)	Supp. Phase II Sampling (9-11/2004)	11/9/04-11/15/04	10/04/00	03/29/01	05/02/01	11/20/02	03/24/03	4/7/2004 (shallow wells 4/9/04)	Supp. Phase II Sampling (9-11/2004)	11/9/04-11/15/04
MW16-01S	2.00	35.90	22.95	20.32	20.26		21.45	21.66	22.70	22.90	12.95	15.58	15.64		14.45	14.24	13.20	13.00
MW16-01D	2.11	36.04	22.64	20.38	20.40	23.59	21.34	21.57	22.50	22.82	13.40	15.66	15.64	12.45	14.70	14.47	13.54	13.22
MW16-01R	1.81	35.21							21.83	22.10							13.38	13.11
MW16-02S	2.84	23.72	12.74	10.42	10.27	12.60	11.38	11.66	13.00	13.16	10.98	13.30	13.45		12.34	12.06	10.72	10.56
MW16-02I	2.10	23.17	N.I.	N.I.	N.I.	14.57	12.66	12.68	15.10	13.75	N.I.	N.I.	N.I.	8.60	10.51	10.49	8.07	9.42
MW16-02D	2.11	23.05	13.22	11.48	11.55	14.18	12.34	12.41	13.30	13.41	9.83	11.57	11.50	8.87	10.71	10.64	9.75	9.64
MW16-02R	1.82	22.99	N.I.	11.53	11.61	14.30	12.51	12.63	13.55	13.56	N.I.	11.46	11.38	8.69	10.48	10.36	9.44	9.43
MW16-02R2	1.54	22.78	N.I.	N.I.	N.I.	13.03	10.99	11.11	11.81	12.07	N.I.	N.I.	N.I.	9.75	11.79	11.67	10.97	10.71
MW16-03S	2.90	14.14	5.89	4.32	5.17	6.08	4.86		6.40	6.36	8.25	9.82	8.97	8.06	9.28		7.74	7.78
MW16-03D	2.39	13.47	7.01	6.61	6.85	7.22	6.37		7.31	7.21	6.46	6.86	6.62	6.25	7.10		6.16	6.26
MW16-03R	2.18	13.68							6.39	7.01							7.29	6.67
MW16-04S	-0.38	9.92	4.33	2.99	3.90	3.98	2.24		3.55	4.01	5.59	6.93	6.02	5.94	7.68		6.37	5.91
MW16-04I	1.66	11.76	N.I.	N.I.	N.I.	8.02	7.45		7.32	8.51	N.I.	N.I.	N.I.	3.74	4.31		4.44	3.25
MW16-04D	1.48	11.91	7.59	7.55	8.18	7.98	7.32		7.30	8.42	4.32	4.36	3.73	3.93	4.59		4.61	3.49
MW16-05S	2.00	15.78	N.I.	12.57	11.56	DRY	11.67		13.41	13.48	N.I.	3.21	4.22		4.11		2.37	2.30
MW16-05I	1.90	15.78	N.I.	N.I.	N.I.	13.52	13.47		13.37	13.65	N.I.	N.I.	N.I.	2.26	2.31		2.41	2.13
MW16-05D	2.51	16.20	13.01	13.11	13.54	13.17	12.96		13.54	13.59	3.19	3.09	2.66	3.03	3.24		2.66	2.61
MW16-05R	2.01	15.96	N.I.	N.I.	N.I.	12.95	12.72		13.35	13.34	N.I.	N.I.	N.I.	3.01	3.24		2.61	2.62
MW16-05R2	1.84	15.04							12.20	12.32							2.84	2.72
MW16-06S	2.23	27.43	15.98	13.06	13.87	DRY	13.86		15.69	15.92	11.45	14.37	13.56		13.57		11.74	11.51
MW16-06D	2.56	27.75	15.70	13.07	13.62	16.35	13.92		16.55	15.76	12.05	14.68	14.13	11.40	13.83		11.20	11.99
MW16-06R	1.79	27.43	N.I.	N.I.	N.I.	16.21	14.04		16.69	15.85	N.I.	N.I.	N.I.	11.22	13.39		10.74	11.58
MW16-07S	2.67	22.27	10.87	8.12	8.90	11.55	8.95		10.75	10.95	11.40	14.15	13.37	10.72	13.32		11.52	11.32
MW16-07D	2.91	22.37	10.93	8.31	8.97	11.63	9.13		11.81	11.00	11.44	14.06	13.40	10.74	13.24		10.56	11.37
MW16-08S	2.02	29.22							16.90	17.16							12.32	12.06
MW16-08D	2.44	30.39	N.I.	15.77	15.78	19.33	16.74	16.94	17.80	18.12	N.I.	14.62	14.61	11.06	13.65	13.45	12.59	12.27
MW16-09D	-0.45	33.90	N.I.	17.04	16.43	18.25	16.90	17.25	17.61	18.02	N.I.	16.86	17.47	15.65	17.00	16.65	16.29	15.88
MW16-10D	-0.22	31.40	N.I.	13.94	13.20	15.90	14.44	14.86	15.05	15.47	N.I.	17.46	18.20	15.50	16.96	16.54	16.35	15.93
MW16-10R	-0.18	31.38	N.I.	14.10	13.40	16.19	14.71	15.22	15.65	15.79	N.I.	17.28	17.98	15.19	16.67	16.16	15.73	15.59
MW16-11S	-0.33	29.43	N.I.	N.I.	N.I.	13.64	12.88	12.98	13.10	13.71	N.I.	N.I.	N.I.	15.79	16.55	16.45	16.33	15.72
MW16-11D	-0.21	29.57	N.I.	12.26	11.88	14.40	13.09	13.39	13.68	14.22	N.I.	17.31	17.69	15.17	16.48	16.18	15.89	15.35
MW16-12S	2.18	31.18							15.90	16.21							15.28	14.97
MW16-12D	2.33	31.55	N.I.	15.04	14.51	17.37	15.87	16.08	16.58	16.97	N.I.	16.51	17.04	14.18	15.68	15.47	14.97	14.58
MW16-13I	-0.18	29.71	N.I.	N.I.	N.I.	14.02	12.80	13.23	13.40	13.95	N.I.	N.I.	N.I.	15.69	16.91	16.48	16.31	15.76
MW16-13D	-0.56	29.40	N.I.	12.02	11.52	14.08	13.11	13.10	13.35	13.86	N.I.	17.38	17.88	15.32	16.29	16.30	16.05	15.54
MW16-14I	-0.18	29.80	N.I.	N.I.	N.I.	15.42	14.08	14.27	14.70	14.97	N.I.	N.I.	N.I.	14.38	15.72	15.53	15.10	14.83
MW16-14D	-0.30	29.70	N.I.	13.60	13.20	16.15	14.51	14.85	15.20	15.71	N.I.	16.10	16.50	13.55	15.19	14.85	14.50	13.99
MW16-14R	-0.25	29.25							15.11	15.41							14.14	13.84
MW16-15S	-0.13	28.97							15.00	15.30							13.97	13.67
MW16-15D	-0.45	28.87	N.I.	16.27	15.95	16.21	14.27	14.51	15.15	15.40	N.I.	12.60	12.92	12.66	14.60	14.36	13.72	13.47
MW16-15R	-0.66	28.64	N.I.	15.11	14.78	16.01	14.04	14.31	15.90	15.15	N.I.	13.53	13.86	12.63	14.60	14.33	12.74	13.49
MW16-15R2	-0.67	28.72	N.I.	N.I.	N.I.	17.53	14.95	15.46	15.99	16.30	N.I.	N.I.	N.I.	11.19	13.77	13.26	12.73	12.42
MW16-16I	2.18	25.67	N.I.	N.I.	N.I.	13.17	11.47	11.53	11.90	12.37	N.I.	N.I.	N.I.	12.50	14.20	14.14	13.77	13.30
MW16-16D	2.13	25.51	N.I.	10.39	10.06	14.21	11.31	11.48	11.85	12.36	N.I.	15.12	15.45	11.30	14.20	14.03	13.66	13.15
MW16-17S	2.16	26.08	N.I.	N.I.	N.I.	11.52	10.44		10.60	11.41	N.I.	N.I.	N.I.	14.56	15.64		15.48	14.67
MW16-17I	1.60	25.72	N.I.	N.I.	N.I.	11.41	10.12		10.42	11.17	N.I.	N.I.	N.I.	14.31	15.60		15.30	14.55
MW16-17D	2.48	26.41	N.I.	10.33	9.96	12.78	11.19		11.65	12.26	N.I.	16.08	16.45	13.63	15.22		14.76	14.15
MW16-17R	1.96	26.07	N.I.	N.I.	N.I.	12.22	10.71		11.16	11.76	N.I.	N.I.	N.I.	13.85	15.36		14.91	14.31

TABLE 3-3

SUMMARY OF DEPTH TO GROUNDWATER AND GROUNDWATER ELEVATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Number	Stickup* (Feet Above Ground Surface)	Measuring Point (feet Mean Seal Level)	Depth to groundwater (ft below measuring point)								Elevation of groundwater surface (ft Mean Sea Level)							
			10/04/00	03/29/01	05/02/01	11/20/02	03/24/03	4/7/2004 (shallow wells 4/9/04)	Supp. Phase II Sampling (9-11/2004)	11/9/04-11/15/04	10/04/00	03/29/01	05/02/01	11/20/02	03/24/03	4/7/2004 (shallow wells 4/9/04)	Supp. Phase II Sampling (9-11/2004)	11/9/04-11/15/04
MW16-18I	2.48	24.05	N.I.	N.I.	N.I.	12.45	10.79		10.95	11.72	N.I.	N.I.	N.I.	11.60	13.26		13.10	12.33
MW16-18D	2.30	23.85	N.I.	10.21	9.82	12.66	11.05		11.35	12.03	N.I.	13.64	14.03	11.19	12.80		12.50	11.82
MW16-19I	2.46	22.78	N.I.	N.I.	N.I.	12.09	10.50		10.71	11.42	N.I.	N.I.	N.I.	10.69	12.28		12.07	11.36
MW16-19D	2.55	22.59	N.I.	9.48	9.13	12.03	10.44		10.40	11.38	N.I.	13.11	13.46	10.56	12.15		12.19	11.21
MW16-20I	-0.32	17.67	N.I.	N.I.	N.I.	8.41	6.14		7.71	8.02	N.I.	N.I.	N.I.	9.26	11.53		9.96	9.65
MW16-20D	-0.30	17.66	N.I.	6.47	6.15	8.69	7.39		9.80	8.72	N.I.	11.19	11.51	8.97	10.27		7.86	8.94
MW16-21I	-0.33	22.16	N.I.	N.I.	N.I.	10.60	8.61	8.83	9.43	9.67	N.I.	N.I.	N.I.	11.56	13.55	13.33	12.73	12.49
MW16-21D	-0.33	22.22	N.I.	8.23	7.98	11.11	9.13	9.32	10.18	10.25	N.I.	13.99	14.24	11.11	13.09	12.90	12.04	11.97
MW16-22I	-0.29	29.77	N.I.	N.I.	N.I.	18.72	16.35	16.79	17.17	17.49	N.I.	N.I.	N.I.	11.05	13.42	12.98	12.60	12.28
MW16-22D	-0.31	29.73	N.I.	14.99	14.80	18.22	15.91	16.20	16.80	17.11	N.I.	14.74	14.93	11.51	13.82	13.53	12.93	12.62
MW16-23S	-0.48	24.62							12.38	12.66							12.24	11.96
MW16-23D	-0.16	25.32	N.I.	11.71	11.54	14.69	12.62	12.86	13.57	13.82	N.I.	13.61	13.78	10.63	12.70	12.46	11.75	11.50
MW16-24I	-0.21	21.22	N.I.	N.I.	N.I.	10.83	9.11	9.28	9.86	10.23	N.I.	N.I.	N.I.	10.39	12.11	11.94	11.36	10.99
MW16-24D	-0.29	20.96	N.I.	8.51	8.39	11.29	9.41	9.60	10.36	10.57	N.I.	12.45	12.57	9.67	11.55	11.36	10.60	10.39
MW16-25S	1.83	23.23							12.96	11.11							10.27	12.12
MW16-25I	1.91	23.57	N.I.	N.I.	N.I.	11.98	10.17	10.21	10.62	11.17	N.I.	N.I.	N.I.	11.59	13.40	13.36	12.95	12.40
MW16-25D	2.67	24.42	N.I.	10.42	10.08	13.14	11.33	11.42	11.75	12.33	N.I.	14.00	14.34	11.28	13.09	13.00	12.67	12.09
MW16-25R	1.41	23.01	N.I.	9.50	9.11	11.96	10.30	10.48	10.72	11.35	N.I.	13.51	13.90	11.05	12.71	12.53	12.29	11.66
MW16-26D	2.45	19.20	N.I.	3.64	4.26	5.93	4.33		5.70	6.17	N.I.	15.56	14.94	13.27	14.87		13.50	13.03
MW16-27I	-0.24	13.06	N.I.	8.49	8.86	9.38	8.95		9.18	9.63	N.I.	4.57	4.20	3.68	4.11		3.88	3.43
MW16-27D	-0.27	12.96	N.I.	7.70	7.87	9.59	8.15		8.99	9.59	N.I.	5.26	5.09	3.37	4.81		3.97	3.37
MW16-27R	-0.27	12.90							8.40	8.83							4.50	4.07
MW16-28I	-0.23	12.27	N.I.	8.58	9.10	9.11	8.81		8.65	9.63	N.I.	3.69	3.17	3.16	3.46		3.62	2.64
MW16-28D	-0.40	12.02	N.I.	8.62	9.12	9.13	8.91		9.15	9.60	N.I.	3.40	2.90	2.89	3.11		2.87	2.42
MW16-28R	-0.43	12.02							9.25	9.66							2.77	2.36
MW16-29D	1.68	16.12	N.I.	10.99	12.46	11.90	11.25		11.86	11.91	N.I.	5.13	3.66	4.22	4.87		4.26	4.21
MW16-30D	-0.25	30.22	N.I.	N.I.	N.I.		13.60	13.89	14.38	14.68	N.I.	N.I.	N.I.	N.I.	16.62	16.33	15.84	15.54
MW16-31D	-0.57	30.29	N.I.	N.I.	N.I.	15.81	14.88	14.58	15.11	15.46	N.I.	N.I.	N.I.	14.48	15.41	15.71	15.18	14.83
MW16-32D	-0.50	30.14	N.I.	N.I.	N.I.	16.59	14.88	15.11	24.00	24.53	N.I.	N.I.	N.I.	13.55	15.26	15.03	6.14	5.61
MW16-32R	-0.14	30.06							16.09	16.30							13.97	13.76
MW16-33S	-0.29	28.12	N.I.	N.I.	N.I.			11.67			N.I.	N.I.	N.I.			16.45		
MW16-33I	-0.34	28.29	N.I.	N.I.	N.I.	13.26	11.60	11.99	12.07	12.60	N.I.	N.I.	N.I.	15.03	16.69	16.30	16.22	15.69
MW16-33D	-0.58	27.85	N.I.	N.I.	N.I.	13.04	11.48	11.86	12.01	12.46	N.I.	N.I.	N.I.	14.81	16.37	15.99	15.84	15.39
MW16-34S	2.30	29.06	N.I.	N.I.	N.I.			13.07	13.70	12.90	N.I.	N.I.	N.I.			15.99	15.36	16.16
MW16-34I	3.05	29.21	N.I.	N.I.	N.I.	14.50	13.18	13.29	13.92	14.08	N.I.	N.I.	N.I.	14.71	16.03	15.92	15.29	15.13
MW16-34D	2.79	29.33	N.I.	N.I.	N.I.	15.21	13.67	13.83	14.74	14.69	N.I.	N.I.	N.I.	14.12	15.66	15.50	14.59	14.64
MW16-35S	2.49	26.22	N.I.	N.I.	N.I.	12.28	11.10	11.11	11.92	11.93	N.I.	N.I.	N.I.	13.94	15.12	15.11	14.30	14.29
MW16-35I	2.27	25.82	N.I.	N.I.	N.I.	12.21	10.83		11.87	11.75	N.I.	N.I.	N.I.	13.61	14.99		13.95	14.07
MW16-35D	2.20	25.79	N.I.	N.I.	N.I.	12.41	10.84		12.00	11.86	N.I.	N.I.	N.I.	13.38	14.95		13.79	13.93
MW16-36D	3.16	23.60	N.I.	N.I.	N.I.	11.42	10.12		10.39	11.22	N.I.	N.I.	N.I.	12.18	13.48		13.21	12.38
MW16-36R	1.97	22.51	N.I.	N.I.	N.I.	10.44	9.07		9.39	10.16	N.I.	N.I.	N.I.	12.07	13.44		13.12	12.35
MW16-37S	2.19	27.53	N.I.	N.I.	N.I.	15.23	11.95	11.98	12.16	12.82	N.I.	N.I.	N.I.	12.30	15.58	15.55	15.37	14.71
MW16-37I	2.27	27.72	N.I.	N.I.	N.I.	13.53	12.11	12.23	12.42	13.08	N.I.	N.I.	N.I.	14.19	15.61	15.49	15.30	14.64
MW16-37D	2.35	27.73	N.I.	N.I.	N.I.	14.14	12.52	12.70	13.10	13.60	N.I.	N.I.	N.I.	13.59	15.21	15.03	14.63	14.13
MW16-38I	2.31	24.94	N.I.	N.I.	N.I.	13.03	11.16	11.26	11.80	12.17	N.I.	N.I.	N.I.	11.91	13.78	13.68	13.14	12.77
MW16-39I	-0.58	15.25	N.I.	N.I.	N.I.	8.12	7.72		7.56	8.73	N.I.	N.I.	N.I.	7.13	7.53		7.69	6.52
MW16-39D	-0.22	15.40	N.I.	N.I.	N.I.	8.42	7.42		7.80	8.29	N.I.	N.I.	N.I.	6.98	7.98		7.60	7.11
MW16-40S	2.35	26.06	N.I.	N.I.	N.I.	16.58	13.18	13.58	15.03	15.07	N.I.	N.I.	N.I.	9.48	12.88	12.48	11.03	10.99

TABLE 3-3

SUMMARY OF DEPTH TO GROUNDWATER AND GROUNDWATER ELEVATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Number	Stickup* (Feet Above Ground Surface)	Measuring Point (feet Mean Seal Level)	Depth to groundwater (ft below measuring point)								Elevation of groundwater surface (ft Mean Sea Level)							
			10/04/00	03/29/01	05/02/01	11/20/02	03/24/03	4/7/2004 (shallow wells 4/9/04)	Supp. Phase II Sampling (9-11/2004)	11/9/04-11/15/04	10/04/00	03/29/01	05/02/01	11/20/02	03/24/03	4/7/2004 (shallow wells 4/9/04)	Supp. Phase II Sampling (9-11/2004)	11/9/04-11/15/04
MW16-40I	2.64	25.24							13.46	13.79							11.78	11.45
MW16-40D	2.53	25.93							14.58	14.86							11.35	11.07
MW16-41S	1.93	22.66	N.I.	N.I.	N.I.	13.07	9.68	10.03	12.12	11.86	N.I.	N.I.	N.I.	9.59	12.98	12.63	10.54	10.80
MW16-41I	1.94	22.73	N.I.	N.I.	N.I.	13.02	10.51	10.64	12.21	12.04	N.I.	N.I.	N.I.	9.71	12.22	12.09	10.52	10.69
MW16-41D	1.61	22.25	N.I.	N.I.	N.I.	12.25	9.94	10.09	10.40	11.25	N.I.	N.I.	N.I.	10.00	12.31	12.16	11.85	11.00
MW16-42S	2.13	20.15	N.I.	N.I.	N.I.	10.72	7.80		10.17	9.91	N.I.	N.I.	N.I.	9.43	12.35		9.98	10.24
MW16-42I	1.82	19.91	N.I.	N.I.	N.I.	12.84	11.32		12.37	12.37	N.I.	N.I.	N.I.	7.07	8.59		7.54	7.54
MW16-42D	3.10	21.11	N.I.	N.I.	N.I.	14.12	12.77		13.61	13.68	N.I.	N.I.	N.I.	6.99	8.34		7.50	7.43
MW16-43S	2.35	20.14	N.I.	N.I.	N.I.	10.04	7.65		9.81	9.68	N.I.	N.I.	N.I.	10.10	12.49		10.33	10.46
MW16-43I	1.89	18.98	N.I.	N.I.	N.I.	9.83	7.93		9.51	9.47	N.I.	N.I.	N.I.	9.15	11.05		9.47	9.51
MW16-43D	3.21	20.31	N.I.	N.I.	N.I.	11.44	9.60		11.08	11.03	N.I.	N.I.	N.I.	8.87	10.71		9.23	9.28
MW16-44S	3.08	19.73	N.I.	N.I.	N.I.	9.87	7.38		10.18	9.60	N.I.	N.I.	N.I.	9.86	12.35		9.55	10.13
MW16-44I	2.43	18.78	N.I.	N.I.	N.I.	10.76	9.25		11.01	10.57	N.I.	N.I.	N.I.	8.02	9.53		7.77	8.21
MW16-44D	2.06	18.89	N.I.	N.I.	N.I.	11.99	10.67		11.55	11.76	N.I.	N.I.	N.I.	6.90	8.22		7.34	7.13
MW16-44R	2.78	19.17	N.I.	N.I.	N.I.	12.17	10.94		11.85	11.95	N.I.	N.I.	N.I.	7.00	8.23		7.32	7.22
MW16-45S	3.26	18.10	N.I.	N.I.	N.I.	10.57	7.91		9.80	9.31	N.I.	N.I.	N.I.	7.53	10.19		8.30	8.79
MW16-45I	2.65	17.35	N.I.	N.I.	N.I.	9.48	7.98		9.46	9.24	N.I.	N.I.	N.I.	7.87	9.37		7.89	8.11
MW16-45D	2.97	17.64	N.I.	N.I.	N.I.	9.67	8.20		9.67	9.43	N.I.	N.I.	N.I.	7.97	9.44		7.97	8.21
MW16-46S	2.19	16.49	N.I.	N.I.	N.I.	9.14	7.52		9.88	9.12	N.I.	N.I.	N.I.	7.35	8.97		6.61	7.37
MW16-46I	2.33	16.16	N.I.	N.I.	N.I.	8.81	7.43		9.02	8.70	N.I.	N.I.	N.I.	7.35	8.73		7.14	7.46
MW16-46D	2.46	16.79	N.I.	N.I.	N.I.	10.70	9.67		10.45	10.75	N.I.	N.I.	N.I.	6.09	7.12		6.34	6.04
MW16-47S	2.11	20.45	N.I.	N.I.	N.I.	9.45	7.26		10.15	9.27	N.I.	N.I.	N.I.	11.00	13.19		10.30	11.18
MW16-47D	2.30	20.50	N.I.	N.I.	N.I.	9.77	7.39		10.20	9.30	N.I.	N.I.	N.I.	10.73	13.11		10.30	11.20
MW16-48S	-0.29	8.37	N.I.	N.I.	N.I.	3.81	3.99		3.64	4.26	N.I.	N.I.	N.I.	4.56	4.38		4.73	4.11
MW16-48I	-0.31	8.33	N.I.	N.I.	N.I.	3.13	2.26		2.58	3.55	N.I.	N.I.	N.I.	5.20	6.07		5.75	4.78
MW16-48D	-0.34	8.34	N.I.	N.I.	N.I.	3.60	2.77		3.10	4.10	N.I.	N.I.	N.I.	4.74	5.57		5.24	4.24
MW16-49I	-0.34	13.46							8.85	9.12							4.61	4.34
MW16-49D	-0.57	13.13	N.I.	N.I.	N.I.	9.01	8.71			9.16	N.I.	N.I.	N.I.	4.12	4.42			3.97
MW16-50I	-0.37	13.33							9.29	9.70							4.04	3.63
MW16-50D	-0.20	13.47	N.I.	N.I.	N.I.	10.41	10.31		10.60	10.74	N.I.	N.I.	N.I.	3.06	3.16		2.87	2.73
MW16-51D	2.49	15.62	N.I.	N.I.	N.I.	12.86	12.76		12.55	13.49	N.I.	N.I.	N.I.	2.76	2.86		3.07	2.13
MW16-51R	2.04	14.92	N.I.	N.I.	N.I.	12.75	12.85		13.40	13.41	N.I.	N.I.	N.I.	2.17	2.07		1.52	1.51
MW16-52D	-0.24	12.70	N.I.	N.I.	N.I.	9.49	9.92		9.22	10.30	N.I.	N.I.	N.I.	3.21	2.78		3.48	2.40
MW16-52R	-0.33	12.54	N.I.	N.I.	N.I.	10.19	10.11		10.18	10.68	N.I.	N.I.	N.I.	2.35	2.43		2.36	1.86
MW16-53S	1.97	16.99	N.I.	N.I.	N.I.	8.62	6.62		9.60	8.75	N.I.	N.I.	N.I.	8.37	10.37		7.39	8.24
MW16-54D	-0.23	27.57	N.I.	N.I.	N.I.	13.35	11.61		12.44	12.67	N.I.	N.I.	N.I.	14.22	15.96		15.13	14.90
MW16-55D	2.29	44.78	N.I.	N.I.	N.I.	28.52	27.31		28.13	28.28	N.I.	N.I.	N.I.	16.26	17.47		16.65	16.50
MW16-55R	1.86	44.56	N.I.	N.I.	N.I.	28.52	27.34		28.27	28.41	N.I.	N.I.	N.I.	16.04	17.22		16.29	16.15
MW16-55R2	1.60	44.08	N.I.	N.I.	N.I.	27.98	27.04		28.91	28.03	N.I.	N.I.	N.I.	16.10	17.04		15.17	16.05
MW16-56I	-0.23	16.37							10.11	10.63							6.26	5.74
MW16-56D	-0.27	16.43							10.54	11.15							5.89	5.28
MW16-56R	-0.23	16.37							9.96	10.48							6.41	5.89
MW16-57I	-0.30	13.00							6.90	7.29							6.10	5.71
MW16-57D	-0.33	12.97							7.10	7.50							5.87	5.47
MW16-58S	2.57	19.87							9.97	10.19							9.90	9.68
MW16-58I1	2.63	19.93							13.93	13.26							6.00	6.67
MW16-58I2	2.67	19.97							13.07	13.48							6.90	6.49
MW16-58D	2.78	19.98							13.10	13.51							6.88	6.47

TABLE 3-3

SUMMARY OF DEPTH TO GROUNDWATER AND GROUNDWATER ELEVATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Number	Stickup* (Feet Above Ground Surface)	Measuring Point (feet Mean Seal Level)	Depth to groundwater (ft below measuring point)								Elevation of groundwater surface (ft Mean Sea Level)							
			10/04/00	03/29/01	05/02/01	11/20/02	03/24/03	4/7/2004 (shallow wells 4/9/04)	Supp. Phase II Sampling (9-11/2004)	11/9/04-11/15/04	10/04/00	03/29/01	05/02/01	11/20/02	03/24/03	4/7/2004 (shallow wells 4/9/04)	Supp. Phase II Sampling (9-11/2004)	11/9/04-11/15/04
MW16-58R	1.68	18.98							12.31	12.80							6.67	6.18
MW16-59S	-0.61	27.79							15.35	15.60							12.44	12.19
MW16-59I	-0.53	27.87							15.40	15.72							12.47	12.15
MW16-59D	-0.10	28.10							15.72	16.06							12.38	12.04
MW16-59R	-0.20	28.00							15.40	15.72							12.60	12.28
MW16-60D	-0.24	28.06							15.07	15.25							12.99	12.81
MW16-60R	-0.15	28.35							14.93	15.80							13.42	12.55
MW16-61I	-0.24	23.66							10.29	10.60							13.37	13.06
MW16-61D	-0.22	23.68							10.27	10.61							13.41	13.07
MW16-62I	-0.52	28.48							15.09	15.38							13.39	13.10
MW16-62D	-0.52	28.30							14.95	15.20							13.35	13.10
MW16-63I	-0.22	30.18							16.88	17.21							13.30	12.97
MW16-63D	-0.26	30.04							16.78	17.12							13.26	12.92
MW16-64I	-0.21	31.49							18.47	18.73							13.02	12.76
MW16-64D	-0.29	31.51							18.54	18.83							12.97	12.68
MW16-65S	2.36	39.06							23.90	24.15							15.16	14.91
MW16-65I	2.48	38.68							23.85	24.09							14.83	14.59
MW16-65D	2.66	39.66							24.82	25.07							14.84	14.59
MW16-65R	2.30	39.20							24.55	24.70							14.65	14.50
MW16-66S	-0.33	29.37								15.06								14.31
MW16-66I	-0.34	29.26								15.00								14.26
MW16-66D	-0.26	29.44								15.80								13.64
MW16-66R	-0.38	29.22								15.69								13.53
MW16-67S	-0.13	30.27								15.92								14.35
MW16-67I	-0.40	30.00								15.91								14.09
MW16-67D	-0.23	30.17								16.??								
MW16-67R	-0.32	30.08								16.63								13.45
MW16-68S	-0.27	30.03								15.63								14.40
MW16-68I	-0.28	30.02								15.69								14.33
MW16-68D	-0.22	30.10								16.51								13.59
MW16-68R	-0.27	29.93								16.21								13.72
MW16-69S	-0.25	30.15								16.05								14.10
MW16-69I	-0.30	30.10								16.75								13.35
MW16-69D	-0.42	29.98								16.70								13.28
MW16-69R	0.14	30.14								17.10								13.04
MW16-70S	-0.17	29.93								15.80								14.13
MW16-70I	-0.31	29.89								15.87								14.02
MW16-70D	-0.65	29.55								16.23								13.32
MW16-70R	-0.32	29.88								16.40								13.48
MW16-71S	-0.27	29.63								15.45								14.18
MW16-71I	-0.48	29.42								15.43								13.99
MW16-71D	-0.13	29.77								16.40								13.37
MW16-71R	-0.15	29.75								16.42								13.33
INJ16-01D	-0.22	29.98								16.55								13.43
INJ16-02D	-0.12	30.18								16.62								13.56
INJ16-03D	-0.45	29.95								16.49								13.46
INJ16-04D	-0.33	30.07								16.45								13.62
INJ16-05D	-0.68	29.82								16.28								13.54

TABLE 3-3

SUMMARY OF DEPTH TO GROUNDWATER AND GROUNDWATER ELEVATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Numb r	Stickup* (Feet Above Ground Surface)	Measuring Point (feet Mean Seal Level)	Depth to groundwater (ft below measuring point)								Elevation of groundwater surface (ft Mean Sea Level)							
			10/04/00	03/29/01	05/02/01	11/20/02	03/24/03	4/7/2004 (shallow wells 4/9/04)	Supp. Phase II Sampling (9-11/2004)	11/9/04-11/15/04	10/04/00	03/29/01	05/02/01	11/20/02	03/24/03	4/7/2004 (shallow wells 4/9/04)	Supp. Phase II Sampling (9-11/2004)	11/9/04-11/15/04
INJ16-06D	-0.20	30.30								16.67								13.63
INJ16-07D	-0.65	29.75								16.20								13.55
INJ16-08D	-0.63	29.77								16.10								13.67
INJ16-09D	-0.51	29.79								16.29								13.50
INJ16-10D	-0.28	29.92								16.29								13.63
INJ16-11D	-0.06	30.04								16.50								13.54
INJ16-12D	-0.49	29.41								15.78								13.63
RMW-01S	0.67	34.87	N.M.	N.M.	16.74	19.28	17.29			19.14	N.M.	N.M.	18.13	15.59	17.58			15.73
RMW-01D	1.17	35.23	N.M.	N.M.	17.32	19.48	17.93			19.81	N.M.	N.M.	17.91	15.75	17.30			15.42
RMW-01I	0.86	34.66	N.M.	N.M.	16.66	18.97	17.21			19.01	N.M.	N.M.	18.00	15.69	17.45			15.65
RMW-02S	1.70	22.15	N.M.	N.M.	6.23	8.00	6.23			8.30	N.M.	N.M.	15.92	14.15	15.92			13.85
RMW-02D	1.83	22.26	N.M.	N.M.	6.22	8.26	6.47			8.39	N.M.	N.M.	16.04	14.00	15.79			13.87
RMW-03S	1.72	13.49	N.M.	N.M.	2.30	2.24	2.07			2.92	N.M.	N.M.	11.19	11.25	11.42			10.57
RMW-03D	2.01	13.64	N.M.	N.M.	2.18	3.50	1.95			3.11	N.M.	N.M.	11.46	10.14	11.69			10.53
PGU-Z3-03S	NM	15.41	N.M.	N.M.	10.73	10.35	10.71			11.18	N.M.	N.M.	4.68	5.06	4.70			4.23
PGU-Z3-03D	NM	15.19	N.M.	N.M.	10.02	10.94	9.98			10.52	N.M.	N.M.	5.17	4.25	5.21			4.67
PGU-Z3-07D	NM	31.89	N.M.	N.M.	11.67	14.26	13.10			13.90	N.M.	N.M.	20.22	17.63	18.79			17.99
PGU-Z3-07S	NM	31.66	N.M.	N.M.	11.40	14.08	12.87			13.66	N.M.	N.M.	20.26	17.58	18.79			18.00
PGU-Z3-08D	NM	40.49	N.M.	N.M.	21.12	24.63	22.70			23.94	N.M.	N.M.	19.37	15.86	17.79			16.55
PGU-Z3-09D	NM	20.21	N.M.	N.M.	8.87	11.23	9.16			10.80	N.M.	N.M.	11.34	8.98	11.05			9.41
PGU-Z3-09S	NM	20.31	N.M.	N.M.	7.60	10.45	7.75			9.93	N.M.	N.M.	12.71	9.86	12.56			10.38
PGU-Z3-10D	NM	42.79	N.M.	N.M.	24.32	27.01	25.65	25.96		26.72	N.M.	N.M.	18.47	15.78	17.14	16.83		16.07
PGU-Z3-10S	NM	42.80	N.M.	N.M.	23.94	27.11	25.23	25.57		26.57	N.M.	N.M.	18.86	15.69	17.57	17.23		16.23
PGU-Z3-11D		27.43				9.46	8.60			9.48				17.97	18.83			17.95
PGU-Z4-03S		26.17				11.58	9.88			10.88				14.59	16.29			15.29
PGU-Z4-03D		25.87				11.35	9.76			10.75				14.52	16.11			15.12
PGU-Z4-04S		14.72				3.20	2.96			3.60				11.52	11.76			11.12
PGU-Z4-04D		14.45				2.59	2.04			2.94				11.86	12.41			11.51
PGU-Z4-05S		11.82													11.82			
EA-110D	2.10	40.15	N.M.	N.M.	21.60	23.62	22.73			23.41	N.M.	N.M.	18.55	16.53	17.42			16.74
EA-110R	2.20	39.71	N.M.	N.M.	21.20	23.16	22.31			22.98	N.M.	N.M.	18.51	16.55	17.40			16.73
EA-111D	-0.32	33.20				17.20	13.08			14.12				16.00	20.12			19.08
EA-111R	-0.36	33.30				17.18	13.15			14.18				16.12	20.15			19.12
MW01-08D	37.50	37.50				19.00	16.20			17.82				18.50	21.30			19.68
MW01-10S	42.73	42.73				23.33	18.99			21.32				19.40	23.74			21.41
MW01-10D	42.88	42.88				23.58	19.41			21.78				19.30	23.47			21.10
MW01-10R	43.96	43.96				24.70	20.87			22.97				19.26	23.09			20.99
MW01-11D	38.98	38.98	N.M.	N.M.	19.10	23.27	20.72			22.11	N.M.	N.M.	19.88	15.71	18.26			16.87
MW01-12S	36.01	36.01								17.88				N.M.	N.M.			18.13
MW01-12D	35.96	35.96				18.91	16.03			17.87				17.05	19.93			18.09
MW01-13D	1.60	26.29	N.M.	N.M.	11.69	14.58	12.56			14.03	N.M.	N.M.	14.60	11.71	13.73			12.26
MW01-13R	1.80	26.74	N.M.	N.M.	11.03	14.28	12.28			13.78	N.M.	N.M.	15.71	12.46	14.46			12.96
MW01-13S	1.30	25.99	N.M.	N.M.	13.45	16.16	14.03			15.50	N.M.	N.M.	12.54	9.83	11.96			10.49
MW01-14D	1.40	37.62	N.M.	N.M.	20.92	23.72	21.79			23.21	N.M.	N.M.	16.70	13.90	15.83			14.41
MW01-14S	1.20	37.38	N.M.	N.M.	21.65	24.08	22.44			23.65	N.M.	N.M.	15.73	13.30	14.94			13.73
MW01-15D	-0.40	32.39	N.M.	N.M.	11.67	16.30	12.90			14.80	N.M.	N.M.	20.72	16.09	19.49			17.59
MW01-15R	-0.50	32.88	N.M.	N.M.	11.98	16.19	13.00			14.80	N.M.	N.M.	20.90	16.69	19.88			18.08
MW02-03D	1.70	41.23	N.M.	N.M.	21.85	25.63	23.50			24.77	N.M.	N.M.	19.38	15.60	17.73			16.46

TABLE 3-3

SUMMARY OF DEPTH TO GROUNDWATER AND GROUNDWATER ELEVATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Number	Stickup* (Feet Above Ground Surface)	Measuring Point (feet Mean Seal Level)	Depth to groundwater (ft below measuring point)								Elevation of groundwater surface (ft Mean Sea Level)							
			10/04/00	03/29/01	05/02/01	11/20/02	03/24/03	4/7/2004 (shallow wells 4/9/04)	Supp. Phase II Sampling (9-11/2004)	11/9/04-11/15/04	10/04/00	03/29/01	05/02/01	11/20/02	03/24/03	4/7/2004 (shallow wells 4/9/04)	Supp. Phase II Sampling (9-11/2004)	11/9/04-11/15/04
MW02-03R	1.80	41.11	N.M.	N.M.	21.10	24.85	22.78			24.03	N.M.	N.M.	20.01	16.26	18.33			17.08
MW02-03S	3.10	42.61	N.M.	N.M.	23.22	26.99	24.86			26.12	N.M.	N.M.	19.39	15.62	17.75			16.49
MW02-05S	-0.30	38.17				20.15	17.88			19.18				18.02	20.29			18.99
MW02-08S	-0.30	38.64				20.68	18.28							17.96	20.36			
MW02-08D	-0.40	38.63				20.72	18.34							17.91	20.29			
MW02-10S	-0.60	37.01					16.99			18.21					20.02			18.80
MW02-10D	-0.40	37.36				19.55	17.43			18.65				17.81	19.93			18.71
MW02-11D	2.00	40.04	N.M.	N.M.	18.72	22.59	20.57			21.74	N.M.	N.M.	21.32	17.45	19.47			18.30
MW02-11S	2.20	40.22	N.M.	N.M.	19.05	22.96	19.10			22.07	N.M.	N.M.	21.17	17.26	21.12			18.15
MW03-02S	2.20	38.37				19.45	16.50			18.05				18.92	21.87			20.32
MW03-02D	2.40	38.57				19.75	16.73			18.32				18.82	21.84			20.25
MW03-03S	2.00	38.36				19.13	16.48			17.85				19.23	21.88			20.51
MW03-03D	2.00	38.43				19.29	16.57			18.03				19.14	21.86			20.40
MW03-03R	1.30	38.21				18.98	16.18			17.67				19.23	22.03			20.54
MW03-04S	-0.50	37.24				18.47	15.62			17.17				18.77	21.62			20.07
MW03-05S	-0.50	37.89				19.11	16.57			17.93				18.78	21.32			19.96
MW03-09D	2.20	43.40				23.73	19.53			21.79				19.67	23.87			21.61
MW03-06D	2.20	38.19				18.75	15.76			17.27				19.44	22.43			20.92
MW03-07D	2.30	35.41				15.66	12.45			14.14				19.75	22.96			21.27
MW03-08D	2.10	32.74				12.72	8.80			11.01				20.02	23.94			21.73
MW03-08R	1.90	32.15				12.03	8.11			10.31				20.12	24.04			21.84
MW03-10D	1.90	35.94				16.27	13.45			14.96				19.67	22.49			20.98
MW07-32D	2.20	7.96				6.86	7.26			7.74				1.10	0.70			0.22
MW07-32R	2.20	7.86				6.99	7.08			7.88				0.87	0.78			-0.02
MW-Z3-01	2.30	43.80				23.41	17.44			21.10				20.39	26.36			22.70
MW-Z3-02	-0.50	36.67	N.M.	N.M.	19.21	22.65	20.10			21.90	N.M.	N.M.	17.46	14.02	16.57			14.77
MW-Z3-03	1.90	40.00	N.M.	N.M.	17.95	22.72	19.80			20.85	N.M.	N.M.	22.05	17.28	20.20			19.15
MW-Z4-01	1.90	40.77	N.M.	N.M.	21.53						N.M.	N.M.	19.24					
MW-Z4-02	2.20	34.18	N.M.	N.M.	15.98	17.08	16.62			17.15	N.M.	N.M.	18.20	17.10	17.56			17.03
MW-Z2-01	1.66	25.28				9.52	9.89			10.20				15.76	15.39			15.08

Notes:
* Stick-up is the physical distance between the ground surface and measuring point at each well.
1) N.I. is not installed.
2) N.M. is not measured.

TABLE 3-4A

SUMMARY OF VERTICAL HYDRAULIC GRADIENTS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Location	Screen Top (ft bgs)	Screen bottom (ft bgs)	Screen mid-point (ft bgs)	WL elevation (ft msl) 10/4/2000	Vertical Gradient	WL elevation (ft msl) 3/29/2001	Vertical Gradient	WL elevation (ft msl) 5/2/2001	Vertical Gradient	WL elevation (ft msl) 11/20/2002	Vertical Gradient	WL elevation (ft msl) 3/24/2003	Vertical Gradient	WL elevation (ft msl) Supp. Phase II Sampling (9/2004-11/2004)	Vertical Gradient	WL elevation (ft msl) 11/9/04-11/15/04	Vertical Gradient	Minimum Gradient	Maximum Gradient	Direction
Shallow (S) to Intermediate (I) Zone																				
MW16-02S	5.00	15.00	10.00	10.98		13.3		13.45				12.34		10.72		10.56				
MW16-02I	32.00	37.00	34.50							8.6		10.51	0.07469	8.07	0.10816	9.42	0.04653	0.04653	0.10816	DOWN
MW16-04S	3.00	13.00	8.00	5.59		6.93		6.02		5.94		7.68		6.37		5.91				
MW16-04I	22.00	32.00	27.00							3.74	0.11579	4.31	0.17737	4.44	0.10158	3.25	0.14000	0.10158	0.17737	DOWN
MW16-05S	8.00	18.00	13.00			3.21		4.22				4.11		2.37		2.3				
MW16-05I	22.00	36.00	29.00							2.26		2.31	0.11250	2.41	-0.00250	2.13	0.01063	-0.00250	0.11250	VARIABLE
MW16-17S	6.00	16.00	11.00							14.56		15.64		15.48		14.67				
MW16-17I	28.00	40.00	34.00							14.31	0.01087	15.6	0.00174	15.3	0.00783	14.55	0.00522	0.00174	0.01087	DOWN
MW16-25S	9.00	19.00	14.00											10.27		12.12				
MW16-25I	32.00	42.00	37.00							11.59		13.4		12.95	-0.11652	12.4	-0.01217	-0.11652	-0.01217	UP
MW16-33S	6.50	16.50	11.50											28.12		28.12				
MW16-33I	34.00	44.00	39.00							15.03		16.69		16.22	0.43273	15.69	0.45200	0.43273	0.45200	DOWN
MW16-34S	5.00	15.00	10.00											15.36		16.16				
MW16-34I	25.00	35.00	30.00							14.71		16.03		15.29	0.00350	15.13	0.05150	0.00350	0.05150	DOWN
MW16-35S	6.00	16.00	11.00							13.94		15.12		14.3		14.29				
MW16-35I	28.00	38.00	33.00							13.61	0.01500	14.99	0.00591	13.95	0.01591	14.07	0.01000	0.00591	0.01591	DOWN
MW16-37S	7.00	22.00	14.50							12.3		15.58		15.37		14.71				
MW16-37I	24.00	38.00	31.00							14.19	-0.11455	15.61	-0.00182	15.3	0.00424	14.64	0.00424	-0.11455	0.00424	VARIABLE
MW16-40S	6.00	22.00	14.00							9.48		12.88		11.03		10.99				
MW16-40I	35.00	45.00	40.00											11.78	-0.02885	11.45	-0.01769	-0.02885	-0.01769	UP
MW16-41S	7.50	17.50	12.50							9.59		12.98		10.54		10.8				
MW16-41I	19.50	29.50	24.50							9.71	-0.01000	12.22	0.06333	10.52	0.00167	10.69	0.00917	-0.01000	0.06333	VARIABLE
MW16-42S	5.50	15.50	10.50							9.43		12.35		9.98		10.24				
MW16-42I	20.00	30.00	25.00							7.07	0.16276	8.59	0.25931	7.54	0.16828	7.54	0.18621	0.16276	0.25931	DOWN
MW16-43S	6.00	21.00	13.50							10.1		12.49		10.33		10.46				
MW16-43I	25.50	33.50	29.50							9.15	0.05938	11.05	0.09000	9.47	0.05375	9.51	0.05938	0.05375	0.09000	DOWN
MW16-44S	6.00	21.00	13.50							9.86		12.35		9.55		10.13				
MW16-44I	23.00	33.00	28.00							8.02	0.12690	9.53	0.19448	7.77	0.12276	8.21	0.13241	0.12276	0.19448	DOWN
MW16-45S	6.00	21.00	13.50							7.53		10.19		8.3		8.79				
MW16-45I	32.00	42.00	37.00							7.87	-0.01447	9.37	0.03489	7.89	0.01745	8.11	0.02894	-0.01447	0.03489	VARIABLE
MW16-46S	6.00	21.00	13.50							7.35		8.97		6.61		7.37				
MW16-46I	22.00	32.00	27.00							7.35	0.00000	8.73	0.01778	7.14	-0.03926	7.46	-0.00667	-0.03926	0.01778	VARIABLE
MW16-48S	4.00	14.00	9.00							4.56		4.38		4.73		4.11				
MW16-48I	20.00	30.00	25.00							5.2	-0.04000	6.07	-0.10563	5.75	-0.06375	4.78	-0.04188	-0.10563	-0.04000	UP
MW16-58S	6.00	16.00	11.00											9.9		9.68				
MW16-58I1	21.00	31.00	26.00											6	0.26000	6.67	0.20067	0.20067	0.26000	DOWN
MW16-58S	6.00	16.00	11.00											9.9		9.68				
MW16-58I2	36.00	46.00	41.00											6.9	0.10000	6.49	0.10633	0.10000	0.10633	DOWN
MW16-59S	14.00	24.00	19.00											12.44		12.19				
MW16-59I	38.00	48.00	43.00											12.47	-0.00125	12.15	0.00167	-0.00125	0.00167	VARIABLE
MW16-65S	27.00	37.00	32.00											15.16		14.91				
MW16-65I	37.00	44.00	40.50											14.83	0.03882	14.59	0.03765	0.03765	0.03882	DOWN
MW16-66S	18.00	28.00	23.00													14.31				
MW16-66I	30.50	40.50	35.50													14.26	0.00400	0.00400	0.00400	DOWN
MW16-67S	14.00	24.00	19.00													14.35				
MW16-67I	28.00	38.00	33.00													14.09	0.01857	0.01857	0.01857	DOWN
MW16-68S	15.00	25.00	20.00													14.4				
MW16-68I	28.00	38.00	33.00													14.33	0.00538	0.00538	0.00538	DOWN
MW16-69S	15.00	25.00	20.00													14.1				
MW16-69I	39.00	49.00	44.00													13.35	0.03125	0.03125	0.03125	DOWN
MW16-70S	10.00	25.00	17.50													14.13				
MW16-70I	28.00	38.00	33.00													14.02	0.00710	0.00710	0.00710	DOWN
MW16-71S	15.00	25.00	20.00													14.18				
MW16-71I	28.00	38.00	33.00													13.99	0.01462	0.01462	0.01462	DOWN
RMW-01S	N.A.	N.A.	N.A.					18.13		15.59		17.58				15.73				
RMW-01I	N.A.	N.A.	N.A.					18		15.69	-1.00000	17.45	1.00000			15.65	1.00000	-1.00000	1.00000	VARIABLE
Intermediate (I) to Deep (D) Zone																				
MW16-02I	32.00	37.00	34.50							8.6		10.51		8.07		9.42				
MW16-02D	56.50	66.50	61.50	9.83		11.57		11.5		8.87	-0.01000	10.71	-0.00741	9.75	-0.06222	9.64	-0.00815	-0.06222	-0.00741	UP
MW16-04I	22.00	32.00	27.00							3.74		4.31		4.44		3.25				
MW16-04D	43.00	53.00	48.00	4.32		4.36		3.73		3.93	-0.00905	4.59	-0.01333	4.61	-0.00810	3.49	-0.01143	-0.01333	-0.00810	UP

TABLE 3-4A

SUMMARY OF VERTICAL HYDRAULIC GRADIENTS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Location	Screen Top (ft bgs)	Screen bottom (ft bgs)	Screen mid-point (ft bgs)	WL elevation (ft msl) 10/4/2000	Vertical Gradient	WL elevation (ft msl) 3/29/2001	Vertical Gradient	WL elevation (ft msl) 5/2/2001	Vertical Gradient	WL elevation (ft msl) 11/20/2002	Vertical Gradient	WL elevation (ft msl) 3/24/2003	Vertical Gradient	WL elevation (ft msl) Supp. Phase II Sampling (9/2004-11/2004)	Vertical Gradient	WL elevation (ft msl) 11/9/04-11/15/04	Vertical Gradient	Minimum Gradient	Maximum Gradient	Direction
MW16-05I	22.00	36.00	29.00							2.26		2.31		2.41		2.13				
MW16-05D	42.00	52.00	47.00	3.19		3.09		2.66		3.03	-0.04278	3.24	-0.05167	2.66	-0.01389	2.61	-0.02667	-0.05167	-0.01389	UP
MW16-13I	24.00	34.00	29.00							15.69		16.91		16.31		15.76				
MW16-13D	57.00	67.00	62.00			17.38		17.88		15.32	0.01121	16.29	0.01879	16.05	0.00788	15.54	0.00667	0.00667	0.01879	DOWN
MW16-14I	26.00	36.00	31.00							14.38		15.72		15.1		14.83				
MW16-14D	52.00	62.00	57.00			16.1		16.5		13.55	0.03192	15.19	0.02038	14.5	0.02308	13.99	0.03231	0.02038	0.03231	DOWN
MW16-16I	32.00	42.00	37.00							12.5		14.2		13.77		13.3				
MW16-16D	54.00	64.00	59.00			15.12		15.45		11.3	0.05455	14.2	0.00000	13.66	0.00500	13.147	0.00695	0.00000	0.05455	DOWN
MW16-17I	28.00	40.00	34.00							14.31		15.6		15.3		14.55				
MW16-17D	57.00	67.00	62.00			16.08		16.45		13.63	0.02429	15.22	0.01357	14.76	0.01929	14.15	0.01429	0.01357	0.02429	DOWN
MW16-18I	22.00	34.00	28.00							11.6		13.26		13.1		12.33				
MW16-18D	42.50	52.50	47.50			13.64		14.03		11.19	0.02103	12.8	0.02359	12.5	-0.03077	11.82	0.02615	0.02103	0.03077	DOWN
MW16-19I	30.00	40.00	35.00							10.69		12.28		12.07		11.36				
MW16-19D	45.50	54.50	50.00			13.11		13.46		10.56	0.00867	12.15	0.00867	12.19	-0.00800	11.21	0.01000	-0.00800	0.01000	VARIABLE
MW16-20I	24.00	34.00	29.00							9.26		11.53		9.96		9.65				
MW16-20D	39.50	49.50	44.50			11.19		11.51		8.97	0.01871	10.27	0.08129	7.86	0.13548	8.94	0.04581	0.01871	0.13548	DOWN
MW16-21I	26.50	36.50	31.50							11.56		13.55		12.73		12.49				
MW16-21D	51.00	61.00	56.00			13.99		14.24		11.11	0.01837	13.09	0.01878	12.04	0.02816	11.97	0.02122	0.01837	0.02816	DOWN
MW16-22I	34.00	44.00	39.00							11.05		13.42		12.6		12.28				
MW16-22D	52.00	62.00	57.00			14.74		14.93		11.51	-0.02556	13.82	-0.02222	12.93	-0.01833	12.62	-0.01889	-0.02556	-0.01833	UP
MW16-24I	18.00	28.00	23.00							10.39		12.11		11.36		10.99				
MW16-24D	50.00	62.00	56.00			12.45		12.57		9.67	0.02182	11.55	0.01697	10.6	0.02303	10.39	0.01818	0.01697	0.02303	DOWN
MW16-25I	32.00	42.00	37.00							11.59		13.4		12.95		12.4				
MW16-25D	46.00	58.00	52.00			14		14.34		11.28	0.02067	13.09	0.02067	12.67	0.01867	12.09	0.02067	0.01867	0.02067	DOWN
MW16-27I	34.00	44.00	39.00			4.57		4.2		3.68		4.11		3.88		3.43				
MW16-27D	54.00	64.00	59.00			5.26	-0.03450	5.09	-0.04450	3.37	0.01550	4.81	-0.03500	3.97	-0.00450	3.37	0.00300	-0.04450	0.01550	VARIABLE
MW16-28I	22.50	32.50	27.50			3.69		3.17		3.16		3.46		3.62		2.64				
MW16-28D	54.50	64.50	59.50			3.4	0.00906	2.9	0.00844	2.89	0.00844	3.11	0.01094	2.87	0.02344	2.42	0.00688	0.00688	0.02344	DOWN
MW16-33I	34.00	44.00	39.00							15.03		16.69		16.22		15.69				
MW16-33D	61.00	71.00	66.00							14.81	0.00815	16.37	0.01185	15.84	0.01407	15.39	0.01111	0.00815	0.01407	DOWN
MW16-34I	25.00	35.00	30.00							14.71		16.03		15.29		15.13				
MW16-34D	44.00	58.00	51.00							14.12	0.02810	15.66	0.01762	14.59	0.03333	14.64	0.02333	0.01762	0.03333	DOWN
MW16-35I	28.00	38.00	33.00							13.61		14.99		13.95		14.07				
MW16-35D	51.50	61.50	56.50							13.38	0.00979	14.95	0.00170	13.79	0.00681	13.93	0.00596	0.00170	0.00979	DOWN
MW16-37I	24.00	38.00	31.00							14.19		15.61		15.3		14.64				
MW16-37D	44.70	54.70	49.70							13.59	0.03209	15.21	0.02139	14.63	0.03583	14.13	0.02727	0.02139	0.03583	DOWN
MW16-39I	45.00	55.00	50.00							7.13		7.53		7.69		6.52				
MW16-39D	64.00	74.00	69.00							6.98	0.00789	7.98	-0.02368	7.6	0.00474	7.11	-0.03105	-0.03105	0.00789	VARIABLE
MW16-40I	35.00	45.00	40.00											11.78		11.45				
MW16-40D	54.00	64.00	59.00											11.35	0.02263	11.07	0.02000	0.02000	0.02263	DOWN
MW16-41I	19.50	29.50	24.50							9.71		12.22		10.52		10.69				
MW16-41D	51.00	61.00	56.00							10	-0.00921	12.31	-0.00286	11.85	-0.04222	11	-0.00984	-0.04222	-0.00286	UP
MW16-42I	20.00	30.00	25.00							7.07		8.59		7.54		7.54				
MW16-42D	58.00	68.00	63.00							6.99	0.00211	8.34	0.00658	7.5	0.00105	7.43	0.00289	0.00105	0.00658	DOWN
MW16-43I	25.50	33.50	29.50							9.15		11.05		9.47		9.51				
MW16-43D	37.00	43.00	40.00							8.87	0.02667	10.71	0.03238	9.23	0.02286	9.28	0.02190	0.02190	0.03238	DOWN
MW16-44I	23.00	33.00	28.00							8.02		9.53		7.77		8.21				
MW16-44D	49.60	59.60	54.60							6.9	0.04211	8.22	0.04925	7.34	0.01617	7.13	0.04060	0.01617	0.04925	DOWN
MW16-45I	32.00	42.00	37.00							7.87		9.37		7.89		8.11				
MW16-45D	48.00	58.00	53.00							7.97	-0.00625	9.44	-0.00438	7.97	-0.00500	8.21	-0.00625	-0.00625	-0.00438	UP
MW16-46I	22.00	32.00	27.00							7.35		8.73		7.14		7.46				
MW16-46D	50.50	59.00	54.75							6.09	0.04541	7.12	0.05802	6.34	0.02883	6.04	0.05117	0.02883	0.05802	DOWN
MW16-48I	20.00	30.00	25.00							5.2		6.07		5.75		4.78				
MW16-48D	35.40	45.40	40.40							4.74	0.02987	5.57	0.03247	5.24	0.03312	4.24	0.03506	0.02987	0.03506	DOWN
MW16-49I	37.00	47.00	42.00											4.61		4.34				
MW16-49D	62.00	76.00	69.00							4.12		4.42				3.97	0.01370	0.01370	0.01370	DOWN
MW16-50I	24.00	34.00	29.00											4.04		3.63				
MW16-50D	78.00	88.00	83.00							3.06		3.16		2.87	0.02167	2.73	0.01667	0.01667	0.02167	DOWN
MW16-56I	33.00	43.00	38.00											6.26		5.74				
MW16-56D	59.00	66.00	62.50											5.89	0.01510	5.28	0.01878	0.01510	0.01878	DOWN
MW16-57I	43.00	53.00	48.00											6.1		5.71				
MW16-57D	66.50	76.50	71.50											5.87	0.00979	5.47	0.01021	0.00979	0.01021	DOWN

TABLE 3-4A

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NORTH KINGSTOWN, RHODE ISLAND

Well Location	Screen Top (ft bgs)	Screen bottom (ft bgs)	Screen mid-point (ft bgs)	WL elevation (ft msl) 10/4/2000	Vertical Gradient	WL elevation (ft msl) 3/29/2001	Vertical Gradient	WL elevation (ft msl) 5/2/2001	Vertical Gradient	WL elevation (ft msl) 11/20/2002	Vertical Gradient	WL elevation (ft msl) 3/24/2003	Vertical Gradient	WL elevation (ft msl) Supp. Phase II Sampling (9/2004-11/2004)	Vertical Gradient	WL elevation (ft msl) 11/9/04-11/15/04	Vertical Gradient	Minimum Gradient	Maximum Gradient	Direction
MW16-58I1	21.00	31.00	26.00											6		6.67				
MW16-58D	51.00	62.00	56.50											6.88	-0.02885	6.47	0.00656	-0.02885	0.00656	VARIABLE
MW16-58I2	36.00	46.00	41.00											6.9		6.49				
MW16-58D	51.00	62.00	56.50											6.88	0.00129	6.47	0.00129	0.00129	0.00129	DOWN
MW16-59I	38.00	48.00	43.00											12.47		12.15				
MW16-59D	64.00	74.00	69.00											12.38	0.00346	12.04	0.00423	0.00346	0.00423	DOWN
MW16-61I	28.00	38.00	33.00											13.37		13.06				
MW16-61D	44.00	53.00	48.50											13.41	-0.00258	13.07	-0.00065	-0.00258	-0.00065	UP
MW16-62I	27.50	37.50	32.50											13.39		13.1				
MW16-62D	47.50	57.50	52.50											13.35	0.00200	13.1	0.00000	0.00000	0.00200	DOWN
MW16-63I	31.00	41.00	36.00											13.3		12.97				
MW16-63D	47.00	55.00	51.00											13.26	0.00267	12.92	0.00333	0.00267	0.00333	DOWN
MW16-64I	30.00	37.50	33.75											13.02		12.76				
MW16-64D	46.50	56.50	51.50											12.97	0.00282	12.68	0.00451	0.00282	0.00451	DOWN
MW16-65I	37.00	44.00	40.50											14.83		14.59				
MW16-65D	70.00	75.00	72.50											14.84	-0.00031	14.59	0.00000	-0.00031	0.00000	VARIABLE
MW16-66I	30.50	40.50	35.50													14.26				
MW16-66D	46.00	57.00	51.50													13.64	0.03875	0.03875	0.03875	DOWN
MW16-67I	28.00	38.00	33.00													14.09				
MW16-67D	51.50	61.50	56.50																	
MW16-68I	28.00	38.00	33.00													14.33				
MW16-68D	48.50	58.50	53.50													13.59	0.03610	0.03610	0.03610	DOWN
MW16-69I	39.00	49.00	44.00													13.35				
MW16-69D	51.50	61.50	56.50													13.28	0.00560	0.00560	0.00560	DOWN
MW16-70I	28.00	38.00	33.00													14.02				
MW16-70D	46.00	56.00	51.00													13.32	0.03889	0.03889	0.03889	DOWN
MW16-71I	28.00	38.00	33.00													13.99				
MW16-71D	46.00	57.00	51.50													13.37	0.03351	0.03351	0.03351	DOWN
RMW-01I	N.A.	N.A.	N.A.					18		15.69		17.45				15.65				
RMW-01D	N.A.	N.A.	N.A.					17.91	1.00000	15.75	-1.00000	17.3	1.00000			15.42	1.00000	-1.00000	1.00000	VARIABLE
Shallow (S) to Deep (D) Zone																				
MW16-01S	17.50	27.50	22.50	12.95		15.58		15.64				14.45		13.2		13				
MW16-01D	48.50	58.50	53.50	13.4	-0.01452	15.66	-0.00258	15.64	0.00000	12.45		14.7	-0.00806	13.54	-0.01097	13.22	-0.00710	-0.01452	0.00000	UP
MW16-02S	5.00	15.00	10.00	10.98		13.3		13.45				12.34		10.72		10.56				
MW16-02D	56.50	66.50	61.50	9.83	0.02233	11.57	0.03359	11.5	0.03786	8.87		10.71	0.03165	9.75	0.01883	9.64	0.01786	0.01786	0.03786	DOWN
MW16-03S	3.00	13.00	8.00	8.25		9.82		8.97		8.06		9.28		7.74		7.78				
MW16-03D	38.50	48.50	43.50	6.46	0.05042	6.86	0.08338	6.62	0.06620	6.25	0.05099	7.1	0.06141	6.16	0.04451	6.26	0.04282	0.04282	0.08338	DOWN
MW16-04S	3.00	13.00	8.00	5.59		6.93		6.02		5.94		7.68		6.37		5.91				
MW16-04D	43.00	53.00	48.00	4.32	0.03175	4.36	0.06425	3.73	0.05725	3.93	0.05025	4.59	0.07725	4.61	0.04400	3.49	0.06050	0.03175	0.07725	DOWN
MW16-05S	8.00	18.00	13.00			3.21		4.22				4.11		2.37		2.3				
MW16-05D	42.00	52.00	47.00	3.19	-0.09382	3.09	0.00353	2.66	0.04588	3.03		3.24	0.02559	2.66	-0.00853	2.61	-0.00912	-0.09382	0.04588	VARIABLE
MW16-06S	7.00	17.00	12.00	11.45		14.37		13.56				13.57		11.74		11.51				
MW16-06D	38.50	44.50	41.50	12.05	-0.02034	14.68	-0.01051	14.13	-0.01932	11.4		13.83	-0.00881	11.2	0.01831	11.99	-0.01627	-0.02034	0.01831	VARIABLE
MW16-07S	7.00	17.00	12.00	11.4		14.15		13.37		10.72		13.32		11.52		11.32				
MW16-07D	27.50	37.50	32.50	11.44	-0.00195	14.06	0.00439	13.4	-0.00146	10.74	-0.00098	13.24	0.00390	10.56	0.04683	11.37	-0.00244	-0.00244	0.04683	VARIABLE
MW16-08S	16.00	26.00	21.00											12.32		12.06				
MW16-08D	40.00	55.00	47.50			14.62		14.61		11.06		13.65		12.59	-0.01019	12.27	-0.00792	-0.01019	-0.00792	UP
MW16-11S	10.00	20.00	15.00							15.79		16.55		16.33		15.72				
MW16-11D	53.50	63.50	58.50			17.31		17.69		15.17	0.01425	16.48	0.00161	15.89	0.01011	15.35	0.00851	0.00161	0.01425	DOWN
MW16-12S	14.40	24.40	19.40											15.28		14.97				
MW16-12D	52.00	62.00	57.00			16.51		17.04		14.18		15.68		14.97	0.00824	14.58	0.01037	0.00824	0.01037	DOWN
MW16-15S	16.00	26.00	21.00											13.97		13.67				
MW16-15D	46.00	56.00	51.00			12.6		12.92		12.66		14.6		13.72	0.00833	13.47	0.00667	0.00667	0.00833	DOWN
MW16-17S	6.00	16.00	11.00							14.56		15.64		15.48		14.67				
MW16-17D	57.00	67.00	62.00			16.08		16.45		13.63	0.01824	15.22	0.00824	14.76	0.01412	14.15	0.01020	0.00824	0.01824	DOWN
MW16-23S	14.00	24.00	19.00											12.24		11.96				
MW16-23D	50.00	65.00	57.50			13.61		13.78		10.63		3.7		11.75	0.01273	11.5	0.01195	0.01195	0.01273	DOWN
MW16-25S	9.00	19.00	14.00											10.27		12.12				
MW16-25D	46.00	58.00	52.00			14		14.34		11.28		13.09		12.67	-0.06316	12.09	0.00079	-0.06316	0.00079	VARIABLE
MW16-33S	6.50	16.50	11.50											28.12		28.12				
MW16-33D	61.00	71.00	66.00							14.81		16.37		15.84	0.22532	15.39	0.23358	0.22532	0.23358	DOWN
MW16-34S	5.00	15.00	10.00											15.36		16.16				

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NORTH KINGSTOWN, RHODE ISLAND

Well Location	Screen Top (ft bgs)	Screen bottom (ft bgs)	Screen mid-point (ft bgs)	WL elevation (ft msl) 10/4/2000	Vertical Gradient	WL elevation (ft msl) 3/29/2001	Vertical Gradient	WL elevation (ft msl) 5/2/2001	Vertical Gradient	WL elevation (ft msl) 11/20/2002	Vertical Gradient	WL elevation (ft msl) 3/24/2003	Vertical Gradient	WL elevation (ft msl) Supp. Phase II Sampling (9/2004-11/2004)	Vertical Gradient	WL elevation (ft msl) 11/9/04-11/15/04	Vertical Gradient	Minimum Gradient	Maximum Gradient	Direction
MW16-34D	44.00	58.00	51.00							14.12		15.66		14.59	0.01878	14.64	0.03707	0.01878	0.03707	DOWN
MW16-35S	6.00	16.00	11.00							13.94		15.12		14.3		14.29				
MW16-35D	51.50	61.50	56.50							13.38	0.01231	14.95	0.00374	13.79	0.01121	13.93	0.00791	0.00374	0.01231	DOWN
MW16-37S	7.00	22.00	14.50							12.3		15.58		15.37		14.71				
MW16-37D	44.70	54.70	49.70							13.59	-0.03665	15.21	0.01051	14.63	0.02102	14.13	0.01648	-0.03665	0.02102	VARIABLE
MW16-40S	6.00	22.00	14.00							9.48		12.88		11.03		10.99				
MW16-40D	54.00	64.00	59.00											11.35	-0.00711	11.07	-0.00178	-0.00711	-0.00178	UP
MW16-41S	7.50	17.50	12.50							9.59		12.98		10.54		10.8				
MW16-41D	51.00	61.00	56.00							10	-0.00943	12.31	0.01540	11.85	-0.03011	11	-0.00460	-0.03011	0.01540	VARIABLE
MW16-42S	5.50	15.50	10.50							9.43		12.35		9.98		10.24				
MW16-42D	58.00	68.00	63.00							6.99	0.04648	8.34	0.07638	7.5	0.04724	7.43	0.05352	0.04648	0.07638	DOWN
MW16-43S	6.00	21.00	13.50							10.1		12.49		10.33		10.46				
MW16-43D	37.00	43.00	40.00							8.87	0.04642	10.71	0.06717	9.23	0.04151	9.28	0.04453	0.04151	0.06717	DOWN
MW16-44S	6.00	21.00	13.50							9.86		12.35		9.55		10.13				
MW16-44D	49.60	59.60	54.60							6.9	0.07202	8.22	0.10049	7.34	0.05377	7.13	0.07299	0.05377	0.10049	DOWN
MW16-45S	6.00	21.00	13.50							7.53		10.19		8.3		8.79				
MW16-45D	48.00	58.00	53.00							7.97	-0.01114	9.44	0.01899	7.97	0.00835	8.21	0.01468	-0.01114	0.01899	VARIABLE
MW16-46S	6.00	21.00	13.50							7.35		8.97		6.61		7.37				
MW16-46D	50.50	59.00	54.75							6.09	0.03055	7.12	0.04485	6.34	0.00655	6.04	0.03224	0.00655	0.04485	DOWN
MW16-47S	4.00	14.00	9.00							11		13.19		10.3		11.18				
MW16-47D	26.30	36.30	31.30							10.73	0.01211	13.11	0.00359	10.3	0.00000	11.2	-0.00090	-0.00090	0.01211	VARIABLE
MW16-48S	4.00	14.00	9.00							4.56		4.38		4.73		4.11				
MW16-48D	35.40	45.40	40.40							4.74	-0.00573	5.57	-0.03790	5.24	-0.01624	4.24	-0.00414	-0.03790	-0.00414	UP
MW16-58S	6.00	16.00	11.00											9.9		9.68				
MW16-58D	51.00	62.00	56.50											6.88	0.06637	6.47	0.07055	0.06637	0.07055	DOWN
MW16-59S	14.00	24.00	19.00											12.44		12.19				
MW16-59D	64.00	74.00	69.00											12.38	0.00120	12.04	0.00300	0.00120	0.00300	DOWN
MW16-65S	27.00	37.00	32.00											15.16		14.91				
MW16-65D	70.00	75.00	72.50											14.84	0.00790	14.59	0.00790	0.00790	0.00790	DOWN
MW16-66S	18.00	28.00	23.00													14.31				
MW16-66D	46.00	57.00	51.50													13.64	0.02351	0.02351	0.02351	DOWN
MW16-67S	14.00	24.00	19.00													14.35				
MW16-67D	51.50	61.50	56.50																	
MW16-68S	15.00	25.00	20.00													14.4				
MW16-68D	48.50	58.50	53.50													13.59	0.02418	0.02418	0.02418	DOWN
MW16-69S	15.00	25.00	20.00													14.1				
MW16-69D	51.50	61.50	56.50													13.28	0.02247	0.02247	0.02247	DOWN
MW16-70S	10.00	25.00	17.50													14.13				
MW16-70D	46.00	56.00	51.00													13.32	0.02418	0.02418	0.02418	DOWN
MW16-71S	15.00	25.00	20.00													14.18				
MW16-71D	46.00	57.00	51.50													13.37	0.02571	0.02571	0.02571	DOWN
RMW-01S	N.A.	N.A.	N.A.					18.13		15.59		17.58				15.73				
RMW-01D	N.A.	N.A.	N.A.					17.91	1.00000	15.75	-1.00000	17.3	1.00000			15.42	1.00000	-1.00000	1.00000	VARIABLE
RMW-02S	N.A.	N.A.	N.A.					15.92		14.15		15.92				13.85				
RMW-02D	N.A.	N.A.	N.A.					16.04	-1.00000	14	1.00000	15.79	1.00000			13.87	-1.00000	-1.00000	1.00000	VARIABLE
RMW-03S	N.A.	N.A.	N.A.					11.19		11.25		11.42				10.57				
RMW-03D	N.A.	N.A.	N.A.					11.46	-1.00000	10.14	1.00000	11.69	-1.00000			10.53	1.00000	-1.00000	1.00000	VARIABLE
PGU-Z3-03S	N.A.	N.A.	N.A.					4.68		5.06		4.7				4.23				
PGU-Z3-03D	N.A.	N.A.	N.A.					5.17	-1.00000	4.25	1.00000	5.21	-1.00000			4.67	-1.00000	-1.00000	1.00000	VARIABLE
PGU-Z3-07S	N.A.	N.A.	N.A.					20.26		17.58		18.79				18				
PGU-Z3-07D	N.A.	N.A.	N.A.					20.22	1.00000	17.63	-1.00000	18.79	-1.00000			17.99	1.00000	-1.00000	1.00000	VARIABLE
PGU-Z3-09S	N.A.	N.A.	N.A.					12.71		9.86		12.56				10.38				
PGU-Z3-09D	N.A.	N.A.	N.A.					11.34	1.00000	8.98	1.00000	11.05	1.00000			9.41	1.00000	1.00000	1.00000	DOWN
PGU-Z3-10S	N.A.	N.A.	N.A.					18.86		15.69		17.57				16.23				
PGU-Z3-10D	N.A.	N.A.	N.A.					18.47	1.00000	15.78	-1.00000	15.14	1.00000			16.07	1.00000	-1.00000	1.00000	VARIABLE
PGU-Z4-02	N.A.	N.A.	N.A.					17.82		16.41		17.04				31.44				
PGU-Z4-03S	N.A.	N.A.	N.A.							14.59		16.29				15.29				
PGU-Z4-03D	N.A.	N.A.	N.A.							14.516	1.00000	16.11	1.00000			15.12	1.00000	1.00000	1.00000	DOWN
PGU-Z4-04S	N.A.	N.A.	N.A.							11.52		11.76				11.12				
PGU-Z4-04D	N.A.	N.A.	N.A.							11.86	-1.00000	12.41	-1.00000			11.51	-1.00000	-1.00000	-1.00000	UP
MW01-10S	N.A.	N.A.	N.A.							19.4		23.74				21.41				
MW01-10D	N.A.	N.A.	N.A.							19.3	1.00000	23.47	1.00000			21.1	1.00000	1.00000	1.00000	DOWN

TABLE 3-4A

SUMMARY OF VERTICAL HYDRAULIC GRADIENTS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Location	Screen Top (ft bgs)	Screen bottom (ft bgs)	Screen mid-point (ft bgs)	WL elevation (ft msl) 10/4/2000	Vertical Gradient	WL elevation (ft msl) 3/29/2001	Vertical Gradient	WL elevation (ft msl) 5/2/2001	Vertical Gradient	WL elevation (ft msl) 11/20/2002	Vertical Gradient	WL elevation (ft msl) 3/24/2003	Vertical Gradient	WL elevation (ft msl) Supp. Phase II Sampling (9/2004-11/2004)	Vertical Gradient	WL elevation (ft msl) 11/9/04-11/15/04	Vertical Gradient	Minimum Gradient	Maximum Gradient	Direction
MW01-12S	N.A.	N.A.	N.A.													18.13				
MW01-12D	N.A.	N.A.	N.A.							17.05		19.93				18.087	1.00000	1.00000	1.00000	DOWN
MW01-13S	N.A.	N.A.	N.A.					12.54		9.83		11.96				10.49				
MW01-13D	N.A.	N.A.	N.A.					14.6	-1.00000	11.71	-1.00000	13.73	-1.00000			12.26	-1.00000	-1.00000	-1.00000	UP
MW01-14S	N.A.	N.A.	N.A.					15.73		13.3		14.94				13.73				
MW01-14D	N.A.	N.A.	N.A.					16.7	-1.00000	13.9	-1.00000	15.83	-1.00000			14.41	-1.00000	-1.00000	-1.00000	UP
MW02-03S	N.A.	N.A.	N.A.					19.39		15.62		17.75				16.49				
MW02-03D	N.A.	N.A.	N.A.					19.38	1.00000	15.6	1.00000	17.73	1.00000			16.46	1.00000	1.00000	1.00000	DOWN
MW02-08S	N.A.	N.A.	N.A.							17.96		20.36								
MW02-08D	N.A.	N.A.	N.A.							17.91	1.00000	20.29	1.00000					1.00000	1.00000	DOWN
MW02-10S	N.A.	N.A.	N.A.									20.02				18.8				
MW02-10D	N.A.	N.A.	N.A.							17.81		19.93	1.00000			18.71	1.00000	1.00000	1.00000	DOWN
MW02-11S	N.A.	N.A.	N.A.					21.17		17.26		21.12				18.15				
MW02-11D	N.A.	N.A.	N.A.					21.32	-1.00000	17.45	-1.00000	19.47	1.00000			18.3	-1.00000	-1.00000	1.00000	VARIABLE
MW03-02S	N.A.	N.A.	N.A.							18.92		21.87				20.32				
MW03-02D	N.A.	N.A.	N.A.							18.82	1.00000	21.84	1.00000			20.25	1.00000	1.00000	1.00000	DOWN
MW03-03S	N.A.	N.A.	N.A.							19.23		21.88				20.51				
MW03-03D	N.A.	N.A.	N.A.							19.14	1.00000	21.86	1.00000			20.4	1.00000	1.00000	1.00000	DOWN
Deep (D) to Upper Rock (R) Zone																				
MW16-01D	48.50	58.50	53.50	13.4		15.66		15.64		12.45		14.7		13.54		13.22				
MW16-01R	60.00	85.00	72.50											13.38	0.00842	13.11	0.00579	0.00579	0.00842	DOWN
MW16-02D	56.50	66.50	61.50	9.83		11.57		11.5		8.87		10.71		9.75		9.64				
MW16-02R	70.00	95.00	82.50			11.46	0.00524	11.38	0.00571	8.69	0.00857	10.48	0.01095	9.44	0.01476	9.43	0.01000	0.00524	0.01476	DOWN
MW16-03D	38.50	48.50	43.50	6.46		6.86		6.62		6.25		7.1		6.16		6.26				
MW16-03R	52.00	77.00	64.50											7.29	-0.05381	6.67	-0.01952	-0.05381	-0.01952	UP
MW16-05D	42.00	52.00	47.00	3.19		3.09		2.66		3.03		3.24		2.66		2.61				
MW16-05R	66.00	91.00	78.50							3.01	0.00063	3.24	0.00000	2.61	0.00159	2.62	-0.00032	-0.00032	0.00159	VARIABLE
MW16-06D	38.50	44.50	41.50	12.05		14.68		14.13		11.4		13.83		11.2		11.99				
MW16-06R	49.00	74.00	61.50							11.22	0.00900	13.39	0.02200	10.74	0.02300	11.58	0.02050	0.00900	0.02300	DOWN
MW16-10D	48.50	58.50	53.50			17.46		18.2		15.5		16.96		16.35		15.93				
MW16-10R	66.00	91.00	78.50			17.28	0.00720	17.98	0.00880	15.19	0.01240	16.67	0.01160	15.73	0.02480	15.59	0.01360	0.00720	0.02480	DOWN
MW16-14D	52.00	62.00	57.00			16.1		16.5		13.55		15.19		14.5		13.99				
MW16-14R	65.00	90.00	77.50											14.14	0.01756	13.84	0.00732	0.00732	0.01756	DOWN
MW16-15D	46.00	56.00	51.00			12.6		12.92		12.66		14.6		13.72		13.47				
MW16-15R	60.50	86.00	73.25			13.53	-0.04180	13.86	-0.04225	12.63	0.00135	14.6	0.00000	12.74	0.04404	13.49	-0.00090	-0.04225	0.04404	VARIABLE
MW16-17D	57.00	67.00	62.00			16.08		16.45		13.63		15.22		14.76		14.15				
MW16-17R	73.00	98.00	85.50							13.85	-0.00936	15.36	-0.00596	14.91	-0.00638	14.31	-0.00681	-0.00936	-0.00596	UP
MW16-25D	46.00	58.00	52.00			14		14.34		11.28		13.09		12.67		12.09				
MW16-25R	61.00	86.00	73.50			13.51	0.02279	13.9	0.02047	11.05	0.01070	12.71	0.01767	12.29	0.01767	11.66	0.02000	0.01070	0.02279	DOWN
MW16-27D	54.00	64.00	59.00			5.26		5.09		3.37		4.81		3.97		3.37				
MW16-27R	66.50	92.00	79.25											4.5	-0.02617	4.07	-0.03457	-0.03457	-0.02617	UP
MW16-28D	54.50	64.50	59.50			3.4		2.9		2.89		3.11		2.87		2.42				
MW16-28R	68.00	93.00	80.50											2.77	0.00476	2.36	0.00286	0.00286	0.00476	DOWN
MW16-32D	50.00	62.00	56.00							13.55		15.26		6.14		5.61				
MW16-32R	68.00	93.00	80.50											13.97		13.76				
MW16-36D	39.50	49.50	44.50							12.18		13.48		13.21		12.38				
MW16-36R	53.50	78.50	66.00							12.07	0.00512	13.44	0.00186	13.12	0.00419	12.35	0.00140	0.00140	0.00512	DOWN
MW16-44D	49.60	59.60	54.60							6.9		8.22		7.34		7.13				
MW16-44R	62.00	87.00	74.50							7	-0.00503	8.23	-0.00050	7.32	0.00101	7.22	-0.00452	-0.00503	0.00101	VARIABLE
MW16-51D	65.50	75.50	70.50							2.76		2.86		3.07		2.13				
MW16-51R	78.50	103.50	91.00							2.17	0.02878	2.07	0.03854	1.52	0.07561	1.51	0.03024	0.02878	0.07561	DOWN
MW16-52D	60.00	74.00	67.00							3.21		2.78		3.48		2.4				
MW16-52R	93.00	118.00	105.50							2.35	0.02234	2.43	0.00909	2.36	0.02909	1.86	0.01403	0.00909	0.02909	DOWN
MW16-55D	90.00	105.00	97.50							16.26		17.47		16.65		16.5				
MW16-55R	108.00	133.00	120.50							16.04	0.00957	17.22	0.01087	16.29	0.01565	16.15	0.01522	0.00957	0.01565	DOWN
MW16-56D	59.00	66.00	62.50											5.89		5.28				
MW16-56R	69.00	94.00	81.50											6.41	-0.02737	5.89	-0.03211	-0.03211	-0.02737	UP
MW16-58D	51.00	62.00	56.50											6.88		6.47				
MW16-58R	66.00	91.00	78.50											6.67	0.00955	6.18	0.01318	0.00955	0.01318	DOWN
MW16-59D	64.00	74.00	69.00											12.38		12.04				
MW16-59R	75.00	100.00	87.50											12.6	-0.01189	12.28	-0.01297	-0.01297	-0.01189	UP
MW16-60D	51.00	61.00	56.00											12.99		12.81				

TABLE 3-4A

SUMMARY OF VERTICAL HYDRAULIC GRADIENTS
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Location	Screen Top (ft bgs)	Screen bottom (ft bgs)	Screen mid-point (ft bgs)	WL elevation (ft msl) 10/4/2000	Vertical Gradient	WL elevation (ft msl) 3/29/2001	Vertical Gradient	WL elevation (ft msl) 5/2/2001	Vertical Gradient	WL elevation (ft msl) 11/20/2002	Vertical Gradient	WL elevation (ft msl) 3/24/2003	Vertical Gradient	WL elevation (ft msl) Supp. Phase II Sampling (9/2004-11/2004)	Vertical Gradient	WL elevation (ft msl) 11/9/04-11/15/04	Vertical Gradient	Minimum Gradient	Maximum Gradient	Direction
MW16-60R	64.00	89.00	76.50											13.42	-0.02098	12.55	0.01268	-0.02098	0.01268	VARIABLE
MW16-65D	70.00	75.00	72.50											14.84		14.59				
MW16-65R	77.00	102.00	89.50											14.65	0.01118	14.5	0.00529	0.00529	0.01118	DOWN
MW16-66D	46.00	57.00	51.50													13.64				
MW16-66R	60.00	85.00	72.50													13.53	0.00524	0.00524	0.00524	DOWN
MW16-67D	51.50	61.50	56.50																	
MW16-67R	64.00	89.00	76.50													13.45				
MW16-68D	48.50	58.50	53.50													13.59				
MW16-68R	61.50	86.50	74.00													13.72	-0.00634	-0.00634	-0.00634	UP
MW16-69D	51.50	61.50	56.50													13.28				
MW16-69R	64.50	89.50	77.00													13.04	0.01171	0.01171	0.01171	DOWN
MW16-70D	46.00	56.00	51.00													13.32				
MW16-70R	61.00	86.00	73.50													13.48	-0.00711	-0.00711	-0.00711	UP
MW16-71D	46.00	57.00	51.50													13.37				
MW16-71R	59.50	84.50	72.00													13.33	0.00195	0.00195	0.00195	DOWN
EA-110D	N.A.	N.A.	N.A.					18.55		16.53		17.42				16.74				
EA-110R	N.A.	N.A.	N.A.					18.51	1.00000	16.55	-1.00000	17.4	1.00000			16.73	1.00000	-1.00000	1.00000	VARIABLE
EA-111D	N.A.	N.A.	N.A.							16		20.12				19.08				
EA-111R	N.A.	N.A.	N.A.							16.12	-1.00000	20.15	-1.00000			19.12	-1.00000	-1.00000	-1.00000	UP
MW01-10D	N.A.	N.A.	N.A.							19.3		23.47				21.1				
MW01-10R	N.A.	N.A.	N.A.							19.26	1.00000	23.09	1.00000			20.99	1.00000	1.00000	1.00000	DOWN
MW01-13D	N.A.	N.A.	N.A.					14.6		11.71		13.73				12.26				
MW01-13R	N.A.	N.A.	N.A.					15.71	-1.00000	12.46	-1.00000	14.46	-1.00000			12.957	-1.00000	-1.00000	-1.00000	UP
MW01-15D	N.A.	N.A.	N.A.					20.72		16.09		19.49				17.59				
MW01-15R	N.A.	N.A.	N.A.					20.9	-1.00000	16.69	-1.00000	19.88	-1.00000			18.08	-1.00000	-1.00000	-1.00000	UP
MW02-03D	N.A.	N.A.	N.A.					19.38		15.6		17.73				16.46				
MW02-03R	N.A.	N.A.	N.A.					20.01	-1.00000	16.26	-1.00000	18.33	-1.00000			17.08	-1.00000	-1.00000	-1.00000	UP
MW03-03D	N.A.	N.A.	N.A.							19.14		21.86				20.4				
MW03-03R	N.A.	N.A.	N.A.							19.23	-1.00000	22.03	-1.00000			20.54	-1.00000	-1.00000	-1.00000	UP
MW03-08D	N.A.	N.A.	N.A.							20.02		23.94				21.73				
MW03-08R	N.A.	N.A.	N.A.							20.12	-1.00000	24.04	-1.00000			21.84	-1.00000	-1.00000	-1.00000	UP
MW07-32D	N.A.	N.A.	N.A.							1.1		0.7				0.22				
MW07-32R	N.A.	N.A.	N.A.							0.87	1.00000	0.78	-1.00000			-0.02	1.00000	-1.00000	1.00000	VARIABLE
Upper Rock (R) to Deep Rock (R2) Zone																				
MW16-02R	70.00	95.00	82.50			11.46		11.38		8.69		10.48		9.44		9.43				
MW16-02R2	96.00	121.00	108.50							9.75	-0.04077	11.79	-0.05038	10.97	-0.05885	10.71	-0.04923	-0.05885	-0.04077	UP
MW16-05R	66.00	91.00	78.50							3.01		3.24		2.61		2.62				
MW16-05R2	91.00	116.00	103.50											2.84	-0.00920	2.72	-0.00400	-0.00920	-0.00400	UP
MW16-15R	60.50	86.00	73.25			13.53		13.86		12.63		14.6		12.74		13.49				
MW16-15R2	86.00	111.00	98.50							11.19	0.05703	13.77	0.03287	12.73	0.00040	12.42	0.04238	0.00040	0.05703	DOWN
MW16-55R	108.00	133.00	120.50							16.04		17.22		16.29		16.15				
MW16-55R2	133.00	158.00	145.50							16.1	-0.00240	17.04	0.00720	15.17	0.04480	16.05	0.00400	-0.00240	0.04480	VARIABLE

Notes:
1) Only wells where vertical hydraulic gradients were capable of being calculated are presented.
2) Vertical hydrualic gradient for non-Site 16 wells are qualitative since well screen information not available (N.A.).
3) Positive gradients are downward, negative gradients are upward.

TABLE 3-4B

SUMMARY OF LONG-TERM VERTICAL HYDRAULIC GRADIENTS DIRECTION OF FLOW
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Cluster	Overburden			Bedrock	
	Shallow - Intermediate	Intermediate - Deep	Shallow - Deep	Deep - Rock	Rock - Deep Rock
MW16-01			Up	Down	
MW16-02	Down	Up	Down	Down	Up
MW16-03			Down	Up	
MW16-04	Down	Up	Down		
MW16-05	Variable (Up and Down)	Up	Variable (Up and Down)	Variable (Up and Down)	Up
MW16-06			Variable (Up and Down)	Down	
MW16-07			Variable (Up and Down)		
MW16-08			Up		
MW16-10				Down	
MW16-11			Down		
MW16-12			Down		
MW16-13		Down			
MW16-14		Down		Down	
MW16-15			Down	Variable (Up and Down)	Down
MW16-16		Down			
MW16-17	Down	Down	Down	Up	
MW16-18		Down			
MW16-19		Variable (Up and Down)			
MW16-20		Down			
MW16-21		Down			
MW16-22		Up			
MW16-23			Down		
MW16-24		Down			
MW16-25	Up	Down	Variable (Up and Down)	Down	
MW16-26					
MW16-27		Variable (Up and Down)		Up	
MW16-28		Down		Down	
MW16-33	Down	Down	Down		
MW16-34	Down	Down	Down		
MW16-35	Down	Down	Down		
MW16-36				Down	
MW16-37	Variable (Up and Down)	Down	Variable (Up and Down)		
MW16-39		Variable (Up and Down)			
MW16-40	Up	Down	Up		
MW16-41	Variable (Up and Down)	Up	Variable (Up and Down)		
MW16-42	Down	Down	Down		
MW16-43	Down	Down	Down		
MW16-44	Down	Down	Down	Variable (Up and Down)	
MW16-45	Variable (Up and Down)	Up	Variable (Up and Down)		
MW16-46	Variable (Up and Down)	Down	Down		
MW16-47			Variable (Up and Down)		
MW16-48	Up	Down	Up		
MW16-49		Down			
MW16-50		Down			
MW16-51				Down	

TABLE 3-4B

SUMMARY OF LONG-TERM VERTICAL HYDRAULIC GRADIENTS DIRECTION OF FLOW
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Cluster	Overburden			Bedrock	
	Shallow - Intermediate	Intermediate - Deep	Shallow - Deep	Deep - Rock	Rock - Deep Rock
MW16-52				Down	
MW16-55				Down	Variable (Up and Down)
MW16-56		Down		Up	
MW16-57		Down			
MW16-58	Down/Down	Variable (Up and Down)/Down	Down	Down	
MW16-59	Variable (Up and Down)	Down	Down	Up	
MW16-60				Variable (Up and Down)	
MW16-61		Up			
MW16-62		Down			
MW16-63		Down			
MW16-64		Down			
MW16-65	Down	Variable (Up and Down)	Down	Down	
MW16-66	Down	Down	Down	Down	
MW16-67	Down				
MW16-68	Down	Down	Down	Up	
MW16-69	Down	Down	Down	Down	
MW16-70	Down	Down	Down	Up	
MW16-71	Down	Down	Down	Down	
RMW-01	Variable (Up and Down)	Variable (Up and Down)	Variable (Up and Down)		
RMW-02			Variable (Up and Down)		
RMW-03			Variable (Up and Down)		
PGU-Z3-03			Variable (Up and Down)		
PGU-Z3-07			Variable (Up and Down)		
PGU-Z3-09			Down		
PGU-Z3-10			Variable (Up and Down)		
PGU-Z4-03			Down		
PGU-Z4-04			Up		
EA-110				Variable (Up and Down)	
EA-111				Up	
MW01-10			Down	Down	
MW01-12			Down		
MW01-13			Up	Up	
MW01-14			Up		
MW01-15				Up	
MW02-03			Down	Up	
MW02-08			Down		
MW02-10			Down		
MW02-11			Variable (Up and Down)		
MW03-02			Down		
MW03-03			Down	Up	
MW03-08				Up	
MW07-32				Variable (Up and Down)	

TABLE 3-5

SUMMARY OF SLUG TEST ANALYSES
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Location	Falling Head K value (ft/day)	Rising Head K value (ft/day)	Geologic Deposits Screened
Shallow (S) Zone			
MW16-03S	15.72	12.66	Silty Sand (9), sandy silt (1)
MW16-04S	32.46		Fill (5.2), boulder (4.8)
MW16-05S	9.192	32.64	Fill (2.5), silty sand (1), sandy silt (2.5), sand (0.5), sandy silt (1), sand (2.5)
MW16-06S	20.62		Sand (1), silty sand (2), sandy silt (1.25), gravel (0.25), sandy silt (2.5), silt (2), gravel (1)
MW16-08S	29.69	40.49	Sand (6.5), silty sand (2), sand (0.5), sandy silt (1)
MW16-12S	71.48	63.05	Sand (7.5), silt (1), sand (1.5)
MW16-15S		17.37	Sand (1), sandy silt (0.5), sand (8.5)
MW16-17S	1.584		Sand (2), silty sand (6), sand (2)
MW16-23S	12.77	14.57	Sand (10)
MW16-25S		96.16	
MW16-35S		3.972	Sand (10)
MW16-37S		5.35	Gravelly sand (5), sand (10)
MW16-42S		21.62	Sandy fill (6.5), sand (2.5), silty with organic material (0.5), silt (0.5)
MW16-44S	1.239	5.109	Sandy fill (8), silt? (2), peat (0.5), sand (1.5), silty sand (3)
MW16-45S	1.003	1.875	Gravelly sandy fill (10.5), Peat (1.5), Sand (3)
MW16-58S	16.63	20.85	Sand (5), silt (1), sand (1), silt (3)
MW16-59S		49.81	Sand (10)
MW16-65S		2.114	Sand (10)
MW16-66S	7.211	7.05	Sand (10)
MW16-67S		45.24	Sand (10)
MW16-68S		41.73	Sand (10)
MW16-69S		9.83	Sand (10)
MW16-70S		33.01	Sand (15)
MW16-71S		15.37	Sand (10)
Average	23.01		
Geometric Mean	13.23		

TABLE 3-5

SUMMARY OF SLUG TEST ANALYSES
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Location	Falling Head K value (ft/day)	Rising Head K value (ft/day)	Geologic Deposits Screened
Int rmediate (I) Zone			
MW16-02I	1.261	1.35	Gravelly Sand (4), silty clay (1)
MW16-04I	1.243	1.574	Silty sand (10)
MW16-05I	14.6	29.75	Sand (1), silty sand (1), sand (2.5), sandy silt (0.5), sand (3.5), sandy silt (0.5), sand (5)
MW16-14I	1.451	1.603	Sand (6.5), silty sand (1.5), sand (2)
MW16-17I	1.111	0.9127	Silty sand (4.5), sandy silt (2), silty sand (5.5)
MW16-22I	0.7505	0.846	Sand (9), sandy silt (1)
MW16-24I	1.088	1.103	Gravelly sand (3), silty sand (1), sand (6)
MW16-24I	2.133		Gravelly sand (3), silty sand (1), sand (6)
MW16-24I	1.415		Gravelly sand (3), silty sand (1), sand (6)
MW16-25I	1.311	1.532	Silty sand (9), gravelly sand (1)
MW16-27I	3.931	4.4	Silty sand (2), sand (8)
MW16-28I	7.941	9.517	Sand (9), silty sand (1)
MW16-35I	2.783	2.338	Sand (10)
MW16-35I		1.31	Sand (10)
MW16-37I	1.939	1.958	Sand (6.5), silty sand (1.5), sand (2), silty sand (4)
MW16-39I	4.92	4.592	Sand (10)
MW16-40I	2.357	2.541	Sand (10)
MW16-42I	1.05	1.369	Sand (10)
MW16-44I	2.293		Silty sand (7), sand (3)
MW16-45I	4.578	3.956	Sand (10)
MW16-49I	4.209	4.567	Sand (10)
MW16-50I	1.484	1.477	Sand (4), silty sand (4), sand (2)
MW16-56I	3.188	2.815	Sand (10)
MW16-57I	2.539	2.979	Sand (10)
MW16-58I1	1.486	1.895	Sandy silt (1), Silty sand (8), sand (1)
MW16-58I2	3.365	3.533	Sand (10)
MW16-59I	0.6194	0.6775	Silty sand (2), sand (2), silty sand (4), sand (1), silty sand (1)
MW16-61I	3.346	3.476	Sand (10)
MW16-62I	3.258	3.681	Sand (10)
MW16-63I	8.869	8.652	Sand (10)

TABLE 3-5

SUMMARY OF SLUG TEST ANALYSES
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Location	Falling Head K value (ft/day)	Rising Head K value (ft/day)	Geologic Deposits Screened
MW16-64I	0.66	0.5687	Silt (7.5)
MW16-65I	1.373	1.325	Sand (4), gravelly sand (3)
MW16-66I	0.8618	0.9298	Sand (10)
MW16-67I	0.1417	0.684	Sand (10)
MW16-68I	3.407	2.822	Sand (2), silty sand (2), sand (6)
MW16-69I	6.013	6.496	Sand (4), sandy gravel (0.5), sand (4.5), sandy gravel (1)
MW16-70I	2.272	2.067	Sand (10)
MW16-71I	1.265	1.361	Silty sand (1), sand (4), silty sand (1), sand (3), silty sand (0.5), silt (0.5)
Average	3.16		
Geometric Mean	2.13		
Deep (D) Zone			
MW16-01D	2.584	2.728	Silt and Sand (3), Sandy cobbly gravel (5.7), rock (1.3)
MW16-01D		2.751	Silt and Sand (3), Sandy cobbly gravel (5.7), rock (1.3)
MW16-01D		2.358	Silt and Sand (3), Sandy cobbly gravel (5.7), rock (1.3)
MW16-01D		1.915	Silt and Sand (3), Sandy cobbly gravel (5.7), rock (1.3)
MW16-02D	33.93	25.5	Gravelly Sand (1.5), sand (1), sandy silt (1), gravelly sand (6.5)
MW16-04D	16.14	9.595	Silty Sand (1), sand (3), boulder (2), silty gravelly sand (2.5), weathered bedrock (1.5)
MW16-05D	24.26	14.93	Sand (2.5), sandy silt (1), sand (0.5), sandy silt (1.5), sand (1.5), silty sand (1), silty gravelly sand (2)
MW16-06D	60.91	51.94	Silty gravelly sand (3.5), gravelly sandy silt (2.5)
MW16-10D	1.095	0.6743	Silt (1.5), weathered rock (silt with rock fragments) (4), rock (1), weathered rock (silty sand and gravel) (3.5)
MW16-14D	1.85	1.245	Gravelly sand (4), boulder (1.5), gravelly sand (4.5)
MW16-15D	8.45	6.347	Silty sand (1), sand and gravel (9)
MW16-17D	1.84	1.094	Boulder (1), sand (0.5), gravel (1.5), silty sand (1), boulder (1), silty sand (4), phyllite (1)
MW16-20D	0.3351	0.3647	Sand & silt (4.5),gravelly sand and silt (4), weathered rock (1.5)
MW16-22D	42.71	32.83	Silty sand (1), sand and gravelly sand (3.5), sandy silt (0.5), silty gravelly sand (5)
MW16-23D	2.377	1.92	Sand (5.5), weathered phyllite (gravelly sand) (4.5)
MW16-24D	3.006	2.675	Sand (2.5), sandy gravel (5.5), sand (0.5), weathered phyllite (3.5)
MW16-25D	2.012	1.73	Silty sand (4), sand (2), gravelly sand (6)
MW16-26D	0.816	0.5519	Silty sand (1), sand (5.5), gravelly sand and silt (2.5)
MW16-27D	20.21	19.43	Layers of sand and silty gravel (2), boulder (3), gravelly sand (2), silty gravelly sand (3)
MW16-29D	3.086	3.388	Silty sand (3.5), sand to gravelly sand (6.5)

TABLE 3-5

SUMMARY OF SLUG TEST ANALYSES
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Location	Falling Head K value (ft/day)	Rising Head K value (ft/day)	Geologic Deposits Screened
MW16-31D	1.417		Gravelly silt (2), silt (3), weathered rock (5)
MW16-31D	1.433		Gravelly silt (2), silt (3), weathered rock (5)
MW16-32D	0.03596	0.01766	Sand (10), weathered Rock (2)
MW16-32D	0.06976		Sand (10), weathered Rock (2)
MW16-32D	0.003382		Sand (10), weathered Rock (2)
MW16-35D	1.537		Sand (6.5), gravelly sand (3.5)
MW16-36D	53.26	45.57	Sand (4.5), silty gravelly sand (3), weathered phyllite (2.5)
MW16-37D	15.21	23.34	Boulder (0.3), sand (9.7)
MW16-40D	5.328	5.769	Sand (2), till (2), boulders/cobbles (6)
MW16-42D	1.151	1.586	Weathered / fractured rock and silt (10)
MW16-44D	1.066	1.092	Gravelly sand (5.2), boulder (4.2), sand (0.6)
MW16-45D	0.6644	0.5578	Gravelly sand (3.8), boulders/cobbles (2.2), sandy silt (2.3), rock (1.7)
MW16-45D	0.7062		Gravelly sand (3.8), boulders/cobbles (2.2), sandy silt (2.3), rock (1.7)
MW16-47D	2.056	1.443	Sand (1.8), silt (0.5), silty sand / sandy silt (3), silty gravelly sand (4.5), sandy silt (0.2)
MW16-49D	0.9895	1.06	Sand (1), boulder (1), sand (2), boulder (2), sand (3.9), boulder (2.1), sand (2)
MW16-51D	5.248	4.67	Gravelly sand (2), boulder (1.5), gravelly sand (6.5)
MW16-52D	35.2	82.09	Gravelly sand (8), sandy silt (2), silty gravelly sand (2), gravelly sand (2)
MW16-56D	2.558	2.533	Gravelly sand (4), sand (1), gravelly sand (2)
MW16-57D	6.604	8.811	Sand (3.5), silty sand (2.5), weathered phyllite (4)
MW16-58D	9.107	11.27	Gravelly sand (2), boulder (1), gravelly sand (1), fractured phyllite (7)
MW16-59D	2.475	2.522	Sand (4), gravel and silt (1), fractured quartzite (5)
MW16-60D	16.05	19.63	Sand (10)
MW16-61D	2.601	2.45	Silty sand (3), sand (6)
MW16-62D	9.489	12.02	Sand (10)
MW16-63D	16.87	14.37	Sand (7), gravelly sand (1)
MW16-64D	13.31	12.91	Sand (0.5), silt (0.5), sand (4), silt (0.5), sand (4.5)
MW16-65D	9.192	8.962	Fractured quartzite (5)
MW16-66D	4.652	9.872	Silt (0.5), sand (10.5)

TABLE 3-5

SUMMARY OF SLUG TEST ANALYSES
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Location	Falling Head K value (ft/day)	Rising Head K value (ft/day)	Geologic Deposits Screened
MW16-67D	10.37	10.07	Sand (1), gravelly sand (1.5), gravel (2), sand (0.5), gravelly sand (1.5), sand (3.5)
MW16-68D	14.5	12.49	Sand (7.5), silt (2.5)
MW16-69D	1.148	0.9682	Gravel (2.5), gravelly sand (2), gravel (5.5)
MW16-70D	9.172	10.59	Sand (10)
MW16-71D	6.798	7.275	Sand (7.5), boulders (2.5), gravelly sand (1)
INJ16-01D	21.05	20.4	Sand (6.5), gravelly sand (2), sand (1), gravelly sand (0.5)
INJ16-02D	10.83	12.38	Sand (10)
INJ16-03D	3.333	3.187	Sand (3), silt (0.5), sand (0.5), gravel (4), sand (2)
INJ16-04D	7.132	6.883	Sand (4), silt (6?)
INJ16-05D	4.972	8.019	Sand (6.5), gravelly sand (2.5), sand (0.5), gravelly sand (0.5)
INJ16-06D	12.23	5.212	Sand (0.5), gravelly sand (1), sand (5), gravelly sand (1), sand (2.5)
INJ16-07D	22.4	20.45	Gravel (1), sandy gravel (2.5), boulder (3), sand (0.5), sandy gravel (2.5), sand (0.5)
INJ16-08D	10.58	11.41	Sand (2.9), boulder (3.1), sand (4)
INJ16-09D	6.869	4.643	Sand (7.5), boulder (1), gravelly sand (1.5)
INJ16-10D	4.053	3.675	Boulder (1), gravel (1), sand (0.5), gravel (1), sand (2), sandy gravel (2), sandy silt (0.5), sand (1.5), gravelly sand (0.5)
INJ16-11D	7.695	9.762	Sand (6), gravelly sand (4)
INJ16-12D	6.65	5.474	Gravelly sand (1), sand (2), gravelly sand (5.75), boulder (1.25)
Average	10.03		
Geometric Mean	4.40		
Cross-Section A-A'			
Shallow (S) Zone			
MW16-68S		41.73	Sand (10)
MW16-70S		33.01	Sand (15)
MW16-15S		17.37	Sand (1), sandy silt (0.5), sand (8.5)
MW16-59S		49.81	Sand (10)
MW16-23S	12.77	14.57	Sand (10)
MW16-02S			Sand (10)
MW16-58S	16.63	20.85	Sand (5), silt (1), sand (1), silt (3)
MW16-05S	9.192	32.64	Fill (2.5), silty sand (1), sandy silt (2.5), sand (0.5), sandy silt (1), sand (2.5)
Average	24.86		
Geometric Mean	21.69		

TABLE 3-5

SUMMARY OF SLUG TEST ANALYSES
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Location	Falling Head K value (ft/day)	Rising Head K value (ft/day)	Geologic Deposits Screened
Intermediate (I) Zone			
MW16-68I	3.407	2.822	Sand (2), silty sand (2), sand (6)
MW16-70I	2.272	2.067	Sand (10)
MW16-62I	3.258	3.681	Sand (10)
MW16-22I	0.7505	0.846	Sand (9), sandy silt (1)
MW16-59I	0.6194	0.6775	Silty sand (2), sand (2), silty sand (4), sand (1), silty sand (1)
MW16-02I	1.261	1.35	Gravelly Sand (4), silty clay (1)
MW16-58I	1.486	1.895	Sandy silt (1), Silty sand (8), sand (1)
MW16-58I2	3.365	3.533	Sand (10)
MW16-05I	14.6	29.75	Sand (1), silty sand (1), sand (2.5), sandy silt (0.5), sand (3.5), sandy silt (0.5), sand (5)
Average	4.31		
Geometric Mean	2.31		
Deep (D) Zone			
MW16-10D	1.095	0.6743	Silt (1.5), weathered rock (silt with rock fragments) (4), rock (1), weathered rock (silty sand and gravel) (3.5)
MW16-30D			Sand (2), gravelly silt (8)
MW16-31D	1.417		Gravelly silt (2), silt (3), weathered rock (5)
MW16-31D	1.433		Gravelly silt (2), silt (3), weathered rock (5)
MW16-32D	0.03596	0.01766	Sand (10) weathered Rock (2)
MW16-32D	0.06976		Sand (10) weathered Rock (2)
MW16-32D	0.003382		Sand (10) weathered Rock (2)
MW16-68D	14.5	12.49	Sand (7.5), silt (2.5)
MW16-70D	9.172	10.59	Sand (10)
MW16-15D	8.45	6.347	Silty sand (1), sand and gravel (9)
MW16-62D	9.489	12.02	Sand (10)
MW16-60D	16.05	19.63	Sand (10)
MW16-22D	42.71	32.83	Silty sand (1), sand and gravelly sand (3.5), sandy silt (0.5), silty gravelly sand (5)
MW16-59D	2.475	2.522	Sand (4), gravel and silt (1), fractured quartzite (5)
MW16-23D	2.377	1.92	Sand (5.5), weathered phyllite (gravelly sand) (4.5)
MW16-02D	33.93	25.5	Gravelly Sand (1.5), sand (1), sandy silt (1), gravelly sand (6.5)
MW16-58D	9.107	11.27	Gravelly sand (2), boulder (1), gravelly sand (1), fractured phyllite (7)
MW16-29D	3.086	3.388	Silty sand (3.5), sand to gravelly sand (6.5)

TABLE 3-5

SUMMARY OF SLUG TEST ANALYSES
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Location	Falling Head K value (ft/day)	Rising Head K value (ft/day)	Geologic Deposits Screened
MW16-05D	24.26	14.93	Sand (2.5), sandy silt (1), sand (0.5), sandy silt (1.5), sand (1.5), silty sand (1), silty gravelly sand (2)
MW16-51D	5.248	4.67	Gravelly sand (2), boulder (1.5), gravelly sand (6.5)
MW16-52D	35.2	82.09	Gravelly sand (8), sandy silt (2), silty gravelly sand (2), gravelly sand (2)
Average	12.81		
Geometric Mean	4.05		

Note:
1) Multiple falling or rising head tests performed at some locations.

TABLE 3-6

SUMMARY OF TIDAL SURVEY RESULTS PERFORMED AT SITE 16
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Well Designation	Approximate Distance from Allen Harbor Shoreline (ft)	Maximum Recorded Ground-Water Level Fluctuation (ft)
MW16-04S	50	0.76
MW16-04I	50	1.9
MW16-04D	50	1.37
MW16-48S	65	0.8
MW16-48I	65	1.1
MW16-48D	65	1.3
MW16-05S	105	0.3
MW16-05I	105	0.6
MW16-05D	105	0.82
MW16-05R	105	0.4
MW16-05R2	105	1.57
MW16-51D	140	~0.5
MW16-51R	140	0.3
MW16-03S	175	0.26
MW16-03D	175	0.73
MW16-03R	175	0.76
MW16-28D	180	0
MW16-28R	180	0
MW16-46S	210	0
MW16-46I	210	~0.275+
MW16-46D	210	0.4
MW16-53S	235	~0.19+
MW16-27D	300	0
MW16-27R	300	0
MW16-45S	310	0.25
MW16-45I	310	0.42
MW16-45D	310	0.47
MW16-44D	320	0.6
MW16-44R	320	0.6
MW16-43D	370	~0.16+
MW16-47D	375	0.1
MW16-47S	375	0.084
MW16-58S	425	0.032
MW16-58I1	425	0.26
MW16-58I2	425	0.96
MW16-58D	425	0.5
MW16-58R	425	0.88
MW16-06S	530	0.04
MW16-06R	530	0.045
MW16-50D	575	0.066
MW16-52D	630	0.07
MW16-52R	630	~0.39+
MW16-49D	635	~0.125+
MW16-39I	900	0

NOTE:
~ + = Largest water level fluctuation observed occurred at beginning or end of the recorded period and maximum fluctuation may be higher than was measured during the monitored period which was typically about 24 hrs or more.

4.0 NATURE AND EXTENT OF CONTAMINATION

This section describes the locations, spatial patterns, chemical forms, and concentrations of organic and inorganic chemical contaminants at Site 16. Analytical data from the following investigations are used in the discussion:

- The Phase II Environmental Baseline Survey
- The Phase II Environmental Baseline Survey Follow-on Investigation
- The Phase II Environmental Baseline Survey Follow-on Addendum Investigations
- The Phase I RI Investigation (Stage I and Stage II)
- The Phase II RI Investigation
- The Supplemental Sediment Investigation (i.e., Phase II Screening Level Ecological Risk Assessment (for sediments))
- The Supplemental Phase II Investigation
- The HRC Injection Pilot Study

The analytical data generated during these environmental investigations are presented in Appendix C of this report. Analytical data for chemicals detected at least once in an environmental media sampled during the Supplemental Phase II Investigation or the HRC Injection Pilot Study are presented on a sample by sample basis in tables referenced in this section. Summary descriptive statistics (frequency of detection, range of positive detections, range of non-detect results [i.e., sample quantitation limits], arithmetic mean concentration, arithmetic mean of positive detections) are also presented for this data as well as for data collected in previous investigations. Additionally, selected data presentation tables and figures from previous Site 16 environmental investigation reports are presented in Appendix A and referenced in text.

Several chemical concentration summations are presented in the Section 4 tables and figures. In calculating total concentrations a value of zero was used for non-detected values. Total xylenes is the summation of m+p xylene and o-xylene. BTEX is the sum of benzene, toluene, ethylbenzene, and xylene. Total chlorinated volatile organic compounds (CVOCs) is the sum of 1,1,1-TCA, 1,1,2,2-PCE, 1,1,2-TCA, 1,1,-DCA, 1,1-DCE, 1,2-DCA, 1,2-dichloropropane, carbon tetrachloride, chloroethane, chloromethane, cis-1,2-DCE, cis-1,3-dichloropropene, methylene chloride, PCE, total 1,2-DCE, trans-1,2-DCE, trans-1,3-dichloropropene, TCE, and vinyl chloride.

Exceedance of a human health or ecological risk-based screening criterion is evidence of possible unacceptable risk but it is not a confirmation that unacceptable risks exist. Conversely, if concentrations

do not exceed screening criteria, the chemicals could pose a risk but the level of risk is generally considered to be acceptable. Therefore, screening criteria were used as approximate numerical limits to conservatively identify areas that could be problematic from a risk perspective. Human health criteria apply to surface soil, subsurface soil, groundwater, surface water, and sediments. The ecological screening values apply to surface soil, surface water, and sediment only. An actual risk assessment was not conducted for this report. In addition to screening levels, consideration was given to cleanup levels that are commonly used to establish the extent of remediation.

Contaminant concentrations are compared to both residential and industrial land use criteria and to ecological screening criteria frequently used in SLERAs. Screening criteria used in the comparisons are presented in Tables 4-1 through 4-5 and are described briefly below.

- **Federal Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) for Public Drinking Water Supplies.** Primary MCLs are enforceable standards promulgated under the federal SDWA and are designed to be protective of human health. Primary MCLs are based on laboratory or epidemiological studies and apply to public water systems. A public water supply is defined as a system which provides water to the public for human consumption and which has at least 15 service connections or regularly serves an average of 25 individuals daily at least 60 days per year. Primary MCLs are designed for the prevention of adverse human health effects but also reflect the technical feasibility of removing a contaminant. Primary (i.e., health based) MCLs are promulgated under the SDWA and are considered ARARs.

- **USEPA Region 9 Preliminary Remediation Goals (PRGs) for Tap Water and Soil.** The PRGs are chemical concentrations corresponding to fixed levels of risk (i.e., a Hazard Quotient (HQ) of 1 for non-carcinogenic chemicals; a lifetime cancer risk of 1×10^{-6} for carcinogenic chemicals). Adverse non-carcinogenic health effects are not anticipated when the hazard quotient is less than or equal to 1. A cancer risk of 1×10^{-6} may be interpreted as one additional case in one million exposed individuals. The tap water PRGs are based on residential use of drinking water. The soil PRGs are based on residential and industrial exposures to soil through incidental ingestion, dermal contact, and inhalation routes of exposure.

- **USEPA Soil Screening Levels (SSLs) for Transfer from Soils to Air, and Migration from Soils to Groundwater.** The USEPA SSLs for the migration of chemicals from soil to groundwater or air are benchmarks derived to identify chemical concentrations in soils that may adversely effect groundwater or air quality (USEPA, May 1996). The migration-to-groundwater and air SSLs are calculated using default, residential land use exposure factors, infinite source models, and conservative default assumptions for source delineation. Therefore, these values are conservative

and are designed to be protective of potential exposure at most sites. Chemicals with concentrations exceeding the SSLs may potentially migrate from the soil to groundwater in sufficient quantities to pose groundwater quality problems.

- **Rhode Island Department of Environmental Management (RIDEM) Direct Exposure Criteria.** The RIDEM Direct Exposure Criteria are similar to the EPA Region 9 PRGs in that they also correspond to a cancer risk of 1×10^{-6} for carcinogens or an HQ of 1 for noncarcinogens. The Direct Contact Criteria are based on residential and industrial exposures to soil through incidental ingestion and inhalation.

- **RIDEM GA Groundwater Objectives.** The GA groundwater objectives are protective of groundwater that is suitable for use as a drinking water supply. They can be either risk-based or based on other considerations such as state of federal MCLs.

- **RIDEM GA Leachability Criteria.** The GA leachability criteria are protective of the migration of chemicals from soil to groundwater. For organics, the criteria correspond to a soil concentration that is protective of leaching to groundwater. For inorganics, the GA leachability criteria are compared to Synthetic Precipitation Leaching Procedure (SPLP) or Toxicity Characteristic Leaching Procedure (TCLP) results.

- **USEPA Ecological Soil Screening Levels (Eco SSLs).** The ECO SSLs are concentrations of contaminants in soil that are protective of ecological receptors that commonly come into contact with soil or ingest biota that live in or on soil. These values are used to identify those contaminants of potential concern in soils that may require further evaluation in a baseline ecological risk assessment. The Eco SSLs were developed for evaluating risks to soil invertebrates, plants, mammals, and birds when adequate data were available.

- **Oak Ridge National Laboratory (ORNL) Plant and Invertebrate Benchmarks.** The ORNL benchmarks are intended to be used as screening values, to evaluate potential risks to plants and invertebrates, and as such, may be overly conservative. They are based on a 20 percent reduction in growth, reproduction, or activity (for invertebrates) or growth and yield (for plants) as the threshold for significant effects.

- **Canadian Soil Quality Guidelines (SQGs).** The SQGs were developed by the Canadian Council of Ministers of the Environment using toxicological data to determine the threshold level for key receptors. The values are calculated for four land uses: agricultural, residential/parkland, commercial, and industrial. Exposure from direct soil contact is used to derive guidelines for the

residential/parkland, commercial, and industrial land uses; the soil guidelines for the agricultural land use incorporates direct soil contact and soil and food ingestion.

- **Dutch Target Values.** The Dutch Target Values were developed by the Netherlands Ministry of Housing, Spatial Planning, and Environment, Department of Soil Protection and are the soil quality levels that are ultimately desired for a site. Most of the values were developed using a risk-based approach, but the values for a few inorganic chemicals are background levels, and not risk-based.

- **USEPA Sediment Quality Benchmarks (SQBs).** USEPA developed SQBs for dieldrin and endrin to protect benthic organisms. The values were calculated using equilibrium partitioning and represent chemical concentrations below which adverse effects are not expected.

- **Effects-Range Low (ER-L) Values.** The ER-L values represent levels below which, adverse effects would be rarely observed. They were first developed by Long and Morgan (1991) using freshwater, marine and estuarine studies and then further refined by Long et al., (1995) using additional data, which only included marine and estuarine studies.

- **Threshold Effects Level (TEL).** The TEL represents the upper limit of the range of sediment contaminant concentrations that are dominated by no effects data for aquatic organisms, including benthic macroinvertebrates, fish, and shellfish. They were developed by the Florida Department of Environmental Protection using data from estuarine and marine waters.

- **Apparent Effects Threshold (AET) Values.** AET values are generally defined as the concentration of a given chemical above which statistically significant biological effects are always expected to occur. AETs have been developed as part of several studies, and were compiled by Buchman in the National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQUIRT).

- **Ecotox Thresholds including Sediment Quality Benchmarks (SQBs).** The SQBs were presented in the USEPA publication "ECO Update-Ecotox Thresholds" for use as benchmark screening values in the first step of a baseline risk assessment. The SQBs were calculated using equilibrium partitioning based on 1 percent organic carbon [10,000 mg/kg total organic carbon (TOC)]. The SQBs calculated in USEPA (1996) are based on freshwater data.

- **Oak Ridge National Laboratory (ORNL) Sediment Secondary Chronic Values (SCVs).** The sediment SCVs are non-enforceable screening levels developed for evaluating impacts to benthic invertebrates from pollutants in sediment. The sediment SCVs were calculated by equilibrium

partitioning which uses the surface water screening levels (ORNL surface water SCVs), the K_{oc} for each chemical, and an assumed total organic carbon value of one percent. The assumption with the equilibrium partitioning model is that sediment SCV is a level where the sediment pore water concentration is equal to the surface water SCV.

- **USEPA Water Quality Criteria (WQC).** The WQC were developed by USEPA to provide states with guidance for developing their own criteria. These values are set to protect the majority of aquatic organisms from adverse impacts from contaminants in the surface water. The WQC are often considered ARARs.

- **National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQUIRT).** The NOAA SQUIRT values include non-enforceable screening levels developed for evaluating impacts to aquatic organisms from chemicals in surface water. The SQUIRT screening levels are a compilation of existing screening levels from other sources.

- **RIDEM Ambient Water Quality Criteria (AWQC).** RIDEM developed AWQC to protect aquatic organisms from chemicals in the surface water. These values consist of saltwater and freshwater values, including freshwater minimum database guidelines for many pollutants for which USEPA water quality criteria are not available.

- **Oak Ridge National Laboratory (ORNL) Tier II Surface Water Secondary Chronic Values (SCVs).** The surface water SCVs are non-enforceable screening levels developed for evaluating impacts to aquatic organisms from pollutants in surface water. Tier II values were developed so that aquatic benchmarks could be established with fewer data than are required for the AWQC. Tier II values are concentrations expected to be higher than AWQC in no more than 20 percent of cases (Suter and Tsao, 1996). Surface water SCVs may be considered for actions that involve groundwater treatment and/or discharge to nearby surface waters.

Metals are a special case. Whereas organic chemicals investigated at Site 16 do not occur naturally at the concentration levels investigated, many metals do occur naturally at those levels. Consequently, where appropriate to do so, metal concentrations are also discussed relative to available background levels. A Site 16-specific background soil data set is unavailable but background data are available form other sources to provide some indication concerning commonly observed soil metal concentrations. Site-specific background concentrations for inorganics in groundwater were established by the Navy during the Basewide Groundwater Inorganics Survey (Stone and Webster, September 1996). The facility-specific background concentrations for groundwater are presented in Table 4-6. Background reference samples were collected for sediments and are discussed in Section 4.5.2.

4.1 POTENTIAL SOURCE AREAS

The Site 16 area includes the 6 EBS Review Items shown on Figure 1-2 and described in Section 2.0. These potential source areas are listed below:

- EBS Review Item 28: :
  - Creosote Dip Tank Area
  - Fire Fighting Training Area
- EBS Review Item 29 - Former Building 41.
- EBS Review Item 60 - Building E-107 Septic Tanks.
- EBS Review Item 81 - Former Building 41 Septic Tanks.
- EBS Review Item 85 - Former UST Area.
- EBS Review Item 86 - Building E-107 Floor Drains.

Over time the area under investigation at Site 16 has been expanded to include groundwater monitoring in the area south of Building 41 (e.g., in the vicinity of old railroad spur immediately south of Building 41 and in the vicinity of Building E-319), the potential upgradient area, and areas to the east just beyond the Phase II RI boundary line.

4.2 SOIL

This section presents analytical chemistry results for soil samples collected at Site 16. Data for samples collected during the EBS Phase II Investigation (EA, February 1998), EBS Phase II Follow-on Investigation (EA, March 1998), EBS Phase II Follow-On Addendum Investigations (EA, May 1998), Phase I RI (EA, August 2004), Phase II RI (EA, June 2003), Supplemental Phase II Investigation (EA, April 2004), and HRC Injection Study (EA, July 2004) are included in this discussion. Tables 4-7 through 4-9 present the chemicals detected in surface soil (0 to 2 feet bgs), shallow subsurface soil (2 to 25 feet bgs) and deep subsurface soil (greater than 25 feet bgs). A copy of the analytical database for soil is presented in Appendix C. Also shown on Tables 4-7 through 4-9 are exceedances of the direct contact human health screening criteria. In addition, as discussed in Section 2.7, MIP screening was used at 59 locations to locate potential source areas during the Phase I RI. The results of the MIP screening are included in Appendix A. The MIP screening is most useful for identifying areas of relative concentration differences for VOCs in soil and, when collected in the saturated zone, in overburden groundwater.

Tables 4-10 and 4-11, which present descriptive statistics for chemicals detected in surface soil at least once during any investigation, also include comparisons to direct contact human health criteria, ecological screening criteria, criteria for migration of chemicals from soil to groundwater, and criteria for migration of

chemicals from soil to air. Tables 4-12 through 4-15, which present descriptive statistics for chemicals detected in subsurface soil at least once during any investigation, also include comparisons to direct contact human health criteria, criteria for migration of chemicals from soil to groundwater, and criteria for migration from soil to air (shallow subsurface soil only). These criteria provide perspective on the degree of risk that could be associated with the detected chemicals. Overall, when describing the extent of contamination emphasis is placed on comparisons to RIDEM direct contact criteria, the criteria for leachability from soils to groundwater, applicable ecological criteria for surface soil, and the commonly used soil cleanup limit of 1 µg/kg for dioxins and furans. The extent of contamination is largely described in terms of exceedances of these criteria.

Figures 4-1 to 4-3 are spatial concentration plots of benzene, total BTEX, TCE, Total CVOCs, and dioxins (expressed as 2,3,7,8-TCDD equivalents, TCDD) in surface soil, shallow subsurface soil, and deep subsurface soil. Figures 4-4 to 4-6 presents the spatial distribution of benzo(a)pyrene, total PAHs, and total carcinogenic PAHs (expressed in terms of benzo(a)pyrene equivalents, BAP EQ) in surface soil, shallow subsurface soil, and deep subsurface soil. The plotted concentrations are representative of the major contaminant groups or chemical groups analyzed at Site 16.

4.2.1 Volatile Organic Compounds

Acetone was the most frequently detected VOC in surface soil (16 of 27 samples) and shallow subsurface soil (31 of 48 samples) while TCE was the most frequently detected VOC in deep subsurface soil (61 of 73 samples). Detections of acetone were scattered across the site with the highest detections in surface soil and shallow subsurface soil occurring between the former creosote dip tank and the wooden burn structure. The highest detection of acetone in deep subsurface soil was reported for a sample collected from within the former Building 41 area. The acetone detections are much less than screening values and are not discussed further. Methylene chloride was the only chlorinated VOC detected in surface soil and was present at concentrations less than surface soil screening criteria. This chemical was also detected infrequently in subsurface soil, usually at concentrations than were less than all criteria, therefore it is not discussed further. Although not detected in surface soils, TCE was detected in 4 of 50 shallow subsurface soil samples at concentrations ranging from 1 J µg/kg to 55 µg/kg (SB16-29). It was detected in 61 of 73 deep subsurface soil samples at concentrations ranging from 2 J µg/kg to 7,800 µg/kg (MW-16-59I). The highest concentrations of TCE in deep subsurface soil were located in the vicinity of the northeast corner of former Building 41. TCE was also detected in deep subsurface soils at MW16-04D and MW16-05D which are located on the northern section of the site in the vicinity of Allen Harbor. Elevated concentrations of BTEX were detected in shallow subsurface soils at location SB16-28 and nearby location SB16-06, but not in deep soils.

Concentrations of all VOCs in surface soil were less than the direct contact human health and ecological screening criteria. Concentrations of TCE in shallow and deep subsurface soil and vinyl chloride in shallow subsurface soil exceeded the direct contact human health screening criteria. Concentrations of all VOCs in surface soil were also less than the screening criteria for the protection of migration from soil to groundwater. However, concentrations of cis-1,2-dichloroethene, methylene chloride, and vinyl chloride in shallow subsurface soil and methylene chloride and TCE in deep subsurface soil exceeded the screening criteria for the protection of chemical migration from soil to groundwater.

Most of the TCE detections exceeding the aforementioned criteria were reported for deep (saturated) subsurface soil samples collected from the former Building 41 area. The presence of TCE contamination in soil is consistent with site operations. The exact point of release can not be determined from the available data. TCE contamination in the intermediate and deep overburden groundwater in the area helps to identify the general areas of maximum soil contamination near Building 41. An additional area of note is the south central portion of the northern section of Site 16, just north of the perimeter road. This area had a total VOC concentration of 1,896 (mostly due to cis-1,2-DCE at location SB16-41) in shallow subsurface soils and the extent of contamination is not delineated in the lateral direction. Deeper samples were not collected at this location but a nearby deeper sample (location MW16-02D, total VOCs = 19 µg/kg) indicates that VOCs may have migrated from location SB16-41 into the deeper soils. Therefore, VOCs have not been delineated in the vertical direction at SB16-41 and should be investigated further to completely evaluate the extent of VOC contamination.

No evidence for DNAPL or LNAPL was observed in any soil samples, therefore, the VOCs are concluded to be in an adsorbed phase, and dissolved in soil moisture, etc., rather than being present as a separate phase. If any separate NAPL phase exists in soil it is likely to be in isolated pockets that would be virtually impossible to find and probably not worth finding as long as the general area of contamination can be delineated.

No surface soil samples were collected near former Building 41. Five shallow subsurface soils were collected in this area. Insufficient data are available for soil in this area to delineate VOC contamination in surface soil or shallow subsurface soil relative to screening criteria. All VOC releases appear to be relatively old because the majority of CVOC mass is deep in the soils. DNAPLs evidently have had time to migrate into deeper soils, dissolving into groundwater as they migrated. LNAPLs would have stayed at, or above, the water table, but also would dissolved into groundwater over time. No evidence of free DNAPL or LNAPL has been observed.

Building 319 inherited the degreasing operations that existed in former Building 41 for three years. Building 319 has not been investigated well enough to determine whether it could be source of VOC

contamination in groundwater. A similar situation exists in the eastern area of Site 16, where some groundwater VOC contamination has been identified but insufficient soil and groundwater data exist to identify the source(s) of the groundwater contamination. Groundwater VOC contamination and the source(s) of the contamination are described in detail in Section 4.3.

In summary, delineation of soil contamination is partially completed relative to RIDEM soil direct contact criteria (surface and subsurface soils), migration to groundwater criteria (surface and subsurface soils), and ecological criteria (surface soils only) in the following areas:

- creosote dip tank area
- vicinity of SB16-28
- vicinity of SB16-41
- Building 41/319 Area
- eastern boundary area near MW16-57

Additional delineation of contamination in lateral directions will likely be necessary to support future risk assessments or FSs. Delineation in the vertical direction will not be as important except for protection of groundwater from soil contaminant migration. This vertical concentration distribution also supports the conclusion that the VOC data are indicative of old spills that migrated deeper into soils over time as DNAPL and dissolved phase CVOCs. In addition, observed BTEX contamination is residual evidence of one or more past releases of gasoline or related spills, although the extent and importance of those spills is subordinate to the CVOC contamination.

4.2.2 Semivolatile Organic Compounds

SVOCs, primarily PAHs, were frequently detected in surface soil and shallow subsurface soil samples. SVOCs were only detected in two deep subsurface soil samples (28SB-15 and SB16-29), indicating limited impact from site operations in the deep strata. This spatial distribution pattern is consistent with surface releases that migrated somewhat into deeper soils, but to a limited extent. Total PAH concentrations ranged from 38 µg/kg to 50,739 µg/kg (SOURCE1-2) in surface soil samples, 4.4 µg/kg to 139,111 µg/kg (SB16-07, 4 to 6 feet) in shallow subsurface soil samples, and 10 µg/kg (SB16-29, 32 to 34 feet) in deep subsurface soil samples.

Concentrations of PAHs in surface soil and shallow subsurface soil exceeded the EPA Region 9 human health direct contact screening criteria in most of the samples where they were detected, but the same concentrations are frequently less than RIDEM soil direct exposure residential criteria. Furthermore, the same concentrations are typically less than the leachability to groundwater criteria because PAHs tend to bind tightly to soils and not to leach into groundwater unless they are present at very high concentrations

in the soil. Concentrations of PAHs in surface soil also exceeded the ecological screening criteria in samples from the former creosote dip tank area, former fire fighting training area, and in the vicinity of SB16-28, located southwest of the former FFTA. The contamination pattern identifies the northwest quadrant of the north central area of Site 16 as having received impacts to soils from site operations involving the use of PAHs. Also slightly affected is the area to the southeast of Building E-107, located north and across the perimeter road in the north central portion of Site 16. Concentrations of benzo(a)anthracene, chrysene, and naphthalene in surface soil exceeded the screening criteria for the migration of chemicals from soil to groundwater in the former creosote dip tank area and near SB16-28. Concentrations of naphthalene in shallow subsurface soil in the fire fighting training area exceeded the screening criteria for the protection of migration from soil to groundwater.

As expected based on site history, total PAH concentrations were highest in surface soil samples collected from the former fire fighting training area, and in surface soil and shallow subsurface soil samples collected from the former creosote dip tank area and near SB16-28. The PAH contamination is not completely bounded in these areas relative to the screening criteria. Partial bounding has been achieved as can be seen from Figure 4-4. For example, one of the locations with the highest PAH concentrations in surface to shallow subsurface soil is SB16-21 but location 28-SB-04 to the northeast where SVOCs were also analyzed, has no SVOC (including PAH) detections that exceed any applicable screening criteria in shallow or intermediate depths. There are no data for deep soil at nearby 28-SB-04. A surface release of significance without detectable levels in the shallower soils is unlikely.

The soil SVOC contamination patterns generally reflect surface releases with limited vertical migration. The exceptions are near the former creosote dip tank area, the former FFTA, and near SB16-07. The greatest vertical migration presumably occurred where surface releases were the most voluminous, with the release penetrating (i.e., soaking) deeper into the soil than would be possible in areas experiencing smaller releases. Vertical migration would also have been facilitated by organic solvents, if released with the PAHs. The organic solvents would have dissolved the SVOCs thus aiding their migration.

Based on the existing spatial patterns and the known chemical and physical behaviors of SVOCs, the extent of contamination can be characterized as follows. One area of significance extends over an approximate rectangle or ellipse oriented southwest of 28-SB-01A to the northeast, near 28-SB-06. This is essentially the original estimated location of the creosote dip tank area. The width of the contaminated area is unknown but appears to be less than about 70 feet. Most of the contaminant mass is in the southwestern half of this rectangular or elliptical area. The vertical extent of contamination is at least four feet bgs in the southwestern half of the rectangle (see Figure 4-5, rectangle not shown) but it is probably less than 10 feet deep in this area, given the known chemical and physical properties of these chemicals.

Based on these properties and site data (see Figure 4-5), the depth of contamination in the northeastern half of this area is limited to surface and shallow subsurface soils.

Another significant area of SVOC contamination appears to be found within a circle of radius equal to approximately 30 feet, centered on SB16-28. This estimated radius is based on observing virtually no detections of SVOCs in soil at any depth at 28-SB-05, which is located approximately 15 feet from 16SB-28. The shallow subsurface soils exhibit the greatest PAH concentrations in this area. The deepest soils, analyzed where well MW16-07D was installed, exhibited no detectable SVOCs, thus establishing a vertical boundary within about 36 feet of ground surface.

The third contaminated area of significance is the former FFTA. This area is represented by a circle on Figure 4-4 but the contaminated area extends somewhat outside this circle to the southeast, near 28-SB-10. The vertical extent of contamination is evidently limited to surface soils because Figure 4-5 indicates no exceedances of RIDEM direct soil exposure residential criteria or ecological screening criteria and few exceedances of the more conservative EPA Region 9 PRGs. The contamination within and slightly outside the circle also appears to be patchy, whereby some locations in the area are contaminated and others are not. Not unexpectedly, the highest observed total recoverable petroleum hydrocarbon (TPH) concentrations in soil were detected inn the former FFTA, where organic fuels are likely to have been burned during the training.

There may be more areas of contamination scattered throughout the north central portion of Site 16 but, based on site history and available data, they are expected to be small and, if they do exist, of much less significance than those already discussed. For example, location SB16-27 exhibits a slight exceedance of the conservative EPA Region IX PRG for benzo(a)pyrene but not the other criteria in both surface and shallow subsurface soils. A similar area is found near the former septic tanks at Building E-107 located north of, and across the road from the north central portion of Site 16. This septic tank area is apparently not related to the creosote dip tank or FFTA operations and is relatively insignificant compared to those areas. Furthermore, the septic tanks were excavated and investigation of SVOCs (including PAHs) in the septic tank area is not warranted at this time.

Though limited exploration was conducted for SVOCs in the former Building 41 area, there were no SVOC detections of significance in that area. Because this area was not explored thoroughly for PAHs, it should be considered for additional investigation, but on a limited basis.

In summary, the areas described above are the areas where potential releases of SVOCs would be logical based on site operations. This knowledge of operations and the available data suggest that the areas of greatest importance with regard to potential SVOC contamination have been investigated.

Limited additional investigation is warranted to better delineate the known contamination and to better support future risk assessments or FSs.

4.2.3 Pesticides/PCBs

4,4'-DDT (3.7 µg/kg), alpha-BHC (2.4 J µg/kg), gamma-chlordane (2.9 J µg/kg), and Aroclor-1260 (19 µg/kg) were detected in only one surface soil sample, although the detections were not all in the same sample (Tables 4-10 and 4-11). 4,4'-DDD (4.1 J µg/kg), 4,4'-DDT (3.7 µg/kg), endrin aldehyde (4.7 µg/kg), and gamma-chlordane (8.9 J) were detected in only one shallow subsurface soil sample, although not all in the same sample (Tables 4-12 and 4-13). Pesticides/PCBs were not detected in deep subsurface soil samples.

Detected concentrations of all pesticides/PCBs were below the direct contact human health screening criteria in all soil samples. Detected concentrations of gamma-chlordane in one surface soil sample (location SB16-21) exceeded the ecological screening criteria. Concentrations of alpha-BHC in one surface soil sample (location SB16-28) exceeded the screening criteria for the protection of migration of chemicals from soil to groundwater. These locations are also locations where fairly high concentrations of SVOCs (especially PAHs) were detected. The origin of the pesticides is unknown.

Given the low concentrations and low frequencies at which these chemicals were detected, they are not considered to be significant site-related contaminants and are not discussed further.

4.2.4 Dioxin/Furans

Dioxin/furans were detected in all surface soil and shallow subsurface soil samples in which they were analyzed. These chemicals are often detected in surface soil as a result of general anthropogenic activity (ATSDR. 1997). For example, the arithmetic mean 2,3,7,8-TCDD equivalent concentration in soil samples representing background conditions in the United States is estimated to be 8 ng/kg (ATSDR. 1997). Anthropogenic sources generally add to surface soil concentrations but not to subsurface concentrations because dioxins and furans do not move easily into deeper soils. In areas such as the former FFTA, where soil were reworked periodically, dioxins and furans as well as other chemicals may have been turned into deeper soils during the reworking. A potential source of the dioxins is the burning associated with the former FFTA. Caution is advised, however, because a source of chlorine is required to generate dioxins and commonly used fire accelerants such as kerosene are not chlorinated. Therefore, the amount of dioxins contributed to Site 16 from the former FFTA is expected to be minimal and the observed dioxin contamination is likely to be a mixture of Site 16 operational and other anthropogenic dioxin sources. It would be difficult if not impossible to apportion the relative contributions from the various sources, even with extensive study.

Total dioxin and furan concentrations at Site 16 (expressed as 2,3,7,8-TCDD equivalents) ranged from 1.19 ng/kg to 48.5 ng/kg (SB16-25) in surface soil and from 0.41 ng/kg to 505 ng/kg (SB16-28, 4 to 6 feet) in shallow subsurface soil. Dioxin/furan concentrations were generally higher in surface soil than shallow subsurface soil except in samples from SB16-23 (304 ng/kg, 3 to 5 feet) and SB16-28. SB16-23 is located in the former fire fighting training area and SB16-28 is located in an area where a fuel oil-like odor was noted during the MIP screening activity (MIP16-07) conducted during stage 1 of the Phase I RI.

Concentrations of dioxins/furans in five surface soil samples and three shallow subsurface soil samples exceeded the direct contact human health screening criteria. Concentrations of dioxins/furans in one surface soil sample and two shallow subsurface soil samples exceeded the screening criteria for inhalation of fugitive dust emissions. Concentrations of dioxin/furans in three surface soil samples and two shallow subsurface soil samples exceeded the screening criteria for protection of migration of chemicals from soil to groundwater. Concentrations of dioxins in three surface soil samples and two shallow subsurface soil samples exceed the mean background concentration for the United States referenced above.

Although the extent of the dioxin contamination is not completely bounded laterally or vertically with reference to the aforementioned screening criteria, the samples with dioxin/furan concentrations above the mean background concentration for the United States are associated only with the fire fighting training area, wooden burned structure, and SB16-28. In addition, it should be noted that none of the dioxin/furan concentrations reported for Site 16 soils exceed the EPA goal of 1 µg/kg (expressed as 2,3,7,8-TCDD equivalents) presented in OSWER Directive 9200.4-26 (EPA, April 1998). This limit is generally used by EPA as a starting point for setting clean-up levels for sites evaluated assuming a residential land use scenario. Because of this, dioxins and furans are not discussed further and are considered to be satisfactorily bounded relative to the 1 µg/kg clean-up level.

4.2.5 Metals

As expected, metals were detected in all soil samples. Metals are naturally occurring and are present in varying concentrations in uncontaminated soils. Some metals such as aluminum, calcium, iron, magnesium, and manganese are major components (tens or hundreds to thousands of mg/kg for manganese, and thousands to tens of thousands of mg/kg for aluminum, calcium, magnesium, and iron) of most soils. Other metals such as potassium, cobalt, nickel, titanium, vanadium, and zinc are lesser components (tens to hundreds and sometimes thousands of mg/kg). Finally, some metals such as mercury, silver, and tin are not often detected or are found at detection limit levels when they are detected (typically less than 1 mg/kg).

The maximum concentration reported for most metals occurred in surface soil and shallow subsurface soil in samples collect at location SB16-28 which is in an area where a fuel oil-like odor was noted during the MIP screening activity (MIP16-07) conducted during Stage 1 of the Phase I RI. Otherwise, there is no discernable concentration pattern for inorganics in soil. A discernible pattern would consist of, for example, an area of high metal concentration surrounded by a decreasing concentrations trending toward background concentration levels as the distance from the highest levels increases. When concentrations patterns do not exist, it is typically an indication of background concentration levels or an area of wide contamination such as might have occurred as a result of aerial releases (e.g., from combustion or crop dusting). Site history suggests that crop dusting would not have occurred at Site 16; combustion could be a very minor but probably insignificant release mechanism for metals. Some metals could be associated with waste engine oils or leaded gasoline, but the volume of waste engine oils that might have been released is probably small, based on site history. The single metal that was potentially used in large quantities would be manganese, which is a component of phospholene, a manganesed phosphoric acid, used in Building 41.

Inorganic concentrations were greater in shallow subsurface soil samples than surface soil or deep subsurface soil samples. However, there are no facility or site-specific background data available for metals in soil to which the observed Site 16 metal concentrations can be compared. Therefore, Table 4-16 presents a comparison of metal concentrations in site soils to regional background values. With the exception of lead in shallow subsurface soil, concentrations of all metals are within the Table 4-16 background ranges. The maximum detected lead concentration of 2,650 mg/kg occurred at SB16-28 (4 to 6 feet bgs). The second highest lead concentration of 339 mg/kg was observed at 28-SB-20 (8 to 10 feet bgs). Lead concentrations in the remaining samples were less than 300 mg/kg. The elevated lead concentrations could be evidence of a past release of, for example, leaded gasoline. However, the limited extent of lead contamination potentially associated with the single highest concentration is considered to be insignificant because exposures to soil generally occur as a result of receptor movement over or through an area or volume. This exposure mechanism effectively results in an averaging of exposure concentrations across the area or volume to yield an exposure concentration for the entire area or home range. Furthermore, lead is notably recalcitrant to movement into the groundwater from soils because it binds tightly to the soils under a wide array of soil conditions (Dragun, 1988). Furthermore, the limited area associated with the elevated lead concentrations is not likely to result in elevated groundwater lead concentrations.

In general, the metal concentrations in surface and subsurface soil are unremarkable with a few notable concentrations in a single subsurface soil (location SB16-28) that would indicate a potential connection to Site 16 activities. Those notable concentrations are barium (1,100 mg/kg), cadmium (2.4, mg/kg), chromium (67 mg/kg), copper (452 mg/kg), and zinc (1610 mg/kg). These concentrations all occurred in

a single sample (SB16-28-NS0-062700-04). The next highest concentrations were considerably less than the highest concentrations (Tables 4-7, 4-8, and 4-9). Therefore, the extent of metals contamination is isolated to this single location and viewed to be insignificant for reasons expressed above for lead.

Although the metals concentrations generally appear to represent background conditions, concentrations of arsenic and beryllium in surface soil and deep subsurface soil and arsenic, beryllium, chromium, iron, lead, and manganese in shallow subsurface soil exceeded the direct contact human health screening criteria. Aluminum, chromium, mercury, vanadium, and zinc were detected in surface soils at concentrations exceeding the ecological screening criteria. Concentrations of aluminum and cobalt in surface soil and deep subsurface soil, and aluminum, antimony, arsenic, chromium, and cobalt in shallow subsurface soil exceeded the screening criteria for protection of chemical migration from soil to groundwater. It should be noted that concentrations of arsenic only exceeded the RIDEM residential direct contact screening criteria in one shallow subsurface soil sample (SB16-28, 4 to 6 feet). The RIDEM residential direct contact criterion for arsenic is based on State-wide background values because the risk-based value for arsenic is less than background levels. Also, concentrations of beryllium were less than the USEPA Region 9 residential PRG but exceeded the RIDEM residential direct contact screening criterion. The RIDEM direct contact criterion for beryllium are based on carcinogenic effects; however, the USEPA currently classifies beryllium as a carcinogen for the inhalation route of exposure only. Furthermore, beryllium concentrations don't often exceed 1 mg/kg, and the maximum observed Site 16 beryllium concentration 0.71 mg/kg was consistent with this "rule of thumb". Most beryllium concentrations were less than 0.55 mg/kg. The RIDEM soil direct exposure limit (Tables 4-7 through 4-9) is 0.4 mg/kg. The exceedances of the direct contact screening criteria for chromium, iron, lead, and manganese in shallow subsurface soil occurred in samples collected from the former fire fighting training area and SB16-28. The elevated concentrations of inorganics in these areas are most likely associated with historical activities in these areas, but the impact to the environment is evidently minor.

In summary, the infrequently observed elevated metal concentrations relative to RIDEM direct contact criteria and ecological criteria (surface soils only) suggest that further investigation would be unwarranted. The site history supports this in that the operations at the site were associated primarily with organic chemicals except the phospholene in former Building 41. The limited soil sampling that did occur for manganese analyses did not reveal any impact from the phospholene to the environment. However, further evaluation of metal contamination at and near SB16-28 in the north central portion of Site 16 should be considered. A satisfactory background soil data set does not exist for metals and collection of background data should also be considered. The background data would provide perspective concerning the relationship of the observed metal concentrations and whether they are related to site operations.

4.3 GROUNDWATER

This section presents the analytical results of the groundwater samples collected at Site 16. Analytical data collected during the Supplemental Phase II Hydrogeologic Investigation (EA, April 2004) and HRC Injection Pilot Study (EA, July 2004) were the data primarily used to define the vertical and horizontal extent of contamination at Site 16. Analytical data collected from the investigations performed prior to 2004 were mainly used to evaluate temporal tends at Site 16, as described in Section 5.0. A copy of the complete analytical database is presented in Appendix C.

Figures 4-7 through 4-10 present the spatial distribution of TCE in each of the groundwater zones for samples collected during the 2004 round of sampling. In addition, as discussed in Section 2.7, MIP screening was used at 59 locations to located potential source areas during the Phase I RI. The results of the MIP screening are included in Appendix A.

4.3.1 Volatile Organic Compounds

4.3.1.1 Shallow Overburden Groundwater Zone

Table 4-17 presents the analytical results for chemicals detected in the 2004 round of groundwater sampling. Tables 4-18 and 4-19 present summary descriptive statistics for chemicals detected in pre-2004 and 2004 groundwater samples, respectively, from the shallow overburden zone. These tables also include comparisons to groundwater screening criteria. The following discussion focuses on the VOC data collected in 2004 because it represents the most recent site groundwater conditions, which change over time.

Total CVOCs were detected in 32 of 37 samples at concentrations ranging from 0.0121 µg/L (MW16-05S) to 175 µg/L (MW16-40S). As shown in Table 4-20, TCE was the major CVOC detected in shallow overburden groundwater. The spatial distribution of TCE is shown on Figures 4-7 and 4-11. TCE was detected in 24 of 37 samples at concentrations ranging from 0.135 J (MW16-41S) µg/L to 93 µg/L (MW16-37S). Other CVOCs detected at maximum concentrations exceeding 50 µg/L were total 1,2-DCE and vinyl chloride. Total 1,2-DCE was detected in 11 of 37 samples at concentrations ranging from 0.166 J µg/L (MW16-02S) to 96.2 µg/L (MW16-40S). Vinyl chloride was detected in 9 of 31 samples at concentrations ranging from 0.0266 J µg/L (MW16-58S) to 58 µg/L (MW16-40S).

The highest concentration of total CVOCs was detected at MW16-40S which is located just north of Davisville Road and downgradient of the former Building 41 area. As discussed in preceding sections, CVOCs (primarily TCE) were detected in the deep subsurface soils collected at the northeast end of former Building 41. The TCE contamination (Figure 4-11) is primarily located between the northeastern

section of former Building 41 and Davisville Road, although TCE was also detected at low levels in wells located in the creosote dip tank area and fire fighting training area. The highest concentration of TCE was detected at MW16-37S which is located to the southeast of former Building 41. Concentrations of both total CVOCs and TCE were significantly lower in wells located adjacent to Allen Harbor. Total CVOCs concentrations are less than 1 µg/L in the wells bordering Allen Harbor and TCE was not detected in these shallow overburden wells. Benzene was detected primarily in monitoring wells located in the north-central portion of Site 16, where it had also been detected in soils; the maximum detected concentration was reported for MW16-46S located immediately downgradient of the former fire training area. Elevated MIP readings were also reported for this general area in the Phase I RI.

VOCs detected in the shallow overburden groundwater at concentrations exceeding the EPA Region 9 PRGs included chlorodibromomethane, cis-1,2-DCE, PCE, total 1,2-DCE, TCE, benzene, and vinyl chloride. With the exception of cis-1,2-DCE and total-1,2-DCE at MW16-40S, TCE and vinyl chloride were the only VOCs detected in groundwater samples in the shallow overburden groundwater zone at concentrations exceeding the EPA MCLs and RIDEM GA groundwater objectives. With the exception of aforementioned location MW16-37S, the TCE exceedances occurred mainly in the TCE plume downgradient of the former Building 41 area as shown on Figure 4-11. Elevated MIP readings were also reported for this general area in the Phase RI. The TCE contamination appears to be bounded in the shallow overburden groundwater zone relative to the EPA MCL and RIDEM GA groundwater objective except to the east of MW16-23S and possibly with respect to MW16-37S. The vinyl chloride exceedances occurred in monitoring wells located between Davisville Road and the former fire fighting training area (MW16-40S, -41S, -42S, and -44S) and likely reflect the degradation of TCE, the predominant Site 16 contaminant. The vinyl chloride contamination in this area appears to be bounded relative to the EPA MCL and RIDEM GA groundwater objectives. However, vinyl chloride detections have been reported for some shallow overburden wells that do not exhibit TCE contamination (e.g., MW16-58S, MW16-42S, see Table 4-17).

CVOCs are significant site-related contaminants in the shallow overburden zone at Site 16. Although the Building 41 area appears to be a primary source of the TCE detected in the shallow groundwater, it should be noted that the soils and shallow overburden groundwater have not been fully characterized in the general vicinity of the Building 41 (e.g., in the vicinity of MW16-37) and to the east of that area. These observations should be considered in any additional environmental monitoring planned for Site 16.

4.3.1.2 Intermediate Overburden Groundwater Zone

Table 4-21 presents analytical results for chemicals detected in the 2004 round of groundwater sampling. Tables 4-22 and 4-23 present summary descriptive statistics for pre-2004 and 2004 groundwater

samples, respectively, from the intermediate overburden zone. These tables also include comparisons to groundwater screening criteria. The following discussion focuses on the VOC data collected in 2004.

Concentrations of VOCs were greater in the intermediate overburden groundwater zone as compared to the shallow overburden groundwater zone. Total CVOCs were detected in 47 of 48 samples at concentrations ranging from 0.0304 (MW16-58I) µg/L to 1,700 µg/L (MW16-37I). As shown in Tables 4-20 through 4-23, TCE was the most frequently detected VOC and was detected at the highest concentrations of all VOCs in intermediate overburden groundwater. Therefore, this chemical is likely representative of the maximum extent of the VOC contaminant plume in the intermediate overburden groundwater zone.

The spatial distribution of TCE in the intermediate zone is shown on Figures 4-8 and 4-11. TCE was detected in 42 of 48 samples at concentrations ranging from 0.137 J µg/L (MW16-48I) to 1,700 µg/L (MW16-37I). The maximum detected concentration of TCE in the shallow overburden aquifer also occurred at location MW16-37 which is located to the southeast of former Building 41. However, based on a review of the groundwater surface contours it is not clear that former Building 41 is the source (or the only source) of the contamination detected at MW16-37S. Other CVOCs detected at concentrations exceeding 10 µg/L in the intermediate zone include total 1,2-DCE, PCE and vinyl chloride. Total 1,2-DCE was detected in 22 of 48 samples at concentrations ranging from 0.158 J µg/L (MW16-20I) to 41 µg/L (MW16-42I). PCE was detected in 10 of 42 samples at concentrations ranged from 0.311 J µg/L (MW16-63I) to 18 µg/L (MW16-33I). Vinyl chloride was detected in 10 of 42 samples at concentrations ranged from 0.0113 J µg/L (MW16-04I) to 33 µg/L (MW16-42I).

As noted above, the highest concentrations of total CVOCs and TCE were detected at MW16-37S. However, as shown on Figure 4-11, there does not appear to be a single distinct groundwater plume in the intermediate zone but rather small pockets of elevated total CVOC and TCE concentrations and possibly multiple smaller overlapping contaminant plumes (or release areas). Total CVOC and TCE concentrations were notable in monitoring wells MW16-38I MW16-37I, MW16-59I, and MW16-69I which are also located in the vicinity of or downgradient of the former Building 41 and the railroad tracks to the east/southeast, and MW16-45I, which is located in the former fire fighting training area. The elevated TCE concentrations in the deep subsurface soil samples in the northeastern corner of former Building 41 indicate a significant VOC source underlying or in the immediate vicinity of the former Building 41. The shallow subsurface soils in the vicinity of the former fire training area do not suggest a significant soils source remaining in that area. No soils data have been collected to date in the immediate vicinity of MW16-37I or MW16-38I. Total CVOCs and TCE concentrations are generally less than 1 µg/L in the wells bordering Allen Harbor although elevated levels of total CVOCs (496 µg/L) and TCE (470 µg/L) were detected at MW16-05I. No soils data have been collected in the immediate vicinity of MW16-05I.

VOCs detected in the intermediate overburden groundwater at concentrations exceeding the EPA Region 9 PRGs included bromodichloromethane, chlorodibromomethane, PCE, 1,1,2-TCA, TCE, benzene, chloroform, and vinyl chloride. With the exception of PCE at MW16-33I and vinyl chloride at MW16-42I, TCE was the only VOC detected in the intermediate zone groundwater samples at concentrations exceeding the EPA MCLs and RIDEM GA groundwater objectives. TCE contamination appears to be bounded with reference to EPA MCLs and the RIDEM GA groundwater objectives to the south, west, and northeast. However, the TCE contamination in the intermediate overburden may not be completely bounded to the northwest in the vicinity of MW16-45I (the former fire fighting training area), north near MW16-05I, southeast near MW16-18I, and east near MW16-39I and MW16-57I. There is also a region of PCE contamination (less than 20 µg/L) in the vicinity of MW16-33I and between former Building 41 and Building 318 which does not appear to be bounded. The PCE contamination at MS16-33I (18 µg/L) is approximately four times the RIDEM GA groundwater objective (5 µg/L).

CVOCs are significant site-related contaminants in the intermediate overburden zone at Site 16. Although the Building 41 area appears to be a primary source of the TCE detected in the intermediate overburden groundwater it should be noted that the soils and/or intermediate overburden groundwater have not been fully characterized particularly in the general vicinity of the former Building 41 and to the southwest, southeast, and east of this area. These observations should be considered in any additional environmental monitoring planned for Site 16.

4.3.1.3 Deep Overburden Groundwater Zone

Table 4-24 presents the analytical results for chemicals detected in the 2004 round of groundwater sampling. Tables 4-25 and 4-26 present summary descriptive statistics for pre-2004 and 2004 groundwater samples, respectively, collected from the deep overburden zone. These tables also include comparisons to groundwater screening criteria. The following discussion focuses on the VOC data collected in 2004.

Concentrations of VOCs in the deep overburden groundwater zone exceed those reported for the shallow and intermediate groundwater zones. This is consistent with the highest concentrations of VOCs appearing in deep overburden soil, which serves as a source of groundwater VOCs. Total CVOCs were detected in 73 of 81 samples at concentrations ranging from 0.031 µg/L (MW16-30D) to 2,939 µg/L (MW16-29D). As shown in Tables 4-20, 4-24, 4-25, and 4-26, TCE was the major CVOC detected in deep overburden groundwater.

The spatial distribution of TCE is shown on Figures 4-9 and 4-11. TCE was detected in 69 of 81 samples at concentrations ranging from 0.142 J µg/L (MW16-03D) to 2,900 µg/L (MW16-29D). The highest

concentration of total CVOCs and TCE were detected at MW16-29D which is located to the southeast of the earth ramp structure in the eastern section of the north-central portion of Site 16 (EBS No. 28). Total CVOC and TCE concentrations were also detected at concentrations exceeding 1000 µg/L in several monitoring wells located in the area between the northeastern section of former Building 41 and monitoring well MW16-05D as shown in Figure 4-9. These results are consistent with those reported in the Phase II RI.

In comparison to the somewhat sparse TCE contamination pattern observed in the intermediate overburden groundwater zone, a TCE groundwater plume does appear to extend from the northeastern portion of former Building 41 to the south eastern corner of Allen Harbor in the deep overburden zone (Figure 4-11). TCE concentrations generally decrease from 1000 to 2000 µg/L near Building 41 to non-detect levels to the west/northwest (MW16-48D, MW16-26D, MW16-55D), to the northeast/east (MW16-52D, MW16-57D), and to the south/southeast (MW16-54D). However, low-level TCE and vinyl chloride concentrations were detected in some of the deep overburden wells at the eastern Phase II RI boundary. Based on groundwater flow pathways presented and discussed in Section 3.0, this elongation of the plume along the primary groundwater flow direction is consistent with expectations. In contrast to the TCE plume(s) noted for the intermediate overburden zone, TCE contamination greater than the SDWA MCL does not extend beyond the eastern Site 16 Phase II RI boundary (Figure 4-11). Other notable CVOCs detected in the deep overburden include vinyl chloride. Vinyl chloride was detected in 37 of 81 samples at concentrations ranging from 0.0132 J µg/L (MW16-07D) to 7.87 µg/L (MW16-24D) and likely reflects the biodegradation of TCE.

VOCs detected in the deep overburden groundwater at concentrations exceeding the EPA Region 9 PRGs included bromodichloromethane, chlorodibromomethane, PCE, TCE, vinyl chloride, 1,1,2-TCA, 1,4-dichlorobenzene, and chloroform. With the exception of vinyl chloride at MW16-24D and PCE at MW16-34D, TCE was the only VOC detected in groundwater samples in the deep overburden groundwater zone at concentrations exceeding the EPA MCLs and RIDEM GA groundwater objectives. The TCE contamination appears to be bounded to the south/southwest, west, and northwest with reference to the EPA MCL and RIDEM GA groundwater objective. The TCE contamination is not bounded toward the north near MW16-04D and MW16-05D; however, these wells are in proximity to Allen Harbor. It should also be noted that low-level vinyl chloride concentrations (less than 1 µg/L) have been noted in some of the site boundary wells (e.g., MW16-57D).

CVOCs are significant site-related contaminants in the deep overburden zone at Site 16. Although the Building 41 area appears to be a primary source of the TCE detected in the deep overburden groundwater, as noted above the soils and/or overburden groundwater have not been fully characterized particularly in the general vicinity of the former Building 41 and to the southwest, southeast, and east of

this area. These observations should be considered in any additional environmental monitoring planned for Site 16.

4.3.1.4 Shallow Bedrock Groundwater Zone

The shallow bedrock monitoring wells were completed within the upper 25 to 30 feet of competent bedrock. Table 4-27 presents analytical results for the chemicals detected in the 2004 round of groundwater sampling. Tables 4-28 and 4-29 present summary descriptive statistics for pre-2004 and 2004 groundwater samples collected from the shallow bedrock zone. These tables also include comparisons to groundwater screening criteria. The following discussion focuses on the VOC data collected in 2004.

Concentrations of CVOCs in the shallow bedrock groundwater zone exceed those reported for the shallow and intermediate groundwater zones and but are generally less than those reported for the deep overburden groundwater zone. Total CVOCs were detected in 24 of 29 samples at concentrations ranged from 0.0157 µg/L (MW16-28R) to 1,824 µg/L (MW16-60R). TCE was the major CVOC detected in shallow bedrock groundwater.

The spatial distribution of TCE is shown on Figures 4-10 and 4-11. The plume reflects the contamination migrating from the overlying deep overburden and its source areas but, with the exception of the TCE concentration reported for location MW16-03R (31 µg/L), is somewhat narrower than the plume described for the deep overburden. TCE was detected in 20 of 29 samples at concentrations ranging from 0.415 J (MW16-65R) µg/L to 1,800 µg/L (MW16-60R). As noted for the deep overburden wells and as shown on Figure 4-11, total CVOC and TCE concentrations were frequently detected at concentrations exceeding 500 µg/L in monitoring wells located in the area between the northeastern section of former Building 41 and monitoring well MW16-05R (southeastern corner of Allen Harbor). The highest concentration of total CVOCs and TCE were detected at MW16-60R which is located northeast of former Building 41. Other notable CVOCs detected in the shallow bedrock include vinyl chloride. Vinyl chloride was detected in 11 of 23 samples at concentrations ranging from 0.0373 J µg/L (MW16-03R) to 0.916 µg/L (MW16-59R).

VOCs detected in the shallow bedrock groundwater at concentrations exceeding the EPA Region 9 PRGs included bromodichloromethane, chlorodibromomethane, PCE, TCE, 1,1,2-TCA, and vinyl chloride. TCE was the only VOC detected in groundwater samples in the shallow bedrock groundwater zone at concentrations exceeding the EPA MCLs and RIDEM GA groundwater objectives. TCE contamination in the shallow bedrock groundwater zone appears to be bounded with respect to these criteria to the south and west. However, the contamination does not appear to be bounded toward the north near MW16-03R (31 µg/L) and MW16-05R (860 µg/L), and toward the east near MW16-02R (1100 µg/L) and MW16-56R

(17 µg/L). MW16-05R is located just south of Allen Harbor and the groundwater plume has not been chased into the harbor.

CVOCs are significant site-related contaminants in the shallow bedrock zone at Site 16. Although the deep overburden and its associated contaminant source areas appear to be the primary source of the TCE detected in the shallow bedrock groundwater, the shallow bedrock groundwater has not been fully characterized to the north and east of Site 16. Also, there are very few monitoring points in the expanded creosote dip tank area. These observations should be considered in any additional environmental monitoring planned for Site 16.

4.3.1.5 Deep Bedrock Groundwater Zone

Groundwater monitoring of the deep bedrock zone underlying Site 16 has been limited to the completion of four monitoring wells in the 25 to 30 feet of competent bedrock below where the adjacent shallow bedrock wells were installed. Three of these wells (MW16-05R2, MW16-02R2, and MW16-15R2) are located along the long axis of the TCE plume described for the deep overburden and shallow bedrock zones. The fourth well (MW16-55R2) is located to the west of the primary areas of investigation at Site 16 and just north of Davisville Road. Table 4-30 presents the analytical results for chemicals detected in the 2004 round of groundwater sampling. Tables 4-31 and 4-32 present summary descriptive statistics for pre-2004 and 2004 groundwater samples, respectively, from the deep bedrock zone. These tables also include comparisons to groundwater screening criteria. The following discussion focuses on the VOC data collected in 2004.

Total CVOCs were detected in 3 of 4 samples collected in 2004 at concentrations ranging from 10.1 µg/L (MW16-05R2) to 476 µg/L (MW16-02R2). TCE was the major CVOC detected in deep bedrock groundwater. This is consistent with vertical downward migration of a DNAPL source from past releases, although evidence for the current presence of DNAPL does not exist.

The spatial distribution of TCE is shown on Figure 4-10. TCE was detected in the samples from wells underlying the TCE plume described for the shallow bedrock and deep overburden at concentrations ranging from 9.37 µg/L (MW16-05R2) to 470 µg/L (MW16-02R2). VOCs were not detected in the sample from MW16-55R2 which is located north of Davisville Road and west of the primary Site 16 area of investigation. Concentrations of total CVOCs and TCE in the samples from MW16-15R2 and MW16-02R2 were approximately two times lower and concentrations in sample from MW16-05R were approximately ten times lower than those reported for related samples from the shallow bedrock zone.

VOCs detected in the deep bedrock groundwater at concentrations exceeding the EPA Region 9 PRGs included bromodichloromethane, chlorodibromomethane, TCE, and vinyl chloride. TCE was the only

VOC detected in groundwater samples in the deep bedrock groundwater zone at concentrations exceeding the EPA MCLs and RIDEM GA groundwater objectives. The exceedances of these criteria were only reported for wells located along the long axis of the previously described TCE plume. However, with the exception of MW16-55R2, deep bedrock monitoring wells have only been installed along the axis of the plume that extends from the former Building 41 area to MW16-05R2 (near the southeast corner of Allen Harbor). Therefore, the degree of lateral VOC dispersion from the plume long axis has not been determined.

CVOCs are significant site-related contaminants in the deep bedrock zone at Site 16. Although the deep overburden and shallow bedrock and associated contaminant source areas appear to be the primary source of the TCE detected in the shallow bedrock groundwater, the deep bedrock groundwater has not been fully characterized. Only four deep bedrock monitoring wells currently exist at Site 16. These observations should be considered in any additional environmental monitoring planned for Site 16.

4.3.1.6 Summary of Volatile Organic Compounds Contamination

The following items summarize the VOC contamination detected in the Site 16 groundwater:

- VOC contamination is present all five groundwater zones evaluated (shallow, intermediate and deep overburden, and shallow and deep bedrock). TCE was the primary VOC contaminant detected in groundwater. In most instances, TCE comprised more than 95 percent of the total CVOC detections. Concentrations of total CVOCs were greatest in the deep overburden and shallow bedrock groundwater zones.

- There does not appear to be a single distinct groundwater plume in the intermediate groundwater zone but rather small pockets of elevated total CVOC and TCE concentrations and multiple smaller overlapping contaminant plumes. There is a distinct contaminant groundwater plume in the deep overburden and shallow bedrock groundwater zones. The plume extents from the northeastern portion of former Building 41 (or nearby) to Allen Harbor in the vicinity of monitor well MW16-05.

- In the shallow overburden groundwater zone, the TCE contamination appears to be bounded by wells that have concentrations less than the EPA MCL and RIDEM GA groundwater objectives with the exception of the area east of MW16-23S. However, the area of vinyl chloride contamination extends beyond the primary TCE contamination area and is defined by monitoring wells located between Davisville Road and the former fire fighting area (MW16-40S, -41S, -42S, and -44S). The vinyl chloride contamination in this area is bounded relative to the EPA MCL and RIDEM GA groundwater objectives.

- In the intermediate overburden groundwater zone, the TCE contamination appears to be bounded to the southwest, west, and northeast by wells that have concentrations less than the EPA MCL and RIDEM GA groundwater objectives. However, the TCE contamination does not appear to be bounded (relative to these criteria) to the northwest in the vicinity of MW16-45I, north near MW16-05I, southeast near MW16-18I, and east near MW16-39I and MW16-57I. Also, the PCE contamination in the vicinity of MW16-33I (18 µg/L, 2004 data) between former Building 41 and Building 318 is not bounded relative to the EPA MCL and RIDEM GA groundwater objectives for PCE.

- In the deep overburden groundwater zone, TCE contamination is bounded to the southwest, west, and northwest by wells that have concentrations less than the EPA MCL and RIDEM GA groundwater objectives. Contamination is not bounded to the north near MW16-04D and MW16-05D; however, these wells are located just south of Allen Harbor.

- In the shallow bedrock groundwater zone contamination is bounded to the south and west by wells that have concentrations less than the EPA MCL and RIDEM GA groundwater objectives. TCE contamination is not bounded (relative to these criteria) on north near MW16-03R or MW16-05R or in the vicinity of MW16-56R. MW-05R is located just south of Allen Harbor.

- The deep bedrock groundwater has not been fully characterized, especially with respect to migration away from the long axis of the plume. Only four deep bedrock monitoring wells currently exist at Site 16. These observations should be considered in any additional environmental monitoring planned for Site 16.

4.3.2 Semivolatile Organic Compounds

Groundwater samples collected in the 2004 round of sampling were not analyzed for SVOCs. The following discussion is based on the previously collected groundwater samples.

4.3.2.1 Shallow Overburden Groundwater Zone

Tables 4-18 presents summary statistics for pre-2004 groundwater samples collected from the shallow overburden zone and analyzed for SVOCs. (SVOCs were not analyzed in 2004 groundwater samples.) This table also includes comparisons to groundwater screening criteria. All analytical data are presented in Appendix C. Additionally, select tables and figures from the Phase I and II RI reports which display positive detections for select chemicals are presented in Appendix A.

SVOCs were detected infrequently in groundwater samples from the shallow overburden groundwater zone. Bis(2-ethylhexyl)phthalate was detected in 5 of 24 groundwater samples. The remaining SVOCs (primarily PAHs) were detected in three or fewer samples.

The majority of the SVOCs listed in Table 4-18 (primarily PAHs) were detected in a groundwater sample collected from 28-GW07 (1998) which is located southeast of Building E-107 and in the general vicinity of the Building E-107 septic tanks (Figure 2-1). However, subsequent groundwater monitoring in adjoining RI monitoring wells MW16-03S, MW16-04S, and MW16-48S detected minimal PAH contamination. Naphthalene was detected in a groundwater sample from MW16-45S which is located in the former fire fighting area. SVOCs were not detected in the limited number of soil samples collected in the vicinity of 28-GW07 but were detected in several soil samples from the expanded creosote dip tank area and the former fire fighting area. The PAH contamination detected in the Site 16 shallow overburden monitoring wells may be associated with historical activities in the north central portion of Site 16 (e.g., the former fire training area, the expanded creosote dip tank area, the Building E-107 septic tanks). However, the PAH concentrations detected to date are generally less than 10 µg/L and therefore do not suggest significant impact to the shallow groundwater from this contamination. In contrast to the VOCs, SVOCs (especially PAHs) tend to bind tightly to soils and do not migrate readily from source area soils to groundwater. Therefore, unless they are present in very high concentrations or large volumes, a significant impact would not be expected.

Bis(2-ethylhexyl)phthalate (MW16-06S; MW16-07S; MW16-40S; EBS81-01; 28-GW-01A), 2-methylnaphthalene (28-GW07), carbazole (28-GW07), dibenzofuran (28-GW07), and naphthalene (28-GW07; 28-GW08) were detected at concentrations exceeding the EPA Region 9 PRGs. However, only bis(2-ethylhexyl)phthalate and naphthalene were detected at concentrations exceeding the EPA MCLs or RIDEM GA groundwater objectives. As noted above, monitoring wells 28-GW07 and 28-GW08 (1998) are located southeast of Building E-107 and in the general vicinity of the Building E-107 septic tanks

Based on the low frequency of detection and low detected concentrations, the SVOC contamination in shallow overburden groundwater is not considered to be significant at Site 16 or appears to represent very localized contamination. The low concentrations are well below the solubilities of these chemicals and indicate that the SVOCs are dissolved in the shallow groundwater. Because of their tendency to bind tightly to suspended particulates, the SVOCs may also be bound to colloidal or slightly larger suspended particulates. However, SVOC monitoring of the shallow groundwater has been limited primarily to wells in the north central section of Site 16. Very few monitoring wells in the vicinity of former Building 41, another significant source of Site 16 contamination, have been sampled for SVOC contamination. Additionally, as noted in Section 4.2, the PAH contamination in the soils in the expanded creosote dip

tank area and other areas within the north central portion of the Site 16 (see Section 4.2.2) has not be completely delineated. These factors should be considered in any additional environmental monitoring planned for Site 16.

4.3.2.2 Intermediate Overburden Groundwater Zone

Table 4-22 presents summary statistics for pre-2004 groundwater samples collected from the intermediate overburden zone and analyzed for SVOCs. (SVOCs were not analyzed in 2004 groundwater samples.) This table also includes comparisons to groundwater screening criteria. All analytical data are presented in Appendix C. Additionally, select tables and figures from the Phase I and II RI reports which display positive detections for select chemicals are presented in Appendix A.

As detailed in Table 4-22, SVOCs (primarily phenols, ethers, PAHs, and phathalates) were detected infrequently and at low concentrations in groundwater samples from the intermediate overburden groundwater zone. Bis(2-ethylhexyl)phthalate was detected in 3 of 14 samples, di-n-butyl phthalate and dibenzofuran were each detected in 2 of 14 samples, and 12 other SVOCs were detected only once.

With the exception of the phthalate compounds listed in Table 4-22, the maximum detected concentrations reported for any of the SVOCs detected in the Site 16 intermediate overburden did not exceed 2 µg/L. The SVOCs were detected primarily in the samples from monitoring wells 28-GW07 (1998) and MW16-04I which are located in the general vicinity of the Building E-107 septic tanks (Figure 2-1). These monitoring wells are located southeast of Building E-107. SVOCs were not detected in soil samples collected in the vicinity of 28-GW07 but were detected in soil samples from MW16-04S (primarily low-level PAHs). As discussed above, the SVOC contamination detected in the Site 16 overburden wells is likely to be associated with historical activities in the north central portion of Site 16. However, the generally low-level detections detected to date do not suggest a significant impact to the intermediate groundwater from this contamination. Additionally, it should be noted that monitoring well MW16-04I, the RI monitoring well demonstrating the widest variety of chemical contaminants in the intermediate overburden zone, is located immediately adjacent to the unnamed asphalt-paved road that encircles the north central portion of Site 16. The road materials (asphalt) or materials historically transported along the road may also have contributed to the SVOC contamination observed in this well.

Bis(2-ethylhexyl)phthalate and hexachlorobenzene were the only SVOCs detected at concentrations exceeding the EPA Region 9 PRGs. However, only bis(2-ethylhexyl)phthalate (MW16-04I, MW16-31D) was detected at concentrations exceeding the EPA MCLs and RIDEM GA groundwater objectives.

Based on the low frequency of detection and low detected concentrations, the SVOC contamination in intermediate overburden groundwater is not considered to be significant at Site 16. However, it should be

noted that SVOC monitoring of the intermediate groundwater zone has been limited. Additionally, as noted above, the PAH contamination in the soils in the expanded creosote dip tank area and nearby areas has not be completely delineated. These factors should be considered in any additional environmental monitoring planned for Site 16.

4.3.2.3 Deep Overburden Groundwater Zone

Table 4-25 presents summary statistics for pre-2004 groundwater samples collected from the deep overburden zone. (SVOCs were not analyzed in 2004 groundwater samples.) All analytical data are presented in Appendix C. Additionally, select tables and figures from the Phase I and II RI reports which display positive detections for select chemicals are presented in Appendix A.

1,4-Dichlorobenzene, bis(2-ehtylhexylphthalate, di-n-butyl phthalate, naphthalene and phenanthrene were the only SVOCs detected in groundwater samples from the deep overburden groundwater zone. Naphthalene was detected in 2 of 37 samples at concentrations of 0.1 µg/L (MW16-11D) and 0.2 J µg/L (MW16-09D). Di-n-butyl phthalate was detected in 2 of 40 samples at concentrations of 0.6 µg/L (MW16-24D) and 0.9 µg/L (MW16-19D). 1,4-Dichlorobenzene and phenanthrene were detected in one groundwater sample at concentrations of 2 J µg/L (MW16-08D) and 0.04 J µg/L (MW16-52D), respectively. Bis(2-ethylhexyl)phthalate was detected in 6 of 40 samples at concentrations ranging from 1 J µg/L to 46 µg/L (MW16-31D). However, only the bis(2-ethylhexyl)phthalate concentration reported for MW16-31D exceeds 10 µg/L. Few soil samples were collected and analyzed for SVOCs in the vicinity of these wells. Consequently, it is not known if SVOCs in soils at these locations are the source of the low-level SVOCs detected in the groundwater at these locations. However, based on available data available, the low-level SVOCs concentrations detected in the groundwater indicate that SVOC contamination in soils in the immediate vicinity of these wells (if any) is not significantly impacting SVOC groundwater quality in the area of these wells.

Concentrations of naphthalene, phenanthrene, and di-N-butyl phthalate were less than the screening criteria. Concentrations of 1,4-dichlorobenzene exceeded the EPA Region 9 PRG (one location only; MW16-08D) while concentrations of bis(2-ethylhexyl)phthalate exceeded both the EPA MCL and RIDEM GA groundwater objective at three locations (MW16-31D, MW16-06D, and MW16-26D).

Based on the low frequency of detection and low detected concentrations, the SVOC contamination in deep overburden groundwater is not considered to be significant. Additionally, in contrast to the somewhat limited monitoring of SVOC contamination in the shallow and intermediate groundwater zones described above, over 35 wells distributed evenly in the deep overburden across Site 16 have been sampled for SVOC contamination. Although soils have exhibited contamination in the north central

portion of the Site 16, the degree of impact is limited, possibly because the PAH contamination is limited primarily to soils less than about 10 feet bgs.

4.3.2.4 Shallow Bedrock Groundwater Zone

Table 4-28 presents summary statistics for pre-2004 groundwater samples collected from the shallow bedrock zone. This table also includes comparisons to groundwater screening criteria. (SVOCs were not analyzed in 2004 groundwater samples.) All analytical data are presented in Appendix C. Additionally, select tables and figures from the Phase I and II RI reports which display positive detections for select chemicals are presented in Appendix A.

Phenanthrene was the only SVOC collected from groundwater samples collected in the shallow bedrock zone. Phenanthrene was detected in 1 of 7 samples at a concentration of 0.06 µg/L at MW16-10R. This monitoring well is located southwest of former Building 41. The detected concentration of phenanthrene was less than the screening criteria.

Based on the low frequency of detection and low detected concentrations the SVOC contamination in shallow bedrock overburden groundwater is not considered to be significant.

4.3.2.5 Deep Bedrock Groundwater Zone

Groundwater samples collected from the deep bedrock monitoring wells were not analyzed for semivolatile organic compounds. Given the low-level SVOCs detections reported for the overburden and shallow bedrock groundwater samples, significant SVOC contamination is not anticipated to occur in the deep bedrock groundwater zone.

4.3.3 Pesticides/PCBs

Groundwater samples collected in the 2004 round of groundwater sampling were not analyzed for Pesticides/PCBs. The following discussion is based on the previously collected groundwater samples. All analytical data are presented in Appendix C. Additionally, select tables and figures from the Phase I and Phase II RI reports which display positive detections for select chemicals are presented in Appendix A.

4.3.3.1 Shallow Overburden Groundwater Zone

Table 4-18 presents summary statistics for pre-2004 groundwater samples collected from the shallow overburden zone. This table also includes comparisons to groundwater screening criteria. (Pesticides/PCBs were not analyzed in 2004 groundwater samples.) 4,4'-DDD, 4,4'-DDT, gamma-BHC,

and Heptachlor Epoxide were the only pesticides detected in shallow overburden groundwater samples. PCBs were not detected. 4,4'-DDD (0.0049 J µg/L) and 4,4'-DDT (0.0063 µg/L) were detected in 1 of 21 samples (28-GW02, 1998). Gamma-BHC (0.0019 µg/L and 0.0049 J µg/L) and Heptachlor Epoxide (0.0025 µg/L and 0.06 J µg/L) were detected in 2 of 21 samples. The concentration of Heptachlor Epoxide in one well (28-GW02, 1998) exceeded the EPA Region 9 PRG but was less than the EPA MCL.

Based on the low frequencies of detection and low detected concentrations, the pesticide contamination in shallow overburden groundwater is not considered to be significant. The available site history (i.e., pesticides/PCBs were not significant process-related chemicals for the Site 16 activities), the preceding nature and extent of contamination information reported for Site 16 soils, and the chemical/physical properties of these chemicals (i.e., in contrast to CVOCs, pesticides/PCBs do not readily migrate to and in the groundwater) also support this conclusion.

4.3.3.2 Intermediate Overburden Groundwater Zone

Table 4-22 presents summary statistics for pre-2004 groundwater samples collected from the intermediate overburden zone and analyzed for pesticides/PCBs. This table also includes comparisons to groundwater screening criteria. (Pesticides/PCBs were not analyzed in 2004 groundwater samples.) 4,4'-DDD, alpha-BHC, Endrin Aldehyde, gamma-BHC, and Heptachlor Epoxide were the only pesticides detected in intermediate overburden groundwater samples. PCBs were not detected. 4,4'-DDD (0.0037 J µg/L), alpha-BHC (0.0073 µg/L), Endrin Aldehyde (0.0062 J µg/L) and gamma-BHC (0.001 J µg/L) were only detected in one groundwater sample. Heptachlor Epoxide was detected in 3 of 14 groundwater samples at concentrations ranging from 0.0013 J µg/L to 0.0034 J µg/L. Concentrations of all pesticides/PCBs were less than screening criteria.

Based on the low frequency of detection and low detected concentrations (no concentrations exceeding screening criteria), the pesticide contamination in intermediate overburden groundwater is not considered to be significant.

4.3.3.3 Deep Overburden Groundwater Zone

Table 4-25 presents summary statistics for pre-2004 groundwater samples collected from the deep overburden zone. This table also includes comparisons to groundwater screening criteria. (Pesticides/PCBs were not analyzed in 2004 groundwater samples.) Beta-BHC was the only pesticide detected in groundwater samples from the deep overburden groundwater zone. No PCBs were detected. The pesticide was detected in 1 of 41 samples (MW16-07D) at a concentration of 0.01 µg/L which is less than the screening criteria. MW16-07D is located within the expanded creosote dip tank area; the TCE concentration reported in this well in the 2004 groundwater samples was less than 3 µg/L.

Based on the low frequencies of detection and the low detected concentrations, the low-levels of pesticide contamination (not exceeding screening criteria) in the deep overburden groundwater is not considered to be significant at Site 16.

4.3.3.4 Shallow Bedrock Groundwater Zone

Table 4-28 presents summary descriptive statistics for chemicals detected in pre-2004 groundwater samples collected from the shallow bedrock zone and analyzed for pesticides/PCBs. This table also includes comparisons to groundwater screening criteria. (Pesticides/PCBs were not analyzed in 2004 groundwater samples.) Gamma-chlordane was the only pesticide detected in groundwater samples from the shallow bedrock groundwater zone. PCBs were not detected. The pesticide was detected in 1 of 7 samples (MW16-02R) at a concentration of 0.004 J µg/L which is less than the screening criteria presented in Table 4-27. MW16-02R is located just north of Davisville Road; the TCE concentration reported in this well in the 2004 groundwater samples exceeded 1000 µg/L.

Based on the low frequencies of detection and the low detected concentrations, the low-levels of pesticide contamination (not exceeding screening criteria) in the shallow bedrock groundwater is not considered to be significant at Site 16.

4.3.3.5 Deep Bedrock Groundwater Zone

Groundwater samples collected from the deep bedrock overburden monitoring wells were not analyzed for pesticides/PCBs. Given the low-level pesticide detections reported for the overburden and shallow bedrock groundwater samples and the soil samples, significant pesticide contamination is not anticipated to occur in the deep bedrock groundwater zone.

4.3.4 Metals

4.3.4.1 Shallow Overburden Groundwater Zone

Table 4-17 presents the analytical results for chemicals detected in 2004 round of groundwater sampling Tables 4-18 and 4-19 present summary descriptive statistics for pre-2004 and 2004 groundwater samples, respectively, collected from the shallow overburden zone. These tables also include comparisons to groundwater screening criteria. The following discussion focuses on the metals data collected in 2004.

Twenty-two EPA TAL metals were detected in groundwater samples collected from the shallow overburden groundwater zone. In general, total and dissolved concentrations were comparable for most

metals except that the average aluminum concentration in the unfiltered samples was significantly greater the average concentration reported for the filtered samples. Arsenic, barium, calcium, iron, manganese, potassium, sodium, and zinc were detected at concentrations exceeding the base-wide background levels. However, formal statistical testing has not been conducted to determine whether the metals concentrations in the Site 16 shallow overburden exceed background metals concentrations. This statistical testing is planned for the upcoming RI report to be prepared for Site 16.

Arsenic, iron, and manganese concentrations detected in both unfiltered and filtered groundwater samples exceeded the EPA Region 9 PRGs. Additionally, arsenic concentrations reported for both unfiltered ($C_{maximum}$ = 19.8 µg/L) and filtered ($C_{maximum}$ = 27.4 µg/L) samples collected from six wells (MW16-41S, MW16-43S, MW16-44S, MW16-45S, and MW16-48S) located in the north central portion of Site 16 approached or exceeded the EPA primary MCL. Evidence of fuel contamination (e.g., BTEX, PAHs) has been detected in this north central portion of Site 16. This contamination may induce reducing conditions in soils/groundwater by serving as a food source for the microbes that cause such conditions. Reducing conditions can cause metals such as arsenic, iron, and manganese to mobilize.

4.3.4.2 Intermediate Overburden Groundwater Zone

Table 4-21 presents the analytical results for chemicals detected in the 2004 round of groundwater sampling. Tables 4-22 and 4-23 present summary descriptive statistics for pre-2004 and 2004 groundwater samples, respectively, collected from the intermediate overburden zone. These tables also include comparisons to groundwater screening criteria. The following discussion focuses on the metals data collected in 2004.

Twenty-two metals were detected in groundwater samples from the intermediate overburden groundwater zone. The sample-specific data presented in Table 4-21 and the descriptive statistics presented in Table 4-23 indicate that metals concentration reported for unfiltered samples were significantly higher than metals concentrations reported for the filtered samples in over half of the monitoring wells tested. Turbidity levels were also elevated in the monitoring wells in which unfiltered metals concentrations were significantly higher than the filtered metals concentrations. The elevated turbidity levels indicate that the metals concentrations detected in the unfiltered samples are due to the presence of particulates in the groundwater sample. With the exception of silver and thallium, concentrations of all metals exceeded the base wide site-specific background levels. However, formal statistical testing has not been conducted to determine if the metals concentrations in the Site 16 intermediate overburden exceed background metals concentrations. This statistical testing is planned for the upcoming RI report to be prepared for Site 16. Concentrations of metals in samples from the intermediate overburden groundwater zone exceeded those detected in samples from the shallow overburden groundwater zone.

Aluminum, arsenic, chromium, iron, manganese, and vanadium concentrations reported for unfiltered samples and arsenic, iron, and manganese concentrations reported for filtered samples exceeded the EPA Region 9 PRGs. Additionally, arsenic, beryllium, cadmium, chromium, and lead concentrations reported for the unfiltered samples, and arsenic concentrations reported for the filtered samples exceeded the EPA MCL or RIDEM GA groundwater objectives. Most of the exceedances of the EPA MCL and RIDEM GA groundwater objectives occurred in the monitoring wells located northeast/east of former Building 41 (MW16-64I, MW16-59I, MW16-22I, MW16-21I, MW16-61I, MW16-38I, MW16-16I, MW16-37I), area or in the north central portion of Site 16 (MW16-46I, MW16-45I, MW-16-42I, MW16-58I). However, a review of sample-specific data presented in Table 4-21 indicates that metals concentrations reported for the unfiltered samples collected from wells to northeast/east of the former Building 41 area are likely the result of sample turbidity; few exceedances of criteria are noted in the filtered samples collected from these wells. In contrast, the elevated arsenic concentrations ($C_{maximum}$ = 56.8 µg/L) reported for filtered samples collected in some wells located in the north central portion of Site 16 (MW16-46I, MW16-45I, MW-16-42I, MW16-58I) may be the result of reducing conditions as described above for the shallow overburden zone.

4.3.4.3 Deep Overburden Groundwater Zone

Table 4-24 presents the analytical results for chemicals detected in the 2004 round of groundwater sampling. Tables 4-25 and 4-26 present summary descriptive statistics for pre-2004 and 2004 groundwater samples, respectively, from the deep overburden zone. These tables also include comparisons to groundwater screening criteria. The following discussion focuses on the metals data collected in 2004.

Twenty-one metals were detected in groundwater samples from the deep overburden groundwater zone. In general, total and dissolved concentrations were comparable for most metals in samples except for aluminum, iron, manganese, and zinc, all of which generally had significantly greater concentrations in the total fraction. With the exception of antimony and thallium, concentrations of all metals exceeded the base wide site-specific background levels. Concentrations of most metals in samples from the deep overburden groundwater zone were less than those from samples in the intermediate groundwater zone.

Aluminum, arsenic, chromium, iron, manganese, and vanadium concentrations reported for unfiltered samples and arsenic, iron, and manganese concentrations reported for filtered samples exceeded the EPA Region 9 PRGs. Arsenic, beryllium, chromium, lead, nickel, and selenium concentrations reported for unfiltered samples and arsenic and selenium concentrations reported for filtered samples exceeded the EPA MCL or RIDEM GA groundwater objectives. The exceedances of the EPA primary MCL and/or RIDEM GA groundwater objectives occurred in the monitoring wells scattered across Site 16. In most cases exceedances of the EPA primary MCL and/or RIDEM GA groundwater objectives in the unfiltered

groundwater samples were not noted in the filtered groundwater samples indicating that the elevated metals concentrations in the unfiltered samples may be the result of sample particulates (e.g., see metals data for unfiltered and filtered samples from locations MW16-30D, -35D, -39D, -54D, -59D, and -61D in Table 4-24). Only the arsenic (16.9 µg/L) and selenium (61 µg/L) detections reported for filtered samples collected from MW16-50D exceed EPA primary MCL and/or RIDEM GA groundwater objectives. This well is located at the eastern Phase II RI boundary and is remote from the primary source areas under investigation at Site 16. The distribution of metals concentrations in the shallow bedrock zone does not suggest that the metals are present as a consequence of Site 16-related contamination. In many cases, the elevated metals concentrations are noted in wells distal to the primary Site 16 source areas.

4.3.4.4 Shallow Bedrock Groundwater Zone

Table 4-27 presents the analytical results for chemicals detected in the 2004 round of groundwater sampling. Tables 4-28 and 4-29 present summary descriptive statistics for pre-2004 and 2004 groundwater samples, respectively, from the shallow bedrock zone. These tables also include comparisons to groundwater screening criteria. The following discussion focuses on the metals data collected in 2004.

Twenty-two metals were detected in groundwater samples from the shallow bedrock groundwater zone. In general, concentrations of total and dissolved metals were comparable except that the aluminum, iron, manganese, and zinc concentrations reported for the unfiltered samples generally exceeded those reported for the filtered samples. With the exception of beryllium, cadmium, chromium, cobalt, and nickel, silver, thallium, and vanadium, concentrations of all metals exceeded the base wide site-specific background levels. Concentrations of arsenic, barium, calcium, magnesium, manganese, mercury, and sodium were generally higher in samples from the shallow bedrock zone than those from samples from the deep overburden groundwater zone while concentrations of the remaining metals were higher in samples from the deep overburden zone.

Unfiltered and filtered arsenic, iron, and manganese concentrations exceeded the EPA Region 9 PRGs. Unfiltered and filtered arsenic, barium, and selenium concentrations exceeded the EPA MCLs or RIDEM GA groundwater objectives. However, the exceedances of the EPA MCL and RIDEM GA groundwater objectives occurred only for arsenic in monitoring wells MW16-51R (11.4 µg/L) and -52R (13.2 µg/L) which are located in the northeast corner of the Site 16 study area (distant from the primary Site 16 source areas) and for barium in MW16-65R which is located northwest of former Building 41. High salinity readings were reported for monitoring wells MW16-51R and -52R (the water in these wells are classified as saline). The distribution of metals concentrations in the shallow bedrock zone does not suggest that the metals are present as a consequence of site-related contamination. In many cases, the elevated metals concentrations are noted in wells distal to the primary Site 16 source areas.

4.3.4.5 Deep Bedrock Groundwater Zone

Table 4-30 presents the analytical results for chemicals detected in the 2004 round of groundwater sampling. Tables 4-31 and 4-32 present summary descriptive statistics for pre-2004 and the 2004 groundwater samples, respectively, from the deep bedrock zone. These tables also include comparisons to groundwater screening criteria.

Seventeen metals were detected in groundwater samples from the deep bedrock groundwater zone. In general concentrations of total and dissolved were comparable for most metals. Concentrations of metals in samples from the deep bedrock groundwater zone were lower than those reported for samples collected from the shallow bedrock groundwater zone.

Concentrations of total and dissolved arsenic and manganese exceeded the EPA Region 9 PRGs. However, the maximum arsenic (8.6 µg/L, MW16-05R2) and manganese (3050 µg/L, MW16-05R2) detections in the unfiltered samples were comparable to or less than background values presented in Table 4-32. The maximum concentration of arsenic in the filtered samples 10.9 µg/L (MW16-05R2) marginally exceeded the current EPA primary MCL (10 µg/L).

4.4 SEEPS

Seeps represent groundwater that is expressed as surface water. Consequently, contamination detected in seeps is expected to reflect groundwater quality and to some degree, sediment quality if sediments at the seeps infiltrate the seep samples during sample collection. It is often difficult to exclude sediments during sampling. One seep sample (28-SP-01) was collected along the southwestern shore of Allen Harbor during the Phase II EBS Follow-on Investigation. Two seeps (SEEP16-01 and SEEP16-02) and one outfall pipe (OPW16-01) were sampled during the Phase I RI Investigation. SEEP16-01 was collected along the southwestern shore of Allen Harbor in the vicinity of 28-SP-01 (Figure 4-12). SEEP16-02 was collected along the southeastern shore. OPW16-01 was collected adjacent to the outfall pipe that extends beneath Allen Harbor Road from the paved parking lot and discharges to Allen Harbor.

Table 4-34 presents the chemicals that were detected in the seep samples and descriptive statistics are presented in Table 4-35. Table 4-34 also shows chemicals with concentrations that exceed the screening criteria for seeps. A copy of the analytical database is presented in Appendix C. Figure 4-12 shows the spatial distribution of TCE and Total CVOCs. Figure 4-13 presents the spatial distribution of benzo(a)pyrene, total PAHs, and total carcinogenic PAHs (express in terms of benzo(a)pyrene equivalents, BAP EQ).

Concentrations of most constituents in samples from 28-SP-01, OPW16-01, SEEP16-01, and SEEP16-02 were less than or equal to the USEPA MCLs and RIDEM GA groundwater objectives. The exceedances are discussed below.

Acetone was detected in sample OPW16-01 but not at the other locations. VOCs were not detected in sample 28-SP-01. Vinyl chloride was detected in sample SEEP16-01 at 0.5 µg/L. The vinyl chloride concentration exceeded the USEPA Region 9 PRG and there is no ecological criterion for this chemical. Trichloroethene (0.7 µg/L) and cis-1,2-dichloroethene (0.7 µg/L) were the only organics detected in SEEP16-02. The cis-1,2-DCE accounted for all of the 1,2-DCE. Concentrations of all constituents in sample SEEP16-02 were less than the USEPA MCLs and RIDEM GA groundwater objectives with the exception of TCE and manganese. The following table presents a comparison of detected VOC concentrations to human health and ecological ambient water quality criteria.

Chemical	Maximum Detected Concentration (µg/L)	Human Health Ambient Water Quality Criteria[1] (µg/L)	Ecological Ambient Water Quality Criteria (µg/L)
Acetone	0.9 J	NA	1,500[2]
Cis-1,2-Dichloroethene	0.7	NA	2,240[3]
TCE	0.7	30	20[3]
Vinyl Chloride	0.5 J	24	NA

NA – Not available.
1 – National Recommended Water Quality Criteria (USEPA, 2004)
2 – Freshwater criteria (RIDEM, 2000)
3 - Freshwater values (Suter and Tsao, 1996)

The detected concentrations of all VOCs in all seep samples are less than their applicable ambient water quality criteria.

SVOCs, especially PAHs, were detected in both 28-SP-01 and SEEP16-01 at comparable levels. They were not analyzed at SEEP16-2 and OPW16-01 exhibited no detectable PAHs. Concentrations of naphthalene exceeded the USEPA Region 9 PRG at SEEP16-01 but not SEEP 16-02 presented in Table 4-35. Concentrations of dibenzofuran, fluoranthene, fluorene, and phenanthrene exceeded the ecological criteria, only, at 28-SP-01 and SEEP16-02. Concentrations of bis(2-ethylhexyl)phthalate exceeded the USEPA Region 9 PRGs, USEPA MCLs, and RIDEM GA groundwater objectives at OPW16-1; concentrations of di-n-octylphthalate exceeded the ecological criteria at that location.

Alpha-BHC was detected at SEEP16-01 and the concentration exceeded the USEPA Region 9 PRG. Dieldrin, endrin, and heptachlor epoxide were detected at 28-SP-01. Concentrations of dieldrin, and

heptachlor epoxide exceeded the PRGs while concentrations of dieldrin, endrin, and heptachlor epoxide exceeded the ecological criteria.

Concentrations of total and dissolved metals were generally comparable, although aluminum, arsenic, beryllium, and copper were not detected in unfiltered samples (total metals) and they were detected in the filtered samples (dissolved metals). When the dissolved metal concentrations exceeded total metal concentrations, it was because the dissolved metal concentrations were near detection limits where the relative analytical uncertainty is greatest. Sample 28-SP-01 was only analyzed for dissolved metals whereas SEEP16-01 was analyzed for total and dissolved metals. Concentrations of arsenic, iron, and lead exceeded the EPA Region 9 PRGs while concentrations of aluminum, barium, copper, iron, lead, and manganese exceeded the ecological criteria. Concentrations of lead exceeded the USEPA Region 9 PRGs, USEPA MCLs, and RIDEM GA groundwater objectives at OPW16-1 whereas concentrations of barium, copper, and lead exceeded the ecological criteria at that location. Chromium was not detected in any filtered samples but it was detected in four of the five unfiltered seep samples (Table 4-34), indicating that chromium is largely associated with particulates. Iron and manganese were detected at concentrations exceeding the ecological criteria.

Monitoring well 28-GW-07S is located upgradient from 28-SP-01, well MW16-03S is located upgradient from SEEP16-01, and well MW16-05S is located upgradient from SEEP16-02 (Figure 4-12). Table 4-36 presents a comparison of groundwater and seep analytical results for these samples. There is no apparent correlation between detected concentrations of chemicals in groundwater and those detected in the seep samples. Furthermore, the available data indicate that the impact from Site 16 to seep water is slight. Additionally, as noted in previous sections, metals and pesticides do not appear to be significant Site 16-related contaminants based on groundwater and soils data. Therefore, seep water is not discussed further.

4.5 SEDIMENT

4.5.1 Allen Harbor Sediments

Shoreline sediments have the potential to be contaminated from onshore and offshore sources. Because sediments are generally high in organic matter and they are situated at the surface water-land interface or at the bottom of surface water bodies, they present a particularly good accumulator of contaminants. Sources of sediment contamination include contamination from recreationers, boat traffic, docks, and other offshore surface water. Allen Harbor, however, is rather well protected so influence from open water is expected to be limited. The most likely offshore contaminants would be SVOCs and oils and, to a lesser extent, the less volatile VOCs. These contaminants originate from dock traffic, boat traffic in the harbor, indiscriminate dumping of wastes into the water, etc. Onshore contaminant sources include

overland runoff and groundwater seepage from Site 16 and nearby areas bordering Allen Harbor. The contaminants most likely to migrate offshore from land and to be present at detectable levels would be those contaminants that predominate at Site 16, i.e., chlorinated VOCs, petroleum hydrocarbons, creosote, and related chemicals. Similar contaminants could be contributed from non-operationally related contaminant sources such as roads or trash piles. Sediments collected from the shoreline are generally expected to exhibit more influence from inland contamination than sediments further offshore. Sediments offshore are expected to exhibit lesser concentrations than near shore sediments because offshore source contribution would be more dilute in those areas.

Two sediment samples (SED16-01 and SED16-02) were collected along the southern shore of Allen Harbor and one sediment sample (OPSED16-01) was collected adjacent to the outfall pipe that extends beneath Allen Harbor Road from the paved parking lot and discharges to Allen Harbor during the Phase I RI Investigation. Eighteen sediment samples and one sediment core were collected from Allen Harbor during the Phase II Screening Level Ecological Risk Assessment (EA, August 2004). One sediment sample was also collected from a storm catch basin located across Allen Harbor Road from location OPSED16-01. Nine sediment samples were collected from three reference areas; Prudence Coggeshall Cove, Little Allen Harbor, and Fishing Cove. Normal chemistry analyses were conducted on these sediments as well as forensic analyses designed to determine whether the observed contaminant concentrations are associated with Site 16. The results of the Phase II Screening Level Ecological Risk Assessment forensic study are summarized in Section 2.9 of this report. The detailed forensics report can be found in Appendix B of the Phase II Screening Level Ecological Risk Assessment report (EA, August 2004).

Tables 4-37 through 4-41 present the chemicals that were detected in the sediment samples and descriptive statistics are presented in Table 42. Tables 4-37 through 4-41 also identify chemicals with concentrations that exceed the screening criteria for sediments. A copy of the analytical database is presented in Appendix C. Figure 4-12 shows the spatial distribution of TCE and Total CVOCs. Figure 4-13 presents the spatial distribution of benzo(a)pyrene, total PAHs, and total carcinogenic PAHs (express in terms of benzo(a)pyrene equivalents, BAP EQ).

VOCs were detected infrequently in the sediment samples collected from along the shore to Allen Harbor and in Allen Harbor sediment. Acetone and carbon disulfide were detected in seep sediments on the shoreline. Acetone, 1,1-dichloroethene, 2-butanone, cis-1,2-dichloroethene, and trichloroethene were detected in sediment samples from Allen Harbor. Trichloroethene (2 µg/kg) and 1,1-dichloroethene (0.9 µg/kg) were only detected in one sediment sample (AH-47). Cis-1,2-dichloroethene ($C_{maximum}$ = 880 µg/kg, AH-47) was only detected in three samples. Sample AH-47 is located approximately 40 feet downgradient from SEEP16-02/SED16-02. TCE was the only VOC detected in seep sample SEEP16-02

(see Section 4.4). Acetone and carbon disulfide were the only VOCs detected in sediment sample SED16-02. The detection of cis-1,2,-dichloroethene at AH-47 is an indication that biodegradation of TCE occurs between SEEP16-02 and AH-47. Despite the apparent minor connection between Site 16 and seeps, the concentrations of all VOCs were below applicable human health and ecological screening criteria, therefore VOCs are not discussed further. Furthermore, the recent screening level ecological risk assessment forensic analysis found minimal to no impact to Allen Harbor sediments from Site 16 (EA, August 2004).

PAHs were detected in all sediment samples. Total PAH concentrations ranged from 0.382 µg/kg (SED16-02) to 28,142 µg/kg (AH-49). Concentrations of PAHs were overall higher in the sediment samples collected from Allen Harbor than the samples collected at the location of the seeps on the shoreline. This is an indication that a major contaminant source for shoreline sediments is from offshore sources, most likely boat traffic and organic preservatives used on docks. PAH concentrations were higher in sediment samples collected close to the shore of Allen Harbor as compared to PAH concentrations in samples collected away from the shoreline. This is an indication that onshore contamination is also contributing to the observed sediment concentrations. PAH concentrations were highest in samples collected near the outfall in the southeastern portion of Allen Harbor and near the docks. The outfall represents overland flow from parking areas, and hence, does not represent Site 16 chemical releases. Concentrations of PAHs exceeded both the human health and ecological screening criteria.

Aroclor-1260 was the only PCB detected in sediment samples. Aroclor-1260 was detected in 19 of 23 samples at concentrations ranging from 16 µg/kg (AH-45), located in the southern central shoreline of Allen Harbor) to 70 µg/kg (AH-23, located at the marina docks). Concentrations of Aroclor-1260 were highest in samples collected near the docks in Allen Harbor. Concentrations of Aroclor-1260 were below human health screening criteria but exceeded the ecological screening criteria. Therefore, the PCB contamination has not been completely delineated relative to ecological screening criteria. However, the spatial distribution patterns suggests that the PCBs have sources other than Site 16 and the PCBs evidently pose little risk to ecological receptors (EA, August 2004), so they are not discussed further. It is worth noting that PCBs were not Site 16-realted contaminants in soil, which would be a source of contamination in overland runoff. PCBs are also extremely insoluble in water, and therefore were not detected in, nor are expected to be transported in, groundwater.

Pesticides were detected sporadically and at low concentrations in sediment samples. Detected pesticide concentrations ranged from 0.45 J µg/kg (heptachlor, SED16-01, located in the southwest corner of Allen Harbor) to 8.1 µg/kg (dieldrin, AH-28, located on the eastern side of Allen Harbor, Figure 4-13). Some pesticides concentrations as high as 9.6 µg/kg were rejected (most rejected values were less than about

3 µg/kg). 4,4'-DDD (6 of 17 samples), 4,4'-DDE (7 of 17 samples), and alpha-chlordane (8 of 12 samples) were the most frequently detected pesticides. Other pesticides were detected in three or fewer samples. Concentrations of pesticides were less than the human health screening criteria but exceeded the ecological screening criteria. Therefore, pesticide contamination has not been completely delineated relative to ecological screening criteria, however, the low levels are indicative of a limited ecological impact. Site 16 or adjacent areas are likely to have been a contributor to the observed pesticide levels because use of these chemicals in Allen Harbor waters would be unusual. The observed low concentrations, however, would be consistent with widespread legal use of these chemicals followed by migration in overland runoff. There is no spatial pattern to suggest otherwise, therefore, pesticides are not discussed further.

Metals were detected in all sediment samples. The highest metal concentrations were detected in the area around the docks (AH-17, AH-29, and AH-32). This indicates that the docks (and related boat traffic) are probably the primary contributors of the contamination. Concentrations of metals in samples collected in the vicinity of the seeps (SED16-01 and SED16-02, locations shown on Figure 4-13) were not significantly different from samples collected in Allen Harbor. Concentrations of metals in the site sediment samples were greater than those collected from the reference area (Tables 3-38 to 3-40). This is discussed further in Section 4.5.2. Concentrations of arsenic, beryllium, chromium, iron, lead, manganese, and vanadium exceeded the human health screening criteria for soil. Concentrations of arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, vanadium, and zinc exceeded the ecological screening criteria for sediment. Because the sediments appear not to have received a significant from Site 16 (EA, August 2004), metals are not discussed further.

The most prevalent observed chemicals in sediments were the metals and PAHs. The forensic study (EA, August 2004) conducted to determine the source of contamination in sediments concluded that historical activities at Site 16 have not impacted the sediment in Allen Harbor. Elevated PAH concentrations in the vicinity of AH-47 were attributed to drainage from Allens Harbor Road, and the elevated PAH concentrations in sediment samples collected from the dock areas are evidently the result of creosote leaching from the dock pilings. Metals were also discounted as Site 16-related contaminants. Therefore, the major contribution to sediments is not site 16-related. This conclusion is consistent with the limited breadth and magnitude of detected concentrations in the Site 16 and Allen Harbor sediments.

In summary, the Allen Harbor sediment samples exhibited localized PAH impact and metal s from the dock pilings and roadway runoff. The available data does not indicate that the PAHs or metals detected in Allen Harbor sediments are associated with historical activities represented by the Site 16 source areas. The observed spatial contaminant distributions are consistent with this conclusion.

PCB and pesticide concentrations are not bounded relative to ecological screening criteria. However, the detected concentrations of these chemicals were generally low and these chemicals appear not to be related to Site 16 operations, or possibly related to the legal use of pesticides at Site 16 and adjacent areas. The need to further delineate the contamination relative to screening criteria is not viewed to be warranted.

4.5.2 Comparison to Reference Samples

Consistent with Navy policy (Navy, January 2004), three reference sites were sampled and analyzed for the same constituents as Allen Harbor. Three samples were collected from Prudence Coggeshall Cove (REF1), three samples were collected Little Allen Harbor (REF2), and three samples were collected from Fishing Cove (REF3). As discussed in the Phase II Screening Level Ecological Risk Assessment (EA, August 2004), Prudence Coggeshall Cove qualifies as a background area, Little Allen Harbor and Fishing Cove do not. Although Coggeshall Cove qualifies as a background area it is not physically similar to Allen Harbor. Coggeshall Cove is more representative of open Narragansett Bay while Allen Harbor has a restricted hydrodynamic flux. The bottom in Little Allen Harbor was very rocky making collection of samples difficult. Fishing Cove is very shallow and exposed during low tide with minimal boat traffic. Tables 4-38 to 4-40 presents the analytical results for the three reference areas. Overall concentrations of all chemicals were lower in the reference samples than in samples from Allen Harbor. VOCs (TCE, 2-butanone, and carbon disulfide) were detected at low concentrations in the samples from Coggeshall Cove (REF1). PAHs and inorganics were detected in samples for all three reference areas at concentrations lower than those from Allen Harbor. The higher concentrations of PAHs in Allen Harbor are attributed to Allen Harbor functioning as a sediment trap due to limited flow into and out of Narragansett Bay. The concentrations of PAHs detected in Allen Harbor sediments reflect input from several sources such as roads and marinas.

4.5.3 Storm Catch Basin Sediments

One sediment sample (SOURCE4-1) was collected from the storm catch basin located across from Allens Harbor Road (Figure 4-12) which discharges into the southeast corner of Allen Harbor and was analyzed for PAHs. Table 4-41 presents the analytical results for this sample. Total PAHs were detected at a concentration of 6,796 µg/kg, which is at the lower end of the range of PAHs detected in Allen Harbor sediments. This sample was also submitted for environmental forensics analysis. The hydrocarbon signatures of chemicals in this sample matched those in samples (AH-49 and AH-28) from Allen Harbor which were located close to the drains from Allens Harbor Road. This indicates that runoff from the road and parking lot are contributing the sediment contamination in Allen Harbor. These contaminants tend to accumulate over time, so the apparent impact increases with time. At some point in time, the sediment

concentrations may no longer increase and a steady state is established whereby the additional contamination from the runoff no longer contributes to increased sediment contaminant concentrations because an equal amount of contamination is constantly being degraded or washing away.

4.6 SUMMARY

Soil

Soil samples were collected during the EBS Phase II Investigation (EA, February 1998), EBS Phase II Follow-on Investigation (EA, March 1998), EBS Phase II Follow-On Addendum Investigations (EA, May 1998), Phase I RI (EA, August 2004), Phase II RI (EA, June 2004), Supplemental Phase II Investigation (EA, April 2004), and HRC Injection Study (EA, July 2004). The nature and extent of soil contamination are summarized below.

Delineation of soil contamination is partially completed relative to RIDEM soil direct contact criteria (surface and subsurface soils) and ecological criteria (surface soils only) for SVOCs and VOCs in the following areas:

- creosote dip tank spill area
- the vicinity of SB16-28
- former FFTA
- vicinity of SB16-41

One area of significant SVOC (especially PAH) contamination extends over an approximate rectangle or ellipse southwest of 28-SB-01A to the northeast, near 28-SB-06. The width of the area is unknown but appears to be less than about 70 feet; the long axis extends approximately 100 feet from 28-SB-01A. Most of the contamination is in the southwestern half of this rectangular or elliptical area. The vertical extent of contamination is at least four feet in the southwestern half of the rectangle but it is probably less than 10 feet deep in this area.

Another significant area of SVOC contamination is found within a circle of radius equal to approximately 30 feet, centered on 16SB-28. The contamination is vertically bounded within about 36 feet of ground surface but additional investigation would be likely to show that the contamination extends much less deeply than 36 feet bgs.

The third contaminated area of significance is the former FFTA, represented by a circle on Figure 4-4. The contaminated area extends somewhat outside this circle to the southeast, near 28-SB-10. The

vertical extent of contamination is evidently limited to surface soils. Most of the contamination in this area appears to be within the FFTA circle on Figure 4-4.

There may be more small sources of contamination scattered throughout the north central portion of Site 16 but, based on site history and available data, they would expected to be of much less significance than those already discussed.

The available data indicate that the SVOC and VOC contamination is not present as DNAPL or LNAPL unless there are very small ganglia of free phase organics that would be virtually impossible to find. The data further indicate that all or the majority of VOC and SVOC contamination is sorbed to soil and bedrock or present as dissolved phase in soil moisture or bedrock groundwater.

Additional delineation in lateral directions for VOCs and SVOCs will likely be necessary to support an FS. Delineation in vertical directions for these chemicals will not be as important except for protection of groundwater from soil contaminant migration. The VOC data are indicative of old spills that migrated deeper into soils over time as DNAPL and dissolved phase CVOCs. In addition, observed BTEX contamination is residual evidence of one or more past releases of gasoline or related spills, although the extent and importance of those spills is subordinate to the CVOC contamination.

The maximum detected concentration for most metals detected in surface soil and shallow subsurface soil occurred in samples collect at SB16-28 which is located in an area where a fuel oil-like odor was noted during the MIP screening activity (MIP16-07) conducted during stage 1 of the Phase I RI. This is also where significant VOC and SVOC contamination was detected, indicating that the metal contamination could be related to site operations. Metal concentrations were generally higher in shallow subsurface soil samples than in surface soil or deep subsurface soil samples. Aside from these observations, there is no discernable concentration pattern for metals in soil. Disregarding location SB16-28, observed metal concentrations appear to be generally consistent with native metal concentrations but no background soil data set is available to confirm this. Collection of background soil data would help to provide perspective on the observed metal concentrations and would be likely to indicate that most observed metal concentrations are consistent with native concentrations, except, perhaps at location SB16-28.

Whereas pesticides, dioxins, and furans were detected in Site 16 soils, they were detected in generally low concentrations and were patchily distributed. Dioxins were an exception, with an area of evidently elevated concentration near the former FFTA where structures were deliberately burned (dioxins are frequently formed during combustion if a source of chlorine is also available). Because these chemicals were detected sporadically and at low concentrations relative to, but not necessarily less than, screening

levels, pesticides, dioxins, and furans are not considered to be important site-related contaminants and are not discussed further for soils.

Groundwater

Analytical data collected during the Supplemental Phase II Hydrogeologic Investigation (EA, April 2004) and HRC Injection Pilot Study (EA, July 2004) were used to define the vertical and horizontal extent of VOC and metals contamination at Site 16. Analytical data collected from the investigations performed prior to 2004 were mainly used to demonstrate initial indications of temporal tends at Site 16 and to evaluate the SVOC and pesticide/PCB chemical profile for the groundwater. The results of the groundwater sampling are summarized below:

- VOCs were detected in all five groundwater zones. TCE was the major VOC detected in groundwater. In most instances TCE comprised more than 95 percent of the total CVOCs detected.

- Concentrations of total CVOCs were highest in the deep overburden and shallow bedrock groundwater zones.

- There was no distinct contaminant groundwater plume in intermediate groundwater zone but rather small pockets of elevated total CVOC and TCE concentrations and multiply smaller overlapping contaminant plumes. There was a distinct contaminant groundwater plume in the deep overburden and shallow bedrock groundwater zones. As shown on Figure 4-11 the plume extents from the northeastern portion of former Building 41 to Allen Harbor in the vicinity of monitor well MW16-05.

- SVOCs and pesticides were detected infrequently and at low concentrations in groundwater samples for all zones.

- Inorganics were detected in groundwater samples from the all zone. Concentrations of inorganics vary across the study area with no distinct areas of elevated concentrations.

- In the shallow overburden groundwater zone the TCE contamination appears to be bounded relative to the EPA MCL and RIDEM GA groundwater objectives except to the east of MW16-23S. Also there is an area of vinyl chloride contamination located outside of the area of TCE contamination. The area of vinyl chloride contamination is defined by monitoring wells located between Davisville Road and the former fire fighting area (MW16-40S, -41S, -42S, and -44S). The vinyl chloride contamination in this area appears to be bounded relative to the EPA MCL and RIDEM GA groundwater objectives.

- In the intermediate overburden groundwater zone TCE contamination appears to be bounded to the southwest, west, and northwest. TCE contamination does not appear to be bounded on the northwest in the vicinity of MW16-45I, north near MW16-05I, southeast near MW16-18I, and east near MW16-39I and MW16-57I. Also there is a region of elevated PCE concentrations in the vicinity of MW16-33I between former Building 41 and Building 318 which does not appear to be bounded relative to the EPA MCL and RIDEM GA groundwater objectives.

- In the deep overburden groundwater zone contamination appears to be bounded to the southwest, west, and northwest. Contamination does not appear to be bounded on north near MW16-04D and MW16-05D. However, these wells area located just south of Allen Harbor.

- In the shallow bedrock groundwater zone contamination appears to be bounded to the south, west, and east. Contamination does not appear to be bounded on north near MW16-05R. As noted above, this well is located just south of Allen Harbor.

Seeps

One seep sample (28-SP-01) was collected along the southwestern shore of Allen Harbor during the Phase II EBS Follow-on Investigation. Two seeps (SEEP16-01 and SEEP16-02) and one outfall pipe (OPW16-01) were sampled during the Phase I RI Investigation. The results of the seep sampling are summarized below:

- VOCs were not detected in sample 28-SP-01 while vinyl chloride was detected at a concentration of 0.5 µg/L in sample SEEP16-01.

- PAHs were detected in samples from both 28-SP-01 and SEEP16-01 at comparable levels.

- Trichloroethene (0.7 µg/L) and cis-1,2-dichloroethene (0.7 µg/L) were the only organics detected in SEEP16-02.

- Acetone, several PAHs, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, and several inorganics were detected in sample OPW16-01.

- Monitoring well 28-GW-07S is located upgradient from 28-SP-01, well MW16-03S is located upgradient from SEEP16-01, and well MW16-05S is located upgradient from SEEP16-02 (Figure 4-12). There is no apparent correlation between detected concentrations of chemicals in groundwater and those detected in the seep samples. Concentrations of PAHs and metals are higher

in the seep samples than the associated groundwater samples. The seep samples were not filtered and it is likely that the higher concentrations detected in the seep samples are associated with particulates in the samples.

Sediments

Two sediment samples (SED16-01 and SED16-02) were collected along the southern shore of Allen Harbor and one sediment sample (OPSED16-01) was collected adjacent to the outfall pipe that extends beneath Allen Harbor Road from the paved parking lot and discharges to Allen Harbor during the Phase I RI Investigation. Eighteen sediment samples and one sediment core were collected from Allen Harbor during the Phase II Screening Level Ecological Risk Assessment (EA, August 2004). Also one sediment sample was collected from a storm catch basin located across Allen Harbor Road from OPSED16-01. In addition, nine sediment samples were collected from three reference areas; Prudence Coggeshall Cove, Little Allen Harbor, and Fishing Cove. The results of the sediment sampling are summarized below:

- VOCs were detected infrequently in the sediment samples collected from along the shore to Allen Harbor and in Allen Harbor sediment. Trichloroethene (2 µg/kg) and 1,1-dichloroethene (0.9 µg/kg) were only detected in one sediment sample (AH-47). Cis-1,2-dichloroethene ($C_{maximum}$= 880 µg/kg, AH-47) was only detected in three samples. Sample AH-47 is located approximately 40 feet downgradient from SEEP16-02/SED16-02. TCE was the only VOC detected in the seep sample SEEP16-02. Acetone and carbon disulfide were the only VOCs detected in sediment sample SED16-02.

- PAHs were detected in all sediment samples. Total PAH concentrations ranged from 0.382 µg/kg (SED16-02) to 28,142 µg/kg (AH-49). PAH concentrations were highest in samples collected near the outfall in the southeastern portion of Allen Harbor and near the docks.

- The concentrations of PAHs detected in Allen Harbor sediments reflect input from several sources such as roads and marinas. The available data does not indicate that the PAHs detected in Allen Harbor sediments are associated with historical activities represented by the Site 16 source areas.

- A limited forensic study was performed as part of the Phase II Screening Level Ecological Risk Assessment (EA, 2004). The study concluded that historical activities at Site 16 have not impacted the sediment in Allen Harbor, elevated PAH concentrations in the vicinity of AH-47 were attributed to drainage from Allens Harbor Road, and the elevated PAH concentrations in sediment samples collected from the dock areas are the result of creosote leaching from the dock pilings.

- Aroclor-1260 was the only PCB detected in sediment samples. Aroclor-1260 was detected in 19 of 23 samples at concentrations ranging from 16 µg/kg (AH-45) to 70 µg/kg (AH-23). Concentrations of Aroclor-1260 were highest in samples collected near the docks in Allen Harbor.

- Inorganics were detected in all sediment samples. There is no discernable concentration pattern for inorganics in sediments, although the highest inorganic concentrations were detected in the area around the docks (AH-17, AH-29, and AH-32).

- One sediment sample (SOURCE4-1) was collected from the storm catch basin located across from Allens Harbor Road (Figure 4-11) which discharges into the southeast corner of Allen Harbor and analyzed for PAHs. Total PAHs were detected at a concentration of 6,796 µg/kg, which is at the lower end of the range of PAHs detected in Allen Harbor sediments. The hydrocarbon signatures of chemicals in this sample matched those in samples (AH-49 and AH-28) from Allen Harbor which were located close to the drains from Allens Harbor Road. This indicates that runoff from the road and parking lot is impacting the sediments in Allen Harbor.

TABLE 4-1
SCREENING CRITERIA FOR DIRECT CONTACT WITH SOIL/SEDIMENT
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA Region 9 Preliminary Remediation Goal[1]		RIDEM Direct Contact Criteria[2]		U.S. EPA Soil Screening Levels[3] Soil to Air		Ecological Screening Criteria
			Residential	Industrial	Residential	Industrial	Residential	Industrial	
Dioxins/Furans									
3268-87-9	1,2,3,4,6,7,8,9-OCDD	NG/KG	39000 C[4]	160000 C[4]	NA	NA	430000 C[4]	800000 C[4]	NA
39001-02-0	1,2,3,4,6,7,8,9-OCDF	NG/KG	39000 C[4]	160000 C[4]	NA	NA	430000 C[4]	800000 C[4]	NA
35822-46-9	1,2,3,4,6,7,8-HPCDD	NG/KG	390 C[4]	1600 C[4]	NA	NA	4300 C[4]	8000 C[4]	NA
67562-39-4	1,2,3,4,6,7,8-HPCDF	NG/KG	390 C[4]	1600 C[4]	NA	NA	4300 C[4]	8000 C[4]	NA
55673-89-7	1,2,3,4,7,8,9-HPCDF	NG/KG	390 C[4]	1600 C[4]	NA	NA	4300 C[4]	8000 C[4]	NA
39227-28-6	1,2,3,4,7,8-HXCDD	NG/KG	39 C[4]	160 C[4]	NA	NA	430 C[4]	800 C[4]	NA
70648-26-9	1,2,3,4,7,8-HXCDF	NG/KG	39 C[4]	160 C[4]	NA	NA	430 C[4]	800 C[4]	NA
57653-85-7	1,2,3,6,7,8-HXCDD	NG/KG	39 C[4]	160 C[4]	NA	NA	430 C[4]	800 C[4]	NA
57117-44-9	1,2,3,6,7,8-HXCDF	NG/KG	39 C[4]	160 C[4]	NA	NA	430 C[4]	800 C[4]	NA
19408-74-3	1,2,3,7,8,9-HXCDD	NG/KG	39 C[4]	160 C[4]	NA	NA	430 C[4]	800 C[4]	NA
72918-21-9	1,2,3,7,8,9-HXCDF	NG/KG	39 C[4]	160 C[4]	NA	NA	430 C[4]	800 C[4]	NA
40321-76-4	1,2,3,7,8-PECDD	NG/KG	3.9 C[4]	16 C[4]	NA	NA	43 C[4]	80 C[4]	NA
57117-41-6	1,2,3,7,8-PECDF	NG/KG	78 C[4]	320 C[4]	NA	NA	860 C[4]	1600 C[4]	NA
60851-34-5	2,3,4,6,7,8-HXCDF	NG/KG	39 C[4]	160 C[4]	NA	NA	430 C[4]	800 C[4]	NA
57117-31-4	2,3,4,7,8-PECDF	NG/KG	7.8 C[4]	32 C[4]	NA	NA	86 C[4]	160 C[4]	NA
1746-01-6	2,3,7,8-TCDD	NG/KG	3.9 C	16 C	NA	NA	43 C	80 C	NA
51207-31-9	2,3,7,8-TCDF	NG/KG	39 C[4]	160 C[4]	NA	NA	430 C[4]	800 C[4]	NA
	2,3,7,8-TCDD Equivalents	NG/KG	3.9 C[4]	16 C[4]	NA	NA	43 C[4]	80 C[4]	NA
37871-00-4	TOTAL HPCDD		NA	NA	NA	NA	NA	NA	NA
38998-75-3	TOTAL HPCDF		NA	NA	NA	NA	NA	NA	NA
34465-46-8	TOTAL HXCDD		NA	NA	NA	NA	NA	NA	NA
55684-94-1	TOTAL HXCDF		NA	NA	NA	NA	NA	NA	NA
36088-22-9	TOTAL PECDD		NA	NA	NA	NA	NA	NA	NA
30402-15-4	TOTAL PECDF		NA	NA	NA	NA	NA	NA	NA
41903-57-5	TOTAL TCDD		NA	NA	NA	NA	NA	NA	NA
55722-27-5	TOTAL TCDF		NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds									
79-00-5	1,1,2-TRICHLOROETHANE	UG/KG	730 C	1600 C	3600	100000	980 C	1800 C	400 [23]
75-34-3	1,1-DICHLOROETHANE	UG/KG	510000 N	1700000 N	920000	10000000	1300000 N	1700000 sat	NA
75-35-4	1,1-DICHLOROETHENE	UG/KG	120000 N	410000 N	200	9500	300000 N	460000 N	NA
107-06-2	1,2-DICHLOROETHANE	UG/KG	280 C	600 C	900	63000	360 C	680 C	NA
106-46-7	1,4-DICHLOROBENZENE	UG/KG	3400 C	7900 C	27000	240000	11000000 N	17000000 N	NA
78-93-3	2-BUTANONE	UG/KG	22000000 N	110000000 N	10000000	10000000	24000000 sat	24000000 sat	NA
591-78-6	2-HEXANONE		NA	NA	NA	NA	NA	NA	NA
108-10-1	4-METHYL-2-PENTANONE	UG/KG	5300000 N	47000000 N	1200000	10000000	2700000 sat	2700000 sat	NA
67-64-1	ACETONE	UG/KG	14000000 N	54000000 N	7800000	10000000	NA	NA	NA
71-43-2	BENZENE	UG/KG	640 C	1400 C	2500	200000	840 C	1600 C	5000 [22]
75-27-4	BROMODICHLOROMETHANE	UG/KG	820 C	1800 C	10000	92000	NA	NA	NA
TTNUS143	BTEX		NA	NA	NA	NA	NA	NA	NA
75-15-0	CARBON DISULFIDE	UG/KG	360000 N	720000 sat	NA	NA	720000 sat	720000 sat	NA
124-48-1	CHLORODIBROMOMETHANE	UG/KG	1100 C	2600 C	7600	68000	480 C	890 C	NA

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NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA Region 9 Preliminary Remediation Goal[1]		RIDEM Direct Contact Criteria[2]		U.S. EPA Soil Screening Levels[3] Soil to Air		Ecological Screening Criteria
			Residential	Industrial	Residential	Industrial	Residential	Industrial	
75-00-3	CHLOROETHANE	UG/KG	3000 C	6500 C	NA	NA	1200000 sat	1200000 sat	NA
67-66-3	CHLOROFORM	UG/KG	220 C	470 C	1200	940000	280 C	520 C	20 [23]
74-87-3	CHLOROMETHANE	UG/KG	47000 N	160000 N	NA	NA	2100 C	3900 C	NA
156-59-2	CIS-1,2-DICHLOROETHENE	UG/KG	43000 N	150000 N	630000	10000000	NA	NA	200 [23]
74-84-0	ETHANE		NA	NA	NA	NA	NA	NA	NA
74-85-1	ETHENE		NA	NA	NA	NA	NA	NA	NA
100-41-4	ETHYLBENZENE	UG/KG	400000 sat	400000 sat	71000	10000000	400000 sat	400000 sat	1200 [22]
TTNUS054	M+P-XYLENES	UG/KG	270000 N[5]	420000 sat[5]	NA	NA	NA	NA	1000 [22]
74-82-8	METHANE		NA	NA	NA	NA	NA	NA	NA
75-09-2	METHYLENE CHLORIDE	UG/KG	9100 C	21000 C	45000	760000	13000 C	24000 C	400 [23]
95-47-6	O-XYLENE	UG/KG	270000 N[5]	420000 sat[5]	NA	NA	NA	NA	1000 [22]
100-42-5	STYRENE	UG/KG	1700000 sat	1700000 sat	13000	190000	1500000 sat	1500000 sat	300000 [20]
127-18-4	TETRACHLOROETHENE	UG/KG	480 C	1300 C	12000	110000	11000 C	20000 C	NA
108-88-3	TOLUENE	UG/KG	520000 sat	520000 sat	190000	10000000	650000 sat	650000 sat	200000 [20]
540-59-0	TOTAL 1,2-DICHLOROETHENE	UG/KG	43000 N[6]	150000 N[6]	630000	10000000	NA	NA	200 [23]
CALC028	TOTAL CHLORINATED VOCS		NA	NA	NA	NA	NA	NA	NA
1330-20-7	TOTAL XYLENES	UG/KG	270000 N	420000 sat	110000	10000000	710000 N[5]	1100000 N[5]	1000 [22]
156-60-5	TRANS-1,2-DICHLOROETHENE	UG/KG	69000 N	230000 N	1100000	10000000	NA	NA	200 [23]
79-01-6	TRICHLOROETHENE	UG/KG	53 C	110 C	13000	520000	71 C	130 C	3000 [22]
75-01-4	VINYL CHLORIDE	UG/KG	79 C[7]	750 C[7]	20	3000	280 C	530 C	10 [23]
Semivolatile Organic Compounds									
106-46-7	1,4-DICHLOROBENZENE	UG/KG	3400 C	7900 C	27000	240000	11000000 N	17000000 N	NA
95-95-4	2,4,5-TRICHLOROPHENOL	UG/KG	6100000 N	62000000 N	330000	10000000	NA	NA	NA
118-79-6	2,4,6-TRIBROMOPHENOL		NA	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-TRICHLOROPHENOL	UG/KG	6100 N	62000 N	58000	520000	200000 C	370000 C	NA
105-67-9	2,4-DIMETHYLPHENOL	UG/KG	1200000 N	12000000 N	1400000	10000000	NA	NA	NA
606-20-2	2,6-DINITROTOLUENE	UG/KG	61000 N	620000 N	NA	NA	NA	NA	NA
91-57-6	2-METHYLNAPHTHALENE	UG/KG	56000 N[8]	190000 N[8]	123000	10000000	NA	NA	600 [8,22]
95-48-7	2-METHYLPHENOL	UG/KG	3100000 N	31000000 N	NA	NA	NA	NA	NA
101-55-3	4-BROMOPHENYL PHENYL ETHER		NA	NA	NA	NA	NA	NA	NA
106-47-8	4-CHLOROANILINE	UG/KG	240000 N	2500000 N	310000	8200000	NA	NA	NA
7005-72-3	4-CHLOROPHENYL PHENYL ETHER		NA	NA	NA	NA	NA	NA	NA
106-44-5	4-METHYLPHENOL	UG/KG	310000 N	3100000 N	NA	NA	NA	NA	NA
83-32-9	ACENAPHTHENE	UG/KG	3700000 N	29000000 N	43000	10000000	NA	NA	20000 [20]
208-96-8	ACENAPHTHYLENE	UG/KG	3700000 N[9]	29000000 N[9]	23000	10000000	NA	NA	700 [22,24]
120-12-7	ANTHRACENE	UG/KG	22000000 N	100000000 Max	35000	10000000	NA	NA	700 [22,24]
56-55-3	BENZO(A)ANTHRACENE	UG/KG	620 C	2100 C	900	7800	NA	NA	700 [22,24]
50-32-8	BENZO(A)PYRENE	UG/KG	62 C	210 C	400	800	NA	NA	700 [22]
205-99-2	BENZO(B)FLUORANTHENE	UG/KG	620 C	2100 C	900	7800	NA	NA	700 [22,24]
191-24-2	BENZO(G,H,I)PERYLENE	UG/KG	2300000 N[10]	29000000 N[10]	800	10000000	NA	NA	700 [22,24]
207-08-9	BENZO(K)FLUORANTHENE	UG/KG	6200 C	21000 C	900	78000	NA	NA	700 [22,24]
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	35000 C	120000 C	46000	410000	NA	NA	100000 [20,25]

TABLE 4-1
SCREENING CRITERIA FOR DIRECT CONTACT WITH SOIL/SEDIMENT
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA Region 9 Preliminary Remediation Goal[1]		RIDEM Direct Contact Criteria[2]		U.S. EPA Soil Screening Levels[3] Soil to Air		Ecological Screening Criteria
			Residential	Industrial	Residential	Industrial	Residential	Industrial	
85-68-7	BUTYL BENZYL PHTHALATE	UG/KG	12000000 N	100000000 Max	NA	NA	NA	NA	NA
86-74-8	CARBAZOLE	UG/KG	24000 C	86000 C	NA	NA	NA	NA	NA
218-01-9	CHRYSENE	UG/KG	62000 C	210000 C	400	780000	NA	NA	700 [22,24]
53-70-3	DIBENZO(A,H)ANTHRACENE	UG/KG	62 C	210 C	400	800	NA	NA	700 [22,24]
132-64-9	DIBENZOFURAN	UG/KG	150000 N	1600000 N	NA	NA	NA	NA	NA
84-66-2	DIETHYL PHTHALATE	UG/KG	49000000 N	100000000 Max	340000	10000000	NA	NA	100000 [20]
84-74-2	DI-N-BUTYL PHTHALATE	UG/KG	6100000 N	62000000 N	NA	NA	NA	NA	200000 [20]
117-84-0	DI-N-OCTYL PHTHALATE	UG/KG	2400000 N	25000000 N	NA	NA	NA	NA	NA
206-44-0	FLUORANTHENE	UG/KG	2300000 N	22000000 N	20000	10000000	NA	NA	700 [22,24]
86-73-7	FLUORENE	UG/KG	2700000 N	26000000 N	28000	10000000	NA	NA	30000 [21]
118-74-1	HEXACHLOROBENZENE	UG/KG	300 C	1100 C	400	3600	960 C	1800 C	NA
193-39-5	INDENO(1,2,3-CD)PYRENE	UG/KG	620 C	2100 C	900	7800	NA	NA	700 [22,24]
91-20-3	NAPHTHALENE	UG/KG	56000 N	190000 N	54000	10000000	170000 N	270000 N	600 [22]
86-30-6	N-NITROSODIPHENYLAMINE	UG/KG	99000 C	350000 C	NA	NA	NA	NA	NA
85-01-8	PHENANTHRENE	UG/KG	2300000 N[10]	29000000 N[10]	40000	10000000	NA	NA	700 [22,24]
129-00-0	PYRENE	UG/KG	2300000 N	29000000 N	13000	10000000	NA	NA	700 [22,24]
	Total BaP Equivalents	UG/KG	62 C	210 C	400	800	NA	NA	NA
TTNUS072	TOTAL PAHS		NA	NA	NA	NA	NA	NA	NA
Pesticides/PCBs									
72-54-8	4,4'-DDD	UG/KG	2400 C	10000 C	NA	NA	NA	NA	12500 [22]
72-55-9	4,4'-DDE	UG/KG	1700 C	7000 C	NA	NA	NA	NA	12500 [22]
50-29-3	4,4'-DDT	UG/KG	1700 C	7000 C	NA	NA	750000 C	1400000 C	NA
319-84-6	ALPHA-BHC	UG/KG	90 C	360 C	NA	NA	760 C	1400 C	3 [23]
5103-71-9	ALPHA-CHLORDANE	UG/KG	1600 C[11]	6500 C[11]	NA	NA	72000 C[11]	120000 C[11]	NA
11096-82-5	AROCLOR-1260	UG/KG	220 C[12]	740 C[12]	NA	NA	NA	NA	40000 [20]
319-85-7	BETA-BHC	UG/KG	320 C	1300 C	NA	NA	6000 C	11000 C	NA
319-86-8	DELTA-BHC	UG/KG	90 C[13]	360 C[13]	NA	NA	NA	NA	NA
60-57-1	DIELDRIN	UG/KG	30 C	110 C	40	400	1100 C	2100 C	0.5 [23]
33213-65-9	ENDOSULFAN II	UG/KG	370000 N[14]	3700000 N[14]	NA	NA	NA	NA	0.01 [23]
1031-07-8	ENDOSULFAN SULFATE	UG/KG	370000 N[14]	3700000 N[14]	NA	NA	NA	NA	NA
72-20-8	ENDRIN	UG/KG	18000 N	180000 N	NA	NA	NA	NA	NA
7421-93-4	ENDRIN ALDEHYDE	UG/KG	18000 N[15]	180000 N[15]	NA	NA	NA	NA	0.04 [23,26]
53494-70-5	ENDRIN KETONE	UG/KG	18000 N[15]	180000 N[15]	NA	NA	NA	NA	NA
58-89-9	GAMMA-BHC (LINDANE)	UG/KG	440 C	1700 C	NA	NA	NA	NA	NA
5103-74-2	GAMMA-CHLORDANE	UG/KG	1600 C[11]	6500 C[11]	NA	NA	72000 C[11]	120000 C[11]	0.03 [23]
76-44-8	HEPTACHLOR	UG/KG	110 C	380 C	NA	NA	4200 C	7800 C	NA
1024-57-3	HEPTACHLOR EPOXIDE	UG/KG	53 C	190 C	NA	NA	4800 C	8900 C	NA
1336-36-3	TOTAL AROCLOR	UG/KG	220 C[12]	740 C[12]	10000	10000	NA	NA	40000 [20]
TTNUS094	TOTAL DDT		NA	NA	NA	NA	NA	NA	NA
TTNUS091	TOTAL PCB CONGENERS		NA	NA	NA	NA	NA	NA	NA
Inorganics									
7429-90-5	ALUMINUM	MG/KG	76000 N	100000 Max	NA	NA	6860000 N	10700000 N	50 [20]

TABLE 4-1
SCREENING CRITERIA FOR DIRECT CONTACT WITH SOIL/SEDIMENT
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA Region 9 Preliminary Remediation Goal[1]		RIDEM Direct Contact Criteria[2]		U.S. EPA Soil Screening Levels[3] Soil to Air		Ecological Screening Criteria
			Residential	Industrial	Residential	Industrial	Residential	Industrial	
7440-36-0	ANTIMONY	MG/KG	31 N	410 N	10	820	NA	NA	78 [19]
7440-38-2	ARSENIC	MG/KG	0.39 C	1.6 C	7	7	745 C	1390 C	18 [18]
7440-39-3	BARIUM	MG/KG	5400 N	67000 N	5500	10000	686000 N	1070000 N	330 [19]
7440-41-7	BERYLLIUM	MG/KG	150 N	1900 N	0.4	1.3	1330 C	2490 C	40 [19]
7440-43-9	CADMIUM	MG/KG	37 N	450 N	39	1000	1780 C	3320 C	32 [18]
7440-70-2	CALCIUM		NA	NA	NA	NA	NA	NA	NA
7440-47-3	CHROMIUM	MG/KG	30 C[16]	64 C[16]	1400	10000	267 C[16]	498 C[16]	0.4 [21]
7440-48-4	COBALT	MG/KG	900 C	1900 C	NA	NA	1140 C	2140 C	13 [18]
7440-50-8	COPPER	MG/KG	3100 N	41000 N	3100	10000	NA	NA	60 [21]
7439-89-6	IRON	MG/KG	23000 N	100000 Max	NA	NA	NA	NA	pH [18]
7439-92-1	LEAD	MG/KG	400	800	150	500	NA	NA	120 [18]
7439-95-4	MAGNESIUM		NA	NA	NA	NA	NA	NA	NA
7439-96-5	MANGANESE	MG/KG	1800 N	19000 N	390	10000	68600 N	107000 N	500 [20]
7439-97-6	MERCURY	MG/KG	23 N	310 N	23	610	2.9 sat	2.9 sat	0.1 [21]
7440-02-0	NICKEL	MG/KG	1600 N	20000 N	1000	10000	NA	NA	30 [20]
7440-09-7	POTASSIUM		NA	NA	NA	NA	NA	NA	NA
7782-49-2	SELENIUM	MG/KG	390 N	5100 N	390	10000	NA	NA	1 [20]
7440-22-4	SILVER	MG/KG	390 N	5100 N	200	10000	NA	NA	2 [20]
7440-23-5	SODIUM		NA	NA	NA	NA	NA	NA	NA
7440-28-0	THALLIUM	MG/KG	5.2 N	67 N	5.5	140	NA	NA	1 [20]
7440-62-2	VANADIUM	MG/KG	78 N	1000 N	550	10000	NA	NA	2 [20]
7440-66-6	ZINC	MG/KG	23000 N	100000 Max	6000	10000	NA	NA	50 [20]
Miscellaneous Compounds									
TTNUS001	TOTAL PETROLEUM HYDROCARBONS		NA	NA	500	2500	NA	NA	NA
57-12-5	CYANIDE	MG/KG	1200 N[17]	12000 N[17]	200	10000	NA	NA	NA

Footnotes:
1 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0]
2 - Rhode Island Department of Environmental Management (RIDEM), DEM-DSR-01-93, February 2004.
3 - U.S. EPA Soil Screening Levels. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.htm.
4 - Value is derived by multiplying criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
5 - Value is for total xylenes.
6 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
7 - Residential PRGs are based on CSF for lifetime exposures by a child/adult. Industrial PRG is based on CSF for exposures by an adult.
8 - The value for naphthalene was used as a surrogate for 2-methylnaphthalene.
9 - The value for acenaphthene was used as a surrogate for acenaphthylene.
10 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 - The value for chlordane was used as a surrogate for alpha- and gamma-chlordane.
12 - The value for Total PCB congeners (Aroclors) is presented.
13 - The value for alpha-BHC (lindane) has been used as a surrogate for delta BHC.
14 - The value for endosulfan have been used as surrogates for Endosulfan II and Endosulfan Sulfate.
15 - The value for endrin have been used as surrogates for endrin aldehyde and endrin ketone.

TABLE 4-1
SCREENING CRITERIA FOR DIRECT CONTACT WITH SOIL/SEDIMENT
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA Region 9 Preliminary Remediation Goal[1]		RIDEM Direct Contact Criteria[2]		U.S. EPA Soil Screening Levels[3] Soil to Air		Ecological Screening Criteria
			Residential	Industrial	Residential	Industrial	Residential	Industrial	

16 - The values for chromium VI are presented.
17 - The values for free cyanide are presented.
18 - Ecological Soil Screening Level - Plant (USEPA, 2003)
19 - Ecological Soil Screening Level - Invertebrate (USEPA, 2003)
20 - Oak Ridge National Laboratory - Plant (Efroymson, 1997a)
21 - Oak Ridge National Laboratory - Invertebrate (Efroymson, 1997b)
22 - Canadian Soil Quality Guidelines (CCME, 1997)
23 - Dutch Target Value (MHSPE, 2000)
24 - Benzo(a)pyrene is used as a surrogate.
25 - Diethylphthalate is used as a surrogate.
26 - Endrin is used as a surrogate.

Qualifiers:
C - Carcinogen.
N - Noncarcinogen.
Max - Ceiling limit.
sat - Soil satuation concentration.

Acronyms:
CSF = Cancer Slope Factor
HI = Hazard Index
NA = No criteria available.
PAH = Polyaromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
U.S. EPA = United States Environmental Protection Agency

TABLE 4-2
SCREENING CRITERIA FOR MIGRATION OF CONTAMINANTS FROM SOIL TO GROUNDWATER
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA SSLs[1] Soil to Groundwater	RIDEM GA Leachability Criteria[2]
Dioxins/Furans				
3268-87-9	1,2,3,4,6,7,8,9-OCDD	NG/KG	56000 [3]	NA
39001-02-0	1,2,3,4,6,7,8,9-OCDF	NG/KG	56000 [3]	NA
35822-46-9	1,2,3,4,6,7,8-HPCDD	NG/KG	560 [3]	NA
67562-39-4	1,2,3,4,6,7,8-HPCDF	NG/KG	560 [3]	NA
55673-89-7	1,2,3,4,7,8,9-HPCDF	NG/KG	560 [3]	NA
39227-28-6	1,2,3,4,7,8-HXCDD	NG/KG	56 [3]	NA
70648-26-9	1,2,3,4,7,8-HXCDF	NG/KG	56 [3]	NA
57653-85-7	1,2,3,6,7,8-HXCDD	NG/KG	56 [3]	NA
57117-44-9	1,2,3,6,7,8-HXCDF	NG/KG	56 [3]	NA
19408-74-3	1,2,3,7,8,9-HXCDD	NG/KG	56 [3]	NA
72918-21-9	1,2,3,7,8,9-HXCDF	NG/KG	56 [3]	NA
40321-76-4	1,2,3,7,8-PECDD	NG/KG	5.6 [3]	NA
57117-41-6	1,2,3,7,8-PECDF	NG/KG	112 [3]	NA
60851-34-5	2,3,4,6,7,8-HXCDF	NG/KG	56 [3]	NA
57117-31-4	2,3,4,7,8-PECDF	NG/KG	11.2 [3]	NA
1746-01-6	2,3,7,8-TCDD	NG/KG	5.6 MCL	NA
51207-31-9	2,3,7,8-TCDF	NG/KG	56 C	NA
	2,3,7,8-TCDD Equivalents	NG/KG	5.6 [3]	NA
37871-00-4	TOTAL HPCDD		NA	NA
38998-75-3	TOTAL HPCDF		NA	NA
34465-46-8	TOTAL HXCDD		NA	NA
55684-94-1	TOTAL HXCDF		NA	NA
36088-22-9	TOTAL PECDD		NA	NA
30402-15-4	TOTAL PECDF		NA	NA
41903-57-5	TOTAL TCDD		NA	NA
55722-27-5	TOTAL TCDF		NA	NA
Volatile Organic Compounds				
79-00-5	1,1,2-TRICHLOROETHANE	UG/KG	18 MCLG	100
75-34-3	1,1-DICHLOROETHANE	UG/KG	41000 N	NA
75-35-4	1,1-DICHLOROETHENE	UG/KG	58 MCLG	700
107-06-2	1,2-DICHLOROETHANE	UG/KG	24 MCL	100
106-46-7	1,4-DICHLOROBENZENE	UG/KG	2200 MCLG	NA
78-93-3	2-BUTANONE	UG/KG	89000 N	NA
591-78-6	2-HEXANONE		NA	NA
108-10-1	4-METHYL-2-PENTANONE	UG/KG	12000 N	NA
67-64-1	ACETONE	UG/KG	130000 N	NA
71-43-2	BENZENE	UG/KG	34 MCL	200
75-27-4	BROMODICHLOROMETHANE	UG/KG	630 MCL	NA
TTNUS143	BTEX		NA	NA
75-15-0	CARBON DISULFIDE	UG/KG	29000 N	NA
124-48-1	CHLORODIBROMOMETHANE	UG/KG	2000 C	NA

TABLE 4-2
SCREENING CRITERIA FOR MIGRATION OF CONTAMINANTS FROM SOIL TO GROUNDWATER
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA SSLs[1] Soil to Groundwater	RIDEM GA Leachability Criteria[2]
75-00-3	CHLOROETHANE	UG/KG	NA	NA
67-66-3	CHLOROFORM	UG/KG	590 MCL	NA
74-87-3	CHLOROMETHANE	UG/KG	40 N	NA
156-59-2	CIS-1,2-DICHLOROETHENE	UG/KG	400 MCLG	1700
74-84-0	ETHANE		NA	NA
74-85-1	ETHENE		NA	NA
100-41-4	ETHYLBENZENE	UG/KG	13000 MCLG	27000
TTNUS054	M+P-XYLENES	UG/KG	190000 MCL	NA
74-82-8	METHANE		NA	NA
75-09-2	METHYLENE CHLORIDE	UG/KG	23 MCL	NA
95-47-6	O-XYLENE	UG/KG	190000 MCL	NA
100-42-5	STYRENE	UG/KG	3500 MCLG	2900
127-18-4	TETRACHLOROETHENE	UG/KG	58 MCL	100
108-88-3	TOLUENE	UG/KG	12000 MCLG	32000
540-59-0	TOTAL 1,2-DICHLOROETHENE	UG/KG	NA	NA
CALC028	TOTAL CHLORINATED VOCS		NA	NA
1330-20-7	TOTAL XYLENES	UG/KG	140000 N	540000
156-60-5	TRANS-1,2-DICHLOROETHENE	UG/KG	680 MCLG	3300
79-01-6	TRICHLOROETHENE	UG/KG	57 C	200
75-01-4	VINYL CHLORIDE	UG/KG	13 MCL	300
Semivolatile Organic Compounds				
106-46-7	1,4-DICHLOROBENZENE	UG/KG	2200 MCLG	NA
95-95-4	2,4,5-TRICHLOROPHENOL	UG/KG	250000 N	NA
118-79-6	2,4,6-TRIBROMOPHENOL		NA	NA
88-06-2	2,4,6-TRICHLOROPHENOL	UG/KG	150 C	NA
105-67-9	2,4-DIMETHYLPHENOL	UG/KG	9000 N	NA
606-20-2	2,6-DINITROTOLUENE	UG/KG	0.85 N	NA
91-57-6	2-METHYLNAPHTHALENE	UG/KG	NA	NA
95-48-7	2-METHYLPHENOL	UG/KG	14000 N	NA
101-55-3	4-BROMOPHENYL PHENYL ETHER		NA	NA
106-47-8	4-CHLOROANILINE	UG/KG	970 N	NA
7005-72-3	4-CHLOROPHENYL PHENYL ETHER		NA	NA
106-44-5	4-METHYLPHENOL	UG/KG	1300 N	NA
83-32-9	ACENAPHTHENE	UG/KG	630000 N	NA
208-96-8	ACENAPHTHYLENE	UG/KG	NA	NA
120-12-7	ANTHRACENE	UG/KG	13000000 N	NA
56-55-3	BENZO(A)ANTHRACENE	UG/KG	3200 MCL	NA
50-32-8	BENZO(A)PYRENE	UG/KG	8200 MCL	240000
205-99-2	BENZO(B)FLUORANTHENE	UG/KG	9800 MCL	NA
191-24-2	BENZO(G,H,I)PERYLENE	UG/KG	NA	NA
207-08-9	BENZO(K)FLUORANTHENE	UG/KG	9800 MCL	NA
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	3600000 MCL	120000
85-68-7	BUTYL BENZYL PHTHALATE	UG/KG	17000000 N	NA
86-74-8	CARBAZOLE	UG/KG	590 C	NA

TABLE 4-2
SCREENING CRITERIA FOR MIGRATION OF CONTAMINANTS FROM SOIL TO GROUNDWATER
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA SSLs[1] Soil to Groundwater	RIDEM GA Leachability Criteria[2]
218-01-9	CHRYSENE	UG/KG	3200 MCL	NA
53-70-3	DIBENZO(A,H)ANTHRACENE	UG/KG	30000 MCL	NA
132-64-9	DIBENZOFURAN	UG/KG	48000 N	NA
84-66-2	DIETHYL PHTHALATE	UG/KG	450000 N	NA
84-74-2	DI-N-BUTYL PHTHALATE	UG/KG	5000000 N	NA
117-84-0	DI-N-OCTYL PHTHALATE	UG/KG	4900000000 N	NA
206-44-0	FLUORANTHENE	UG/KG	6300000 N	NA
86-73-7	FLUORENE	UG/KG	810000 N	NA
118-74-1	HEXACHLOROBENZENE	UG/KG	2200 MCL	NA
193-39-5	INDENO(1,2,3-CD)PYRENE	UG/KG	28000 MCL	NA
91-20-3	NAPHTHALENE	UG/KG	61000 N	800
86-30-6	N-NITROSODIPHENYLAMINE	UG/KG	4300 C	NA
85-01-8	PHENANTHRENE	UG/KG	NA	NA
129-00-0	PYRENE	UG/KG	4600000 N	NA
	Total BaP Equivalents	UG/KG	8200 MCL	240000
TTNUS072	TOTAL PAHS		NA	NA
Pesticides/PCBs				
72-54-8	4,4'-DDD	UG/KG	14000 C	NA
72-55-9	4,4'-DDE	UG/KG	45000 C	NA
50-29-3	4,4'-DDT	UG/KG	26000 C	NA
319-84-6	ALPHA-BHC	UG/KG	0.72 C	NA
5103-71-9	ALPHA-CHLORDANE	UG/KG	9600 MCL[4]	NA
11096-82-5	AROCLOR-1260	UG/KG	NA	NA
319-85-7	BETA-BHC	UG/KG	2.6 C	NA
319-86-8	DELTA-BHC	UG/KG	NA	NA
60-57-1	DIELDRIN	UG/KG	4.6 C	NA
33213-65-9	ENDOSULFAN II	UG/KG	20000 N[5]	NA
1031-07-8	ENDOSULFAN SULFATE	UG/KG	20000 N[5]	NA
72-20-8	ENDRIN	UG/KG	990 MCLG	NA
7421-93-4	ENDRIN ALDEHYDE	UG/KG	NA	NA
53494-70-5	ENDRIN KETONE	UG/KG	NA	NA
58-89-9	GAMMA-BHC (LINDANE)	UG/KG	9.4 MCLG	NA
5103-74-2	GAMMA-CHLORDANE	UG/KG	9600 MCL[4]	NA
76-44-8	HEPTACHLOR	UG/KG	23000 MCL	NA
1024-57-3	HEPTACHLOR EPOXIDE	UG/KG	670 MCL	NA
1336-36-3	TOTAL AROCLOR	UG/KG	NA	10000
TTNUS094	TOTAL DDT		NA	NA
TTNUS091	TOTAL PCB CONGENERS		NA	NA
Inorganics				
7429-90-5	ALUMINUM	MG/KG	170 N	NA
7440-36-0	ANTIMONY	MG/KG	5.4 MCLG	[7]
7440-38-2	ARSENIC	MG/KG	5.8 C	NA
7440-39-3	BARIUM	MG/KG	1600 MCLG	[7]

TABLE 4-2
SCREENING CRITERIA FOR MIGRATION OF CONTAMINANTS FROM SOIL TO GROUNDWATER
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA SSLs[1] Soil to Groundwater	RIDEM GA Leachability Criteria[2]
7440-41-7	BERYLLIUM	MG/KG	63 MCLG	[7]
7440-43-9	CADMIUM	MG/KG	7.5 MCLG	[7]
7440-70-2	CALCIUM		NA	NA
7440-47-3	CHROMIUM	MG/KG	42 N[6]	[7]
7440-48-4	COBALT	MG/KG	3.3 N	NA
7440-50-8	COPPER	MG/KG	11000 MCLG	NA
7439-89-6	IRON	MG/KG	NA	NA
7439-92-1	LEAD	MG/KG	NA	[7]
7439-95-4	MAGNESIUM		NA	NA
7439-96-5	MANGANESE	MG/KG	2200 N	NA
7439-97-6	MERCURY	MG/KG	2.1 MCLG	[7]
7440-02-0	NICKEL	MG/KG	280 N	[7]
7440-09-7	POTASSIUM		NA	NA
7782-49-2	SELENIUM	MG/KG	5.2 MCLG	[7]
7440-22-4	SILVER	MG/KG	31 N	NA
7440-23-5	SODIUM		NA	NA
7440-28-0	THALLIUM	MG/KG	1.1 N	[7]
7440-62-2	VANADIUM	MG/KG	5100 N	NA
7440-66-6	ZINC	MG/KG	14000 N	NA
Miscellaneous Compounds				
TTNUS001	TOTAL PETROLEUM HYDROCARBONS		NA	NA
57-12-5	CYANIDE	MG/KG	40 MCLG	2400

Footnotes:
1 - U.S. EPA Soil Screening Levels. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.htm.
2 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
3 - Value is derived by multiplying criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
4 - The value for chlordane was used as a surrogate for alpha- and gamma-chlordane.
5 - The value for endosulfan has been used as a surrogate for Endosulfan II and Endosulfan Sulfate.
6 - The value for chromium VI is presented.
7 - Leachability criteria for inorganics are based on SPLP/TCLP analysis.

Qualifiers:
C - Carcinogen.
N - Noncarcinogen.
MCL - Maximum Contaminant Level.
MCLG - Maximum Contaminant Level Goal.

TABLE 4-2
SCREENING CRITERIA FOR MIGRATION OF CONTAMINANTS FROM SOIL TO GROUNDWATER
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA SSLs[1] Soil to Groundwater	RIDEM GA Leachability Criteria[2]

Acronyms:
GA = Drinking water suitability
NA = No criteria available
PAH = Polyaromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SPLP = Synthetic Precipitate Leaching Procedure
SSL = Soil Screening Level
TCLP = Toxicity Characteristic Leaching Procedure
U.S. EPA = United States Environmental Protection Agency

TABLE 4-3
HUMAN HEALTH SCREENING CRITERIA FOR GROUNDWATER/SURFACE WATER/SEEPS
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA Region 9 PRG[1] Tap Water	U.S. EPA MCL[2]	RIDEM GA Groundwater Objective[3]
Volatile Organic Compounds					
79-00-5	1,1,2-TRICHLOROETHANE	UG/L	0.2 C	5	5
75-34-3	1,1-DICHLOROETHANE	UG/L	810 N	NA	NA
75-35-4	1,1-DICHLOROETHENE	UG/L	340 C	7	7
107-06-2	1,2-DICHLOROETHANE	UG/L	0.12 C	5	5
106-46-7	1,4-DICHLOROBENZENE	UG/L	0.5 C	75	75
78-93-3	2-BUTANONE	UG/L	7000 N	NA	NA
591-78-6	2-HEXANONE		NA	NA	NA
108-10-1	4-METHYL-2-PENTANONE	UG/L	2000 N	NA	NA
67-64-1	ACETONE	UG/L	5500 N	NA	NA
71-43-2	BENZENE	UG/L	0.35 C	5	5
75-27-4	BROMODICHLOROMETHANE	UG/L	0.18 C	80	NA
TTNUS143	BTEX		NA	NA	NA
75-15-0	CARBON DISULFIDE	UG/L	1000 N	NA	NA
124-48-1	CHLORODIBROMOMETHANE	UG/L	0.13 C	80	NA
75-00-3	CHLOROETHANE	UG/L	4.6 C	NA	NA
67-66-3	CHLOROFORM	UG/L	0.17 C	80	NA
74-87-3	CHLOROMETHANE	UG/L	160 N	NA	NA
156-59-2	CIS-1,2-DICHLOROETHENE	UG/L	61 N	70	70
74-84-0	ETHANE		NA	NA	NA
74-85-1	ETHENE		NA	NA	NA
100-41-4	ETHYLBENZENE	UG/L	1300 N	700	700
TTNUS054	M+P-XYLENES	UG/L	210 N[4]	10000[4]	10000[4]
74-82-8	METHANE		NA	NA	NA
75-09-2	METHYLENE CHLORIDE	UG/L	4.3 C	5	5
95-47-6	O-XYLENE	UG/L	210 N[4]	10000[4]	10000[4]
100-42-5	STYRENE	UG/L	1600 N	100	100
127-18-4	TETRACHLOROETHENE	UG/L	0.1 C	5	5
108-88-3	TOLUENE	UG/L	720 N	1000	1000
540-59-0	TOTAL 1,2-DICHLOROETHENE	UG/L	61 N[5]	NA	70
CALC028	TOTAL CHLORINATED VOCS		NA	NA	NA
1330-20-7	TOTAL XYLENES	UG/L	210 N	10000	10000
156-60-5	TRANS-1,2-DICHLOROETHENE	UG/L	120 N	100	100
79-01-6	TRICHLOROETHENE	UG/L	0.028 C	5	5
75-01-4	VINYL CHLORIDE	UG/L	0.02 C[6]	2	2
Semivolatile Organic Compounds					
106-46-7	1,4-DICHLOROBENZENE	UG/L	0.5 C	75	75
95-95-4	2,4,5-TRICHLOROPHENOL	UG/L	3600 N	NA	NA
118-79-6	2,4,6-TRIBROMOPHENOL		NA	NA	NA
88-06-2	2,4,6-TRICHLOROPHENOL	UG/L	3.6 N	NA	NA
105-67-9	2,4-DIMETHYLPHENOL	UG/L	730 N	NA	NA
606-20-2	2,6-DINITROTOLUENE	UG/L	36 N	NA	NA
91-57-6	2-METHYLNAPHTHALENE	UG/L	6.2 N[7]	NA	NA
95-48-7	2-METHYLPHENOL	UG/L	1800 N	NA	NA
101-55-3	4-BROMOPHENYL PHENYL ETHER		NA	NA	NA
106-47-8	4-CHLOROANILINE	UG/L	150 N	NA	NA
7005-72-3	4-CHLOROPHENYL PHENYL ETHER		NA	NA	NA
106-44-5	4-METHYLPHENOL	UG/L	180 N	NA	NA
83-32-9	ACENAPHTHENE	UG/L	370 N	NA	NA
208-96-8	ACENAPHTHYLENE	UG/L	370 N[8]	NA	NA
120-12-7	ANTHRACENE	UG/L	1800 N	NA	NA
56-55-3	BENZO(A)ANTHRACENE	UG/L	0.092 C	NA	NA

TABLE 4-3
HUMAN HEALTH SCREENING CRITERIA FOR GROUNDWATER/SURFACE WATER/SEEPS
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA Region 9 PRG[1] Tap Water	U.S. EPA MCL[2]	RIDEM GA Groundwater Objective[3]
50-32-8	BENZO(A)PYRENE	UG/L	0.0092 C	0.2	0.2
205-99-2	BENZO(B)FLUORANTHENE	UG/L	0.092 C	NA	NA
191-24-2	BENZO(G,H,I)PERYLENE	UG/L	180 N[9]	NA	NA
207-08-9	BENZO(K)FLUORANTHENE	UG/L	0.92 C	NA	NA
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	4.8 C	6	6
85-68-7	BUTYL BENZYL PHTHALATE	UG/L	7300 N	NA	NA
86-74-8	CARBAZOLE	UG/L	3.4 C	NA	NA
218-01-9	CHRYSENE	UG/L	9.2 C	NA	NA
53-70-3	DIBENZO(A,H)ANTHRACENE	UG/L	0.0092 C	NA	NA
132-64-9	DIBENZOFURAN	UG/L	12 N	NA	NA
84-66-2	DIETHYL PHTHALATE	UG/L	29000 N	NA	NA
84-74-2	DI-N-BUTYL PHTHALATE	UG/L	3600 N	NA	NA
117-84-0	DI-N-OCTYL PHTHALATE	UG/L	1500 N	NA	NA
206-44-0	FLUORANTHENE	UG/L	1500 N	NA	NA
86-73-7	FLUORENE	UG/L	240 N	NA	NA
118-74-1	HEXACHLOROBENZENE	UG/L	0.042 C	1	1
193-39-5	INDENO(1,2,3-CD)PYRENE	UG/L	0.092 C	NA	NA
91-20-3	NAPHTHALENE	UG/L	6.2 N	NA	20
86-30-6	N-NITROSODIPHENYLAMINE	UG/L	14 C	NA	NA
85-01-8	PHENANTHRENE	UG/L	180 N[9]	NA	NA
129-00-0	PYRENE	UG/L	180 N	NA	NA
	Total BaP Equivalents	UG/L	0.0092 C	0.2	0.2
TTNUS072	TOTAL PAHS		NA	NA	NA
Pesticides/PCBs					
72-54-8	4,4'-DDD	UG/L	0.28 C	NA	NA
72-55-9	4,4'-DDE	UG/L	0.2 C	NA	NA
50-29-3	4,4'-DDT	UG/L	0.2 C	NA	NA
319-84-6	ALPHA-BHC	UG/L	0.011 C	NA	NA
5103-71-9	ALPHA-CHLORDANE	UG/L	0.19 C[10]	2[10]	NA
11096-82-5	AROCLOR-1260	UG/L	0.034 C[11]	0.5[11]	NA
319-85-7	BETA-BHC	UG/L	0.037 C	NA	NA
319-86-8	DELTA-BHC	UG/L	0.011 C[12]	NA	NA
60-57-1	DIELDRIN	UG/L	0.0042 C	NA	NA
33213-65-9	ENDOSULFAN II	UG/L	220 N[13]	NA	NA
1031-07-8	ENDOSULFAN SULFATE	UG/L	220 N[13]	NA	NA
72-20-8	ENDRIN	UG/L	11 N	2	NA
7421-93-4	ENDRIN ALDEHYDE	UG/L	11 N[14]	NA	NA
53494-70-5	ENDRIN KETONE	UG/L	11 N[14]	NA	NA
58-89-9	GAMMA-BHC (LINDANE)	UG/L	0.052 C	0.2	NA
5103-74-2	GAMMA-CHLORDANE	UG/L	0.19 C[10]	2[10]	NA
76-44-8	HEPTACHLOR	UG/L	0.015 C	0.4	NA
1024-57-3	HEPTACHLOR EPOXIDE	UG/L	0.0074 C	0.2	NA
1336-36-3	TOTAL AROCLOR	UG/L	0.034 C[11]	0.5[11]	0.5
TTNUS094	TOTAL DDT		NA	NA	NA
TTNUS091	TOTAL PCB CONGENERS	UG/L	0.034 C[11]	0.5[11]	NA
Inorganics					
7429-90-5	ALUMINUM	UG/L	36000 N	NA	NA
7440-36-0	ANTIMONY	UG/L	15 N	6	6
7440-38-2	ARSENIC	UG/L	0.045 C	10	NA
7440-39-3	BARIUM	UG/L	2600 N	2000	2000
7440-41-7	BERYLLIUM	UG/L	73 N	4	4

TABLE 4-3
HUMAN HEALTH SCREENING CRITERIA FOR GROUNDWATER/SURFACE WATER/SEEPS
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA Region 9 PRG[1] Tap Water	U.S. EPA MCL[2]	RIDEM GA Groundwater Objective[3]
7440-43-9	CADMIUM	UG/L	18 N	5	5
7440-70-2	CALCIUM		NA	NA	NA
7440-47-3	CHROMIUM	UG/L	110 N[15]	100[15]	100
7440-48-4	COBALT	UG/L	730 N	NA	NA
7440-50-8	COPPER	UG/L	1500 N	1300[16]	NA
7439-89-6	IRON	UG/L	11000 N	NA	NA
7439-92-1	LEAD		NA	15[16]	15
7439-95-4	MAGNESIUM		NA	NA	NA
7439-96-5	MANGANESE	UG/L	880 N	NA	NA
7439-97-6	MERCURY	UG/L	11 N	2	2
7440-02-0	NICKEL	UG/L	730 N	NA	100
7440-09-7	POTASSIUM		NA	NA	NA
7782-49-2	SELENIUM	UG/L	180 N	50	50
7440-22-4	SILVER	UG/L	180 N	NA	NA
7440-23-5	SODIUM		NA	NA	NA
7440-28-0	THALLIUM	UG/L	2.4 N	2	2
7440-62-2	VANADIUM	UG/L	36 N	NA	NA
7440-66-6	ZINC	UG/L	11000 N	NA	NA
Miscellaneous Compounds					
57-12-5	CYANIDE	UG/L	730 N[17]	200	200
7783-06-4	HYDROGEN SULFIDE	MG/L	0.11 N	NA	NA
14797-55-8	NITRATE	MG/L	10 N	10	NA
14797-65-0	NITRITE	MG/L	1 N	1	NA

Footnotes:
1 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
2 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Winter 2004).
3 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
4 - Value is for total xylenes
5 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
6 - PRG is based on CSF for lifetime exposures by a child/adult.
7 - The value for napthalene is used as a surrogate for 2-methylnaphthalene.
8 - The value for acenaphthene is used as a surrogate for acenaphthylene.
9 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 - The value for chlordane is used as a surrogate for alpha- and gamma-chlordane.
11 - The value for Total PCB congeners (Aroclors) is presented.
12 - The value for alpha-BHC is used as a surrogate for delta BHC.
13 - The value for endosulfan is used as a surrogate for Endosulfan II and Endosulfan Sulfate.
14 - The value for endrin is used as a surrogate for endrin aldehyde and endrin ketone.
15 - The value for chromium VI is presented.
16 - The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.
17 - The value for free cyanide is presented.

Qualifiers:
C - Carcinogenic.
N - Noncarcinogenic.

TABLE 4-3
HUMAN HEALTH SCREENING CRITERIA FOR GROUNDWATER/SURFACE WATER/SEEPS
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Parameter	Units	U.S. EPA Region 9 PRG[1] Tap Water	U.S. EPA MCL[2]	RIDEM GA Groundwater Objective[3]

Acronyms:
GA = Drinking water suitability
MCL = Maximum Contaminant Level
NA = No criteria available
PAH = Polyaromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SDWA = Safe Drinking Water Act
U.S. EPA = United States Environmental Protection Agency

TABLE 4-4
ECOLOGICALSCREENING CRITERIA FOR SEEPS
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Chemical	Criteria	Source
Volatile Organics (ug/L)			
67-64-1	ACETONE	1500	3
156-59-2	CIS-1,2-DICHLOROETHENE	2240	2[1]
540-59-0	TOTAL 1,2-DICHLOROETHENE	2240	2[1]
	TOTAL CHLORINATED VOCS	NA	
79-01-6	TRICHLOROETHENE	20	2[1]
75-01-4	VINYL CHLORIDE	NA	
Semivolatile Organics (ug/L)			
91-57-6	2-METHYLNAPHTHALENE	3	2[1]
83-32-9	ACENAPHTHENE	71	2[2]
208-96-8	ACENAPHTHYLENE	3	2[1]
120-12-7	ANTHRACENE	3	2[1]
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	360	2
117-84-0	DI-N-OCTYL PHTHALATE	0.34	2[2]
132-64-9	DIBENZOFURAN	3.7	3
206-44-0	FLUORANTHENE	1.6	2[2]
86-73-7	FLUORENE	3	2[1]
91-20-3	NAPHTHALENE	23.5	2[1]
85-01-8	PHENANTHRENE	4.6	2
129-00-0	PYRENE	3	2[1]
	TOTAL PAHS	3	2[1]
Pesticides (ug/L)			
319-84-6	ALPHA-BHC	0.16	1[4]
60-57-1	DIELDRIN	0.0019	1
72-20-8	ENDRIN	0.0023	1
1024-57-3	HEPTACHLOR EPOXIDE	0.0036	1
Metals (ug/L)			
7429-90-5	ALUMINUM	87	1[3]
7440-38-2	ARSENIC	36	1
7440-39-3	BARIUM	4	3
7440-41-7	BERYLLIUM	0.53	2[2,3]
7440-70-2	CALCIUM	NA	
7440-47-3	CHROMIUM	50	1
7440-48-4	COBALT	23	3
7440-50-8	COPPER	3.1	1
7439-89-6	IRON	1000	1[3]
7439-92-1	LEAD	8.1	1
7439-95-4	MAGNESIUM	NA	
7439-96-5	MANGANESE	120	3
7439-97-6	MERCURY	0.94	1
7440-02-0	NICKEL	8.2	1
7440-09-7	POTASSIUM	NA	
7440-23-5	SODIUM	NA	
7440-62-2	VANADIUM	20	3
7440-66-6	ZINC	81	1

TABLE 4-4
ECOLOGICALSCREENING CRITERIA FOR SEEPS
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Chemical	Criteria	Source

Sources:
1 - Water Quality Criteria (USEPA, 2004)
2 - Saltwater values (Buchman, 1999)
3 - Freshwater values (Suter and Tsao, 1996)

Footnotes:
(1) Calculated by multplying the acute LOEL by 0.01 to estimate a chronic NOEL.
(2) Calculated by multplying the chronic LOEL by 0.1 to estimate a chronic NOEL.
(3) Freshwater value.
(4) Acute value for gamma-BHC multiplied by 0.1.

Acronyms:
LOEL = Lowest Observed Effect Level
NOEL = No Observed Effect Level
PAH = Polyaromatic Hydrocarbon
RI = Remedial Investigation
VOC = Volatile Organic Carbon

TABLE 4-5
ECOLOGICAL SCREENING CRITERIA FOR SEDIMENT
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Chemical	Criteria	Source
Volatile Organics (ug/kg)			
75-35-4	1,1-DICHLOROETHENE	NA	
78-93-3	2-BUTANONE	NA	
67-64-1	ACETONE	NA	
75-15-0	CARBON DISULFIDE	NA	
156-59-2	CIS-1,2-DICHLOROETHENE	NA	
540-59-0	TOTAL 1,2-DICHLOROETHENE	NA	
	TOTAL CHLORINATED VOCS	NA	
79-01-6	TRICHLOROETHENE	41	5
Semivolatile Organics (ug/kg)			
91-57-6	2-METHYLNAPHTHALENE	70	2
83-32-9	ACENAPHTHENE	16	2
208-96-8	ACENAPHTHYLENE	44	2
120-12-7	ANTHRACENE	85.3	2
	BAP EQUIVALENT	NA	
56-55-3	BENZO(A)ANTHRACENE	261	2
50-32-8	BENZO(A)PYRENE	430	2
205-99-2	BENZO(B)FLUORANTHENE	1800	5
191-24-2	BENZO(G,H,I)PERYLENE	670	5
207-08-9	BENZO(K)FLUORANTHENE	1800	5
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	182	3
218-01-9	CHRYSENE	384	2
117-84-0	DI-N-OCTYL PHTHALATE	61	5
53-70-3	DIBENZO(A,H)ANTHRACENE	63.4	2
132-64-9	DIBENZOFURAN	110	5
206-44-0	FLUORANTHENE	600	2
86-73-7	FLUORENE	19	2
	HIGH MOLECULAR WEIGHT PAHS	1700	2
193-39-5	INDENO(1,2,3-CD)PYRENE	600	5
	LOW MOLECULAR WEIGHT PAHS	552	2
91-20-3	NAPHTHALENE	160	2
85-01-8	PHENANTHRENE	240	2
129-00-0	PYRENE	665	2
	TOTAL PAHS	4022	2
Pesticides PCBs (ug/kg)			
72-54-8	4,4'-DDD	1.22	3
72-55-9	4,4'-DDE	2.2	2
50-29-3	4,4'-DDT	1.58	2
5103-71-9	ALPHA-CHLORDANE	2.26	3
11096-82-5	AROCLOR-1260	22.7	2(2)
319-86-8	DELTA-BHC	0.32	3(1)
60-57-1	DIELDRIN	280	1
1031-07-8	ENDOSULFAN SULFATE	5.4	6(4)
53494-70-5	ENDRIN KETONE	9.9	1
5103-74-2	GAMMA-CHLORDANE	2.26	3
76-44-8	HEPTACHLOR	0.3	5

TABLE 4-5
ECOLOGICAL SCREENING CRITERIA FOR SEDIMENT
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Chemical	Criteria	Source
1024-57-3	HEPTACHLOR EPOXIDE	0.3	5(3)
1336-36-3	TOTAL AROCLOR	22.7	2
	TOTAL DDT	1.58	2
	TOTAL PCB CONGENERS	22.7	2(2)
Inorganics (mg/kg)			
7429-90-5	ALUMINUM	18000	5
7440-36-0	ANTIMONY	2	4
7440-38-2	ARSENIC	8.2	2
7440-39-3	BARIUM	48	5
7440-41-7	BERYLLIUM	NA	
7440-43-9	CADMIUM	1.2	2
7440-70-2	CALCIUM	NA	
7440-47-3	CHROMIUM	81	2
7440-48-4	COBALT	10	5
7440-50-8	COPPER	34	2
7439-89-6	IRON	220000	5
7439-92-1	LEAD	46.7	2
7439-95-4	MAGNESIUM	NA	
7439-96-5	MANGANESE	260	5
7439-97-6	MERCURY	0.15	2
7440-02-0	NICKEL	20.9	2
7440-09-7	POTASSIUM	NA	
7782-49-2	SELENIUM	1	5
7440-22-4	SILVER	1	2
7440-23-5	SODIUM	NA	
7440-62-2	VANADIUM	57	5
7440-66-6	ZINC	150	2

Sources:
1 - Sediment Quality Benchmark for Dieldrin and Endrin (assume 1% total organic carbon) (USEPA, 1996)
2 - ER-L (Long et al., 1995)
3 - TEL (MacDonald, 1994)
4 - ER-L (Long and Morgan, 1991)
5 - AET (Buchman, 1999)
6 - SQB from Ecotox Thresholds (USEPA, 1996)

Footnotes:
(1) Gamma-BHC is used as a surrogate.
(2) Total PCBs is used as a surrogate.
(3) Heptachlor is used as a surrogate.
(4) Endosulfan is used as a surrogate.

TABLE 4-5
ECOLOGICAL SCREENING CRITERIA FOR SEDIMENT
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

CAS No.	Chemical	Criteria	Source

Acronyms:
AET = Apparent Effects Threshold
ER-L = Effects Range-Low
PAH = Polyaromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
RI = Remedial Investigation
SQB = Sediment Quality Benchmark
TEL = Threshold Effects Level

TABLE 4-6
BASEWIDE BACKGROUND CONCENTRATIONS IN GROUNDWATER
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Inorganics	Background Value (ug/L)
Aluminum	5315
Antimony	6
Arsenic	6.4
Barium	80.5
Beryllium	1.3
Cadmium	3
Calcium	13302
Chromium	214
Cobalt	24.9
Copper	25.8
Iron	25500
Lead	4.8
Magnesium	5126
Manganese	3292
Mercury	0.2 U
Nickel	154
Potassium	3843
Selenium	2.2
Silver	1
Sodium	12346
Thallium	4.1
Vanadium	24.4
Zinc	89.9

Source:

Table 7-4 from Stone & Websters Final Background Inorganics Groundwater Study Report, December 1996. The groundwater background values are based on the more conservative value of the 95% UCL and the maximum detected concentration.

Acronyms:

RI = Remedial Investigation

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-01 28SB-01-NSO-061797-00 NORMAL 6/17/1997 0 - 2	01 28-SB-01A 28SB-01A-NSO-042496-00 NORMAL 4/24/1996 0 - 2	01 28-SB-01B 28SB-01B-NSO-042496-00 NORMAL 4/24/1996 0 - 2	01 28-SB-01C 28SB-01C-NSO-042696-00 NORMAL 4/26/1996 0 - 2	01 28-SB-01D 28SB-01D-NSO-042696-00 NORMAL 4/26/1996 0 - 2
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8,9-HXCDF	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TEQ BIRD[1]	NA	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	11 U				
ACETONE	14000000	7800000	11 U				
BTEX[1]	NA	NA	0 U				
METHYLENE CHLORIDE	9100	45000	11 U				
TOLUENE	520000	190000	11 U				
TOTAL CHLORINATED VOCs[1]	NA	NA	0 U				
Semivolatile Organics (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000	350 U				
ACENAPHTHENE	3700000	43000	350 U				
ACENAPHTHYLENE	3700000	23000	350 U				
ANTHRACENE	22000000	35000	350 U				
BAP EQUIVALENT[1]	62	400	0 U				
BENZO(A)ANTHRACENE	620	900	350 U				
BENZO(A)PYRENE	62	400	350 U				
BENZO(B)FLUORANTHENE	620	900	350 U				
BENZO(G,H,I)PERYLENE	2300000	800	350 U				
BENZO(K)FLUORANTHENE	6200	900	350 U				
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	350 U				
CARBAZOLE	24000	NA	350 U				
CHRYSENE	62000	400	350 U				
DI-N-BUTYL PHTHALATE	6100000	NA	350 U				

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-01 28SB-01-NSO-061797-00 NORMAL 6/17/1997 0 - 2	01 28-SB-01A 28SB-01A-NSO-042496-00 NORMAL 4/24/1996 0 - 2	01 28-SB-01B 28SB-01B-NSO-042496-00 NORMAL 4/24/1996 0 - 2	01 28-SB-01C 28SB-01C-NSO-042696-00 NORMAL 4/26/1996 0 - 2	01 28-SB-01D 28SB-01D-NSO-042696-00 NORMAL 4/26/1996 0 - 2
DIBENZO(A,H)ANTHRACENE	62	400	350 U				
FLUORANTHENE	2300000	20000	350 U				
FLUORENE	2700000	28000	350 U				
INDENO(1,2,3-CD)PYRENE	620	900	350 U				
NAPHTHALENE	56000	54000	350 U				
PHENANTHRENE	2300000	40000	350 U				
PYRENE	2300000	13000	350 U				
TOTAL PAHS[1]	NA	NA	0 U				
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000					
ACENAPHTHENE	3700000	43000		420	2400 J	42 U	800 J
ACENAPHTHYLENE	3700000	23000		54 J	1600 UJ	74 U	1500 UJ
ANTHRACENE	22000000	35000		15	4600 J	5 J	300 J
BAP EQUIVALENT	62	400		96.9	477	5.45	1837
BENZO(A)ANTHRACENE	620	900		57	590 J	4	1100 J
BENZO(A)PYRENE	62	400		67	330 J	4 J	1400 J
BENZO(B)FLUORANTHENE	620	900		100	680 J	8	1800 J
BENZO(G,H,I)PERYLENE	2300000	800		87	280 J	3 J	700 J
BENZO(K)FLUORANTHENE	6200	900		39	300 J	3	820 J
CHRYSENE	62000	400		73	1500 J	15 J	1400 J
DIBENZO(A,H)ANTHRACENE	62	400		9	44 UJ	2 U	88 J
FLUORANTHENE	2300000	20000		73	2500 J	17 J	930 J
FLUORENE	2700000	28000		5 J	510 J	7 U	140 J
INDENO(1,2,3-CD)PYRENE	620	900		47	150 J	2 J	490 J
NAPHTHALENE	56000	54000		30 J	890 UJ	42 U	870 UJ
PHENANTHRENE	2300000	40000		30	900 J	6 J	280 J
PYRENE	2300000	13000		70	1700 J	13 J	2200 J
TOTAL PAHS	NA	NA		1176	16440	80	12448
Pesticides PCBs (ug/kg)							
4,4'-DDT	1700	NA					
ALPHA-BHC	90	NA					
AROCLOR-1260	220	NA					
GAMMA-CHLORDANE	1600	NA					
TOTAL AROCLOR[1]	220	10000					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
MERCURY	23	23					
NICKEL	1600	1000					
POTASSIUM	NA	NA					

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-01 28SB-01-NSO-061797-00 NORMAL 6/17/1997 0 - 2	01 28-SB-01A 28SB-01A-NSO-042496-00 NORMAL 4/24/1996 0 - 2	01 28-SB-01B 28SB-01B-NSO-042496-00 NORMAL 4/24/1996 0 - 2	01 28-SB-01C 28SB-01C-NSO-042696-00 NORMAL 4/26/1996 0 - 2	01 28-SB-01D 28SB-01D-NSO-042696-00 NORMAL 4/26/1996 0 - 2
SELENIUM	390	390					
SILVER	390	200					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
PH (S.U.)	NA	NA					
TOTAL INORGANIC CARBON (%)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA					
TOTAL RESIDUE (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA	368				

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-02 28SB-02-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-03 28SB-03-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-04 28SB-04-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-05 28SB-05-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-06 28SB-06-NSO-061797-00 NORMAL 6/17/1997 0 - 2	02 28-SB-07 28SB-07-NSO-061897-00 ORIG 6/18/1997 0 - 2
Dioxins (ng/kg)								
1,2,3,4,6,7,8,9-OCDD	39000	NA						
1,2,3,4,6,7,8,9-OCDF	39000	NA						
1,2,3,4,6,7,8-HPCDD	390	NA						
1,2,3,4,6,7,8-HPCDF	390	NA						
1,2,3,4,7,8,9-HPCDF	390	NA						
1,2,3,4,7,8-HXCDD	39	NA						
1,2,3,4,7,8-HXCDF	39	NA						
1,2,3,6,7,8-HXCDD	39	NA						
1,2,3,6,7,8-HXCDF	39	NA						
1,2,3,7,8,9-HXCDD	39	NA						
1,2,3,7,8,9-HXCDF	39	NA						
1,2,3,7,8-PECDD	3.9	NA						
1,2,3,7,8-PECDF	78	NA						
2,3,4,6,7,8-HXCDF	39	NA						
2,3,4,7,8-PECDF	7.8	NA						
2,3,7,8-TCDD	3.9	NA						
2,3,7,8-TCDF	39	NA						
TEQ[1]	3.9	NA						
TEQ BIRD[1]	NA	NA						
TOTAL HPCDD	NA	NA						
TOTAL HPCDF	NA	NA						
TOTAL HXCDD	NA	NA						
TOTAL HXCDF	NA	NA						
TOTAL PECDD	NA	NA						
TOTAL PECDF	NA	NA						
TOTAL TCDD	NA	NA						
TOTAL TCDF	NA	NA						
Volatile Organics (ug/kg)								
2-BUTANONE	22000000	10000000	11 U	10 U	11 U	10 U	10 U	11 U
ACETONE	14000000	7800000	11 U	1300 J	3700 J	3000 J	33	890 J
BTEX[1]	NA	NA	0 U	0 U	0 U	0 U	0 U	0 U
METHYLENE CHLORIDE	9100	45000	11 U	10 U	11 U	10 U	10 U	4 J
TOLUENE	520000	190000	11 U	10 U	11 U	10 U	10 UJ	11 U
TOTAL CHLORINATED VOCs[1]	NA	NA	0 U	0 U	0 U	0 U	0 U	4
Semivolatile Organics (ug/kg)								
2-METHYLNAPHTHALENE	56000	123000	350 U	330 U	350 U	340 U	340 U	350 U
ACENAPHTHENE	3700000	43000	350 U	330 U	350 U	340 U	62 J	350 U
ACENAPHTHYLENE	3700000	23000	350 U	330 U	350 U	340 U	340 U	350 U
ANTHRACENE	22000000	35000	350 U	330 U	350 U	340 U	87 J	39 J
BAP EQUIVALENT[1]	62	400	0 U	0 U	5.04	0 U	**550**	**325**
BENZO(A)ANTHRACENE	620	900	350 U	330 U	350 U	340 U	350	330 J
BENZO(A)PYRENE	62	400	350 U	330 U	350 U	340 U	**350**	**200 J**
BENZO(B)FLUORANTHENE	620	900	350 U	330 U	50 J	340 U	530	370
BENZO(G,H,I)PERYLENE	2300000	800	350 U	330 U	350 U	340 U	250 J	100 J
BENZO(K)FLUORANTHENE	6200	900	350 U	330 U	350 U	340 U	180 J	120 J
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	350 U	330 U	350 U	340 U	340 U	350 U
CARBAZOLE	24000	NA	350 U	330 U	350 U	340 U	66 J	350 U
CHRYSENE	62000	400	350 U	330 U	36 J	340 U	340 J	330 J
DI-N-BUTYL PHTHALATE	6100000	NA	350 U	330 U	350 U	56 J	49 J	37 J

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-02 28SB-02-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-03 28SB-03-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-04 28SB-04-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-05 28SB-05-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-06 28SB-06-NSO-061797-00 NORMAL 6/17/1997 0 - 2	02 28-SB-07 28SB-07-NSO-061897-00 ORIG 6/18/1997 0 - 2
DIBENZO(A,H)ANTHRACENE	62	400	350 U	330 U	350 U	340 U	84 J	41 J
FLUORANTHENE	2300000	20000	350 U	330 U	50 J	340 U	580	1200 J
FLUORENE	2700000	28000	350 U	330 U	350 U	340 U	62 J	350 U
INDENO(1,2,3-CD)PYRENE	620	900	350 U	330 U	350 U	340 U	260 J	120 J
NAPHTHALENE	56000	54000	350 U	330 U	350 U	340 U	340 U	350 U
PHENANTHRENE	2300000	40000	350 U	330 U	350 U	340 U	500	190 J
PYRENE	2300000	13000	350 U	330 U	44 J	340 U	490	930 J
TOTAL PAHS[1]	NA	NA	0 U	0 U	180	0 U	4125	3970
Polyaromatic Hydrocarbons (ug/kg)								
2-METHYLNAPHTHALENE	56000	123000						
ACENAPHTHENE	3700000	43000						
ACENAPHTHYLENE	3700000	23000						
ANTHRACENE	22000000	35000						
BAP EQUIVALENT	62	400						
BENZO(A)ANTHRACENE	620	900						
BENZO(A)PYRENE	62	400						
BENZO(B)FLUORANTHENE	620	900						
BENZO(G,H,I)PERYLENE	2300000	800						
BENZO(K)FLUORANTHENE	6200	900						
CHRYSENE	62000	400						
DIBENZO(A,H)ANTHRACENE	62	400						
FLUORANTHENE	2300000	20000						
FLUORENE	2700000	28000						
INDENO(1,2,3-CD)PYRENE	620	900						
NAPHTHALENE	56000	54000						
PHENANTHRENE	2300000	40000						
PYRENE	2300000	13000						
TOTAL PAHS	NA	NA						
Pesticides PCBs (ug/kg)								
4,4'-DDT	1700	NA						
ALPHA-BHC	90	NA						
AROCLOR-1260	220	NA						
GAMMA-CHLORDANE	1600	NA						
TOTAL AROCLOR[1]	220	10000						
Inorganics (mg/kg)								
ALUMINUM	76000	NA						
ARSENIC	0.39	7						
BARIUM	5400	5500						
BERYLLIUM	150	0.4						
CADMIUM	37	39						
CALCIUM	NA	NA						
CHROMIUM	30	1400						
COBALT	900	NA						
COPPER	3100	3100						
IRON	23000	NA						
LEAD	400	150						
MAGNESIUM	NA	NA						
MANGANESE	1800	390						
MERCURY	23	23						
NICKEL	1600	1000						
POTASSIUM	NA	NA						

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-02 28SB-02-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-03 28SB-03-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-04 28SB-04-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-05 28SB-05-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-06 28SB-06-NSO-061797-00 NORMAL 6/17/1997 0 - 2	02 28-SB-07 28SB-07-NSO-061897-00 ORIG 6/18/1997 0 - 2
SELENIUM	390	390						
SILVER	390	200						
SODIUM	NA	NA						
THALLIUM	5.2	5.5						
VANADIUM	78	550						
ZINC	23000	6000						
Miscellaneous Parameters (mg/kg)								
PH (S.U.)	NA	NA						
TOTAL INORGANIC CARBON (%)	NA	NA						
TOTAL ORGANIC CARBON	NA	NA						
TOTAL RESIDUE (%)	NA	NA						
Petroleum Hydrocarbons (mg/kg)								
TOTAL RECOVERABLE TPH	NA	NA	26 U	25 U	26 U	34	552	708

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-07 28SB-07-NSO-061897-00-D DUP 6/18/1997 0 - 2	02 28-SB-08 28SB-08-NSO-061897-00 ORIG 6/18/1997 0 - 2	02 28-SB-08 28SB-08-NSO-061897-00-D DUP 6/18/1997 0 - 2	02 28-SB-09 28SB-09-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-10 28SB-10-NSO-061997-00 NORMAL 6/19/1997 0 - 2
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8,9-HXCDF	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TEQ BIRD[1]	NA	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	10 U	11 U	11 U	11 U	11 U
ACETONE	14000000	7800000	880 J	27 J	22	63 J	11 U
BTEX[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
METHYLENE CHLORIDE	9100	45000	10 U	11 U	11 U	11 U	11 U
TOLUENE	520000	190000	10 U	11 U	11 U	11 U	11 U
TOTAL CHLORINATED VOCs[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
Semivolatile Organics (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000	340 U	350 U	350 U	360 U	350 U
ACENAPHTHENE	3700000	43000	340 U	350 UJ	350 U	360 U	350 U
ACENAPHTHYLENE	3700000	23000	340 U	350 U	350 U	360 U	350 U
ANTHRACENE	22000000	35000	340 U	350 U	350 U	360 U	350 U
BAP EQUIVALENT[1]	62	400	355	0 U	496	0 U	0 U
BENZO(A)ANTHRACENE	620	900	200 J	350 U	200 J	360 U	350 U
BENZO(A)PYRENE	62	400	230 J	350 U	310 J	360 U	350 U
BENZO(B)FLUORANTHENE	620	900	330 J	350 U	450	360 U	350 U
BENZO(G,H,I)PERYLENE	2300000	800	170 J	350 U	290 J	360 U	350 U
BENZO(K)FLUORANTHENE	6200	900	120 J	350 U	150 J	360 U	350 U
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	340 U	350 U	37 J	360 U	36 J
CARBAZOLE	24000	NA	340 U	350 U	350 U	360 U	350 U
CHRYSENE	62000	400	240 J	350 U	250 J	360 U	350 U
DI-N-BUTYL PHTHALATE	6100000	NA	55 J	350 U	350 U	40 J	350 U

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-07 28SB-07-NSO-061897-00-D DUP 6/18/1997 0 - 2	02 28-SB-08 28SB-08-NSO-061897-00 ORIG 6/18/1997 0 - 2	02 28-SB-08 28SB-08-NSO-061897-00-D DUP 6/18/1997 0 - 2	02 28-SB-09 28SB-09-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-10 28SB-10-NSO-061997-00 NORMAL 6/19/1997 0 - 2
DIBENZO(A,H)ANTHRACENE	62	400	54 J	350 U	94 J	360 U	350 U
FLUORANTHENE	2300000	20000	450 J	350 U	330 J	360 U	350 U
FLUORENE	2700000	28000	340 U	350 U	350 U	360 U	350 U
INDENO(1,2,3-CD)PYRENE	620	900	170 J	350 U	250 J	360 U	350 U
NAPHTHALENE	56000	54000	340 U	350 U	350 U	360 U	350 U
PHENANTHRENE	2300000	40000	210 J	350 U	160 J	360 U	350 U
PYRENE	2300000	13000	330 J	350 UJ	320 J	360 U	38 J
TOTAL PAHS[1]	NA	NA	2504	0 U	2804	0 U	38
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000					
ACENAPHTHENE	3700000	43000					
ACENAPHTHYLENE	3700000	23000					
ANTHRACENE	22000000	35000					
BAP EQUIVALENT	62	400					
BENZO(A)ANTHRACENE	620	900					
BENZO(A)PYRENE	62	400					
BENZO(B)FLUORANTHENE	620	900					
BENZO(G,H,I)PERYLENE	2300000	800					
BENZO(K)FLUORANTHENE	6200	900					
CHRYSENE	62000	400					
DIBENZO(A,H)ANTHRACENE	62	400					
FLUORANTHENE	2300000	20000					
FLUORENE	2700000	28000					
INDENO(1,2,3-CD)PYRENE	620	900					
NAPHTHALENE	56000	54000					
PHENANTHRENE	2300000	40000					
PYRENE	2300000	13000					
TOTAL PAHS	NA	NA					
Pesticides PCBs (ug/kg)							
4,4'-DDT	1700	NA					
ALPHA-BHC	90	NA					
AROCLOR-1260	220	NA					
GAMMA-CHLORDANE	1600	NA					
TOTAL AROCLOR[1]	220	10000					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
MERCURY	23	23					
NICKEL	1600	1000					
POTASSIUM	NA	NA					

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-07 28SB-07-NSO-061897-00-D DUP 6/18/1997 0 - 2	02 28-SB-08 28SB-08-NSO-061897-00 ORIG 6/18/1997 0 - 2	02 28-SB-08 28SB-08-NSO-061897-00-D DUP 6/18/1997 0 - 2	02 28-SB-09 28SB-09-NSO-061897-00 NORMAL 6/18/1997 0 - 2	02 28-SB-10 28SB-10-NSO-061997-00 NORMAL 6/19/1997 0 - 2
SELENIUM	390	390					
SILVER	390	200					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
PH (S.U.)	NA	NA					
TOTAL INORGANIC CARBON (%)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA					
TOTAL RESIDUE (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA	176 J	1640 J	94	1750	26 U

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-11 28SB-11-NSO-061997-00 NORMAL 6/19/1997 0 - 2	02 28-SB-12 28SB-12-NSO-061997-00 NORMAL 6/19/1997 0 - 2	02 28-SB-13 28SB-13-NSO-061997-00 NORMAL 6/19/1997 0 - 2	02 28-SB-14 28SB-14-NSO-062097-00 ORIG 6/20/1997 0 - 2	02 28-SB-14 28SB-14-NSO-062097-00-D DUP 6/20/1997 0 - 2
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8,9-HXCDF	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TEQ BIRD[1]	NA	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	11 U	11 U	13 U	11 U	11 U
ACETONE	14000000	7800000	11 U	11 U	13 U	11 U	11 U
BTEX[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
METHYLENE CHLORIDE	9100	45000	11 U	11 U	13 U	11 U	11 U
TOLUENE	520000	190000	11 U	11 U	13 U	11 U	11 U
TOTAL CHLORINATED VOCs[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
Semivolatile Organics (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000	350 U	360 U	440 U	350 U	360 U
ACENAPHTHENE	3700000	43000	350 U	360 U	440 U	350 U	360 U
ACENAPHTHYLENE	3700000	23000	350 U	360 U	440 U	350 U	360 U
ANTHRACENE	22000000	35000	350 U	360 U	440 U	350 U	360 U
BAP EQUIVALENT[1]	62	400	5.64	45.5	0 U	**143**	3.9
BENZO(A)ANTHRACENE	620	900	350 U	360 U	440 U	100 J	360 U
BENZO(A)PYRENE	62	400	350 U	40 J	440 U	**110 J**	360 U
BENZO(B)FLUORANTHENE	620	900	56 J	55 J	440 U	150 J	39 J
BENZO(G,H,I)PERYLENE	2300000	800	350 U	360 U	440 U	73 J	360 U
BENZO(K)FLUORANTHENE	6200	900	350 U	360 U	440 U	45 J	360 U
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	350 U	360 U	440 U	350 U	360 U
CARBAZOLE	24000	NA	350 U	360 U	440 U	350 U	360 U
CHRYSENE	62000	400	41 J	360 U	440 U	110 J	360 U
DI-N-BUTYL PHTHALATE	6100000	NA	350 U	360 U	440 U	350 U	360 U

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-11 28SB-11-NSO-061997-00 NORMAL 6/19/1997 0 - 2	02 28-SB-12 28SB-12-NSO-061997-00 NORMAL 6/19/1997 0 - 2	02 28-SB-13 28SB-13-NSO-061997-00 NORMAL 6/19/1997 0 - 2	02 28-SB-14 28SB-14-NSO-062097-00 ORIG 6/20/1997 0 - 2	02 28-SB-14 28SB-14-NSO-062097-00-D DUP 6/20/1997 0 - 2
DIBENZO(A,H)ANTHRACENE	62	400	350 U	360 U	440 U	350 U	360 U
FLUORANTHENE	2300000	20000	55 J	360 U	440 U	150 J	51 J
FLUORENE	2700000	28000	350 U	360 U	440 U	350 U	360 U
INDENO(1,2,3-CD)PYRENE	620	900	350 U	360 U	440 U	70 J	360 U
NAPHTHALENE	56000	54000	350 U	360 U	440 U	350 U	360 U
PHENANTHRENE	2300000	40000	350 U	360 U	440 U	63 J	360 U
PYRENE	2300000	13000	68 J	360 U	440 U	190 J	50 J
TOTAL PAHS[1]	NA	NA	220	95	0 U	1061	140
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000					
ACENAPHTHENE	3700000	43000					
ACENAPHTHYLENE	3700000	23000					
ANTHRACENE	22000000	35000					
BAP EQUIVALENT	62	400					
BENZO(A)ANTHRACENE	620	900					
BENZO(A)PYRENE	62	400					
BENZO(B)FLUORANTHENE	620	900					
BENZO(G,H,I)PERYLENE	2300000	800					
BENZO(K)FLUORANTHENE	6200	900					
CHRYSENE	62000	400					
DIBENZO(A,H)ANTHRACENE	62	400					
FLUORANTHENE	2300000	20000					
FLUORENE	2700000	28000					
INDENO(1,2,3-CD)PYRENE	620	900					
NAPHTHALENE	56000	54000					
PHENANTHRENE	2300000	40000					
PYRENE	2300000	13000					
TOTAL PAHS	NA	NA					
Pesticides PCBs (ug/kg)							
4,4'-DDT	1700	NA					
ALPHA-BHC	90	NA					
AROCLOR-1260	220	NA					
GAMMA-CHLORDANE	1600	NA					
TOTAL AROCLOR[1]	220	10000					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
MERCURY	23	23					
NICKEL	1600	1000					
POTASSIUM	NA	NA					

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-11 28SB-11-NSO-061997-00 NORMAL 6/19/1997 0 - 2	02 28-SB-12 28SB-12-NSO-061997-00 NORMAL 6/19/1997 0 - 2	02 28-SB-13 28SB-13-NSO-061997-00 NORMAL 6/19/1997 0 - 2	02 28-SB-14 28SB-14-NSO-062097-00 ORIG 6/20/1997 0 - 2	02 28-SB-14 28SB-14-NSO-062097-00-D DUP 6/20/1997 0 - 2
SELENIUM	390	390					
SILVER	390	200					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
PH (S.U.)	NA	NA					
TOTAL INORGANIC CARBON (%)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA					
TOTAL RESIDUE (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA	644	35	33 U	32 J	27 UJ

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-15 28SB-15-NSO-062397-00 NORMAL 6/23/1997 0 - 2	02 28-SB-16 28SB-16-NSO-062497-00 NORMAL 6/24/1997 0 - 2	03 28-SS-21 28SB-21-NSO-101398-00 NORMAL 10/13/1998 0 - 2	02 28-SS-01 28SS-01-NSO-070197-00 NORMAL 7/1/1997 0 - 2	01 EBS85-SB01 EBS85-SB01-050196-00 NORMAL 5/1/1996 0 - 2
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8,9-HXCDF	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TEQ BIRD[1]	NA	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	10 U	10 U	4 U	10 U	55 J
ACETONE	14000000	7800000	10 U	10 U	3 U	10 U	63
BTEX[1]	NA	NA	6	0 U	0 U	0 U	36
METHYLENE CHLORIDE	9100	45000	10 U	10 U	1 U	10 U	11 U
TOLUENE	520000	190000	6 J	10 U	1 U	10 U	36
TOTAL CHLORINATED VOCs[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
Semivolatile Organics (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000	340 U	340 U	56 U		
ACENAPHTHENE	3700000	43000	340 U	340 U	57 U		
ACENAPHTHYLENE	3700000	23000	340 U	340 U	54 U		
ANTHRACENE	22000000	35000	340 U	340 U	51 U		
BAP EQUIVALENT[1]	62	400	79	0 U	90.1		
BENZO(A)ANTHRACENE	620	900	59 J	340 U	70		
BENZO(A)PYRENE	62	400	58 J	340 U	70		
BENZO(B)FLUORANTHENE	620	900	100 J	340 U	130		
BENZO(G,H,I)PERYLENE	2300000	800	48 J	340 U	96 U		
BENZO(K)FLUORANTHENE	6200	900	340 U	340 U	66 U		
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	340 U	340 U	130 U		
CARBAZOLE	24000	NA	340 U	340 U	69 U		
CHRYSENE	62000	400	66 J	340 U	96		
DI-N-BUTYL PHTHALATE	6100000	NA	43 J	44 J	93 U		

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-15 28SB-15-NSO-062397-00 NORMAL 6/23/1997 0 - 2	02 28-SB-16 28SB-16-NSO-062497-00 NORMAL 6/24/1997 0 - 2	03 28-SS-21 28SB-21-NSO-101398-00 NORMAL 10/13/1998 0 - 2	02 28-SS-01 28SS-01-NSO-070197-00 NORMAL 7/1/1997 0 - 2	01 EBS85-SB01 EBS85-SB01-050196-00 NORMAL 5/1/1996 0 - 2
DIBENZO(A,H)ANTHRACENE	62	400	340 U	340 U	77 U		
FLUORANTHENE	2300000	20000	82 J	340 U	160		
FLUORENE	2700000	28000	340 U	340 U	64 U		
INDENO(1,2,3-CD)PYRENE	620	900	50 J	340 U	89 U		
NAPHTHALENE	56000	54000	340 U	340 U	95 U		
PHENANTHRENE	2300000	40000	340 U	340 U	74		
PYRENE	2300000	13000	86 J	340 U	140		
TOTAL PAHS[1]	NA	NA	549	0 U	740		
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000					
ACENAPHTHENE	3700000	43000					
ACENAPHTHYLENE	3700000	23000					
ANTHRACENE	22000000	35000					
BAP EQUIVALENT	62	400					
BENZO(A)ANTHRACENE	620	900					
BENZO(A)PYRENE	62	400					
BENZO(B)FLUORANTHENE	620	900					
BENZO(G,H,I)PERYLENE	2300000	800					
BENZO(K)FLUORANTHENE	6200	900					
CHRYSENE	62000	400					
DIBENZO(A,H)ANTHRACENE	62	400					
FLUORANTHENE	2300000	20000					
FLUORENE	2700000	28000					
INDENO(1,2,3-CD)PYRENE	620	900					
NAPHTHALENE	56000	54000					
PHENANTHRENE	2300000	40000					
PYRENE	2300000	13000					
TOTAL PAHS	NA	NA					
Pesticides PCBs (ug/kg)							
4,4'-DDT	1700	NA			3.6 U		
ALPHA-BHC	90	NA			1.9 U		
AROCLOR-1260	220	NA			36 U		
GAMMA-CHLORDANE	1600	NA			1.9 U		
TOTAL AROCLOR[1]	220	10000			36 U		
Inorganics (mg/kg)							
ALUMINUM	76000	NA			4300		
ARSENIC	0.39	7			2.2		
BARIUM	5400	5500			19.4 J		
BERYLLIUM	150	0.4			0.38 J		
CADMIUM	37	39			0.07 U		
CALCIUM	NA	NA			419 J		
CHROMIUM	30	1400			5.5		
COBALT	900	NA			4.2 J		
COPPER	3100	3100			18.5		
IRON	23000	NA			9740		
LEAD	400	150			58.6		
MAGNESIUM	NA	NA			1200		
MANGANESE	1800	390			167 J		
MERCURY	23	23			0.05 U		
NICKEL	1600	1000			7.3 J		
POTASSIUM	NA	NA			599 J		

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-15 28SB-15-NSO-062397-00 NORMAL 6/23/1997 0 - 2	02 28-SB-16 28SB-16-NSO-062497-00 NORMAL 6/24/1997 0 - 2	03 28-SS-21 28SB-21-NSO-101398-00 NORMAL 10/13/1998 0 - 2	02 28-SS-01 28SS-01-NSO-070197-00 NORMAL 7/1/1997 0 - 2	01 EBS85-SB01 EBS85-SB01-050196-00 NORMAL 5/1/1996 0 - 2
SELENIUM	390	390			0.45 U		
SILVER	390	200			0.2 U		
SODIUM	NA	NA			75.8 J		
THALLIUM	5.2	5.5			0.25 U		
VANADIUM	78	550			7.5 J		
ZINC	23000	6000			39.6		
Miscellaneous Parameters (mg/kg)							
PH (S.U.)	NA	NA					
TOTAL INORGANIC CARBON (%)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA					
TOTAL RESIDUE (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA	55	28		119	

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 SB16-21 SB16-21-NSO-062600-00 ORIG 6/26/2000 0 - 2	04 SB16-21 SB16-21-NSO-062600-00-D DUP 6/26/2000 0 - 2	04 SB16-22 SB16-22-NSO-062700-00 NORMAL 6/27/2000 0 - 2	04 SB16-23 SB16-23-NSO-062600-00 NORMAL 6/26/2000 0 - 2	04 SB16-24 SB16-24-NSO-062600-00 NORMAL 6/26/2000 0 - 2
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA	1060 J	740	831 J	2080 J	1360
1,2,3,4,6,7,8,9-OCDF	39000	NA	35.1	23.7	45.8	112	15.1
1,2,3,4,6,7,8-HPCDD	390	NA	63.9	49.7	69	242	22.5
1,2,3,4,6,7,8-HPCDF	390	NA	12.7	9.2	23.3	43.6	7.4
1,2,3,4,7,8,9-HPCDF	390	NA	4.95 U	5 U	0.97	3.7	5 U
1,2,3,4,7,8-HXCDD	39	NA	1.1	5 U	1	2.8	5 U
1,2,3,4,7,8-HXCDF	39	NA	2.2 U	1.2	2.8 U	5.9	0.98
1,2,3,6,7,8-HXCDD	39	NA	3.5	2.7	3.8	10.3	5 U
1,2,3,6,7,8-HXCDF	39	NA	1.1	0.89	1.4	3.2	0.54
1,2,3,7,8,9-HXCDD	39	NA	3.8 J	1.9	3.6	10.8	5 U
1,2,3,7,8,9-HXCDF	39	NA	4.95 U	5 U	4.97 U	4.88 U	5 U
1,2,3,7,8-PECDD	3.9	NA	1.4	5 U	1.1	2.7	5 U
1,2,3,7,8-PECDF	78	NA	1	5 U	2.3 J	4.88 U	5 U
2,3,4,6,7,8-HXCDF	39	NA	1.4	5 U	2.2	5.4	1.4
2,3,4,7,8-PECDF	7.8	NA	1.5	1.4 J	2.1	3.6	0.77 J
2,3,7,8-TCDD	3.9	NA	0.26	1 U	0.99 U	0.96	1 U
2,3,7,8-TCDF	39	NA	1.4	1.1 U	2.1	3.9	0.73
TEQ[1]	3.9	NA	4.57	2.03	4.7	12.8	1.19
TEQ BIRD[1]	NA	NA	5.68	2.04	6.74	14.9	2.03
TOTAL HPCDD	NA	NA	122	95.5	128	473	50.8
TOTAL HPCDF	NA	NA	35	20.7	54.4	135	17.9
TOTAL HXCDD	NA	NA	34.6	22.2	34.8	102	7.4
TOTAL HXCDF	NA	NA	14.3 U	7.8	24.9	71.6	22.1
TOTAL PECDD	NA	NA	12.6 UJ	1.8	11.3 U	25.8	5 U
TOTAL PECDF	NA	NA	7.3 UJ	7	19.4	61.6 J	17.2 J
TOTAL TCDD	NA	NA	2.1 J	0.55	1.6	15.7	1 U
TOTAL TCDF	NA	NA	15.7 J	9.2 J	31.2	81.8 J	4.6 J
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	10 U	10 U	10 U	10 U	10
ACETONE	14000000	7800000	56 J	22 J	16 J	19 J	20
BTEX[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
METHYLENE CHLORIDE	9100	45000	5 UJ	5 UJ	7 UJ	5 UJ	4 J
TOLUENE	520000	190000	5 U	5 U	5 U	5 U	5 U
TOTAL CHLORINATED VOCs[1]	NA	NA	0 U	0 U	0 U	0 U	4
Semivolatile Organics (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000	330 U	330 U	330 UJ	360 U	360 U
ACENAPHTHENE	3700000	43000	330 U	330 U	330 UJ	360 U	360 U
ACENAPHTHYLENE	3700000	23000	380 J	200	330 UJ	360 U	360 U
ANTHRACENE	22000000	35000	870 J	460 J	330 UJ	360 U	360 U
BAP EQUIVALENT[1]	62	400	3155	1898	0 U	0 U	0 U
BENZO(A)ANTHRACENE	620	900	2500	2000	330 UJ	360 U	360 U
BENZO(A)PYRENE	62	400	1900	1200	330 UJ	360 U	360 U
BENZO(B)FLUORANTHENE	620	900	4700 J	4000	330 UJ	360 U	360 U
BENZO(G,H,I)PERYLENE	2300000	800	1100	600	330 UJ	360 U	360 U
BENZO(K)FLUORANTHENE	6200	900	2100	1100 J	330 UJ	360 U	360 U
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	330 U	330 U	330 UJ	360 U	360 U
CARBAZOLE	24000	NA	550 J	260 J	330 UJ	360 U	360 U
CHRYSENE	62000	400	3900	2400	330 UJ	360 U	360 U
DI-N-BUTYL PHTHALATE	6100000	NA	330 U	330 U	330 UJ	360 U	360 U

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 SB16-21 SB16-21-NSO-062600-00 ORIG 6/26/2000 0 - 2	04 SB16-21 SB16-21-NSO-062600-00-D DUP 6/26/2000 0 - 2	04 SB16-22 SB16-22-NSO-062700-00 NORMAL 6/27/2000 0 - 2	04 SB16-23 SB16-23-NSO-062600-00 NORMAL 6/26/2000 0 - 2	04 SB16-24 SB16-24-NSO-062600-00 NORMAL 6/26/2000 0 - 2
DIBENZO(A,H)ANTHRACENE	62	400	350	330 U	330 UJ	360 U	360 U
FLUORANTHENE	2300000	20000	5100	3400	330 UJ	360 U	360 U
FLUORENE	2700000	28000	330 U	330 U	330 UJ	360 U	360 U
INDENO(1,2,3-CD)PYRENE	620	900	1600 J	850 J	330 UJ	360 U	360 U
NAPHTHALENE	56000	54000	330 U	330 U	330 UJ	360 U	360 U
PHENANTHRENE	2300000	40000	700 J	390 J	330 UJ	360 U	360 U
PYRENE	2300000	13000	5300	4200	330 UJ	360 U	360 U
TOTAL PAHS[1]	NA	NA	30500	20800	0 U	0 U	0 U
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000	16	2200 U	20 U	42 U	22 U
ACENAPHTHENE	3700000	43000	440	2200 U	20 U	42 U	22 U
ACENAPHTHYLENE	3700000	23000	440	2200 U	20 U	42 U	22 U
ANTHRACENE	22000000	35000	930	2200 U	20 U	37	22 U
BAP EQUIVALENT	62	400	3847	4128	28.7	127	46.9
BENZO(A)ANTHRACENE	620	900	4800	4100	25	100	43
BENZO(A)PYRENE	62	400	2000	2700	20	73	32
BENZO(B)FLUORANTHENE	620	900	7400	7400	40 J	120	62
BENZO(G,H,I)PERYLENE	2300000	800	900	1200	13	47	28
BENZO(K)FLUORANTHENE	6200	900	1300	2300	20 U	41	14
CHRYSENE	62000	400	4200	5300	26	83	38
DIBENZO(A,H)ANTHRACENE	62	400	400	2200 U	20 U	24	22 U
FLUORANTHENE	2300000	20000	710	7900	40 J	220	69
FLUORENE	2700000	28000	85	2200 UJ	20 UJ	42 UJ	22 U
INDENO(1,2,3-CD)PYRENE	620	900	2100	2500	22	76	42
NAPHTHALENE	56000	54000	14	2200 U	20 U	42 U	22 U
PHENANTHRENE	2300000	40000	710	2200 U	24	77	20
PYRENE	2300000	13000	6200	6600	32 J	170	59
TOTAL PAHS	NA	NA	32645	40000	242	1068	407
Pesticides PCBs (ug/kg)							
4,4'-DDT	1700	NA	3.5 R	3.5 R	3.4 UJ	3.5 U	3.6 U
ALPHA-BHC	90	NA	1.8 R	1.8 R	1.8 U	1.8 UJ	1.8 UJ
AROCLOR-1260	220	NA	18 U	19	18 U	18 U	18 U
GAMMA-CHLORDANE	1600	NA	2.9 J	1.8 R	1.8 U	1.8 U	1.8 U
TOTAL AROCLOR[1]	220	10000	18 U	19	18 U	18 U	18 U
Inorganics (mg/kg)							
ALUMINUM	76000	NA	3510	3860	2570	5360	4430
ARSENIC	0.39	7	2.1	1.9	1.3	1.8	1.9 U
BARIUM	5400	5500	18.3	26.1	14.8	14.9	14.8
BERYLLIUM	150	0.4	0.44	0.48	0.53	0.52	0.53
CADMIUM	37	39	0.26 U	0.25 U	0.27 U	0.3 U	0.56
CALCIUM	NA	NA	665 J	864	282	1200	321 J
CHROMIUM	30	1400	4.7 J	3.2	2.9	7	4.7 J
COBALT	900	NA	3.1 J	3.3	2	4.7	3.5
COPPER	3100	3100	9.4	7 J	8.2 J	40.2 J	14.6
IRON	23000	NA	9840	8270	5930	11700	8120
LEAD	400	150	16.1	10.8	22	18.8	98.4
MAGNESIUM	NA	NA	861 J	1130	540	1470	872 J
MANGANESE	1800	390	141 J	173 J	84.4 J	149 J	121 J
MERCURY	23	23	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
NICKEL	1600	1000	4.1 U	3.7	2.6	7.2	4.6 U
POTASSIUM	NA	NA	449 J	921 J	381	564	531

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 SB16-21 SB16-21-NSO-062600-00 ORIG 6/26/2000 0 - 2	04 SB16-21 SB16-21-NSO-062600-00-D DUP 6/26/2000 0 - 2	04 SB16-22 SB16-22-NSO-062700-00 NORMAL 6/27/2000 0 - 2	04 SB16-23 SB16-23-NSO-062600-00 NORMAL 6/26/2000 0 - 2	04 SB16-24 SB16-24-NSO-062600-00 NORMAL 6/26/2000 0 - 2
SELENIUM	390	390	0.3 U	0.26 U	0.27 U	0.29 U	0.31 U
SILVER	390	200	0.28 U	0.24 U	0.25 U	0.27 U	0.29 U
SODIUM	NA	NA	23.9 U	34	27.5	82	21.8 U
THALLIUM	5.2	5.5	0.33 U	0.35 U	0.3 U	0.32 U	0.35 U
VANADIUM	78	550	6.4	7.4	4.7	10.6	8
ZINC	23000	6000	38.3	41.9 J	33.1 J	40.8 J	29.8
Miscellaneous Parameters (mg/kg)							
PH (S.U.)	NA	NA	7		7.1	7.8	5.6
TOTAL INORGANIC CARBON (%)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA	2800	3100	1900	2100	2700
TOTAL RESIDUE (%)	NA	NA	95	95	97	94	92
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 SB16-25 SB16-25-NSO-062600-00 NORMAL 6/26/2000 0 - 2	04 SB16-26 SB16-26-NSO-062300-00 NORMAL 6/23/2000 0 - 2	04 SB16-27 SB16-27-NSO-062600-00 NORMAL 6/26/2000 0 - 2	04 SB16-28 SB16-28-NSO-062700-00 NORMAL 6/27/2000 0 - 2	07 SOURCE1-1 SOURCE1-1-NSD-032604 NORMAL 3/26/2004 0 - 6
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA	3310	1140	1400	1940 J	
1,2,3,4,6,7,8,9-OCDF	39000	NA	113	77.2	68.4	33.6	
1,2,3,4,6,7,8-HPCDD	390	NA	664	53.7	80	181	
1,2,3,4,6,7,8-HPCDF	390	NA	69.2	43.1	29.2	17.8	
1,2,3,4,7,8,9-HPCDF	390	NA	4	1.4	0.96	1.4	
1,2,3,4,7,8-HXCDD	39	NA	8.8	0.66	1.1	3.2	
1,2,3,4,7,8-HXCDF	39	NA	24.4	1.6	2.7	7.6 U	
1,2,3,6,7,8-HXCDD	39	NA	36.7	2.7	3.8	10.6	
1,2,3,6,7,8-HXCDF	39	NA	10	1.3	1.6	3.5	
1,2,3,7,8,9-HXCDD	39	NA	38	1.8	3.3 J	12.1	
1,2,3,7,8,9-HXCDF	39	NA	5.01 U	5.03 U	5.02 U	0.31	
1,2,3,7,8-PECDD	3.9	NA	10	5.03 U	5.02 U	4.1	
1,2,3,7,8-PECDF	78	NA	20.5 J	5.03 U	5.02 U	3.6	
2,3,4,6,7,8-HXCDF	39	NA	11.5	2.3	3	4.1	
2,3,4,7,8-PECDF	7.8	NA	20 J	0.71 J	1.6 J	5.6	
2,3,7,8-TCDD	3.9	NA	4	1 U	1 U	1.1	
2,3,7,8-TCDF	39	NA	28.3	0.57 U	1.4 U	6.1	
TEQ[1]	3.9	NA	48.5	2.49	3.6	14.4	
TEQ BIRD[1]	NA	NA	75.3	2.09	3.28	20.1	
TOTAL HPCDD	NA	NA	1220	105	151	331	
TOTAL HPCDF	NA	NA	156	86.5	64.2	45.6	
TOTAL HXCDD	NA	NA	340	21.7	29.7	110	
TOTAL HXCDF	NA	NA	125	45.9	45.3	37.3	
TOTAL PECDD	NA	NA	101	5.03 U	2.1	40.6	
TOTAL PECDF	NA	NA	197	30.4 J	35.7 J	47.7	
TOTAL TCDD	NA	NA	54.4	0.76	1.1	14	
TOTAL TCDF	NA	NA	495	12.3 J	25.2 J	115	
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	10 UJ	11	12	11 U	
ACETONE	14000000	7800000	15 J	35 E	25	24 J	
BTEX[1]	NA	NA	0 U	0 U	0 U	0 U	
METHYLENE CHLORIDE	9100	45000	5 UJ	5 UJ	4 J	11 UJ	
TOLUENE	520000	190000	5 U	5 U	5 U	6 U	
TOTAL CHLORINATED VOCs[1]	NA	NA	0 U	0 U	4	0 U	
Semivolatile Organics (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000	360 U	360 U	360 U	430 U	11.2 J
ACENAPHTHENE	3700000	43000	360 U	360 U	360 U	430 U	12.3
ACENAPHTHYLENE	3700000	23000	360 U	360 U	360 U	430 U	159 J
ANTHRACENE	22000000	35000	360 U	360 U	360 U	430 U	530
BAP EQUIVALENT[1]	62	400	0 U	0 U	0 U	0 U	668
BENZO(A)ANTHRACENE	620	900	360 U	360 U	360 U	430 U	770
BENZO(A)PYRENE	62	400	360 U	360 U	360 U	430 U	318
BENZO(B)FLUORANTHENE	620	900	360 U	360 U	360 U	430 U	1021
BENZO(G,H,I)PERYLENE	2300000	800	360 U	360 U	360 U	430 U	301
BENZO(K)FLUORANTHENE	6200	900	360 U	360 U	360 U	430 U	986
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	360 U	360 U	360 U	430 U	
CARBAZOLE	24000	NA	360 U	360 U	360 U	430 U	
CHRYSENE	62000	400	360 U	360 U	360 U	430 U	1298
DI-N-BUTYL PHTHALATE	6100000	NA	360 U	360 U	360 U	430 U	

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 SB16-25 SB16-25-NSO-062600-00 NORMAL 6/26/2000 0 - 2	04 SB16-26 SB16-26-NSO-062300-00 NORMAL 6/23/2000 0 - 2	04 SB16-27 SB16-27-NSO-062600-00 NORMAL 6/26/2000 0 - 2	04 SB16-28 SB16-28-NSO-062700-00 NORMAL 6/27/2000 0 - 2	07 SOURCE1-1 SOURCE1-1-NSD-032604 NORMAL 3/26/2004 0 - 6
DIBENZO(A,H)ANTHRACENE	62	400	360 U	360 U	360 U	430 U	116
FLUORANTHENE	2300000	20000	360 U	360 U	360 U	430 U	2549
FLUORENE	2700000	28000	360 U	360 U	360 U	430 U	43.0
INDENO(1,2,3-CD)PYRENE	620	900	360 U	360 U	360 U	430 U	435
NAPHTHALENE	56000	54000	360 U	360 U	360 U	430 U	19.0 J
PHENANTHRENE	2300000	40000	360 U	360 U	360 U	430 U	364
PYRENE	2300000	13000	360 U	360 U	360 U	430 U	2131
TOTAL PAHS[1]	NA	NA	0 U	0 U	0 U	0 U	11063
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000	42 U	22 U	22 U	30	
ACENAPHTHENE	3700000	43000	42 U	22 U	22 U	14	
ACENAPHTHYLENE	3700000	23000	42 U	12	22 U	32	
ANTHRACENE	22000000	35000	42 U	6	12	870	
BAP EQUIVALENT	62	400	99.7	102	112	287	
BENZO(A)ANTHRACENE	620	900	60	53	75 J	250	
BENZO(A)PYRENE	62	400	71	51	70	140 J	
BENZO(B)FLUORANTHENE	620	900	140	97	100 J	500	
BENZO(G,H,I)PERYLENE	2300000	800	50	68	50 J	100	
BENZO(K)FLUORANTHENE	6200	900	36	18	35 J	150 J	
CHRYSENE	62000	400	86	34	69	1000	
DIBENZO(A,H)ANTHRACENE	62	400	42 U	26	15 J	50	
FLUORANTHENE	2300000	20000	120	53	120	1400	
FLUORENE	2700000	28000	42 UJ	22 U	22 UJ	55 J	
INDENO(1,2,3-CD)PYRENE	620	900	83	100	86 J	190 J	
NAPHTHALENE	56000	54000	42 U	22 U	22 U	15	
PHENANTHRENE	2300000	40000	35	28	64	920	
PYRENE	2300000	13000	68	53	90	760	
TOTAL PAHS	NA	NA	749	599	786	6476	
Pesticides PCBs (ug/kg)							
4,4'-DDT	1700	NA	3.5 U	3.7	3.5 U	4.2 U	
ALPHA-BHC	90	NA	1.8 UJ	1.8 UJ	1.8 UJ	2.4 J	
AROCLOR-1260	220	NA	18 U	18 U	18 U	21 U	
GAMMA-CHLORDANE	1600	NA	1.8 U	1.8 U	1.8 U	2.1 U	
TOTAL AROCLOR[1]	220	10000	18 U	18 U	18 U	21 U	
Inorganics (mg/kg)							
ALUMINUM	76000	NA	3670	5560	3340	8590	
ARSENIC	0.39	7	3.3	2 J	1.7 U	4	
BARIUM	5400	5500	29.9	40.6	26.1	38.9	
BERYLLIUM	150	0.4	0.4	0.51	0.33	0.64	
CADMIUM	37	39	0.25 UJ	0.35 J	0.43 U	0.46 U	
CALCIUM	NA	NA	361 J	550 U	469 J	495	
CHROMIUM	30	1400	6 J	7.4	5.9 J	11.6	
COBALT	900	NA	3.9	4.7 J	3.4	7.8	
COPPER	3100	3100	24.8	16.9 J	21.6	24.3 J	
IRON	23000	NA	9880	14000	8080	21200	
LEAD	400	150	59.3	29.1	36	69.3	
MAGNESIUM	NA	NA	1200 J	1830 J	1200 J	2140	
MANGANESE	1800	390	102 J	171	105 J	248 J	
MERCURY	23	23	0.11	0.02 U	0.01 U	0.03 U	
NICKEL	1600	1000	7.6 U	9	4.1 U	11	
POTASSIUM	NA	NA	432	562 U	542	634	

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 SB16-25 SB16-25-NSO-062600-00 NORMAL 6/26/2000 0 - 2	04 SB16-26 SB16-26-NSO-062300-00 NORMAL 6/23/2000 0 - 2	04 SB16-27 SB16-27-NSO-062600-00 NORMAL 6/26/2000 0 - 2	04 SB16-28 SB16-28-NSO-062700-00 NORMAL 6/27/2000 0 - 2	07 SOURCE1-1 SOURCE1-1-NSD-032604 NORMAL 3/26/2004 0 - 6
SELENIUM	390	390	0.28 U	0.29 U	0.27 U	0.88	
SILVER	390	200	0.32 J	0.51 UJ	0.25 U	0.33 U	
SODIUM	NA	NA	20.9 U	35.2 U	20.8 U	43.1	
THALLIUM	5.2	5.5	0.31 U	0.31 U	0.65 J	0.4 U	
VANADIUM	78	550	8.6	11.8	7.4	16.1	
ZINC	23000	6000	70.4	62.6 J	35.9	85.3 J	
Miscellaneous Parameters (mg/kg)							
PH (S.U.)	NA	NA	5.5	6.9	5.9	6.4	
TOTAL INORGANIC CARBON (%)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA	6300	4400	3500	3900	
TOTAL RESIDUE (%)	NA	NA	94	93	94	79	
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	07 SOURCE1-2 SOURCE1-2-NSD-032604 NORMAL 3/26/2004 0 - 6	07 SOURCE2-1 SOURCE2-1-NSD-032604 NORMAL 3/26/2004 0 - 6	07 SOURCE2-2 SOURCE2-2-NSD-032604 NORMAL 3/26/2004 0 - 6	07 SOURCE3-1 SOURCE3-1-NSD-032604 NORMAL 3/26/2004 0 - 6	07 SOURCE3-2 SOURCE3-2-NSD-032604 NORMAL 3/26/2004 0 - 6
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8,9-HXCDF	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TEQ BIRD[1]	NA	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000					
ACETONE	14000000	7800000					
BTEX[1]	NA	NA					
METHYLENE CHLORIDE	9100	45000					
TOLUENE	520000	190000					
TOTAL CHLORINATED VOCs[1]	NA	NA					
Semivolatile Organics (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000	50 J	9428 J	10012 J	4.15 J	99.6 J
ACENAPHTHENE	3700000	43000	47.2 J	441	749	4.93	65.0
ACENAPHTHYLENE	3700000	23000	963 J	5.74 R	651 J	11.3 J	26.3 J
ANTHRACENE	22000000	35000	1885 J	223	652	20.8	66.0
BAP EQUIVALENT[1]	62	400	4608	524	1571	73.9	282
BENZO(A)ANTHRACENE	620	900	3812 J	314	1060	59.0	186.4
BENZO(A)PYRENE	62	400	2339 J	328	989	42.4	170
BENZO(B)FLUORANTHENE	620	900	7236 J	383	1129	66.9	262
BENZO(G,H,I)PERYLENE	2300000	800	1904 J	295	875	44.7	154
BENZO(K)FLUORANTHENE	6200	900	6221 J	347	1029	62.5	214
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000					
CARBAZOLE	24000	NA					
CHRYSENE	62000	400	6549 J	338	1208	67.9	214
DI-N-BUTYL PHTHALATE	6100000	NA					

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	07 SOURCE1-2 SOURCE1-2-NSD-032604 NORMAL 3/26/2004 0 - 6	07 SOURCE2-1 SOURCE2-1-NSD-032604 NORMAL 3/26/2004 0 - 6	07 SOURCE2-2 SOURCE2-2-NSD-032604 NORMAL 3/26/2004 0 - 6	07 SOURCE3-1 SOURCE3-1-NSD-032604 NORMAL 3/26/2004 0 - 6	07 SOURCE3-2 SOURCE3-2-NSD-032604 NORMAL 3/26/2004 0 - 6
DIBENZO(A,H)ANTHRACENE	62	400	825 J	91.5	259	13.1	46.3
FLUORANTHENE	2300000	20000	6958 J	462	1943	136	329
FLUORENE	2700000	28000	145 J	678	984	5.49	66.5
INDENO(1,2,3-CD)PYRENE	620	900	2708 J	307	935	51.9	181
NAPHTHALENE	56000	54000	122 J	3367 J	3685 J	13.5 J	163 J
PHENANTHRENE	2300000	40000	959 J	1563	2767	92.6	235
PYRENE	2300000	13000	8017 J	492	1740	106	271
TOTAL PAHS[1]	NA	NA	50739	19058	30666	804	2749
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000					
ACENAPHTHENE	3700000	43000					
ACENAPHTHYLENE	3700000	23000					
ANTHRACENE	22000000	35000					
BAP EQUIVALENT	62	400					
BENZO(A)ANTHRACENE	620	900					
BENZO(A)PYRENE	62	400					
BENZO(B)FLUORANTHENE	620	900					
BENZO(G,H,I)PERYLENE	2300000	800					
BENZO(K)FLUORANTHENE	6200	900					
CHRYSENE	62000	400					
DIBENZO(A,H)ANTHRACENE	62	400					
FLUORANTHENE	2300000	20000					
FLUORENE	2700000	28000					
INDENO(1,2,3-CD)PYRENE	620	900					
NAPHTHALENE	56000	54000					
PHENANTHRENE	2300000	40000					
PYRENE	2300000	13000					
TOTAL PAHS	NA	NA					
Pesticides PCBs (ug/kg)							
4,4'-DDT	1700	NA					
ALPHA-BHC	90	NA					
AROCLOR-1260	220	NA					
GAMMA-CHLORDANE	1600	NA					
TOTAL AROCLOR[1]	220	10000					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
MERCURY	23	23					
NICKEL	1600	1000					
POTASSIUM	NA	NA					

TABLE 4-7
SUMMARY OF CHEMICALS DETECTED IN SURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	07 SOURCE1-2 SOURCE1-2-NSD-032604 NORMAL 3/26/2004 0 - 6	07 SOURCE2-1 SOURCE2-1-NSD-032604 NORMAL 3/26/2004 0 - 6	07 SOURCE2-2 SOURCE2-2-NSD-032604 NORMAL 3/26/2004 0 - 6	07 SOURCE3-1 SOURCE3-1-NSD-032604 NORMAL 3/26/2004 0 - 6	07 SOURCE3-2 SOURCE3-2-NSD-032604 NORMAL 3/26/2004 0 - 6
SELENIUM	390	390					
SILVER	390	200					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
PH (S.U.)	NA	NA					
TOTAL INORGANIC CARBON (%)	NA	NA				0.8	
TOTAL ORGANIC CARBON	NA	NA					
TOTAL RESIDUE (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

Investigation Description:
01 - EBS Phase II Sampling
02 - EBS Phase II Follow-On Sampling
03 - EBS Phase II Follow-On Addendum Sampling
04 - State I Phase I RI Sampling Event
07 - Supplemental SD RI Investigation

Qualifiers:
J - Estimated value.
U - Nondetected result.
UJ - Nondetected result is estimated.
R - Rejected value.

Sample Code Description:
NORMAL - One sample was collected at this location.
ORIG - First of two samples collected at this location.
DUP - Second of two samples collected at this location.

Acronyms:
NA = Not Applicable/Not Available
PAH = Polyaromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
TPH = Total Petroleum Hydrocarbon
VOC = Volatile Organic Compound

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

TAB

SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-01 28SB-01-NSO-061797-08 NORMAL 6/17/1997 8 - 10	01 28-SB-01A 28SB-01A-NSO-042696-02 NORMAL 4/26/1996 2 - 4	01 28-SB-01B 28SB-01B-NSO-042496-02 NORMAL 4/24/1996 2 - 4	01 28-SB-01C 28SB-01C-NSO-042496-02 NORMAL 4/24/1996 2 - 4	01 28-SB-01D 28SB-01D-NSO-042696-02 ORIG 4/26/1996 2 - 4
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
1,1,2-TRICHLOROETHANE	730	3600	12 U				
2-BUTANONE	22000000	10000000	12 U				
2-HEXANONE	NA	NA	12 U				
4-METHYL-2-PENTANONE	5300000	1200000	12 U				
ACETONE	14000000	7800000	220				
BENZENE	640	2500	12 U				
BROMODICHLOROMETHANE	820	10000	12 U				
BTEX[1]	NA	NA	0 U				
CARBON DISULFIDE	360000	NA	12 U				
CHLOROFORM	220	1200	12 U				
CHLOROMETHANE	47000	NA	12 U				
CIS-1,2-DICHLOROETHENE	43000	630000					
ETHYLBENZENE	400000	71000	12 U				
M+P-XYLENES	270000	NA					
METHYLENE CHLORIDE	9100	45000	12 U				
O-XYLENE	270000	NA					
STYRENE	1700000	13000	12 U				
TOLUENE	520000	190000	12 U				
TOTAL 1,2-DICHLOROETHENE	43000	630000	12 U				
TOTAL CHLORINATED VOCS[1]	NA	NA	0 U				
TOTAL XYLENES	270000	110000	12 U				
TRANS-1,2-DICHLOROETHENE	69000	1100000					
TRICHLOROETHENE	53	13000	12 U				

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-01 28SB-01-NSO-061797-08 NORMAL 6/17/1997 8 - 10	01 28-SB-01A 28SB-01A-NSO-042696-02 NORMAL 4/26/1996 2 - 4	01 28-SB-01B 28SB-01B-NSO-042496-02 NORMAL 4/24/1996 2 - 4	01 28-SB-01C 28SB-01C-NSO-042496-02 NORMAL 4/24/1996 2 - 4	01 28-SB-01D 28SB-01D-NSO-042696-02 ORIG 4/26/1996 2 - 4
VINYL CHLORIDE	79	20	12 U				
Semivolatile Organics (ug/kg)							
2,4-DIMETHYLPHENOL	1200000	1400000	390 U				
2,6-DINITROTOLUENE	61000	NA	390 U				
2-METHYLNAPHTHALENE	56000	123000	390 U				
2-METHYLPHENOL	3100000	NA	390 U				
4-CHLOROANILINE	240000	310000	390 U				
4-METHYLPHENOL	310000	NA	390 U				
ACENAPHTHENE	3700000	43000	390 U				
ANTHRACENE	22000000	35000	390 U				
BAP EQUIVALENT[1]	62	400	0 U				
BENZO(A)ANTHRACENE	620	900	390 U				
BENZO(A)PYRENE	62	400	390 U				
BENZO(B)FLUORANTHENE	620	900	390 U				
BENZO(G,H,I)PERYLENE	2300000	800	390 U				
BENZO(K)FLUORANTHENE	6200	900	390 U				
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	390 U				
CARBAZOLE	24000	NA	390 U				
CHRYSENE	62000	400	390 U				
DI-N-BUTYL PHTHALATE	6100000	NA	57 J				
DIBENZO(A,H)ANTHRACENE	62	400	390 U				
DIBENZOFURAN	150000	NA	390 U				
DIETHYL PHTHALATE	49000000	340000	390 U				
FLUORANTHENE	2300000	20000	390 U				
FLUORENE	2700000	28000	390 U				
INDENO(1,2,3-CD)PYRENE	620	900	390 U				
NAPHTHALENE	56000	54000	390 U				
PHENANTHRENE	2300000	40000	390 U				
PYRENE	2300000	13000	390 U				
TOTAL PAHS[1]	NA	NA	0 U				
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000					
ACENAPHTHENE	3700000	43000		4200 J	51	1400 J	9200 J
ACENAPHTHYLENE	3700000	23000		800 UJ	76 U	75 J	1700 UJ
ANTHRACENE	22000000	35000		150 J	40	92 J	430 J
BAP EQUIVALENT	62	400		**2046**	11.3	**382**	**2808**
BENZO(A)ANTHRACENE	620	900		**1200 J**	11	230 J	**1300 J**
BENZO(A)PYRENE	62	400		**1600 J**	8	**280 J**	**2200 J**
BENZO(B)FLUORANTHENE	620	900		**1200 J**	17	330 J	**1800 J**
BENZO(G,H,I)PERYLENE	2300000	800		**840 J**	6	240 J	**1400 J**
BENZO(K)FLUORANTHENE	6200	900		510 J	7	99 J	690 J
CHRYSENE	62000	400		**1200 J**	28	300 J	**1300 J**
DIBENZO(A,H)ANTHRACENE	62	400		**150 J**	2 U	32 J	**210 J**
FLUORANTHENE	2300000	20000		1600 J	41	480 J	1900 J
FLUORENE	2700000	28000		160 J	8 U	38 J	180 J
INDENO(1,2,3-CD)PYRENE	620	900		500 J	4	130 J	**800 J**
NAPHTHALENE	56000	54000		460 UJ	44 U	140 J	990 UJ
PHENANTHRENE	2300000	40000		550 J	14	300 J	1600 J
PYRENE	2300000	13000		1300 J	37	360 J	1500 J
TOTAL PAHS[1]	NA	NA		15160	264	4526	24510

TAB

SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-01 28SB-01-NSO-061797-08 NORMAL 6/17/1997 8 - 10	01 28-SB-01A 28SB-01A-NSO-042696-02 NORMAL 4/26/1996 2 - 4	01 28-SB-01B 28SB-01B-NSO-042496-02 NORMAL 4/24/1996 2 - 4	01 28-SB-01C 28SB-01C-NSO-042496-02 NORMAL 4/24/1996 2 - 4	01 28-SB-01D 28SB-01D-NSO-042696-02 ORIG 4/26/1996 2 - 4
Pesticides (ug/kg)							
4,4'-DDD	2400	NA					
4,4'-DDT	1700	NA					
ENDRIN ALDEHYDE	18000	NA					
GAMMA-CHLORDANE	1600	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
MERCURY	23	23					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SILVER	390	200					
SODIUM	NA	NA					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA					
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
DIESEL RANGE ORGANICS	NA	NA					
OIL & GREASE	NA	NA					
PHC AS DIESEL	NA	NA					
TOTAL PETROLEUM HYDROCARBONS	NA	500					
TOTAL RECOVERABLE TPH	NA	NA	29 U				

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	01 28-SB-01D 28SB-01D-NSO-042696-02-D DUP 4/26/1996 2 - 4	02 28-SB-02 28SB-02-NSO-061897-08 NORMAL 6/18/1997 8 - 10	02 28-SB-03 28SB-03-NSO-061897-06 NORMAL 6/18/1997 6 - 8	02 28-SB-04 28SB-04-NSO-061897-02 NORMAL 6/18/1997 2 - 4	02 28-SB-05 28SB-05-NSO-061997-06 NORMAL 6/19/1997 6 - 8
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
1,1,2-TRICHLOROETHANE	730	3600		12 U	11 U	11 U	12 U
2-BUTANONE	22000000	10000000		12 U	11 U	11 U	12 U
2-HEXANONE	NA	NA		12 U	11 U	11 U	12 U
4-METHYL-2-PENTANONE	5300000	1200000		12 U	11 U	11 U	12 U
ACETONE	14000000	7800000		15000 J	4400 J	150 J	2000 J
BENZENE	640	2500		12 U	11 U	11 U	12 U
BROMODICHLOROMETHANE	820	10000		12 U	11 U	11 U	12 U
BTEX[1]	NA	NA		0 U	0 U	0 U	0 U
CARBON DISULFIDE	360000	NA		12 U	11 U	11 U	12 U
CHLOROFORM	220	1200		12 U	11 U	11 U	12 U
CHLOROMETHANE	47000	NA		12 U	11 U	11 U	12 U
CIS-1,2-DICHLOROETHENE	43000	630000					
ETHYLBENZENE	400000	71000		12 U	11 U	11 U	12 U
M+P-XYLENES	270000	NA					
METHYLENE CHLORIDE	9100	45000		12 U	11 U	11 U	12 U
O-XYLENE	270000	NA					
STYRENE	1700000	13000		12 U	11 U	11 U	12 U
TOLUENE	520000	190000		12 U	11 U	11 U	12 U
TOTAL 1,2-DICHLOROETHENE	43000	630000		12 U	11 U	11 U	12 U
TOTAL CHLORINATED VOCS[1]	NA	NA		0 U	0 U	0 U	0 U
TOTAL XYLENES	270000	110000		12 U	11 U	11 U	12 U
TRANS-1,2-DICHLOROETHENE	69000	1100000					
TRICHLOROETHENE	53	13000		12 U	11 U	11 U	12 U

TAB

SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	01 28-SB-01D 28SB-01D-NSO-042696-02-D DUP 4/26/1996 2 - 4	02 28-SB-02 28SB-02-NSO-061897-08 NORMAL 6/18/1997 8 - 10	02 28-SB-03 28SB-03-NSO-061897-06 NORMAL 6/18/1997 6 - 8	02 28-SB-04 28SB-04-NSO-061897-02 NORMAL 6/18/1997 2 - 4	02 28-SB-05 28SB-05-NSO-061997-06 NORMAL 6/19/1997 6 - 8
VINYL CHLORIDE	79	20		12 U	11 U	11 U	12 U
Semivolatile Organics (ug/kg)							
2,4-DIMETHYLPHENOL	1200000	1400000		390 U	350 U	350 U	380 U
2,6-DINITROTOLUENE	61000	NA		390 U	350 U	350 U	380 U
2-METHYLNAPHTHALENE	56000	123000		390 U	350 U	350 U	380 U
2-METHYLPHENOL	3100000	NA		390 U	350 U	350 U	380 U
4-CHLOROANILINE	240000	310000		390 U	350 U	350 U	380 U
4-METHYLPHENOL	310000	NA		390 U	350 U	350 U	380 U
ACENAPHTHENE	3700000	43000		390 U	350 U	350 U	380 U
ANTHRACENE	22000000	35000		390 U	350 U	350 U	380 U
BAP EQUIVALENT[1]	62	400		0 U	0 U	0 U	0 U
BENZO(A)ANTHRACENE	620	900		390 U	350 U	350 U	380 U
BENZO(A)PYRENE	62	400		390 U	350 U	350 U	380 U
BENZO(B)FLUORANTHENE	620	900		390 U	350 U	350 U	380 U
BENZO(G,H,I)PERYLENE	2300000	800		390 U	350 U	350 U	380 U
BENZO(K)FLUORANTHENE	6200	900		390 U	350 U	350 U	380 U
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000		390 U	350 U	350 U	110 J
CARBAZOLE	24000	NA		390 U	350 U	350 U	380 U
CHRYSENE	62000	400		390 U	350 U	350 U	380 U
DI-N-BUTYL PHTHALATE	6100000	NA		390 U	350 U	120 J	380 U
DIBENZO(A,H)ANTHRACENE	62	400		390 U	350 U	350 U	380 U
DIBENZOFURAN	150000	NA		390 U	350 U	350 U	380 U
DIETHYL PHTHALATE	49000000	340000		390 U	350 U	350 U	380 U
FLUORANTHENE	2300000	20000		390 U	350 U	350 U	380 U
FLUORENE	2700000	28000		390 U	350 U	350 U	380 U
INDENO(1,2,3-CD)PYRENE	620	900		390 U	350 U	350 U	380 U
NAPHTHALENE	56000	54000		390 U	350 U	350 U	380 U
PHENANTHRENE	2300000	40000		390 U	350 U	350 U	380 U
PYRENE	2300000	13000		390 U	350 U	350 U	380 U
TOTAL PAHS[1]	NA	NA		0 U	0 U	0 U	0 U
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000					
ACENAPHTHENE	3700000	43000	21000 J				
ACENAPHTHYLENE	3700000	23000	1700 UJ				
ANTHRACENE	22000000	35000	800 J				
BAP EQUIVALENT	62	400	**3948**				
BENZO(A)ANTHRACENE	620	900	**2700 J**				
BENZO(A)PYRENE	62	400	**2700 J**				
BENZO(B)FLUORANTHENE	620	900	**3800 J**				
BENZO(G,H,I)PERYLENE	2300000	800	**2700 J**				
BENZO(K)FLUORANTHENE	6200	900	**1500 J**				
CHRYSENE	62000	400	**2700 J**				
DIBENZO(A,H)ANTHRACENE	62	400	**420 J**				
FLUORANTHENE	2300000	20000	2800 J				
FLUORENE	2700000	28000	110 J				
INDENO(1,2,3-CD)PYRENE	620	900	**1600 J**				
NAPHTHALENE	56000	54000	550 J				
PHENANTHRENE	2300000	40000	1600 J				
PYRENE	2300000	13000	2300 J				
TOTAL PAHS[1]	NA	NA	47280				

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	01 28-SB-01D 28SB-01D-NSO-042696-02-D DUP 4/26/1996 2 - 4	02 28-SB-02 28SB-02-NSO-061897-08 NORMAL 6/18/1997 8 - 10	02 28-SB-03 28SB-03-NSO-061897-06 NORMAL 6/18/1997 6 - 8	02 28-SB-04 28SB-04-NSO-061897-02 NORMAL 6/18/1997 2 - 4	02 28-SB-05 28SB-05-NSO-061997-06 NORMAL 6/19/1997 6 - 8
Pesticides (ug/kg)							
4,4'-DDD	2400	NA					
4,4'-DDT	1700	NA					
ENDRIN ALDEHYDE	18000	NA					
GAMMA-CHLORDANE	1600	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
MERCURY	23	23					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SILVER	390	200					
SODIUM	NA	NA					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA					
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
DIESEL RANGE ORGANICS	NA	NA					
OIL & GREASE	NA	NA					
PHC AS DIESEL	NA	NA					
TOTAL PETROLEUM HYDROCARBONS	NA	500					
TOTAL RECOVERABLE TPH	NA	NA		29 U	27 U	27 U	29 U

TAB

SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-06 28SB-06-NSO-061997-08 NORMAL 6/19/1997 8 - 10	02 28-SB-07 28SB-07-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-08 28SB-08-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-09 28SB-09-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-10 28SB-10-NSO-061997-04 NORMAL 6/19/1997 4 - 6
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
1,1,2-TRICHLOROETHANE	730	3600	11 U	13 U	11 U	11 U	11 U
2-BUTANONE	22000000	10000000	11 U	13 U	11 U	11 U	11 U
2-HEXANONE	NA	NA	11 U	13 U	11 U	11 U	11 U
4-METHYL-2-PENTANONE	5300000	1200000	11 U	13 U	11 U	11 U	11 U
ACETONE	14000000	7800000	75000 J	150 J	11 UJ	190	11 U
BENZENE	640	2500	11 U	13 U	11 U	11 U	11 U
BROMODICHLOROMETHANE	820	10000	11 U	13 U	11 U	11 U	11 U
BTEX[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
CARBON DISULFIDE	360000	NA	11 U	13 U	11 U	11 U	11 U
CHLOROFORM	220	1200	11 U	13 U	11 U	11 U	11 U
CHLOROMETHANE	47000	NA	11 U	13 U	11 U	11 U	11 U
CIS-1,2-DICHLOROETHENE	43000	630000					
ETHYLBENZENE	400000	71000	11 U	13 U	11 U	11 U	11 U
M+P-XYLENES	270000	NA					
METHYLENE CHLORIDE	9100	45000	11 U	13 U	11 U	11 U	11 U
O-XYLENE	270000	NA					
STYRENE	1700000	13000	11 U	13 U	11 U	11 U	11 U
TOLUENE	520000	190000	11 U	13 U	11 U	11 U	11 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	11 U	13 U	11 U	11 U	11 U
TOTAL CHLORINATED VOCS[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
TOTAL XYLENES	270000	110000	11 U	13 U	11 U	11 U	11 U
TRANS-1,2-DICHLOROETHENE	69000	1100000					
TRICHLOROETHENE	53	13000	11 U	13 U	11 U	11 U	11 U

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-06 28SB-06-NSO-061997-08 NORMAL 6/19/1997 8 - 10	02 28-SB-07 28SB-07-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-08 28SB-08-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-09 28SB-09-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-10 28SB-10-NSO-061997-04 NORMAL 6/19/1997 4 - 6
VINYL CHLORIDE	79	20	11 U	13 U	11 U	11 U	11 U
Semivolatile Organics (ug/kg)							
2,4-DIMETHYLPHENOL	1200000	1400000	370 U	430 U	350 U	350 U	360 U
2,6-DINITROTOLUENE	61000	NA	370 U	430 UJ	350 U	350 U	360 U
2-METHYLNAPHTHALENE	56000	123000	370 U	430 UJ	350 U	350 U	360 U
2-METHYLPHENOL	3100000	NA	370 U	430 U	350 U	350 U	360 U
4-CHLOROANILINE	240000	310000	370 U	430 UJ	350 U	350 U	360 U
4-METHYLPHENOL	310000	NA	370 U	430 U	350 U	350 U	360 U
ACENAPHTHENE	3700000	43000	370 U	430 UJ	350 U	350 U	360 U
ANTHRACENE	22000000	35000	370 U	430 UJ	53 J	350 U	360 U
BAP EQUIVALENT[1]	62	400	0 U	0 U	**307**	0 U	**112**
BENZO(A)ANTHRACENE	620	900	370 U	430 UJ	200 J	350 U	75 J
BENZO(A)PYRENE	62	400	370 U	430 UJ	**190 J**	350 U	**87 J**
BENZO(B)FLUORANTHENE	620	900	370 U	430 UJ	240 J	350 U	110 J
BENZO(G,H,I)PERYLENE	2300000	800	370 U	430 UJ	170 J	350 U	66 J
BENZO(K)FLUORANTHENE	6200	900	370 U	430 UJ	67 J	350 U	43 J
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	370 U	430 UJ	83 J	46 J	40 J
CARBAZOLE	24000	NA	370 U	430 UJ	350 U	350 U	360 U
CHRYSENE	62000	400	370 U	430 UJ	190 J	350 U	80 J
DI-N-BUTYL PHTHALATE	6100000	NA	370 U	430 UJ	350 U	350 U	360 U
DIBENZO(A,H)ANTHRACENE	62	400	370 U	430 UJ	58 J	350 U	360 U
DIBENZOFURAN	150000	NA	370 U	430 UJ	350 U	350 U	360 U
DIETHYL PHTHALATE	49000000	340000	370 U	430 UJ	350 U	350 U	360 U
FLUORANTHENE	2300000	20000	370 U	430 UJ	260 J	350 U	78 J
FLUORENE	2700000	28000	370 U	430 UJ	350 U	350 U	360 U
INDENO(1,2,3-CD)PYRENE	620	900	370 U	430 UJ	140 J	350 U	56 J
NAPHTHALENE	56000	54000	370 U	430 UJ	350 U	350 U	360 U
PHENANTHRENE	2300000	40000	370 U	430 UJ	220 J	350 U	65 J
PYRENE	2300000	13000	370 U	430 UJ	360 J	350 U	110 J
TOTAL PAHS[1]	NA	NA	0 U	0 U	2148	0 U	770
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000					
ACENAPHTHENE	3700000	43000					
ACENAPHTHYLENE	3700000	23000					
ANTHRACENE	22000000	35000					
BAP EQUIVALENT	62	400					
BENZO(A)ANTHRACENE	620	900					
BENZO(A)PYRENE	62	400					
BENZO(B)FLUORANTHENE	620	900					
BENZO(G,H,I)PERYLENE	2300000	800					
BENZO(K)FLUORANTHENE	6200	900					
CHRYSENE	62000	400					
DIBENZO(A,H)ANTHRACENE	62	400					
FLUORANTHENE	2300000	20000					
FLUORENE	2700000	28000					
INDENO(1,2,3-CD)PYRENE	620	900					
NAPHTHALENE	56000	54000					
PHENANTHRENE	2300000	40000					
PYRENE	2300000	13000					
TOTAL PAHS[1]	NA	NA					

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SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-06 28SB-06-NSO-061997-08 NORMAL 6/19/1997 8 - 10	02 28-SB-07 28SB-07-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-08 28SB-08-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-09 28SB-09-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-10 28SB-10-NSO-061997-04 NORMAL 6/19/1997 4 - 6
Pesticides (ug/kg)							
4,4'-DDD	2400	NA					
4,4'-DDT	1700	NA					
ENDRIN ALDEHYDE	18000	NA					
GAMMA-CHLORDANE	1600	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
MERCURY	23	23					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SILVER	390	200					
SODIUM	NA	NA					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA					
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
DIESEL RANGE ORGANICS	NA	NA					
OIL & GREASE	NA	NA					
PHC AS DIESEL	NA	NA					
TOTAL PETROLEUM HYDROCARBONS	NA	500					
TOTAL RECOVERABLE TPH	NA	NA	118	33 U	810 J	100	27 U

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-11 28SB-11-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-12 28SB-12-NSO-061997-06 NORMAL 6/19/1997 6 - 8	02 28-SB-13 28SB-13-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-16 28SB-16-NSO-062497-14 NORMAL 6/24/1997 14 - 16	03 28-SB-17 28SB-17-NSO-101398-08 NORMAL 10/13/1998 8 - 10
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
1,1,2-TRICHLOROETHANE	730	3600	10 U	13 U	11 U	10 U	1 U
2-BUTANONE	22000000	10000000	10 U	13 U	11 U	10 U	5 U
2-HEXANONE	NA	NA	10 U	13 U	11 U	10 U	5 U
4-METHYL-2-PENTANONE	5300000	1200000	10 U	13 U	11 U	10 U	6 U
ACETONE	14000000	7800000	10 U	880 J	470 J	14	3 U
BENZENE	640	2500	10 U	13 U	11 U	10 U	1 U
BROMODICHLOROMETHANE	820	10000	10 U	13 U	11 U	10 U	1 U
BTEX[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
CARBON DISULFIDE	360000	NA	10 U	13 U	11 U	10 U	2 U
CHLOROFORM	220	1200	10 U	13 U	11 U	10 U	1 U
CHLOROMETHANE	47000	NA	10 U	13 U	11 U	10 U	2 U
CIS-1,2-DICHLOROETHENE	43000	630000					
ETHYLBENZENE	400000	71000	10 U	13 U	11 U	10 U	2 U
M+P-XYLENES	270000	NA					
METHYLENE CHLORIDE	9100	45000	10 U	13 U	11 U	10 U	1 U
O-XYLENE	270000	NA					
STYRENE	1700000	13000	10 U	13 U	11 U	10 U	1 U
TOLUENE	520000	190000	10 U	13 U	11 U	10 U	1 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	10 U	13 U	11 U	10 U	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
TOTAL XYLENES	270000	110000	10 U	13 U	11 U	10 U	2 U
TRANS-1,2-DICHLOROETHENE	69000	1100000					
TRICHLOROETHENE	53	13000	10 U	13 U	11 U	10 U	1 U

TAB[illegible]8

SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-11 28SB-11-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-12 28SB-12-NSO-061997-06 NORMAL 6/19/1997 6 - 8	02 28-SB-13 28SB-13-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-16 28SB-16-NSO-062497-14 NORMAL 6/24/1997 14 - 16	03 28-SB-17 28SB-17-NSO-101398-08 NORMAL 10/13/1998 8 - 10
VINYL CHLORIDE	79	20	10 U	13 U	11 U	10 U	2 U
Semivolatile Organics (ug/kg)							
2,4-DIMETHYLPHENOL	1200000	1400000	340 U	410 U	350 U	340 U	52 U
2,6-DINITROTOLUENE	61000	NA	340 U	410 U	350 U	340 U	55 U
2-METHYLNAPHTHALENE	56000	123000	340 U	420	350 U	340 U	57 U
2-METHYLPHENOL	3100000	NA	340 U	410 U	350 U	340 U	58 U
4-CHLOROANILINE	240000	310000	340 U	410 U	350 U	340 U	110 U
4-METHYLPHENOL	310000	NA	340 U	410 U	350 U	340 U	49 U
ACENAPHTHENE	3700000	43000	340 U	530	350 U	340 U	58 U
ANTHRACENE	22000000	35000	340 U	410 U	350 U	340 U	52 U
BAP EQUIVALENT[1]	62	400	45.5	101	0 U	0 U	0 U
BENZO(A)ANTHRACENE	620	900	43 J	410 U	350 U	340 U	71 U
BENZO(A)PYRENE	62	400	36 J	83 J	350 U	340 U	49 U
BENZO(B)FLUORANTHENE	620	900	51 J	110 J	350 U	340 U	75 U
BENZO(G,H,I)PERYLENE	2300000	800	340 U	110 J	350 U	340 U	98 U
BENZO(K)FLUORANTHENE	6200	900	340 U	410 U	350 U	340 U	67 U
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	340 U	66 J	350 U	340 U	130 U
CARBAZOLE	24000	NA	340 U	410 U	350 U	340 U	71 U
CHRYSENE	62000	400	50 J	69 J	350 U	340 U	74 U
DI-N-BUTYL PHTHALATE	6100000	NA	340 U	56 J	350 U	53 J	96 U
DIBENZO(A,H)ANTHRACENE	62	400	340 U	410 U	350 U	340 U	79 U
DIBENZOFURAN	150000	NA	340 U	160 J	350 U	340 U	53 U
DIETHYL PHTHALATE	49000000	340000	340 U	61 J	350 U	36 UJ	71 U
FLUORANTHENE	2300000	20000	67 J	78 J	350 U	340 U	64 U
FLUORENE	2700000	28000	340 U	140 J	350 U	340 U	65 U
INDENO(1,2,3-CD)PYRENE	620	900	340 U	70 J	350 U	340 U	91 U
NAPHTHALENE	56000	54000	340 U	2300	350 U	340 U	97 U
PHENANTHRENE	2300000	40000	49 J	140 J	350 U	340 U	71 U
PYRENE	2300000	13000	75 J	66 J	350 U	340 U	81 U
TOTAL PAHS[1]	NA	NA	371	4116	0 U	0 U	0 U
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000					
ACENAPHTHENE	3700000	43000					
ACENAPHTHYLENE	3700000	23000					
ANTHRACENE	22000000	35000					
BAP EQUIVALENT	62	400					
BENZO(A)ANTHRACENE	620	900					
BENZO(A)PYRENE	62	400					
BENZO(B)FLUORANTHENE	620	900					
BENZO(G,H,I)PERYLENE	2300000	800					
BENZO(K)FLUORANTHENE	6200	900					
CHRYSENE	62000	400					
DIBENZO(A,H)ANTHRACENE	62	400					
FLUORANTHENE	2300000	20000					
FLUORENE	2700000	28000					
INDENO(1,2,3-CD)PYRENE	620	900					
NAPHTHALENE	56000	54000					
PHENANTHRENE	2300000	40000					
PYRENE	2300000	13000					
TOTAL PAHS[1]	NA	NA					

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-11 28SB-11-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-12 28SB-12-NSO-061997-06 NORMAL 6/19/1997 6 - 8	02 28-SB-13 28SB-13-NSO-061997-02 NORMAL 6/19/1997 2 - 4	02 28-SB-16 28SB-16-NSO-062497-14 NORMAL 6/24/1997 14 - 16	03 28-SB-17 28SB-17-NSO-101398-08 NORMAL 10/13/1998 8 - 10
Pesticides (ug/kg)							
4,4'-DDD	2400	NA					3.7 U
4,4'-DDT	1700	NA					3.7 U
ENDRIN ALDEHYDE	18000	NA					3.7 U
GAMMA-CHLORDANE	1600	NA					1.9 U
Inorganics (mg/kg)							
ALUMINUM	76000	NA					3480
ANTIMONY	31	10					0.53 UJ
ARSENIC	0.39	7					**1.6 J**
BARIUM	5400	5500					11.6 J
BERYLLIUM	150	0.4					0.27 J
CADMIUM	37	39					0.04 U
CALCIUM	NA	NA					505 J
CHROMIUM	30	1400					4.9
COBALT	900	NA					4.2 J
COPPER	3100	3100					8.4
IRON	23000	NA					6980
LEAD	400	150					4.6
MAGNESIUM	NA	NA					969 J
MANGANESE	1800	390					121 J
MERCURY	23	23					0.05 U
NICKEL	1600	1000					6.9 J
POTASSIUM	NA	NA					401 J
SELENIUM	390	390					0.49 U
SILVER	390	200					0.22 U
SODIUM	NA	NA					101 J
VANADIUM	78	550					6.1 J
ZINC	23000	6000					20.7
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA					
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
DIESEL RANGE ORGANICS	NA	NA					28.1 U
OIL & GREASE	NA	NA					
PHC AS DIESEL	NA	NA					
TOTAL PETROLEUM HYDROCARBONS	NA	500					
TOTAL RECOVERABLE TPH	NA	NA	127	31 U	27 U	44	

TAB

SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	03 28-SB-18 28SB-18-NSO-101398-10 NORMAL 10/13/1998 10 - 12	03 28-SB-19 28SB-19-NSO-101398-08 ORIG 10/13/1998 8 - 10	03 28-SB-19 28SB-19-NSO-101398-08-D DUP 10/13/1998 8 - 10	03 28-SB-20 28SB-20-NSO-101398-08 NORMAL 10/13/1998 8 - 10	02 EBS60-01 EBS60-RSPT-01-071497-02 ORIG 7/14/1997 2 - 3
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
1,1,2-TRICHLOROETHANE	730	3600	1 U	1 U	1 U	1 U	10 U
2-BUTANONE	22000000	10000000	4 U	5 U	5 U	5 U	10 U
2-HEXANONE	NA	NA	4 U	5 U	5 U	5 U	10 U
4-METHYL-2-PENTANONE	5300000	1200000	6 U	6 U	6 U	6 U	10 U
ACETONE	14000000	7800000	20	3 U	3 U	4 U	10 UJ
BENZENE	640	2500	1 U	1 U	1 U	1 U	10 U
BROMODICHLOROMETHANE	820	10000	1 U	1 U	1 U	1 U	10 U
BTEX[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
CARBON DISULFIDE	360000	NA	2 U	2 U	2 U	2 U	10 U
CHLOROFORM	220	1200	1 U	1 U	1 U	1 U	10 U
CHLOROMETHANE	47000	NA	2 U	2 U	2 U	2 U	10 U
CIS-1,2-DICHLOROETHENE	43000	630000					
ETHYLBENZENE	400000	71000	2 U	2 U	2 U	2 U	10 U
M+P-XYLENES	270000	NA					
METHYLENE CHLORIDE	9100	45000	1 U	1 U	1 U	1 U	10 U
O-XYLENE	270000	NA					
STYRENE	1700000	13000	1 U	1 U	1 U	1 U	10 U
TOLUENE	520000	190000	1 U	1 U	1 U	1 U	10 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	1 U	1 U	1 U	1 U	10 U
TOTAL CHLORINATED VOCS[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
TOTAL XYLENES	270000	110000	2 U	2 U	2 U	2 U	10 U
TRANS-1,2-DICHLOROETHENE	69000	1100000					
TRICHLOROETHENE	53	13000	1 U	1 U	1 U	1 U	10 U

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	03 28-SB-18 28SB-18-NSO-101398-10 NORMAL 10/13/1998 10 - 12	03 28-SB-19 28SB-19-NSO-101398-08 ORIG 10/13/1998 8 - 10	03 28-SB-19 28SB-19-NSO-101398-08-D DUP 10/13/1998 8 - 10	03 28-SB-20 28SB-20-NSO-101398-08 NORMAL 10/13/1998 8 - 10	02 EBS60-01 EBS60-RSPT-01-071497-02 ORIG 7/14/1997 2 - 3
VINYL CHLORIDE	79	20	2 U	2 U	2 U	2 U	10 U
Semivolatile Organics (ug/kg)							
2,4-DIMETHYLPHENOL	1200000	1400000	52 U	53 U	52 U	55 U	340 U
2,6-DINITROTOLUENE	61000	NA	55 U	56 U	56 U	59 U	340 U
2-METHYLNAPHTHALENE	56000	123000	57 U	58 U	58 U	61 U	340 U
2-METHYLPHENOL	3100000	NA	58 U	60 U	59 U	63 U	340 U
4-CHLOROANILINE	240000	310000	110 U	110 U	110 U	120 U	340 U
4-METHYLPHENOL	310000	NA	49 U	51 U	50 U	53 U	340 U
ACENAPHTHENE	3700000	43000	58 U	60 U	59 U	63 U	340 U
ANTHRACENE	22000000	35000	52 U	53 U	52 U	55 U	340 U
BAP EQUIVALENT[1]	62	400	0 U	0 U	0 U	0 U	49.9
BENZO(A)ANTHRACENE	620	900	71 U	72 U	72 U	76 U	52 J
BENZO(A)PYRENE	62	400	49 U	50 U	49 U	52 U	38 J
BENZO(B)FLUORANTHENE	620	900	75 U	77 U	76 U	81 U	66 J
BENZO(G,H,I)PERYLENE	2300000	800	98 U	100 U	99 U	100 U	340 U
BENZO(K)FLUORANTHENE	6200	900	67 U	69 U	68 U	72 U	340 U
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	130 U	140 U	140 U	140 U	340 U
CARBAZOLE	24000	NA	71 U	72 U	72 U	76 U	340 U
CHRYSENE	62000	400	74 U	76 U	75 U	80 U	50 J
DI-N-BUTYL PHTHALATE	6100000	NA	96 U	98 U	97 U	100 U	340 U
DIBENZO(A,H)ANTHRACENE	62	400	79 U	80 U	80 U	84 U	340 U
DIBENZOFURAN	150000	NA	53 U	54 U	53 U	57 U	340 U
DIETHYL PHTHALATE	49000000	340000	71 U	72 U	72 U	76 U	340 U
FLUORANTHENE	2300000	20000	64 U	66 U	65 U	69 U	96 J
FLUORENE	2700000	28000	65 U	67 U	66 U	70 U	340 U
INDENO(1,2,3-CD)PYRENE	620	900	91 U	93 U	92 U	98 U	340 U
NAPHTHALENE	56000	54000	97 U	99 U	98 U	100 U	340 U
PHENANTHRENE	2300000	40000	71 U	72 U	72 U	76 U	51 J
PYRENE	2300000	13000	81 U	83 U	82 U	87 U	86 J
TOTAL PAHS[1]	NA	NA	0 U	0 U	0 U	0 U	439
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000					
ACENAPHTHENE	3700000	43000					
ACENAPHTHYLENE	3700000	23000					
ANTHRACENE	22000000	35000					
BAP EQUIVALENT	62	400					
BENZO(A)ANTHRACENE	620	900					
BENZO(A)PYRENE	62	400					
BENZO(B)FLUORANTHENE	620	900					
BENZO(G,H,I)PERYLENE	2300000	800					
BENZO(K)FLUORANTHENE	6200	900					
CHRYSENE	62000	400					
DIBENZO(A,H)ANTHRACENE	62	400					
FLUORANTHENE	2300000	20000					
FLUORENE	2700000	28000					
INDENO(1,2,3-CD)PYRENE	620	900					
NAPHTHALENE	56000	54000					
PHENANTHRENE	2300000	40000					
PYRENE	2300000	13000					
TOTAL PAHS[1]	NA	NA					

TA[illegible]
SUMMARY OF CHEMICALS DETECTED I[illegible]ALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	03 28-SB-18 28SB-18-NSO-101398-10 NORMAL 10/13/1998 10 - 12	03 28-SB-19 28SB-19-NSO-101398-08 ORIG 10/13/1998 8 - 10	03 28-SB-19 28SB-19-NSO-101398-08-D DUP 10/13/1998 8 - 10	03 28-SB-20 28SB-20-NSO-101398-08 NORMAL 10/13/1998 8 - 10	02 EBS60-01 EBS60-RSPT-01-071497-02 ORIG 7/14/1997 2 - 3
Pesticides (ug/kg)							
4,4'-DDD	2400	NA	3.7 U	3.8 U	3.8 U	4 U	
4,4'-DDT	1700	NA	3.7 U	3.8 U	3.8 U	4 U	
ENDRIN ALDEHYDE	18000	NA	3.7 U	3.8 U	3.8 U	4 U	
GAMMA-CHLORDANE	1600	NA	1.9 U	1.9 U	1.9 U	2 U	
Inorganics (mg/kg)							
ALUMINUM	76000	NA	8780	9010	9610	3600	
ANTIMONY	31	10	0.66 J	0.52 UJ	0.58 J	6.4 J	
ARSENIC	0.39	7	2.5	2.4	2 J	2.8	1.7 J
BARIUM	5400	5500	35.8 J	37.6 J	31.3 J	98.9	8.7
BERYLLIUM	150	0.4	0.57 J	0.52 J	0.51 J	0.3 J	
CADMIUM	37	39	0.06 U	0.04 U	0.04 U	0.81 J	0.05 U
CALCIUM	NA	NA	1050 J	934 J	871 J	2640	
CHROMIUM	30	1400	13.3	10.8	11.3	16.5	4.4 J
COBALT	900	NA	9.5 J	8.4 J	7.5 J	7 J	
COPPER	3100	3100	28.3	21.9	16.2	54.1	
IRON	23000	NA	17300	16000	15900	25800	
LEAD	400	150	24.6	27.2	19.7	339	7.5 J
MAGNESIUM	NA	NA	3240	2550	2490	1660	
MANGANESE	1800	390	228 J	198 J	156 J	317 J	
MERCURY	23	23	0.05 U	0.06 U	0.05 J	0.14	0.1 U
NICKEL	1600	1000	17.1	12.4	12.2	18.3	
POTASSIUM	NA	NA	1170	1080	997 J	901 J	
SELENIUM	390	390	0.49 U	0.47 U	0.46 U	0.5 U	0.17 U
SILVER	390	200	0.22 U	0.22 U	0.21 U	0.29 J	0.33 U
SODIUM	NA	NA	103 J	92.3 J	98 J	145 J	
VANADIUM	78	550	14.9	15.3	15.5	7.4 J	
ZINC	23000	6000	61.8	73.7	58.1	528	
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA					
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
DIESEL RANGE ORGANICS	NA	NA	27.8 U	28.3 U	28.2 U	82.9	
OIL & GREASE	NA	NA					
PHC AS DIESEL	NA	NA					
TOTAL PETROLEUM HYDROCARBONS	NA	500					124
TOTAL RECOVERABLE TPH	NA	NA					

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 EBS60-01 EBS60-RSPT-01-071497-02-D DUP 7/14/1997 2 - 3	03 EBS81-01 EBS81-RSPT-01S-120297-09 NORMAL 12/2/1997 9 - 11	03 EBS81-02 EBS81-RSPT-02S-120297-09 NORMAL 12/2/1997 9 - 11	01 EBS85-SB01 EBS85-SB01-050196-02 NORMAL 5/1/1996 2 - 4	01 EBS85-SB02 EBS85-SB02-050196-02 NORMAL 5/1/1996 2 - 4
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
1,1,2-TRICHLOROETHANE	730	3600	10 U	11 U	11 U	11 U	11 U
2-BUTANONE	22000000	10000000	10 U	11 U	11 U	99 J	63 J
2-HEXANONE	NA	NA	10 U	11 U	11 U	11 U	11 U
4-METHYL-2-PENTANONE	5300000	1200000	10 U	11 U	11 U	11 U	11 U
ACETONE	14000000	7800000	10 UJ	11 U	11 U	48 J	28 J
BENZENE	640	2500	10 U	11 U	11 U	11 U	11 U
BROMODICHLOROMETHANE	820	10000	10 U	11 U	11 U	11 U	11 U
BTEX[1]	NA	NA	0 U	0 U	0 U	15	6
CARBON DISULFIDE	360000	NA	10 U	11 U	11 U	11 U	11 U
CHLOROFORM	220	1200	10 U	11 U	11 U	11 U	11 U
CHLOROMETHANE	47000	NA	10 U	11 U	11 U	11 U	11 U
CIS-1,2-DICHLOROETHENE	43000	630000					
ETHYLBENZENE	400000	71000	10 U	11 U	11 U	11 U	11 U
M+P-XYLENES	270000	NA					
METHYLENE CHLORIDE	9100	45000	10 U	11 U	11 U	11 U	11 U
O-XYLENE	270000	NA					
STYRENE	1700000	13000	10 U	11 U	11 U	11 U	11 U
TOLUENE	520000	190000	10 U	11 U	11 U	15	6 J
TOTAL 1,2-DICHLOROETHENE	43000	630000	10 U	11 U	11 U	11 U	11 U
TOTAL CHLORINATED VOCS[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
TOTAL XYLENES	270000	110000	10 U	11 U	11 U	11 U	11 U
TRANS-1,2-DICHLOROETHENE	69000	1100000					
TRICHLOROETHENE	53	13000	10 U	11 U	11 U	11 U	11 U

TA[illegible]8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 EBS60-01 EBS60-RSPT-01-071497-02-D DUP 7/14/1997 2 - 3	03 EBS81-01 EBS81-RSPT-01S-120297-09 NORMAL 12/2/1997 9 - 11	03 EBS81-02 EBS81-RSPT-02S-120297-09 NORMAL 12/2/1997 9 - 11	01 EBS85-SB01 EBS85-SB01-050196-02 NORMAL 5/1/1996 2 - 4	01 EBS85-SB02 EBS85-SB02-050196-02 NORMAL 5/1/1996 2 - 4
VINYL CHLORIDE	79	20	10 U	11 U	11 U	11 U	11 U
Semivolatile Organics (ug/kg)							
2,4-DIMETHYLPHENOL	1200000	1400000	340 U	350 U	350 U		
2,6-DINITROTOLUENE	61000	NA	340 U	350 U	350 U		
2-METHYLNAPHTHALENE	56000	123000	340 U	350 U	350 U		
2-METHYLPHENOL	3100000	NA	340 U	350 U	350 U		
4-CHLOROANILINE	240000	310000	340 U	350 U	350 U		
4-METHYLPHENOL	310000	NA	340 U	350 U	350 U		
ACENAPHTHENE	3700000	43000	340 U	350 U	350 U		
ANTHRACENE	22000000	35000	340 U	350 U	350 U		
BAP EQUIVALENT[1]	62	400	0 U	0 U	0 U		
BENZO(A)ANTHRACENE	620	900	340 U	350 U	350 U		
BENZO(A)PYRENE	62	400	340 U	350 U	350 U		
BENZO(B)FLUORANTHENE	620	900	340 U	350 U	350 U		
BENZO(G,H,I)PERYLENE	2300000	800	340 U	350 U	350 U		
BENZO(K)FLUORANTHENE	6200	900	340 U	350 U	350 U		
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	340 U	350 U	350 U		
CARBAZOLE	24000	NA	340 U	350 U	350 U		
CHRYSENE	62000	400	340 U	350 U	350 U		
DI-N-BUTYL PHTHALATE	6100000	NA	340 U	350 U	350 U		
DIBENZO(A,H)ANTHRACENE	62	400	340 U	350 U	350 U		
DIBENZOFURAN	150000	NA	340 U	350 U	350 U		
DIETHYL PHTHALATE	49000000	340000	340 U	350 U	350 U		
FLUORANTHENE	2300000	20000	340 U	350 U	350 U		
FLUORENE	2700000	28000	340 U	350 U	350 U		
INDENO(1,2,3-CD)PYRENE	620	900	340 U	350 U	350 U		
NAPHTHALENE	56000	54000	340 U	350 U	350 U		
PHENANTHRENE	2300000	40000	340 U	350 U	350 U		
PYRENE	2300000	13000	340 U	350 U	350 U		
TOTAL PAHS[1]	NA	NA	0 U	0 U	0 U		
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000					
ACENAPHTHENE	3700000	43000					
ACENAPHTHYLENE	3700000	23000					
ANTHRACENE	22000000	35000					
BAP EQUIVALENT	62	400					
BENZO(A)ANTHRACENE	620	900					
BENZO(A)PYRENE	62	400					
BENZO(B)FLUORANTHENE	620	900					
BENZO(G,H,I)PERYLENE	2300000	800					
BENZO(K)FLUORANTHENE	6200	900					
CHRYSENE	62000	400					
DIBENZO(A,H)ANTHRACENE	62	400					
FLUORANTHENE	2300000	20000					
FLUORENE	2700000	28000					
INDENO(1,2,3-CD)PYRENE	620	900					
NAPHTHALENE	56000	54000					
PHENANTHRENE	2300000	40000					
PYRENE	2300000	13000					
TOTAL PAHS[1]	NA	NA					

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 EBS60-01 EBS60-RSPT-01-071497-02-D DUP 7/14/1997 2 - 3	03 EBS81-01 EBS81-RSPT-01S-120297-09 NORMAL 12/2/1997 9 - 11	03 EBS81-02 EBS81-RSPT-02S-120297-09 NORMAL 12/2/1997 9 - 11	01 EBS85-SB01 EBS85-SB01-050196-02 NORMAL 5/1/1996 2 - 4	01 EBS85-SB02 EBS85-SB02-050196-02 NORMAL 5/1/1996 2 - 4
Pesticides (ug/kg)							
4,4'-DDD	2400	NA					
4,4'-DDT	1700	NA					
ENDRIN ALDEHYDE	18000	NA					
GAMMA-CHLORDANE	1600	NA					
Inorganics. (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7	2.8 J	3.4	3.1		
BARIUM	5400	5500	10.7	5.2 J	3 J		
BERYLLIUM	150	0.4					
CADMIUM	37	39	0.06 U	0.04 U	0.04 U		
CALCIUM	NA	NA					
CHROMIUM	30	1400	4.3 J	3.7	1.9		
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150	9.2 J	6.5	3.6		
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
MERCURY	23	23	0.1 U	0.1 U	0.1 U		
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390	0.28 U	0.38 U	0.21 U		
SILVER	390	200	0.38 U	0.07 U	0.07 U		
SODIUM	NA	NA					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA					
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
DIESEL RANGE ORGANICS	NA	NA					
OIL & GREASE	NA	NA					
PHC AS DIESEL	NA	NA					
TOTAL PETROLEUM HYDROCARBONS	NA	500	109	56	27.1		
TOTAL RECOVERABLE TPH	NA	NA					

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SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	01 EBS85-SB02 EBS85-SB02-050196-08 NORMAL 5/1/1996 8 - 10	04 MW16-01S MW16-01S-NSO-051700-19 NORMAL 5/17/2000 19 - 21	04 MW16-02S MW16-02S-NSO-052400-10 NORMAL 5/24/2000 10 - 12	04 MW16-03S MW16-03S-NSO-061200-03 NORMAL 6/12/2000 3 - 5	04 MW16-04S MW16-04S-NSO-061400-03 NORMAL 6/14/2000 3 - 5
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
1,1,2-TRICHLOROETHANE	730	3600	12 U	5 U	5 U	5 U	5 U
2-BUTANONE	22000000	10000000	52 J	10 UJ	10 U	10 U	7 J
2-HEXANONE	NA	NA	12 U	10 U	10 U	10 U	10 UJ
4-METHYL-2-PENTANONE	5300000	1200000	12 U	10 U	10 U	10 U	10 U
ACETONE	14000000	7800000	12 U	10 UJ	10 UJ	8 E	10 E
BENZENE	640	2500	12 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	820	10000	12 U	5 U	5 U	5 U	5 U
BTEX[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
CARBON DISULFIDE	360000	NA	12 U	5 U	5 U	5 UJ	5 U
CHLOROFORM	220	1200	12 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	47000	NA	12 U	5 UJ	5 U	5 U	5 UJ
CIS-1,2-DICHLOROETHENE	43000	630000		5 U	5 U	5 U	5 U
ETHYLBENZENE	400000	71000	12 U	5 U	5 U	5 U	5 U
M+P-XYLENES	270000	NA		5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	9100	45000	12 U	22 UJ	8 UJ	6 UJ	5 UJ
O-XYLENE	270000	NA		5 U	5 U	5 U	5 U
STYRENE	1700000	13000	12 U	5 U	5 U	5 U	5 U
TOLUENE	520000	190000	12 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	12 U	5 U	5 U	5 U	5 U
TOTAL CHLORINATED VOCS[1]	NA	NA	0 U	0 U	6	0 U	0 U
TOTAL XYLENES	270000	110000	12 U	5 U	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	69000	1100000		5 U	5 U	5 U	5 U
TRICHLOROETHENE	53	13000	12 U	5 U	6	5 U	5 U

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	01 EBS85-SB02 EBS85-SB02-050196-08 NORMAL 5/1/1996 8 - 10	04 MW16-01S MW16-01S-NSO-051700-19 NORMAL 5/17/2000 19 - 21	04 MW16-02S MW16-02S-NSO-052400-10 NORMAL 5/24/2000 10 - 12	04 MW16-03S MW16-03S-NSO-061200-03 NORMAL 6/12/2000 3 - 5	04 MW16-04S MW16-04S-NSO-061400-03 NORMAL 6/14/2000 3 - 5
VINYL CHLORIDE	79	20	12 U	10 U	10 U	10 U	10 U
Semivolatile Organics (ug/kg)							
2,4-DIMETHYLPHENOL	1200000	1400000		400 UJ	400 U	400 U	360 U
2,6-DINITROTOLUENE	61000	NA		400 UJ	400 U	400 U	360 U
2-METHYLNAPHTHALENE	56000	123000		400 UJ	400 U	400 U	360 U
2-METHYLPHENOL	3100000	NA		400 UJ	400 U	400 U	360 U
4-CHLOROANILINE	240000	310000		400 UJ	400 UJ	400 UJ	360 UJ
4-METHYLPHENOL	310000	NA		400 UJ	400 U	400 U	360 U
ACENAPHTHENE	3700000	43000		400 UJ	400 U	400 U	360 U
ANTHRACENE	22000000	35000		400 UJ	400 U	400 U	360 U
BAP EQUIVALENT[1]	62	400		0 U	0 U	0 U	0 U
BENZO(A)ANTHRACENE	620	900		400 UJ	400 U	400 U	360 U
BENZO(A)PYRENE	62	400		400 UJ	400 U	400 U	360 U
BENZO(B)FLUORANTHENE	620	900		400 UJ	400 U	400 U	360 U
BENZO(G,H,I)PERYLENE	2300000	800		400 UJ	400 U	400 UJ	360 UJ
BENZO(K)FLUORANTHENE	6200	900		400 UJ	400 U	400 UJ	360 UJ
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000		400 UJ	400 U	400 U	360 U
CARBAZOLE	24000	NA		400 UJ	400 U	400 U	360 U
CHRYSENE	62000	400		400 UJ	400 U	400 U	360 U
DI-N-BUTYL PHTHALATE	6100000	NA		400 UJ	400 U	400 U	360 U
DIBENZO(A,H)ANTHRACENE	62	400		400 UJ	400 U	400 UJ	360 UJ
DIBENZOFURAN	150000	NA		400 UJ	400 U	400 U	360 U
DIETHYL PHTHALATE	49000000	340000		400 UJ	400 UJ	400 U	360 U
FLUORANTHENE	2300000	20000		400 UJ	400 U	400 U	360 U
FLUORENE	2700000	28000		400 UJ	400 U	400 U	360 U
INDENO(1,2,3-CD)PYRENE	620	900		400 UJ	400 U	400 UJ	360 UJ
NAPHTHALENE	56000	54000		400 UJ	400 U	400 U	360 U
PHENANTHRENE	2300000	40000		400 UJ	400 U	400 U	360 U
PYRENE	2300000	13000		400 UJ	400 UJ	400 U	360 U
TOTAL PAHS[1]	NA	NA		0 U	0 U	0 U	0 U
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000		24 UJ	24 UJ	24 U	22 U
ACENAPHTHENE	3700000	43000		24 UJ	24 UJ	24 U	22 U
ACENAPHTHYLENE	3700000	23000		24 UJ	24 UJ	24 U	22 U
ANTHRACENE	22000000	35000		24 UJ	24 UJ	24 U	11
BAP EQUIVALENT	62	400		0 U	0 U	0 U	79.6
BENZO(A)ANTHRACENE	620	900		24 UJ	24 U	24 U	59
BENZO(A)PYRENE	62	400		24 UJ	24 UJ	24 U	51
BENZO(B)FLUORANTHENE	620	900		24 UJ	24 U	24 U	81
BENZO(G,H,I)PERYLENE	2300000	800		24 UJ	24 UJ	24 U	34
BENZO(K)FLUORANTHENE	6200	900		24 UJ	24 U	24 U	24
CHRYSENE	62000	400		24 UJ	24 U	24 U	50
DIBENZO(A,H)ANTHRACENE	62	400		24 UJ	24 UJ	24 U	10
FLUORANTHENE	2300000	20000		24 UJ	24 U	24 U	100
FLUORENE	2700000	28000		24 UJ	24 U	24 U	22 U
INDENO(1,2,3-CD)PYRENE	620	900		24 UJ	24 UJ	24 U	43
NAPHTHALENE	56000	54000		24 UJ	24 UJ	24 U	22 U
PHENANTHRENE	2300000	40000		24 UJ	24 UJ	24 U	60
PYRENE	2300000	13000		24 UJ	24 U	24 U	83
TOTAL PAHS[1]	NA	NA		0 U	0 U	0 U	606

TAB[illegible]

SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	01 EBS85-SB02 EBS85-SB02-050196-08 NORMAL 5/1/1996 8 - 10	04 MW16-01S MW16-01S-NSO-051700-19 NORMAL 5/17/2000 19 - 21	04 MW16-02S MW16-02S-NSO-052400-10 NORMAL 5/24/2000 10 - 12	04 MW16-03S MW16-03S-NSO-061200-03 NORMAL 6/12/2000 3 - 5	04 MW16-04S MW16-04S-NSO-061400-03 NORMAL 6/14/2000 3 - 5
Pesticides (ug/kg)							
4,4'-DDD	2400	NA		4 U	4 U	3.8 U	3.8 U
4,4'-DDT	1700	NA		4 U	4 U	3.8 U	3.8 U
ENDRIN ALDEHYDE	18000	NA		4 U	4 U	3.8 U	3.8 U
GAMMA-CHLORDANE	1600	NA		2.1 U	2.1 U	2 U	1.9 U
Inorganics (mg/kg)							
ALUMINUM	76000	NA		3570	3380	5270	2810
ANTIMONY	31	10		0.22 U	0.23 U	0.38 UJ	0.18 UJ
ARSENIC	0.39	7		3.1	2	1.7 UJ	1.5 UJ
BARIUM	5400	5500		10.1	9.5	11.6	12
BERYLLIUM	150	0.4		0.29	0.31	0.6	0.44
CADMIUM	37	39		0.25 U	0.03 U	0.43 U	0.2 U
CALCIUM	NA	NA		492	587	341 U	526 U
CHROMIUM	30	1400		5.4	5.5	8.1	2.5
COBALT	900	NA		4.9	4.3	10.2	2.9
COPPER	3100	3100		15.5	8.1	56.7 J	6.7 J
IRON	23000	NA		11500	9080	22000	5900
LEAD	400	150		5.8	4.6	9.1	11.6
MAGNESIUM	NA	NA		1410	1260	1740 J	509 UJ
MANGANESE	1800	390		157	145	219	92
MERCURY	23	23		0.01 U	0.01 U	0.01 U	0.02 U
NICKEL	1600	1000		4.3 U	6.1	12.6	2.7 U
POTASSIUM	NA	NA		616	469	524 U	389 U
SELENIUM	390	390		0.28 U	0.3 U	0.92	0.23 U
SILVER	390	200		0.51 U	0.27 U	0.45 U	0.21 UJ
SODIUM	NA	NA		68.6	45.9	23.4 U	20.2 U
VANADIUM	78	550		8.2	6.6	10.9	4.6
ZINC	23000	6000		20.8	22.7	39.3 J	27.8 J
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA		6.4	6.4	6.5	6.4
TOTAL ORGANIC CARBON	NA	NA		1900	890	3600	3300
TOTAL RESIDUE (%)	NA	NA		81	82	86	87
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
DIESEL RANGE ORGANICS	NA	NA					
OIL & GREASE	NA	NA					
PHC AS DIESEL	NA	NA					
TOTAL PETROLEUM HYDROCARBONS	NA	500					
TOTAL RECOVERABLE TPH	NA	NA					

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 MW16-05S MW16-05S-NSO-053000-05 NORMAL 5/30/2000 5 - 7	04 MW16-06S MW16-06S-NSO-062100-10 NORMAL 6/21/2000 10 - 12	04 MW16-07S MW16-07S-NSO-061900-05 ORIG 6/19/2000 5 - 7	04 MW16-07S MW16-07S-NSO-061900-05-D DUP 6/19/2000 5 - 7	08 MW16-49I MW16-49I-NSO-080404-10 ORIG 8/4/2004 10 - 12
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
1,1,2-TRICHLOROETHANE	730	3600	5 U	5 U	340 U	330 U	4 U
2-BUTANONE	22000000	10000000	10 U	10 U	670 UJ	660 UJ	7 J
2-HEXANONE	NA	NA	10 U	10 U	670 U	660 U	8 U
4-METHYL-2-PENTANONE	5300000	1200000	10 U	10 U	670 U	660 U	8 U
ACETONE	14000000	7800000	17 U	27 E	490 E	450 E	49 J
BENZENE	640	2500	5 U	5 U	340 U	330 U	4 U
BROMODICHLOROMETHANE	820	10000	5 U	5 U	340 U	330 U	4 U
BTEX[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
CARBON DISULFIDE	360000	NA	5 U	5 U	340 U	330 U	11 J
CHLOROFORM	220	1200	5 U	5 U	340 U	330 U	4 U
CHLOROMETHANE	47000	NA	5 UJ	5 UJ	340 U	330 U	4 U
CIS-1,2-DICHLOROETHENE	43000	630000	5 U	5 U	340 U	330 U	4 U
ETHYLBENZENE	400000	71000	5 U	5 U	340 U	330 U	4 U
M+P-XYLENES	270000	NA	5 U	5 U	340 U	330 U	8 U
METHYLENE CHLORIDE	9100	45000	19 UJ	4 J	230 J	190 J	7 U
O-XYLENE	270000	NA	5 U	5 U	340 U	330 U	4 U
STYRENE	1700000	13000	5 U	5 U	340 U	330 U	4 U
TOLUENE	520000	190000	5 U	5 U	340 U	330 U	4 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	5 U	5 U	340 U	330 U	4 U
TOTAL CHLORINATED VOCS[1]	NA	NA	0 U	4	230	190	0 U
TOTAL XYLENES	270000	110000	5 U	5 U	340 U	330 U	4 U
TRANS-1,2-DICHLOROETHENE	69000	1100000	5 U	5 U	340 U	330 U	4 U
TRICHLOROETHENE	53	13000	5 U	5 U	340 U	330 U	4 U

TAB

SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 MW16-05S MW16-05S-NSO-053000-05 NORMAL 5/30/2000 5 - 7	04 MW16-06S MW16-06S-NSO-062100-10 NORMAL 6/21/2000 10 - 12	04 MW16-07S MW16-07S-NSO-061900-05 ORIG 6/19/2000 5 - 7	04 MW16-07S MW16-07S-NSO-061900-05-D DUP 6/19/2000 5 - 7	08 MW16-49I MW16-49I-NSO-080404-10 ORIG 8/4/2004 10 - 12
VINYL CHLORIDE	79	20	10 U	10 U	670 U	660 U	4 U
Semivolatile Organics (ug/kg)							
2,4-DIMETHYLPHENOL	1200000	1400000	400 U	360 U	360 U	360 U	220 U
2,6-DINITROTOLUENE	61000	NA	400 U	360 U	360 U	360 U	220 U
2-METHYLNAPHTHALENE	56000	123000	400 UJ	360 U	5700	8100	220 U
2-METHYLPHENOL	3100000	NA	400 U	360 U	360 U	360 U	220 U
4-CHLOROANILINE	240000	310000	400 UJ	360 UJ	360 UJ	360 UJ	220 U
4-METHYLPHENOL	310000	NA	400 UJ	360 U	360 U	360 U	220 U
ACENAPHTHENE	3700000	43000	400 UJ	360 U	610	640	
ANTHRACENE	22000000	35000	400 UJ	360 U	360 U	360 U	
BAP EQUIVALENT[1]	62	400	0 U	0 U	0 U	0 U	
BENZO(A)ANTHRACENE	620	900	400 UJ	360 U	360 U	360 U	
BENZO(A)PYRENE	62	400	400 UJ	360 U	360 U	360 U	
BENZO(B)FLUORANTHENE	620	900	400 UJ	360 U	360 U	360 U	
BENZO(G,H,I)PERYLENE	2300000	800	400 UJ	360 U	360 UJ	360 UJ	
BENZO(K)FLUORANTHENE	6200	900	400 UJ	360 U	360 UJ	360 UJ	
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	400 U	360 U	560	360 U	1600
CARBAZOLE	24000	NA	400 U	360 U	360 U	360 U	220 U
CHRYSENE	62000	400	400 UJ	360 U	360 U	360 U	
DI-N-BUTYL PHTHALATE	6100000	NA	400 U	360 U	360 U	360 U	220 U
DIBENZO(A,H)ANTHRACENE	62	400	400 UJ	360 U	360 UJ	360 UJ	
DIBENZOFURAN	150000	NA	400 U	360 U	360 U	360 U	220 U
DIETHYL PHTHALATE	49000000	340000	400 U	360 U	360 U	360 U	220 U
FLUORANTHENE	2300000	20000	400 U	360 U	280	350	
FLUORENE	2700000	28000	400 UJ	360 U	620	700	
INDENO(1,2,3-CD)PYRENE	620	900	400 UJ	360 U	360 UJ	360 UJ	
NAPHTHALENE	56000	54000	400 UJ	360 U	360 U	360 U	
PHENANTHRENE	2300000	40000	400 UJ	360 U	1000	1200	
PYRENE	2300000	13000	400 UJ	360 U	350	360 J	
TOTAL PAHS[1]	NA	NA	0 U	0 U	8560	11350	
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000	24 U	22 U	7000	5900	
ACENAPHTHENE	3700000	43000	24 UJ	22 U	600	600	22 U
ACENAPHTHYLENE	3700000	23000	24 UJ	22 U	310 J	22 UJ	44 U
ANTHRACENE	22000000	35000	24 U	22 U	1300	1200	2.2 U
BAP EQUIVALENT	62	400	0 U	0 U	129	150	0 U
BENZO(A)ANTHRACENE	620	900	24 UJ	22 U	140	140	2.2 U
BENZO(A)PYRENE	62	400	24 UJ	22 U	89 J	92 J	2.2 U
BENZO(B)FLUORANTHENE	620	900	24 UJ	22 U	200	180	4.4 U
BENZO(G,H,I)PERYLENE	2300000	800	24 UJ	22 U	46 J	46 J	4.4 U
BENZO(K)FLUORANTHENE	6200	900	24 UJ	22 U	24	35 J	2.2 U
CHRYSENE	62000	400	24 U	22 U	100 J	100 J	2.2 U
DIBENZO(A,H)ANTHRACENE	62	400	24 UJ	22 U	22 U	19	4.4 U
FLUORANTHENE	2300000	20000	24 U	22 U	280	300	22 J
FLUORENE	2700000	28000	24 U	22 U	660 J	710 J	4.4 U
INDENO(1,2,3-CD)PYRENE	620	900	24 UJ	22 U	60 J	63 J	2.2 U
NAPHTHALENE	56000	54000	24 U	22 U	620	540	22 U
PHENANTHRENE	2300000	40000	24 U	22 U	1400	1300	2.2 U
PYRENE	2300000	13000	24 U	22 U	400	350	21 J
TOTAL PAHS[1]	NA	NA	0 U	0 U	13229	11575	43

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 MW16-05S MW16-05S-NSO-053000-05 NORMAL 5/30/2000 5 - 7	04 MW16-06S MW16-06S-NSO-062100-10 NORMAL 6/21/2000 10 - 12	04 MW16-07S MW16-07S-NSO-061900-05 ORIG 6/19/2000 5 - 7	04 MW16-07S MW16-07S-NSO-061900-05-D DUP 6/19/2000 5 - 7	08 MW16-49I MW16-49I-NSO-080404-10 ORIG 8/4/2004 10 - 12
Pesticides (ug/kg)							
4,4'-DDD	2400	NA	3.8 U	3.8 U	3.8 U	3.7 U	
4,4'-DDT	1700	NA	3.8 U	3.8 U	3.8 U	3.7 U	
ENDRIN ALDEHYDE	18000	NA	3.8 U	3.8 U	3.8 U	3.7 U	
GAMMA-CHLORDANE	1600	NA	2 U	2 U	1.9 U	1.9 U	
Inorganics (mg/kg)							
ALUMINUM	76000	NA	4560	7970	3390	3520	
ANTIMONY	31	10	0.21 UJ	0.24 UJ	0.21 UJ	0.24 UJ	
ARSENIC	0.39	7	2.2	2.8 J	1.5	1.7	
BARIUM	5400	5500	10.8	23.5	38.4	37.2	
BERYLLIUM	150	0.4	0.36	0.57	0.27 J	0.39	
CADMIUM	37	39	0.33 J	0.25 U	0.23 U	0.27 U	
CALCIUM	NA	NA	358 J	1050 U	350 U	356 U	
CHROMIUM	30	1400	7.4	9.9	4 U	4.5 U	
COBALT	900	NA	4.8	7.7	3.3	3.8	
COPPER	3100	3100	8.6	20.2 J	8.3 J	9.3 J	
IRON	23000	NA	12900	17100	6930	7690	
LEAD	400	150	4.6	7.2	3.8	4.1	
MAGNESIUM	NA	NA	1900	3040 J	966 U	1050	
MANGANESE	1800	390	140	195	66.8	73.7	
MERCURY	23	23	0.01 U	0.01 U	0.01 U	0.01 U	
NICKEL	1600	1000	8.3	11.3	5.9	5.1	
POTASSIUM	NA	NA	619	1390 U	270 U	344 U	
SELENIUM	390	390	0.27 U	0.31 U	0.32 U	0.31 U	
SILVER	390	200	0.3 J	0.44 UJ	0.24 U	0.33 J	
SODIUM	NA	NA	31.8	26 U	18.4 U	21.6 U	
VANADIUM	78	550	8.3	15.1	6.6	7	
ZINC	23000	6000	25.2	37.3 J	15.9 J	18.7 J	
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA	6.4	7.1	7.4	7.8	6.43
TOTAL ORGANIC CARBON	NA	NA	1800	3500	1800	2600	5400
TOTAL RESIDUE (%)	NA	NA	87	87	87	90	
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
DIESEL RANGE ORGANICS	NA	NA					11
OIL & GREASE	NA	NA					120
PHC AS DIESEL	NA	NA					
TOTAL PETROLEUM HYDROCARBONS	NA	500					
TOTAL RECOVERABLE TPH	NA	NA					

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SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	08 MW16-49I MW16-49I-NSO-080404-10-D DUP 8/4/2004 10 - 12	08 MW16-50I MW16-50I-NSO-080504-22 NORMAL 8/5/2004 22 - 24	08 SB16-07 SB16-07-NSO-051404-04 NORMAL 5/14/2004 4 - 6	08 SB16-07 SB16-07-NSO-051404-10 NORMAL 5/14/2004 10 - 12	04 SB16-21 SB16-21-NSO-062600-08 NORMAL 6/26/2000 8 - 10
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					7240 J
1,2,3,4,6,7,8,9-OCDF	39000	NA					9.88 U
1,2,3,4,6,7,8-HPCDD	390	NA					46.8
1,2,3,4,6,7,8-HPCDF	390	NA					4.94 U
1,2,3,4,7,8,9-HPCDF	390	NA					4.94 U
1,2,3,4,7,8-HXCDD	39	NA					4.94 U
1,2,3,4,7,8-HXCDF	39	NA					4.94 U
1,2,3,6,7,8-HXCDD	39	NA					4.94 U
1,2,3,6,7,8-HXCDF	39	NA					4.94 U
1,2,3,7,8,9-HXCDD	39	NA					4.94 U
1,2,3,7,8-PECDD	3.9	NA					4.94 U
1,2,3,7,8-PECDF	78	NA					4.94 U
2,3,4,6,7,8-HXCDF	39	NA					4.94 U
2,3,4,7,8-PECDF	7.8	NA					4.94 U
2,3,7,8-TCDD	3.9	NA					0.98 U
2,3,7,8-TCDF	39	NA					0.98 U
TEQ[1]	3.9	NA					1.19
TOTAL HPCDD	NA	NA					80.5 J
TOTAL HPCDF	NA	NA					1.4 U
TOTAL HXCDD	NA	NA					3.3 U
TOTAL HXCDF	NA	NA					19.8 U
TOTAL PECDD	NA	NA					4.94 U
TOTAL PECDF	NA	NA					0.47 U
TOTAL TCDD	NA	NA					0.98 U
TOTAL TCDF	NA	NA					0.98 U
Volatile Organics (ug/kg)							
1,1,2-TRICHLOROETHANE	730	3600	4 U	8 U	5 J	5 U	5 U
2-BUTANONE	22000000	10000000	5 J	13 J	10 U	10 U	10 U
2-HEXANONE	NA	NA	8 U	16 UJ	400 J	10 U	10 U
4-METHYL-2-PENTANONE	5300000	1200000	8 U	16 UJ	7 J	10 U	10 U
ACETONE	14000000	7800000	41 J	130 J	31 U	47 U	18 J
BENZENE	640	2500	4 U	8 UJ	9 J	5 U	5 U
BROMODICHLOROMETHANE	820	10000	4 U	8 U	7 J	5 U	5 U
BTEX[1]	NA	NA	0 U	0 U	105	8	0 U
CARBON DISULFIDE	360000	NA	5 J	3 J	5 U	5 U	5 U
CHLOROFORM	220	1200	4 U	8 U	2 J	5 U	5 U
CHLOROMETHANE	47000	NA	4 U	8 U	5 U	5 U	5 UJ
CIS-1,2-DICHLOROETHENE	43000	630000	4 U	8 U	5 U	5 U	5 U
ETHYLBENZENE	400000	71000	4 U	8 UJ	12 J	5 U	5 U
M+P-XYLENES	270000	NA	8 U	16 UJ	44 J	2 J	5 U
METHYLENE CHLORIDE	9100	45000	4 U	5 U	1 U	1 U	5 UJ
O-XYLENE	270000	NA	4 U	8 UJ	33 J	4 J	5 U
STYRENE	1700000	13000	4 U	8 UJ	1 J	5 U	5 U
TOLUENE	520000	190000	4 U	8 UJ	7 J	2 J	5 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	4 U	8 U	5 U	5 U	5 U
TOTAL CHLORINATED VOCS[1]	NA	NA	0 U	0 U	6	1	0 U
TOTAL XYLENES	270000	110000	4 U	8 UJ	77 J	6 J	5 U
TRANS-1,2-DICHLOROETHENE	69000	1100000	4 U	8 U	5 U	5 U	5 U
TRICHLOROETHENE	53	13000	4 U	8 UJ	1 J	1 J	5 U

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	08 MW16-49I MW16-49I-NSO-080404-10-D DUP 8/4/2004 10 - 12	08 MW16-50I MW16-50I-NSO-080504-22 NORMAL 8/5/2004 22 - 24	08 SB16-07 SB16-07-NSO-051404-04 NORMAL 5/14/2004 4 - 6	08 SB16-07 SB16-07-NSO-051404-10 NORMAL 5/14/2004 10 - 12	04 SB16-21 SB16-21-NSO-062600-08 NORMAL 6/26/2000 8 - 10
VINYL CHLORIDE	79	20	4 U	8 U	5 U	5 U	10 U
Semivolatile Organics (ug/kg)							
2,4-DIMETHYLPHENOL	1200000	1400000	230 U	270 U	5900 U	1900 U	400 U
2,6-DINITROTOLUENE	61000	NA	230 U	270 U	5900 U	2000	400 U
2-METHYLNAPHTHALENE	56000	123000	230 U	270 U	120000 J	13000	400 U
2-METHYLPHENOL	3100000	NA	230 U	270 U	5900 U	1900 U	400 U
4-CHLOROANILINE	240000	310000	230 U	270 U	5900 U	1900 U	400 UJ
4-METHYLPHENOL	310000	NA	230 U	270 U	5900 U	1900 U	400 U
ACENAPHTHENE	3700000	43000					400 U
ANTHRACENE	22000000	35000					400 U
BAP EQUIVALENT[1]	62	400					0 U
BENZO(A)ANTHRACENE	620	900					400 U
BENZO(A)PYRENE	62	400					400 U
BENZO(B)FLUORANTHENE	620	900					400 U
BENZO(G,H,I)PERYLENE	2300000	800					400 U
BENZO(K)FLUORANTHENE	6200	900					400 U
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	2200	1800	5900 U	1900 U	400 U
CARBAZOLE	24000	NA	230 U	270 U	5900 U	1900 U	400 U
CHRYSENE	62000	400					400 U
DI-N-BUTYL PHTHALATE	6100000	NA	230 U	270 U	5900 U	1900 U	400 U
DIBENZO(A,H)ANTHRACENE	62	400					400 U
DIBENZOFURAN	150000	NA	230 U	270 U	5900 U	1900 U	400 U
DIETHYL PHTHALATE	49000000	340000	230 U	270 U	5900 U	1900 U	400 U
FLUORANTHENE	2300000	20000					400 U
FLUORENE	2700000	28000					400 U
INDENO(1,2,3-CD)PYRENE	620	900					400 U
NAPHTHALENE	56000	54000					400 U
PHENANTHRENE	2300000	40000					400 U
PYRENE	2300000	13000					400 U
TOTAL PAHS[1]	NA	NA					0 U
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000					24 U
ACENAPHTHENE	3700000	43000	23 U	28 UJ	20 U	20 U	24 U
ACENAPHTHYLENE	3700000	23000	46 U	55 UJ	40 U	110 J	24 U
ANTHRACENE	22000000	35000	2.3 U	2.8 U	240 J	86 J	24 U
BAP EQUIVALENT	62	400	0 U	0 U	204	142	37.1
BENZO(A)ANTHRACENE	620	900	2.3 U	2.8 UR	2 U	2 U	28
BENZO(A)PYRENE	62	400	2.3 U	2.8 UR	190 J	140 J	26
BENZO(B)FLUORANTHENE	620	900	4.6 U	5.5 UR	45 J	3.9 U	57
BENZO(G,H,I)PERYLENE	2300000	800	4.6 U	5.5 UR	130 J	19 J	13
BENZO(K)FLUORANTHENE	6200	900	2.3 U	2.8 UR	120 J	2 U	15
CHRYSENE	62000	400	2.3 U	2.8 U	2 U	2 U	30
DIBENZO(A,H)ANTHRACENE	62	400	4.6 U	5.5 U	4 U	3.9 U	24 U
FLUORANTHENE	2300000	20000	16	7.5 J	4 U	3.9 U	40
FLUORENE	2700000	28000	4.6 U	5.5 UR	2400 J	1300 J	24 UJ
INDENO(1,2,3-CD)PYRENE	620	900	2.3 U	2.8 UR	86 J	21 J	24
NAPHTHALENE	56000	54000	23 U	28 U	14000 J	160 J	24 U
PHENANTHRENE	2300000	40000	2.3 U	2.8 U	1900 J	2 U	24 U
PYRENE	2300000	13000	10 J	2.8 U	2 U	2400 J	39
TOTAL PAHS[1]	NA	NA	26	7.5	139111	17236	272

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SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	08 MW16-49I MW16-49I-NSO-080404-10-D DUP 8/4/2004 10 - 12	08 MW16-50I MW16-50I-NSO-080504-22 NORMAL 8/5/2004 22 - 24	08 SB16-07 SB16-07-NSO-051404-04 NORMAL 5/14/2004 4 - 6	08 SB16-07 SB16-07-NSO-051404-10 NORMAL 5/14/2004 10 - 12	04 SB16-21 SB16-21-NSO-062600-08 NORMAL 6/26/2000 8 - 10
Pesticides (ug/kg)							
4,4'-DDD	2400	NA					3.9 U
4,4'-DDT	1700	NA					3.9 U
ENDRIN ALDEHYDE	18000	NA					3.9 U
GAMMA-CHLORDANE	1600	NA					2 U
Inorganics (mg/kg)							
ALUMINUM	76000	NA					11300
ANTIMONY	31	10					0.24 UN
ARSENIC	0.39	7					2.5
BARIUM	5400	5500					17.4
BERYLLIUM	150	0.4					0.55
CADMIUM	37	39					0.36 U
CALCIUM	NA	NA					1090
CHROMIUM	30	1400					10.5
COBALT	900	NA					4.7 J
COPPER	3100	3100					7.9 J
IRON	23000	NA					14200
LEAD	400	150					8.5
MAGNESIUM	NA	NA					1490
MANGANESE	1800	390					94.2 J
MERCURY	23	23					0.03 U
NICKEL	1600	1000					6.6
POTASSIUM	NA	NA					481
SELENIUM	390	390					0.7
SILVER	390	200					0.28 J
SODIUM	NA	NA					38.5
VANADIUM	78	550					18.4
ZINC	23000	6000					22.9 J
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA	6.53	7.5	7.43 J	7.89 J	6.6
TOTAL ORGANIC CARBON	NA	NA	3800	8100	25000	1800	2000
TOTAL RESIDUE (%)	NA	NA					85
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
DIESEL RANGE ORGANICS	NA	NA	18	25			
OIL & GREASE	NA	NA	100 U	160	960	160	
PHC AS DIESEL	NA	NA			7800	1600	
TOTAL PETROLEUM HYDROCARBONS	NA	500					
TOTAL RECOVERABLE TPH	NA	NA					

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 SB16-22 SB16-22-NSO-062700-06 NORMAL 6/27/2000 6 - 8	04 SB16-23 SB16-23-NSO-062600-03 NORMAL 6/26/2000 3 - 5	04 SB16-24 SB16-24-NSO-062600-07 NORMAL 6/26/2000 7 - 9	04 SB16-25 SB16-25-NSO-062600-07 NORMAL 6/26/2000 7 - 9	04 SB16-26 SB16-26-NSO-062300-02 NORMAL 6/23/2000 2 - 4
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA	2500 J	34930 J	4590 J	1310	1410
1,2,3,4,6,7,8,9-OCDF	39000	NA	9.83 U	1790	10.06 U	9.5	98
1,2,3,4,6,7,8-HPCDD	390	NA	16	7630 J	24.5	52.5	73
1,2,3,4,6,7,8-HPCDF	390	NA	4.91 U	1870	5.03 U	6.4	36.7
1,2,3,4,7,8,9-HPCDF	390	NA	4.91 U	48.4	5.03 U	5.02 U	1.1
1,2,3,4,7,8-HXCDD	39	NA	4.91 U	87.4	5.03 U	0.77	0.94
1,2,3,4,7,8-HXCDF	39	NA	4.91 U	68.5	5.03 U	1.1	2.1
1,2,3,6,7,8-HXCDD	39	NA	4.91 U	403	5.03 U	2.9	4.2
1,2,3,6,7,8-HXCDF	39	NA	4.91 U	26	5.03 U	5.02 U	1.2
1,2,3,7,8,9-HXCDD	39	NA	4.91 U	412	5.03 U	2.9	3.2
1,2,3,7,8-PECDD	3.9	NA	4.91 U	69.2	5.03 U	5.02 U	0.75
1,2,3,7,8-PECDF	78	NA	4.91 U	33.2	5.03 U	0.69	2.9 J
2,3,4,6,7,8-HXCDF	39	NA	4.91 U	39.8	5.03 U	5.02 U	1.7
2,3,4,7,8-PECDF	7.8	NA	4.91 U	20	5.03 U	5.02 U	1.1 J
2,3,7,8-TCDD	3.9	NA	0.98 U	18.8	1 U	1 U	1 U
2,3,7,8-TCDF	39	NA	0.98 U	16.9	1 U	1 U	1.1 U
TEQ[1]	3.9	NA	0.41	304	0.704	1.52	4.04
TOTAL HPCDD	NA	NA	38.1	14230 J	70.9	99.1	134
TOTAL HPCDF	NA	NA	9.83 U	4030 J	10.1 U	13.5	89
TOTAL HXCDD	NA	NA	3.3 U	4080	14.1	28.5	30.6
TOTAL HXCDF	NA	NA	19.7 U	1190	20.1 U	6.3	34.1
TOTAL PECDD	NA	NA	4.91 U	868	5.03 U	5.6	4.2
TOTAL PECDF	NA	NA	9.83 U	261 J	10.1 U	1.9	22.3 J
TOTAL TCDD	NA	NA	0.98 U	335	1 U	0.91	0.72
TOTAL TCDF	NA	NA	0.98 U	399 J	1 U	3.2 J	20.6 J
Volatile Organics (ug/kg)							
1,1,2-TRICHLOROETHANE	730	3600	5 U	8 UJ	5 U	5 U	5 U
2-BUTANONE	22000000	10000000	10 U	16 UJ	10 U	10 UJ	10
2-HEXANONE	NA	NA	10 UJ	16 UJ	10 U	10 U	10 U
4-METHYL-2-PENTANONE	5300000	1200000	10 U	16 UJ	10 U	10 UJ	10 U
ACETONE	14000000	7800000	25 J	22 J	8	8 J	22 E
BENZENE	640	2500	5 U	8 J	5 U	5 U	5 U
BROMODICHLOROMETHANE	820	10000	5 U	8 UJ	5 U	5 U	5 U
BTEX[1]	NA	NA	0 U	8.	0 U	0 U	0 U
CARBON DISULFIDE	360000	NA	5 U	8 UJ	1.1	4	5 U
CHLOROFORM	220	1200	5 U	8 UJ	5 U	5 U	5 U
CHLOROMETHANE	47000	NA	5 UJ	8 UJ	5 UJ	5 U	5 UJ
CIS-1,2-DICHLOROETHENE	43000	630000	5 U	8 UJ	5 U	5 U	5 U
ETHYLBENZENE	400000	71000	5 U	8 UJ	5 U	5 U	5 U
M+P-XYLENES	270000	NA	5 U	8 UJ	5 U	5 U	5 U
METHYLENE CHLORIDE	9100	45000	5 UJ	8 UJ	7 J	8 UJ	3 J
O-XYLENE	270000	NA	5 U	8 UJ	5 U	5 U	5 U
STYRENE	1700000	13000	5 U	8 UJ	5 U	5 U	5 U
TOLUENE	520000	190000	5 U	8 UJ	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	5 U	8 U	5 U	5 U	5 U
TOTAL CHLORINATED VOCS[1]	NA	NA	0 U	0 U	7	0 U	3
TOTAL XYLENES	270000	110000	5 U	8 U	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	69000	1100000	5 U	8 UJ	5 U	5 U	5 U
TRICHLOROETHENE	53	13000	5 U	8 UJ	5 U	5 U	5 U

TAB

SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 SB16-22 SB16-22-NSO-062700-06 NORMAL 6/27/2000 6 - 8	04 SB16-23 SB16-23-NSO-062600-03 NORMAL 6/26/2000 3 - 5	04 SB16-24 SB16-24-NSO-062600-07 NORMAL 6/26/2000 7 - 9	04 SB16-25 SB16-25-NSO-062600-07 NORMAL 6/26/2000 7 - 9	04 SB16-26 SB16-26-NSO-062300-02 NORMAL 6/23/2000 2 - 4
VINYL CHLORIDE	79	20	10 U	16 UJ	10 U	10 U	10 U
Semivolatile Organics (ug/kg)							
2,4-DIMETHYLPHENOL	1200000	1400000	400 U	400 U	400 U	400 U	360 U
2,6-DINITROTOLUENE	61000	NA	400 U	400 U	400 U	400 U	360 U
2-METHYLNAPHTHALENE	56000	123000	400 U	400 U	400 U	400 U	360 U
2-METHYLPHENOL	3100000	NA	400 U	400 U	400 U	400 U	360 U
4-CHLOROANILINE	240000	310000	400 UJ	400 UJ	400 UJ	400 UJ	360 UJ
4-METHYLPHENOL	310000	NA	400 U	400 U	400 U	400 U	360 U
ACENAPHTHENE	3700000	43000	400 U	400 U	400 U	400 U	360 U
ANTHRACENE	22000000	35000	400 U	400 U	400 U	400 U	360 U
BAP EQUIVALENT[1]	62	400	0 U	609	0 U	0 U	909
BENZO(A)ANTHRACENE	620	900	400 U	480	400 U	400 U	200
BENZO(A)PYRENE	62	400	400 U	460	400 U	400 U	690
BENZO(B)FLUORANTHENE	620	900	400 U	670	400 U	400 U	1300
BENZO(G,H,I)PERYLENE	2300000	800	400 U	260	400 U	400 U	480
BENZO(K)FLUORANTHENE	6200	900	400 U	230	400 U	400 U	380
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	400 U	400 U	400 U	400 U	360 U
CARBAZOLE	24000	NA	400 U	400 U	400 U	400 U	360 U
CHRYSENE	62000	400	400 U	490	400 U	400 U	370
DI-N-BUTYL PHTHALATE	6100000	NA	400 U	400 U	400 U	400 U	360 U
DIBENZO(A,H)ANTHRACENE	62	400	400 U	400 U	400 U	400 U	360 U
DIBENZOFURAN	150000	NA	400 U	400 U	400 U	400 U	360 U
DIETHYL PHTHALATE	49000000	340000	400 U	400 U	400 U	400 U	360 U
FLUORANTHENE	2300000	20000	400 U	560	400 U	400 U	360 U
FLUORENE	2700000	28000	400 U	400 U	400 U	400 U	360 U
INDENO(1,2,3-CD)PYRENE	620	900	400 U	310	400 U	400 U	650
NAPHTHALENE	56000	54000	400 U	400 U	400 U	400 U	360 U
PHENANTHRENE	2300000	40000	400 U	210	400 U	400 U	360 U
PYRENE	2300000	13000	400 U	500	400 U	400 U	360 U
TOTAL PAHS[1]	NA	NA	0 U	4170	0 U	0 U	4070
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000	24 U	2400 U	24 U	24 U	22 U
ACENAPHTHENE	3700000	43000	24 U	2400 U	24 U	24 U	22 U
ACENAPHTHYLENE	3700000	23000	24 U	2400 U	24 U	24 U	29
ANTHRACENE	22000000	35000	24 U	2400 U	24 U	12 J	45
BAP EQUIVALENT	62	400	0 U	0 U	0 U	28	822
BENZO(A)ANTHRACENE	620	900	24 U	2400 U	24 U	31	300
BENZO(A)PYRENE	62	400	24 U	2400 U	24 U	19 J	500
BENZO(B)FLUORANTHENE	620	900	24 U	2400 U	24 U	37 J	850
BENZO(G,H,I)PERYLENE	2300000	800	24 U	2400 U	24 U	15 J	400
BENZO(K)FLUORANTHENE	6200	900	24 U	2400 U	24 U	24 U	260
CHRYSENE	62000	400	24 U	2400 U	24 U	31	190
DIBENZO(A,H)ANTHRACENE	62	400	24 U	2400 U	24 U	24 U	140
FLUORANTHENE	2300000	20000	24 U	2400 U	24 U	92	180
FLUORENE	2700000	28000	24 UJ	2400 UJ	24 UJ	24 UJ	7
INDENO(1,2,3-CD)PYRENE	620	900	24 U	2400 U	24 U	22 J	640
NAPHTHALENE	56000	54000	24 U	2400 U	24 U	27	6
PHENANTHRENE	2300000	40000	24 U	2400 U	24 U	55	98
PYRENE	2300000	13000	24 U	2400 U	24 U	62	130
TOTAL PAHS[1]	NA	NA	0 U	0 U	0 U	403	3775

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 SB16-22 SB16-22-NSO-062700-06 NORMAL 6/27/2000 6 - 8	04 SB16-23 SB16-23-NSO-062600-03 NORMAL 6/26/2000 3 - 5	04 SB16-24 SB16-24-NSO-062600-07 NORMAL 6/26/2000 7 - 9	04 SB16-25 SB16-25-NSO-062600-07 NORMAL 6/26/2000 7 - 9	04 SB16-26 SB16-26-NSO-062300-02 NORMAL 6/23/2000 2 - 4
Pesticides (ug/kg)							
4,4'-DDD	2400	NA	3.8 U	4 U	3.9 U	3.8 U	3.6 U
4,4'-DDT	1700	NA	3.8 U	4 U	3.9 U	3.8 U	3.7
ENDRIN ALDEHYDE	18000	NA	3.8 U	4.7	3.9 U	3.8 U	3.6 U
GAMMA-CHLORDANE	1600	NA	2 U	2.1 U	2 U	2 U	1.8 U
Inorganics (mg/kg)							
ALUMINUM	76000	NA	12400	7210	6670	6150	3440
ANTIMONY	31	10	0.24 UN	4.7	0.26 UJ	0.25 UJ	0.25 UJ
ARSENIC	0.39	7	2.6	4.2	5.8	2.9	1.6 UJ
BARIUM	5400	5500	25.2	189	18.4	36.9	28.4
BERYLLIUM	150	0.4	0.71	0.58	0.48	0.5	0.62
CADMIUM	37	39	0.42 U	1.1 U	0.4 U	1.1 UJ	0.21 U
CALCIUM	NA	NA	975	3970	584 J	748 J	413 U
CHROMIUM	30	1400	11.5	19.1	7.6 J	7.5 J	5.2
COBALT	900	NA	6 J	6.5	5.2	6.8	2.6
COPPER	3100	3100	14.2 J	160 J	11	16.6	10.7 J
IRON	23000	NA	16900	26500	14100	12900	9220
LEAD	400	150	8.1	288	6.7	17.1	27.7
MAGNESIUM	NA	NA	2360	2550	1780 J	1670 J	766 UJ
MANGANESE	1800	390	144 J	295 J	136 J	102 J	81.7
MERCURY	23	23	0.01 U	0.52	0.02 U	0.02 U	0.02 U
NICKEL	1600	1000	10.3	25.6	7.1 U	9.4	3.9
POTASSIUM	NA	NA	754	1100	490	588	447 U
SELENIUM	390	390	0.55 J	0.59 U	0.34 U	0.32 U	0.32 U
SILVER	390	200	0.29 U	2	0.31 U	0.3 U	0.32 UJ
SODIUM	NA	NA	33.6	209	29.8	31.4	23.5 U
VANADIUM	78	550	18.9	14.2	11.3	10.5	6
ZINC	23000	6000	28.8 J	688 J	23.2	366	42.9 J
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA	7.8	8.2	7.4	7.1	7
TOTAL ORGANIC CARBON	NA	NA	3700	11000	3700	5300	4700
TOTAL RESIDUE (%)	NA	NA	86	82	84	86	93
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
DIESEL RANGE ORGANICS	NA	NA					
OIL & GREASE	NA	NA					
PHC AS DIESEL	NA	NA					
TOTAL PETROLEUM HYDROCARBONS	NA	500					
TOTAL RECOVERABLE TPH	NA	NA					

TAB

SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 SB16-27 SB16-27-NSO-062600-02 ORIG 6/26/2000 2 - 4	04 SB16-27 SB16-27-NSO-062600-02-D DUP 6/26/2000 2 - 4	04 SB16-28 SB16-28-NSO-062700-04 NORMAL 6/27/2000 4 - 6	05 SB16-29 SB16-29-NSO-011701-20 NORMAL 1/17/2001 20 - 22	06 SB16-31 SB16-31-NSO-021802-08 NORMAL 2/18/2002 8 - 10
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA	1840	1860	26370 J		
1,2,3,4,6,7,8,9-OCDF	39000	NA	69.9	87.2	851		
1,2,3,4,6,7,8-HPCDD	390	NA	59	51.8	8340 J		
1,2,3,4,6,7,8-HPCDF	390	NA	25.8	26.3	719 J		
1,2,3,4,7,8,9-HPCDF	390	NA	5.01 U	5 U	4.85 U		
1,2,3,4,7,8-HXCDD	39	NA	5.01 U	5 U	88.1		
1,2,3,4,7,8-HXCDF	39	NA	1	1.5	310 J		
1,2,3,6,7,8-HXCDD	39	NA	2.4	2.3	505		
1,2,3,6,7,8-HXCDF	39	NA	1.2	1.2	4.85 UJ		
1,2,3,7,8,9-HXCDD	39	NA	1.6	5 U	556		
1,2,3,7,8-PECDD	3.9	NA	5.01 U	5 U	119		
1,2,3,7,8-PECDF	78	NA	5.01 U	5 U	121		
2,3,4,6,7,8-HXCDF	39	NA	2.3	2.4	215 J		
2,3,4,7,8-PECDF	7.8	NA	0.89 J	0.76 J	125		
2,3,7,8-TCDD	3.9	NA	1 U	1 U	44.5		
2,3,7,8-TCDF	39	NA	0.82 U	0.58	125		
TEQ[1]	3.9	NA	2.33	2.15	505		
TOTAL HPCDD	NA	NA	136	109	15510 J		
TOTAL HPCDF	NA	NA	76.7	70.5	2400		
TOTAL HXCDD	NA	NA	14.2	13.9	4630 J		
TOTAL HXCDF	NA	NA	39.5	34.9	1160 J		
TOTAL PECDD	NA	NA	5.01 U	5 U	897		
TOTAL PECDF	NA	NA	25.2 J	13.3 J	789		
TOTAL TCDD	NA	NA	1 U	1	505		
TOTAL TCDF	NA	NA	9.5 J	4 J	1900 J		
Volatile Organics (ug/kg)							
1,1,2-TRICHLOROETHANE	730	3600	5 U	5 U	320 U	5 U	
2-BUTANONE	22000000	10000000	12	10 U	630 U	10 U	
2-HEXANONE	NA	NA	10 U	10 UJ	630 U	10 U	
4-METHYL-2-PENTANONE	5300000	1200000	10 U	10 U	630 UJ	10 U	
ACETONE	14000000	7800000	30 J	7 J	570 J	38	
BENZENE	640	2500	5 U	5 U	34 J	5 U	
BROMODICHLOROMETHANE	820	10000	5 U	5 U	320 U	5 U	
BTEX[1]	NA	NA	0 U	0 U	1464	0 U	
CARBON DISULFIDE	360000	NA	5 U	5 U	320 U	5 U	
CHLOROFORM	220	1200	5 U	5 U	320 U	5 U	
CHLOROMETHANE	47000	NA	5 UJ	5 UJ	320 U	5 U	
CIS-1,2-DICHLOROETHENE	43000	630000	5 U	5 U	320 U	5 U	
ETHYLBENZENE	400000	71000	5 U	5 U	350	5 U	
M+P-XYLENES	270000	NA	5 U	5 U	620	5 U	
METHYLENE CHLORIDE	9100	45000	4 J	5 UJ	320 U	3 J	
O-XYLENE	270000	NA	5 U	5 U	290	5 U	
STYRENE	1700000	13000	5 U	5 U	320 U	5 U	
TOLUENE	520000	190000	5 U	5 U	170	5 U	
TOTAL 1,2-DICHLOROETHENE	43000	630000	5 U	5 U	320 U	5 U	
TOTAL CHLORINATED VOCS[1]	NA	NA	4	0 U	0 U	58	
TOTAL XYLENES	270000	110000	5 U	5 U	910	5 U	
TRANS-1,2-DICHLOROETHENE	69000	1100000	5 U	5 U	320 U	5 U	
TRICHLOROETHENE	53	13000	5 U	5 U	320 U	55	

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 SB16-27 SB16-27-NSO-062600-02 ORIG 6/26/2000 2 - 4	04 SB16-27 SB16-27-NSO-062600-02-D DUP 6/26/2000 2 - 4	04 SB16-28 SB16-28-NSO-062700-04 NORMAL 6/27/2000 4 - 6	05 SB16-29 SB16-29-NSO-011701-20 NORMAL 1/17/2001 20 - 22	06 SB16-31 SB16-31-NSO-021802-08 NORMAL 2/18/2002 8 - 10
VINYL CHLORIDE	79	20	10 U	10 U	630 U	10 U	
Semivolatile Organics (ug/kg)							
2,4-DIMETHYLPHENOL	1200000	1400000	360 U	360 U	400 U	400 U	
2,6-DINITROTOLUENE	61000	NA	360 U	360 U	400 U	400 U	
2-METHYLNAPHTHALENE	56000	123000	360 U	360 U	400 U	400 U	
2-METHYLPHENOL	3100000	NA	360 U	360 U	400 U	400 U	
4-CHLOROANILINE	240000	310000	360 UJ	360 UJ	400 UJ	400 UJ	
4-METHYLPHENOL	310000	NA	360 U	360 U	400 U	400 U	
ACENAPHTHENE	3700000	43000	360 U	360 U	400 U	400 U	
ANTHRACENE	22000000	35000	360 U	360 U	400 U	400 U	
BAP EQUIVALENT[1]	62	400	0 U	0 U	0 U	0 U	
BENZO(A)ANTHRACENE	620	900	360 U	360 U	400 U	400 U	
BENZO(A)PYRENE	62	400	360 U	360 U	400 U	400 U	
BENZO(B)FLUORANTHENE	620	900	360 U	360 U	400 U	400 U	
BENZO(G,H,I)PERYLENE	2300000	800	360 U	360 U	400 U	400 U	
BENZO(K)FLUORANTHENE	6200	900	360 U	360 U	400 U	400 U	
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	360 U	360 U	400 U	400 U	
CARBAZOLE	24000	NA	360 U	360 U	400 U	400 U	
CHRYSENE	62000	400	360 U	360 U	400 U	400 U	
DI-N-BUTYL PHTHALATE	6100000	NA	360 U	360 U	400 U	400 U	
DIBENZO(A,H)ANTHRACENE	62	400	360 U	360 U	400 U	400 U	
DIBENZOFURAN	150000	NA	360 U	360 U	400 U	400 U	
DIETHYL PHTHALATE	49000000	340000	360 U	360 U	400 U	400 U	
FLUORANTHENE	2300000	20000	240	270	250	400 U	
FLUORENE	2700000	28000	360 U	360 U	400 U	400 U	
INDENO(1,2,3-CD)PYRENE	620	900	360 U	360 U	400 U	400 U	
NAPHTHALENE	56000	54000	360 U	360 U	400 U	400 U	
PHENANTHRENE	2300000	40000	360 U	360 U	400 U	400 U	
PYRENE	2300000	13000	200	220	240	400 U	
TOTAL PAHS[1]	NA	NA	440	490	490	0 U	
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000	42 U	86 U	49000	24 U	
ACENAPHTHENE	3700000	43000	42 U	86 U	5300	24 UJ	
ACENAPHTHYLENE	3700000	23000	42 U	86 U	2400 U	24 UJ	
ANTHRACENE	22000000	35000	42 U	86 U	2800	24 U	
BAP EQUIVALENT	62	400	96.2	119	2212	0.506	
BENZO(A)ANTHRACENE	620	900	83	92	2000	24 U	
BENZO(A)PYRENE	62	400	68	83	1600	24 U	
BENZO(B)FLUORANTHENE	620	900	120	170	2600	5 J	
BENZO(G,H,I)PERYLENE	2300000	800	44	56	2400 U	24 U	
BENZO(K)FLUORANTHENE	6200	900	37	86 U	2400 U	24 U	
CHRYSENE	62000	400	70	94	2200	6 J	
DIBENZO(A,H)ANTHRACENE	62	400	42 U	86 U	2400 U	24 U	
FLUORANTHENE	2300000	20000	160	230	5500	6	
FLUORENE	2700000	28000	42 UJ	86 UJ	5100 J	24 UJ	
INDENO(1,2,3-CD)PYRENE	620	900	75	96	1500	24 U	
NAPHTHALENE	56000	54000	42 U	86 U	12000	24 U	
PHENANTHRENE	2300000	40000	75	99	13000 J	24 U	
PYRENE	2300000	13000	100	130	5000	5 J	
TOTAL PAHS[1]	NA	NA	832	1050	107600	22	

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SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 SB16-27 SB16-27-NSO-062600-02 ORIG 6/26/2000 2 - 4	04 SB16-27 SB16-27-NSO-062600-02-D DUP 6/26/2000 2 - 4	04 SB16-28 SB16-28-NSO-062700-04 NORMAL 6/27/2000 4 - 6	05 SB16-29 SB16-29-NSO-011701-20 NORMAL 1/17/2001 20 - 22	06 SB16-31 SB16-31-NSO-021802-08 NORMAL 2/18/2002 8 - 10
Pesticides (ug/kg)							
4,4'-DDD	2400	NA	3.5 UJ	4.1 J	8 U	4.1 U	
4,4'-DDT	1700	NA	3.5 U	3.6 U	8 U	4.1 U	
ENDRIN ALDEHYDE	18000	NA	3.5 U	3.6 U	8 U	4.1 U	
GAMMA-CHLORDANE	1600	NA	1.8 U	1.8 U	8.9 J	2.1 U	
Inorganics (mg/kg)							
ALUMINUM	76000	NA	4570	4950	7740	3390	
ANTIMONY	31	10	0.24 UJ	0.23 UJ	8.7	0.4 UJ	
ARSENIC	0.39	7	2.1	2.8	10.6	1.4	
BARIUM	5400	5500	21.8	18.5	1100	11.4	
BERYLLIUM	150	0.4	0.46	0.48	0.56	0.5	
CADMIUM	37	39	0.27 UJ	0.26 UJ	2.4	0.03 U	
CALCIUM	NA	NA	427 J	451 J	23400	592 U	
CHROMIUM	30	1400	7.5 J	9.7 J	67.2	5.2	
COBALT	900	NA	5.2	5 J	6	3	
COPPER	3100	3100	14.4	14.8	452 J	8.6	
IRON	23000	NA	11800	13800	54300	9290	
LEAD	400	150	33.8	27	2650	4.7	
MAGNESIUM	NA	NA	1480 J	1530 J	4910	1260 J	
MANGANESE	1800	390	107 J	108 J	587 J	117 J	
MERCURY	23	23	0.01 U	0.01 U	0.96	0.01 U	
NICKEL	1600	1000	7.5 U	8.5	34.5	5.5	
POTASSIUM	NA	NA	724	690	1060	393 U	
SELENIUM	390	390	0.36 J	0.3 J	0.99 U	0.33 U	
SILVER	390	200	0.28 U	0.28 U	6.8	0.11 U	
SODIUM	NA	NA	24.6	28.5	596	43.9 U	
VANADIUM	78	550	10.3	10.9	14.4	8.4	
ZINC	23000	6000	39.8	36.8	1610 J	27.1	
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA				1200	
PERCENT MOISTURE (%)	NA	NA				17.5	
PH (S.U.)	NA	NA	6.3		8.2	5.8	
TOTAL ORGANIC CARBON	NA	NA	4400	5300	34000		
TOTAL RESIDUE (%)	NA	NA	93	93	82	81	
TOTAL SOLIDS (%)	NA	NA				82.5	
Petroleum Hydrocarbons (mg/kg)							
DIESEL RANGE ORGANICS	NA	NA					
OIL & GREASE	NA	NA					3.8 R
PHC AS DIESEL	NA	NA					
TOTAL PETROLEUM HYDROCARBONS	NA	500					
TOTAL RECOVERABLE TPH	NA	NA					

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	06 SB16-31 SB16-31-NSO-021802-14 NORMAL 2/18/2002 14 - 16	06 SB16-31 SB16-31-NSO-022502-08 NORMAL 2/25/2002 8 - 10	06 SB16-31 SB16-31-NSO-022502-14 NORMAL 2/25/2002 14 - 16	06 SB16-32 SB16-32-NSO-021202-10 NORMAL 2/12/2002 10 - 12	08 SB16-41 SB16-41-NSO-051104-16 NORMAL 5/11/2004 16 - 18
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	39000	NA					
1,2,3,4,6,7,8,9-OCDF	39000	NA					
1,2,3,4,6,7,8-HPCDD	390	NA					
1,2,3,4,6,7,8-HPCDF	390	NA					
1,2,3,4,7,8,9-HPCDF	390	NA					
1,2,3,4,7,8-HXCDD	39	NA					
1,2,3,4,7,8-HXCDF	39	NA					
1,2,3,6,7,8-HXCDD	39	NA					
1,2,3,6,7,8-HXCDF	39	NA					
1,2,3,7,8,9-HXCDD	39	NA					
1,2,3,7,8-PECDD	3.9	NA					
1,2,3,7,8-PECDF	78	NA					
2,3,4,6,7,8-HXCDF	39	NA					
2,3,4,7,8-PECDF	7.8	NA					
2,3,7,8-TCDD	3.9	NA					
2,3,7,8-TCDF	39	NA					
TEQ[1]	3.9	NA					
TOTAL HPCDD	NA	NA					
TOTAL HPCDF	NA	NA					
TOTAL HXCDD	NA	NA					
TOTAL HXCDF	NA	NA					
TOTAL PECDD	NA	NA					
TOTAL PECDF	NA	NA					
TOTAL TCDD	NA	NA					
TOTAL TCDF	NA	NA					
Volatile Organics (ug/kg)							
1,1,2-TRICHLOROETHANE	730	3600			180 U	330 UJ	5 U
2-BUTANONE	22000000	10000000			360 R	330 R	24
2-HEXANONE	NA	NA			360 U	330 UJ	10 U
4-METHYL-2-PENTANONE	5300000	1200000			360 U	330 UJ	10 U
ACETONE	14000000	7800000			490 R	330 R	130
BENZENE	640	2500			180 U	330 UJ	5 U
BROMODICHLOROMETHANE	820	10000			180 U	330 UJ	5 U
BTEX[1]	NA	NA			0 U	0 U	0 U
CARBON DISULFIDE	360000	NA			180 U	330 UJ	9
CHLOROFORM	220	1200			180 U	330 UJ	5 U
CHLOROMETHANE	47000	NA			180 U	330 UJ	5 U
CIS-1,2-DICHLOROETHENE	43000	630000			180 U	330 UJ	1800
ETHYLBENZENE	400000	71000			180 U	330 UJ	5 U
M+P-XYLENES	270000	NA			180 U	330 UJ	10 U
METHYLENE CHLORIDE	9100	45000			180 U	150 T	1 U
O-XYLENE	270000	NA			180 U	330 UJ	5 U
STYRENE	1700000	13000			180 U	330 UJ	5 U
TOLUENE	520000	190000			180 U	330 UJ	5 U
TOTAL 1,2-DICHLOROETHENE	43000	630000			180 U	330 U	1875
TOTAL CHLORINATED VOCS[1]	NA	NA			0 U	150	1896
TOTAL XYLENES	270000	110000			180 U	330 U	5 U
TRANS-1,2-DICHLOROETHENE	69000	1100000			180 U	330 UJ	75
TRICHLOROETHENE	53	13000			180 U	330 UJ	5 U

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SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	06 SB16-31 SB16-31-NSO-021802-14 NORMAL 2/18/2002 14 - 16	06 SB16-31 SB16-31-NSO-022502-08 NORMAL 2/25/2002 8 - 10	06 SB16-31 SB16-31-NSO-022502-14 NORMAL 2/25/2002 14 - 16	06 SB16-32 SB16-32-NSO-021202-10 NORMAL 2/12/2002 10 - 12	08 SB16-41 SB16-41-NSO-051104-16 NORMAL 5/11/2004 16 - 18
VINYL CHLORIDE	79	20			180 U	330 UJ	21
Semivolatile Organics (ug/kg)							
2,4-DIMETHYLPHENOL	1200000	1400000					220 U
2,6-DINITROTOLUENE	61000	NA					220 U
2-METHYLNAPHTHALENE	56000	123000					220 U
2-METHYLPHENOL	3100000	NA					220 U
4-CHLOROANILINE	240000	310000					220 U
4-METHYLPHENOL	310000	NA					220 U
ACENAPHTHENE	3700000	43000					
ANTHRACENE	22000000	35000					
BAP EQUIVALENT[1]	62	400					
BENZO(A)ANTHRACENE	620	900					
BENZO(A)PYRENE	62	400					
BENZO(B)FLUORANTHENE	620	900					
BENZO(G,H,I)PERYLENE	2300000	800					
BENZO(K)FLUORANTHENE	6200	900					
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000					220 U
CARBAZOLE	24000	NA					220 U
CHRYSENE	62000	400					
DI-N-BUTYL PHTHALATE	6100000	NA					220 U
DIBENZO(A,H)ANTHRACENE	62	400					
DIBENZOFURAN	150000	NA					220 U
DIETHYL PHTHALATE	49000000	340000					220 U
FLUORANTHENE	2300000	20000					
FLUORENE	2700000	28000					
INDENO(1,2,3-CD)PYRENE	620	900					
NAPHTHALENE	56000	54000					
PHENANTHRENE	2300000	40000					
PYRENE	2300000	13000					
TOTAL PAHS[1]	NA	NA					
Polyaromatic Hydrocarbons (ug/kg)							
2-METHYLNAPHTHALENE	56000	123000					
ACENAPHTHENE	3700000	43000					23 U
ACENAPHTHYLENE	3700000	23000					45 U
ANTHRACENE	22000000	35000					2.3 U
BAP EQUIVALENT	62	400					0 U
BENZO(A)ANTHRACENE	620	900					2.3 U
BENZO(A)PYRENE	62	400					2.3 U
BENZO(B)FLUORANTHENE	620	900					4.5 U
BENZO(G,H,I)PERYLENE	2300000	800					4.5 U
BENZO(K)FLUORANTHENE	6200	900					2.3 U
CHRYSENE	62000	400					2.3 U
DIBENZO(A,H)ANTHRACENE	62	400					4.5 U
FLUORANTHENE	2300000	20000					4.5 U
FLUORENE	2700000	28000					4.5 U
INDENO(1,2,3-CD)PYRENE	620	900					2.3 U
NAPHTHALENE	56000	54000					23 U
PHENANTHRENE	2300000	40000					4.4
PYRENE	2300000	13000					2.3 U
TOTAL PAHS[1]	NA	NA					4.4

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	06 SB16-31 SB16-31-NSO-021802-14 NORMAL 2/18/2002 14 - 16	06 SB16-31 SB16-31-NSO-022502-08 NORMAL 2/25/2002 8 - 10	06 SB16-31 SB16-31-NSO-022502-14 NORMAL 2/25/2002 14 - 16	06 SB16-32 SB16-32-NSO-021202-10 NORMAL 2/12/2002 10 - 12	08 SB16-41 SB16-41-NSO-051104-16 NORMAL 5/11/2004 16 - 18
Pesticides (ug/kg)							
4,4'-DDD	2400	NA					
4,4'-DDT	1700	NA					
ENDRIN ALDEHYDE	18000	NA					
GAMMA-CHLORDANE	1600	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
MERCURY	23	23					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SILVER	390	200					
SODIUM	NA	NA					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					6.77 J
TOTAL ORGANIC CARBON	NA	NA					9800
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
DIESEL RANGE ORGANICS	NA	NA					
OIL & GREASE	NA	NA	1.3 R	1.3	1 U		100 U
PHC AS DIESEL	NA	NA					36
TOTAL PETROLEUM HYDROCARBONS	NA	500					
TOTAL RECOVERABLE TPH	NA	NA					

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SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	08 SB16-44 SB16-44-NSO-051304-14 NORMAL 5/13/2004 14 - 16	08 SB16-45 SB16-45-NSO-051204-14 ORIG 5/12/2004 14 - 16	08 SB16-45 SB16-45-NSO-051204-14-D DUP 5/12/2004 14 - 16	08 SB16-46 SB16-46-NSO-051304-12 NORMAL 5/13/2004 12 - 14
Dioxins (ng/kg)						
1,2,3,4,6,7,8,9-OCDD	39000	NA				
1,2,3,4,6,7,8,9-OCDF	39000	NA				
1,2,3,4,6,7,8-HPCDD	390	NA				
1,2,3,4,6,7,8-HPCDF	390	NA				
1,2,3,4,7,8,9-HPCDF	390	NA				
1,2,3,4,7,8-HXCDD	39	NA				
1,2,3,4,7,8-HXCDF	39	NA				
1,2,3,6,7,8-HXCDD	39	NA				
1,2,3,6,7,8-HXCDF	39	NA				
1,2,3,7,8,9-HXCDD	39	NA				
1,2,3,7,8-PECDD	3.9	NA				
1,2,3,7,8-PECDF	78	NA				
2,3,4,6,7,8-HXCDF	39	NA				
2,3,4,7,8-PECDF	7.8	NA				
2,3,7,8-TCDD	3.9	NA				
2,3,7,8-TCDF	39	NA				
TEQ[1]	3.9	NA				
TOTAL HPCDD	NA	NA				
TOTAL HPCDF	NA	NA				
TOTAL HXCDD	NA	NA				
TOTAL HXCDF	NA	NA				
TOTAL PECDD	NA	NA				
TOTAL PECDF	NA	NA				
TOTAL TCDD	NA	NA				
TOTAL TCDF	NA	NA				
Volatile Organics (ug/kg)						
1,1,2-TRICHLOROETHANE	730	3600	7 UJ	14 U	12 U	5 U
2-BUTANONE	22000000	10000000	30	74	120	4 J
2-HEXANONE	NA	NA	14 U	29 U	25 U	10 U
4-METHYL-2-PENTANONE	5300000	1200000	14 U	29 U	25 U	10 U
ACETONE	14000000	7800000	190 U	410 J	590 J	16 U
BENZENE	640	2500	7 UJ	14 U	12 U	0.9 J
BROMODICHLOROMETHANE	820	10000	7 UJ	14 U	12 U	5 U
BTEX[1]	NA	NA	0 U	8	9	2.9
CARBON DISULFIDE	360000	NA	13 J	21	29	5
CHLOROFORM	220	1200	7 UJ	14 U	12 U	5 U
CHLOROMETHANE	47000	NA	7 U	14 U	12 U	2 J
CIS-1,2-DICHLOROETHENE	43000	630000	1300 J	280	310	5 U
ETHYLBENZENE	400000	71000	7 UJ	14 U	12 U	5 U
M+P-XYLENES	270000	NA	14 UJ	29 U	25 U	10 U
METHYLENE CHLORIDE	9100	45000	2 U	4 U	4 U	1 U
O-XYLENE	270000	NA	7 UJ	14 U	12 U	5 U
STYRENE	1700000	13000	7 UR	14 U	12 U	5 U
TOLUENE	520000	190000	7 UJ	8 J	9 J	2 J
TOTAL 1,2-DICHLOROETHENE	43000	630000	1342 J	314	347	5 U
TOTAL CHLORINATED VOCS[1]	NA	NA	1342	314	350	2
TOTAL XYLENES	270000	110000	7 UJ	14 U	12 U	5 U
TRANS-1,2-DICHLOROETHENE	69000	1100000	42 J	34	37	5 U
TRICHLOROETHENE	53	13000	7 UJ	14 U	12 U	5 U

TABLE 4-8
SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	08 SB16-44 SB16-44-NSO-051304-14 NORMAL 5/13/2004 14 - 16	08 SB16-45 SB16-45-NSO-051204-14 ORIG 5/12/2004 14 - 16	08 SB16-45 SB16-45-NSO-051204-14-D DUP 5/12/2004 14 - 16	08 SB16-46 SB16-46-NSO-051304-12 NORMAL 5/13/2004 12 - 14
VINYL CHLORIDE	79	20	7 U	14 U	3 J	5 U
Semivolatile Organics (ug/kg)						
2,4-DIMETHYLPHENOL	1200000	1400000	420 U	510 U	650 U	270 J
2,6-DINITROTOLUENE	61000	NA	420 UJ	510 U	650 U	430 U
2-METHYLNAPHTHALENE	56000	123000	420 UJ	510 U	650 U	360 J
2-METHYLPHENOL	3100000	NA	420 U	510 U	650 U	200 J
4-CHLOROANILINE	240000	310000	420 U	510 U	650 U	260 J
4-METHYLPHENOL	310000	NA	420 U	510 U	650 U	830
ACENAPHTHENE	3700000	43000				
ANTHRACENE	22000000	35000				
BAP EQUIVALENT[1]	62	400				
BENZO(A)ANTHRACENE	620	900				
BENZO(A)PYRENE	62	400				
BENZO(B)FLUORANTHENE	620	900				
BENZO(G,H,I)PERYLENE	2300000	800				
BENZO(K)FLUORANTHENE	6200	900				
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	420 U	510 U	650 U	300 J
CARBAZOLE	24000	NA	420 U	510 U	650 U	120 J
CHRYSENE	62000	400				
DI-N-BUTYL PHTHALATE	6100000	NA	420 U	510 U	650 U	130 J
DIBENZO(A,H)ANTHRACENE	62	400				
DIBENZOFURAN	150000	NA	420 U	510 U	650 U	240 J
DIETHYL PHTHALATE	49000000	340000	420 U	510 U	650 U	430 U
FLUORANTHENE	2300000	20000				
FLUORENE	2700000	28000				
INDENO(1,2,3-CD)PYRENE	620	900				
NAPHTHALENE	56000	54000				
PHENANTHRENE	2300000	40000				
PYRENE	2300000	13000				
TOTAL PAHS[1]	NA	NA				
Polyaromatic Hydrocarbons (ug/kg)						
2-METHYLNAPHTHALENE	56000	123000				
ACENAPHTHENE	3700000	43000	43 UR	50 U	65 U	22 U
ACENAPHTHYLENE	3700000	23000	85 UJ	100 U	130 U	44 U
ANTHRACENE	22000000	35000	4.3 UJ	5 U	6.5 U	120 J
BAP EQUIVALENT	62	400	0.008	1.9	0.016	395
BENZO(A)ANTHRACENE	620	900	4.3 UR	5 U	6.5 U	260 J
BENZO(A)PYRENE	62	400	4.3 UR	5 U	6.5 U	360 J
BENZO(B)FLUORANTHENE	620	900	8.5 UR	10 U	13 U	70 J
BENZO(G,H,I)PERYLENE	2300000	800	8.5 U	10 U	13 U	4.4 U
BENZO(K)FLUORANTHENE	6200	900	4.3 UR	190 J	6.5 UJ	190 J
CHRYSENE	62000	400	8 J	5 UJ	16 J	130 J
DIBENZO(A,H)ANTHRACENE	62	400	8.5 UJ	10 U	13 U	4.4 U
FLUORANTHENE	2300000	20000	8.5 U	10 UJ	49 J	280 J
FLUORENE	2700000	28000	8.5 UR	10 U	13 U	180 J
INDENO(1,2,3-CD)PYRENE	620	900	4.3 UR	5 U	6.5 U	2.2 U
NAPHTHALENE	56000	54000	43 U	50 U	65 U	670 J
PHENANTHRENE	2300000	40000	4.3 UJ	5 U	6.5 U	550 J
PYRENE	2300000	13000	4.3 UR	5 U	6.5 U	280 J
TOTAL PAHS[1]	NA	NA	8	190	65	3450

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SUMMARY OF CHEMICALS DETECTED IN SHALLOW SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	08 SB16-44 SB16-44-NSO-051304-14 NORMAL 5/13/2004 14 - 16	08 SB16-45 SB16-45-NSO-051204-14 ORIG 5/12/2004 14 - 16	08 SB16-45 SB16-45-NSO-051204-14-D DUP 5/12/2004 14 - 16	08 SB16-46 SB16-46-NSO-051304-12 NORMAL 5/13/2004 12 - 14
Pesticides (ug/kg)						
4,4'-DDD	2400	NA				
4,4'-DDT	1700	NA				
ENDRIN ALDEHYDE	18000	NA				
GAMMA-CHLORDANE	1600	NA				
Inorganics (mg/kg)						
ALUMINUM	76000	NA				
ANTIMONY	31	10				
ARSENIC	0.39	7				
BARIUM	5400	5500				
BERYLLIUM	150	0.4				
CADMIUM	37	39				
CALCIUM	NA	NA				
CHROMIUM	30	1400				
COBALT	900	NA				
COPPER	3100	3100				
IRON	23000	NA				
LEAD	400	150				
MAGNESIUM	NA	NA				
MANGANESE	1800	390				
MERCURY	23	23				
NICKEL	1600	1000				
POTASSIUM	NA	NA				
SELENIUM	390	390				
SILVER	390	200				
SODIUM	NA	NA				
VANADIUM	78	550				
ZINC	23000	6000				
Miscellaneous Parameters (mg/kg)						
CARBON	NA	NA				
PERCENT MOISTURE (%)	NA	NA				
PH (S.U.)	NA	NA	7.92 J	6.91 J	6.91 J	7.54 J
TOTAL ORGANIC CARBON	NA	NA	18000	7300	9000	10000
TOTAL RESIDUE (%)	NA	NA				
TOTAL SOLIDS (%)	NA	NA				
Petroleum Hydrocarbons (mg/kg)						
DIESEL RANGE ORGANICS	NA	NA				
OIL & GREASE	NA	NA	620 J	300	490	3360
PHC AS DIESEL	NA	NA	280 J	200 J	430 J	980
TOTAL PETROLEUM HYDROCARBONS	NA	500				
TOTAL RECOVERABLE TPH	NA	NA				

Investigation Description:
01 - EBS Phase II Sampling
02 - EBS Phase II Follow-On Sampling
03 - EBS Phase II Follow-On Addendum Sampling
04 - State I Phase I RI Sampling Event
05 - Stage II Phase I RI Sampling Event
06 - Phase II RI Sampling Event
08 - CTO 97 Supplemental Phase II Investigation

Qualifiers:
J - Estimated value.
U - Nondetected result.
UJ - Nondetected result is estimated.
UN - Nondetected result is qualified due to spike noncompliance.

Sample Code Description:
NORMAL - One sample was collected at this location.
ORIG - First of two samples collected at this location.
DUP - Second of two samples collected at this location.

Acronyms:
NA = Not Applicable/Not Available
PAH = Polyaromatic Hydrocarbon
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
TPH = Total Petroleum Hydrocarbon
VOC = Volatile Organic Compound

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

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SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	02 28-SB-14 28SB-14-NSO-062397-42 NORMAL 6/23/1997 42 - 44	02 28-SB-15 28SB-15-NSO-062497-30 NORMAL 6/24/1997 30 - 32	09 INJ16-01D INJ16-01D-NSO-090804-48 NORMAL 9/8/2004 48 - 50	09 INJ16-01D INJ16-01D-NSO-090804-56 NORMAL 9/8/2004 56 - 57.4	09 INJ16-02D INJ16-02D-NSO-082504-44 NORMAL 8/25/2004 44 - 46
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	12 U	11 U	860 U	820 U	6 U
2-HEXANONE	NA	NA	12 U	11 U	860 U	820 U	6 U
ACETONE	14000000	7800000	17	11 U	970 U	820 U	8 U
CARBON DISULFIDE	360000	NA	12 U	11 U	430 U	410 U	3 U
CIS-1,2-DICHLOROETHENE	43000	630000			430 U	410 U	3 U
METHYLENE CHLORIDE	9100	45000	12 U	11 U	660 U	720 U	3 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	12 U	11 U	430 U	410 U	3 U
TOTAL CHLORINATED VOCS[1]	NA	NA	0 U	0 U	1300	840	0 U
TRICHLOROETHENE	53	13000	12 U	11 U	1300	840	3 U
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA	400 U	47 J			
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000					
PHENANTHRENE	2300000	40000					
TOTAL PAHS[1]	NA	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA			3000	1200 U	1600
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA	30 U	31			

TABLE 4-9
SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	09 INJ16-02D INJ16-02D-NSO-082504-52 NORMAL 8/25/2004 52 - 54	09 INJ16-03D INJ16-03D-NSO-091004-46 NORMAL 9/10/2004 46 - 48	09 INJ16-03D INJ16-03D-NSO-091004-52 NORMAL 9/10/2004 52 - 54	09 INJ16-04D INJ16-04D-NSO-090704-44 NORMAL 9/7/2004 44 - 46	09 INJ16-04D INJ16-04D-NSO-090704-46 NORMAL 9/7/2004 46 - 48
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	8 U	5 U	3 U	7 U	7 UJ
2-HEXANONE	NA	NA	8 U	7 U	6 U	7 U	7 UJ
ACETONE	14000000	7800000	11 U	250 U	370 U	8 U	29 U
CARBON DISULFIDE	360000	NA	4 U	3 U	3 U	3 U	4 U
CIS-1,2-DICHLOROETHENE	43000	630000	4 U	3 U	3 U	3 U	4 U
METHYLENE CHLORIDE	9100	45000	4 U	3 U	3 U	3 U	4 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	4 U	3 U	3 U	3 U	4 U
TOTAL CHLORINATED VOCS[1]	NA	NA	17	690	110	76	19
TRICHLOROETHENE	53	13000	17	690	110	76	19
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA					
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000					
PHENANTHRENE	2300000	40000					
TOTAL PAHS[1]	NA	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA	1200 U	1900	1100 U	1100 U	1100 U
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TAB [illegible]

SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	09 INJ16-05D INJ16-05D-NSO-090704-44 NORMAL 9/7/2004 44 - 46	09 INJ16-05D INJ16-05D-NSO-090704-46 NORMAL 9/7/2004 46 - 48	09 INJ16-06D INJ16-06D-NSO-082604-50 NORMAL 8/26/2004 50 - 52	09 INJ16-06D INJ16-06D-NSO-082704-58 ORIG 8/27/2004 58 - 60	09 INJ16-06D INJ16-06D-NSO-082704-58-D DUP 8/27/2004 58 - 60
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	6 UJ	3 J	6 U	6 U	6 U
2-HEXANONE	NA	NA	6 UJ	7 UJ	6 U	6 U	6 U
ACETONE	14000000	7800000	31 U	38 U	9 U	11 U	9 U
CARBON DISULFIDE	360000	NA	0.9 J	0.8 J	3 U	3 U	3 U
CIS-1,2-DICHLOROETHENE	43000	630000	3 U	4 U	3 U	3 U	3 U
METHYLENE CHLORIDE	9100	45000	3 U	4 U	5 U	3 U	4 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	3 U	4 U	3 U	3 U	3 U
TOTAL CHLORINATED VOCS[1]	NA	NA	2400	2600	11	100	9
TRICHLOROETHENE	53	13000	2400	2600	11	100 J	9 J
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA					
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000					
PHENANTHRENE	2300000	40000					
TOTAL PAHS[1]	NA	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA	1600	1200 U	1200 U	1100 U	1100 U
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TABLE 4-9
SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	09 INJ16-07D INJ16-07D-NSO-090204-54 NORMAL 9/2/2004 54 - 56	09 INJ16-07D INJ16-07D-NSO-090204-60 NORMAL 9/2/2004 60 - 62	09 INJ16-08D INJ16-08D-NSO-081804-56 NORMAL 8/18/2004 56 - 56.8	09 INJ16-08D INJ16-08D-NSO-081804-62 NORMAL 8/18/2004 62 - 64	09 INJ16-09D INJ16-09D-NSO-082404-54 NORMAL 8/24/2004 54 - 55.9
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	700 U	670 U	7 U	6 U	7 U
2-HEXANONE	NA	NA	700 U	670 U	7 U	6 U	7 U
ACETONE	14000000	7800000	700 U	700 U	17 U	24 U	100 U
CARBON DISULFIDE	360000	NA	350 U	330 U	3 U	3 U	3 U
CIS-1,2-DICHLOROETHENE	43000	630000	350 U	330 U	3 U	3 U	3 U
METHYLENE CHLORIDE	9100	45000	550 U	420 U	3 U	3 U	3 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	350 U	330 U	3 U	3 U	3 U
TOTAL CHLORINATED VOCS[1]	NA	NA	430	1000	71	87	130
TRICHLOROETHENE	53	13000	430	1000	71	87	130
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA					
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000					
PHENANTHRENE	2300000	40000					
TOTAL PAHS[1]	NA	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA	1110 U	1900	1100 U	1100 U	1100 U
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TAB

SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	09 INJ16-09D INJ16-09D-NSO-082404-58 NORMAL 8/24/2004 58 - 58.4	09 INJ16-10D INJ16-10D-NSO-082704-51 NORMAL 8/27/2004 51 - 53	09 INJ16-10D INJ16-10D-NSO-082704-57 NORMAL 8/27/2004 57 - 59	09 INJ16-11D INJ16-11D-NSO-090204-56 ORIG 9/2/2004 56 - 58	09 INJ16-11D INJ16-11D-NSO-090204-56-D DUP 9/2/2004 56 - 58
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	3 J	7 U	6 U	720 U	730 U
2-HEXANONE	NA	NA	6 U	7 U	6 U	720 U	730 U
ACETONE	14000000	7800000	13 U	13 U	61 U	720 U	730 U
CARBON DISULFIDE	360000	NA	14 U	3 U	3 U	360 U	370 U
CIS-1,2-DICHLOROETHENE	43000	630000	3 U	3 U	3 U	360 U	370 U
METHYLENE CHLORIDE	9100	45000	3 U	3 U	4 B	550 U	650 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	3 U	3 U	3 U	360 U	370 U
TOTAL CHLORINATED VOCS[1]	NA	NA	32	43	74	480	560
TRICHLOROETHENE	53	13000	32	43	70	480	560
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA					
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000					
PHENANTHRENE	2300000	40000					
TOTAL PAHS[1]	NA	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA	1100 U	3200	1200 U	1100 U	1100 U
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TABLE 4-9
SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	09 INJ16-11D INJ16-11D-NSO-090204-58 NORMAL 9/2/2004 58 - 60	09 INJ16-12D INJ16-12D-NSO-083004-48 NORMAL 8/30/2004 48 - 50	09 INJ16-12D INJ16-12D-NSO-083004-52 ORIG 8/30/2004 52 - 54	09 INJ16-12D INJ16-12D-NSO-083004-52-D DUP 8/30/2004 52 - 54	04 MW16-01D MW16-01D-NSO-051500-48 NORMAL 5/15/2000 48 - 50
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	2 J	6 U	830 U	850 U	10 R
2-HEXANONE	NA	NA	5 U	6 U	830 U	850 U	10 U
ACETONE	14000000	7800000	41 U	16 U	1000 U	1000 U	7 E
CARBON DISULFIDE	360000	NA	3 U	3 U	410 U	420 U	5 U
CIS-1,2-DICHLOROETHENE	43000	630000	3 U	3 U	410 U	420 U	5 U
METHYLENE CHLORIDE	9100	45000	3 U	3 U	520 U	590 U	10 UJ
TOTAL 1,2-DICHLOROETHENE	43000	630000	3 U	3 U	410 U	420 U	5 U
TOTAL CHLORINATED VOCS[1]	NA	NA	430	35	950	610	6
TRICHLOROETHENE	53	13000	430	35	950	610	6
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA					400 UJ
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000					24 UJ
PHENANTHRENE	2300000	40000					24 UJ
TOTAL PAHS[1]	NA	NA					0 U
Inorganics (mg/kg)							
ALUMINUM	76000	NA					7190
ANTIMONY	31	10					0.18 U
ARSENIC	0.39	7					2
BARIUM	5400	5500					21.9
BERYLLIUM	150	0.4					0.47
CADMIUM	37	39					0.24 J
CALCIUM	NA	NA					1900
CHROMIUM	30	1400					11.7
COBALT	900	NA					7.4
COPPER	3100	3100					13.4
IRON	23000	NA					18600
LEAD	400	150					5.8
MAGNESIUM	NA	NA					3530
MANGANESE	1800	390					227
NICKEL	1600	1000					12.9
POTASSIUM	NA	NA					1240
SELENIUM	390	390					0.24 U
SODIUM	NA	NA					53.1
THALLIUM	5.2	5.5					0.26 U
VANADIUM	78	550					14.5
ZINC	23000	6000					46.2
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					6.6
TOTAL ORGANIC CARBON	NA	NA	1100 U	1900	1100 J	2000 J	11000
TOTAL RESIDUE (%)	NA	NA					79
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TAB

SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 MW16-02D MW16-02D-NSO-052200-64 NORMAL 5/22/2000 64 - 66	04 MW16-03D MW16-03D-NSO-060100-46 ORIG 6/1/2000 46.5 - 48.5	04 MW16-03D MW16-03D-NSO-060100-46-D DUP 6/1/2000 46.5 - 48.5	04 MW16-04D MW16-04D-NSO-061300-52 NORMAL 6/13/2000 52 - 53	04 MW16-05D MW16-05D-NSO-052500-54 NORMAL 5/25/2000 54 - 56
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	NA	NA	10 U	10 U	10 U	10 U	10 U
ACETONE	14000000	7800000	10 UJ	7 J	10 UJ	7 E	14 U
CARBON DISULFIDE	360000	NA	5 U	5 U	5 UJ	5 UJ	5 U
CIS-1,2-DICHLOROETHENE	43000	630000	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	9100	45000	8 UJ	8 UJ	5 UJ	6 UJ	12 UJ
TOTAL 1,2-DICHLOROETHENE	43000	630000	5 U	5 U	5 U	5 U	5 U
TOTAL CHLORINATED VOCS[1]	NA	NA	19	0 U	0 U	76	800
TRICHLOROETHENE	53	13000	19	5 U	5 U	76	800
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA	400 U	330 U	360 U	400 U	360 U
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000	24 U	20 U	22 U	24 U	22 U
PHENANTHRENE	2300000	40000	24 U	20 U	22 U	24 U	22 U
TOTAL PAHS[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
Inorganics (mg/kg)							
ALUMINUM	76000	NA	8340	3710	5090	4920	5150
ANTIMONY	31	10	0.26 U	0.22 UJ	0.22 UJ	0.23 UJ	0.25 UJ
ARSENIC	0.39	7	2	1.7	1.4	1.2 UJ	1.1
BARIUM	5400	5500	24.4	11.5	16	12.6	14.9
BERYLLIUM	150	0.4	0.48	0.31	0.43	0.58	0.34
CADMIUM	37	39	0.03 U	0.25 U	0.29 J	0.27	0.28 UJ
CALCIUM	NA	NA	1440	1080	1240	2060 U	1360 J
CHROMIUM	30	1400	14.5	6.6	9	7.1	9
COBALT	900	NA	10.6	5.7	7.6	6.7	6.8
COPPER	3100	3100	18.7	14.1	13.9	20.1 J	11.9
IRON	23000	NA	20000	9630	15400	12200	11400
LEAD	400	150	8.3	4.7	7.1	4.7	4.2
MAGNESIUM	NA	NA	4100	2140	3050	2600 J	2470
MANGANESE	1800	390	201	92.8 J	148 J	107	114
NICKEL	1600	1000	21	11.9	14	13 U	12.6
POTASSIUM	NA	NA	1900	1230	1530	1410 U	1160
SELENIUM	390	390	0.34 U	0.28 U	0.29 U	0.3 U	0.32 U
SODIUM	NA	NA	79.1	32.7	41.2	41.8 U	47
THALLIUM	5.2	5.5	0.37 U	0.31 U	0.82 U	0.33 U	0.35 U
VANADIUM	78	550	17.2	8.9	12.8	10.9	11.3
ZINC	23000	6000	47.6	28.7	34.4	33.6 J	28.3
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA	6.7	6.9		6.4	6.8
TOTAL ORGANIC CARBON	NA	NA	1100	2600	2000	3500	2400
TOTAL RESIDUE (%)	NA	NA	87	96	91	85	92
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TABLE 4-9
SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	04 MW16-06D MW16-06D-NSO-062200-40 NORMAL 6/22/2000 40 - 42	04 MW16-07D MW16-07D-NSO-061500-36 NORMAL 6/15/2000 36 - 38	05 MW16-13D MW16-13D-NSO-011601-58 NORMAL 1/16/2001 58 - 60	05 MW16-14D MW16-14D-NSO-013001-57 NORMAL 1/30/2001 57.5 - 59.5	05 MW16-15R MW16-15R-NSO-012201-51 NORMAL 1/22/2001 51 - 53
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	10 U	10 UJ	10 U	430 U	10 UJ
2-HEXANONE	NA	NA	10 U	10 UJ	10 U	430 U	10 U
ACETONE	14000000	7800000	24 E	40 E	10 U	430 UJ	14 J
CARBON DISULFIDE	360000	NA	5 U	5 UJ	5 U	220 U	5 U
CIS-1,2-DICHLOROETHENE	43000	630000	5 U	5 UJ	5 U	220 U	5 U
METHYLENE CHLORIDE	9100	45000	4 J	5 UJ	5 UJ	420 U	5 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	5 U	5 U	5 U	220 U	5 U
TOTAL CHLORINATED VOCS[1]	NA	NA	4	0 U	0 U	5400	1200
TRICHLOROETHENE	53	13000	5 U	5 UJ	5 U	**5400**	**1200**
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA	360 U	360 U	360 U	360 U	360 U
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000	22 U	22 U	22 U	22 U	22 U
PHENANTHRENE	2300000	40000	22 U	22 U	22 U	22 U	22 U
TOTAL PAHS[1]	NA	NA	0 U	0 U	0 U	0 U	0 U
Inorganics (mg/kg)							
ALUMINUM	76000	NA	7410	5630	6560	5740	5580
ANTIMONY	31	10	0.23 UJ	0.21 UJ	0.4 UJ	0.4 J	0.4 UJ
ARSENIC	0.39	7	**1.9 J**	0.97 UJ	**1.5**	**1.4**	**0.85**
BARIUM	5400	5500	19.5	13.6	17.6	15.9	13.6
BERYLLIUM	150	0.4	**0.71**	**0.41**	**0.54**	0.46 UJ	**0.58**
CADMIUM	37	39	0.24 U	0.23 U	0.03 UJ	0.03 UJ	0.03 UJ
CALCIUM	NA	NA	3420 U	1410 U	1820 U	1900	1390 U
CHROMIUM	30	1400	11.9	9.7	10.9	9.7	9.1
COBALT	900	NA	9.3	7.6	7.6	6.8	7
COPPER	3100	3100	19.2 J	17 J	15.7	11.4 J	11.3
IRON	23000	NA	19400	14200	17400	15800	14100
LEAD	400	150	6.7	4.9	5.6	5.1	6.8
MAGNESIUM	NA	NA	4080 J	2970 J	3420 J	3230	3000 J
MANGANESE	1800	390	194	123	243 J	181	130 J
NICKEL	1600	1000	16.2	14.2	13.9	13.5	15.9
POTASSIUM	NA	NA	2250 U	1450 U	1200 U	1470	1120 U
SELENIUM	390	390	0.3 U	0.26 U	0.33 U	0.42 J	0.34 U
SODIUM	NA	NA	45.1 U	37.4 U	62.2 U	82.8 U	47.5 U
THALLIUM	5.2	5.5	0.33 U	0.29 U	0.51 U	0.52 U	0.52 U
VANADIUM	78	550	17.6	13.7	13.4	12.4	12.8
ZINC	23000	6000	46.1 J	34.4 J	37.2	37.5	38
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA			1300	1400	2100
PERCENT MOISTURE (%)	NA	NA			10.2	16.5	7.7
PH (S.U.)	NA	NA	7.2	5.6	5.8	5.9	6.4
TOTAL ORGANIC CARBON	NA	NA	2500	2400			
TOTAL RESIDUE (%)	NA	NA	89	91	89	87	89
TOTAL SOLIDS (%)	NA	NA			89.8	83.5	92.3
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TAB

SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	05 MW16-22D MW16-22D-NSO-011601-59 ORIG 1/16/2001 59 - 61	05 MW16-22D MW16-22D-NSO-011601-59-D DUP 1/16/2001 59 - 61	05 MW16-23D MW16-23D-NSO-011001-54 NORMAL 1/10/2001 54 - 56	09 MW16-59D MW16-59D-NSO-072104-64 NORMAL 7/21/2004 64 - 66	09 MW16-59D MW16-59D-NSO-072104-66 NORMAL 7/21/2004 66 - 68
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	10 U	10 UJ	10 UJ	670 U	700 U
2-HEXANONE	NA	NA	10 U	10 UJ	10 U	230 J	700 U
ACETONE	14000000	7800000	5 J	10 UJ	10 UJ	670 U	740 U
CARBON DISULFIDE	360000	NA	5 U	5 UJ	5 U	340 U	350 U
CIS-1,2-DICHLOROETHENE	43000	630000	5 U	5 UJ	5 U	340 U	350 U
METHYLENE CHLORIDE	9100	45000	5 UJ	5 UJ	5 U	340 U	350 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	5 U	5 U	5 U	340 U	350 U
TOTAL CHLORINATED VOCS[1]	NA	NA	1300	760	800	1800	3300
TRICHLOROETHENE	53	13000	1300	760 J	800	1800	3300
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA	360 U	360 U	400 U		
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000	22 U	22 U	24 U		
PHENANTHRENE	2300000	40000	22 U	22 U	24 U		
TOTAL PAHS[1]	NA	NA	0 U	0 U	0 U		
Inorganics (mg/kg)							
ALUMINUM	76000	NA	9200	8700	2840		
ANTIMONY	31	10	0.35 UJ	0.39 UJ	0.36 UJ		
ARSENIC	0.39	7	0.94	2.3	2.8		
BARIUM	5400	5500	22.1	21.4	9.5		
BERYLLIUM	150	0.4	0.56	0.51	0.32		
CADMIUM	37	39	0.02 U	0.03 UJ	0.02 UJ		
CALCIUM	NA	NA	1700 U	1780 U	739		
CHROMIUM	30	1400	14.2	13.4	5.1		
COBALT	900	NA	10.3	10.1	3.8		
COPPER	3100	3100	16.6 J	43.3 J	7.2		
IRON	23000	NA	21200	18300	10800		
LEAD	400	150	6.4	7.4	4.8		
MAGNESIUM	NA	NA	4910 J	4540 J	1300 J		
MANGANESE	1800	390	193 J	196 J	182 J		
NICKEL	1600	1000	19.5	19	8.5		
POTASSIUM	NA	NA	1230	1210 U	480 U		
SELENIUM	390	390	0.29 U	0.33 U	0.3 U		
SODIUM	NA	NA	56.2 U	51.2 U	44.9 U		
THALLIUM	5.2	5.5	0.51 J	0.51 U	0.47 U		
VANADIUM	78	550	18.4	17.3	7.5		
ZINC	23000	6000	53.7	52.2	20.4		
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA	2600	2000	1600		
PERCENT MOISTURE (%)	NA	NA	8.9	7.8	17.4		
PH (S.U.)	NA	NA	6		5.8		
TOTAL ORGANIC CARBON	NA	NA				2100	1200
TOTAL RESIDUE (%)	NA	NA	91	93	83		
TOTAL SOLIDS (%)	NA	NA	91.1	92.2	82.6		
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TABLE 4-9
SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	09 MW16-59I MW16-59I-NSO-072604-44 NORMAL 7/26/2004 44 - 46	09 MW16-59I MW16-59I-NSO-072604-46 NORMAL 7/26/2004 46 - 48	09 MW16-60D MW16-60D-NSO-072004-52 NORMAL 7/20/2004 52 - 54	09 MW16-60D MW16-60D-NSO-072104-56 NORMAL 7/21/2004 56 - 58	09 MW16-61D MW16-61D-NSO-072804-44 NORMAL 7/28/2004 44 - 46
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	850 U	760 U	910 U	790 U	6 U
2-HEXANONE	NA	NA	850 U	760 U	210 J	790 U	6 UJ
ACETONE	14000000	7800000	880 U	760 U	1100 U	790 U	10 U
CARBON DISULFIDE	360000	NA	430 U	380 U	450 UJ	390 U	3 U
CIS-1,2-DICHLOROETHENE	43000	630000	430 U	380 U	450 U	390 U	3 U
METHYLENE CHLORIDE	9100	45000	430 U	380 U	450 U	390 U	3 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	430 U	380 U	450 U	390 U	3 U
TOTAL CHLORINATED VOCS[1]	NA	NA	4700	7800	350	420	55
TRICHLOROETHENE	53	13000	4700	7800	350 J	420	55
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA					
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000					
PHENANTHRENE	2300000	40000					
TOTAL PAHS[1]	NA	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA	2800	4500	1200 U	1300	4000
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TABLE

SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	09 MW16-61D MW16-61D-NSO-072904-48 NORMAL 7/29/2004 48 - 50	09 MW16-61D MW16-61D-NSO-072904-50 ORIG 7/29/2004 50 - 52	09 MW16-61D MW16-61D-NSO-072904-50-D DUP 7/29/2004 50 - 52	09 MW16-62D MW16-62D-NSO-080304-51 NORMAL 8/3/2004 51 - 53	09 MW16-62D MW16-62D-NSO-080304-55 NORMAL 8/3/2004 55 - 57
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	6 U	6 U	7 U	7 U	1300 U
2-HEXANONE	NA	NA	6 UJ	6 U	7 UJ	7 U	1300 U
ACETONE	14000000	7800000	21 U	6 U	43 U	11 U	620 U
CARBON DISULFIDE	360000	NA	3 U	3 U	3 UJ	3 UJ	630 U
CIS-1,2-DICHLOROETHENE	43000	630000	3 U	3 U	3 U	3 U	630 U
METHYLENE CHLORIDE	9100	45000	3 U	3 U	3 U	3 U	920 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	3 U	3 U	3 U	3 U	630 U
TOTAL CHLORINATED VOCS[1]	NA	NA	4	61	6	6	1200
TRICHLOROETHENE	53	13000	4	61 J	6 J	6	1200
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA					
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000					
PHENANTHRENE	2300000	40000					
TOTAL PAHS[1]	NA	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA	1500	1400	1200 U	1100 U	1200
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TABLE 4-9
SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	09 MW16-63D MW16-63D-NSO-072704-48 NORMAL 7/27/2004 48 - 50	09 MW16-63D MW16-63D-NSO-072704-54 NORMAL 7/27/2004 54 - 54.3	09 MW16-64D MW16-64D-NSO-072704-51 NORMAL 7/27/2004 51 - 53	09 MW16-64D MW16-64D-NSO-072704-55 NORMAL 7/27/2004 55 - 57	09 MW16-66D MW16-66D-NSO-081004-46 NORMAL 8/10/2004 46 - 48
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	530 U	360 U	730 UJ	1100 UJ	7 U
2-HEXANONE	NA	NA	1100 U	720 U	730 UJ	1100 UJ	7 U
ACETONE	14000000	7800000	1400 U	830 U	730 U	1100 U	8 U
CARBON DISULFIDE	360000	NA	530 U	360 U	360 UJ	560 UJ	3 U
CIS-1,2-DICHLOROETHENE	43000	630000	530 U	360 U	360 U	560 U	3 U
METHYLENE CHLORIDE	9100	45000	530 U	360 U	360 U	560 U	3 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	530 U	360 U	360 U	560 U	3 U
TOTAL CHLORINATED VOCS[1]	NA	NA	1000	180	400	670	4
TRICHLOROETHENE	53	13000	1000	180 J	400	670	4
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA					
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000					
PHENANTHRENE	2300000	40000					
TOTAL PAHS[1]	NA	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA	1100 U	2000	1200 U	2300	2000
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TAB

SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	09 MW16-66D MW16-66D-NSO-081004-48 NORMAL 8/10/2004 48 - 50	09 MW16-67D MW16-67D-NSO-083104-56 NORMAL 8/31/2004 56 - 58	09 MW16-67D MW16-67D-NSO-083104-60 ORIG 8/31/2004 60 - 62	09 MW16-67D MW16-67D-NSO-083104-60-D DUP 8/31/2004 60 - 62	09 MW16-68D MW16-68D-NSO-080904-54 NORMAL 8/9/2004 54 - 56
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	7 U	1 J	5 U	6 U	7 U
2-HEXANONE	NA	NA	7 U	5 U	5 U	6 U	7 U
ACETONE	14000000	7800000	11 U	26 U	15 U	13 U	35 U
CARBON DISULFIDE	360000	NA	4 U	3	3 U	3 U	0.8 J
CIS-1,2-DICHLOROETHENE	43000	630000	4 U	3 U	3 U	3 U	3 U
METHYLENE CHLORIDE	9100	45000	4 U	3 U	3 U	2 U	3 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	4 U	3 U	3 U	3 U	3 U
TOTAL CHLORINATED VOCS[1]	NA	NA	2	46	57	70	89
TRICHLOROETHENE	53	13000	2 J	46	57	70	89
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA					
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000					
PHENANTHRENE	2300000	40000					
TOTAL PAHS[1]	NA	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA	2600	1800	1100 U	1300	2600
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TABLE 4-9
SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	09 MW16-68D MW16-68D-NSO-080904-56 NORMAL 8/9/2004 56 - 58	09 MW16-69D MW16-69D-NSO-081204-54 NORMAL 8/12/2004 54 - 56	09 MW16-69D MW16-69D-NSO-081204-56 NORMAL 8/12/2004 56 - 58	09 MW16-70D MW16-70D-NSO-080904-46 NORMAL 8/9/2004 46 - 48	09 MW16-70D MW16-70D-NSO-080904-54 NORMAL 8/9/2004 54 - 56
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	810 U	7 U	8 U	2 J	6 U
2-HEXANONE	NA	NA	810 U	7 U	8 U	6 U	6 U
ACETONE	14000000	7800000	930 U	9 U	15 U	30 U	110 U
CARBON DISULFIDE	360000	NA	400 U	2 J	4 U	3 U	0.9 J
CIS-1,2-DICHLOROETHENE	43000	630000	400 U	1 J	1 J	3 U	3 U
METHYLENE CHLORIDE	9100	45000	460 U	3 U	4 U	3 U	3 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	400 U	1 J	1 J	3 U	3 U
TOTAL CHLORINATED VOCS[1]	NA	NA	850	101	33	9	96
TRICHLOROETHENE	53	13000	850	100	32	9	96
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA					
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000					
PHENANTHRENE	2300000	40000					
TOTAL PAHS[1]	NA	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA	1100	1100 U	1300	1800	1830
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TAB

SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	09 MW16-71D MW16-71D-NSO-081804-46 NORMAL 8/18/2004 46 - 48	09 MW16-71D MW16-71D-NSO-081804-56 NORMAL 8/18/2004 56 - 57.25	05 SB16-29 SB16-29-NSO-011701-32 NORMAL 1/17/2001 32 - 34	06 SB16-30 SB16-30-NSO-021902-34 NORMAL 2/19/2002 34 - 36	06 SB16-30 SB16-30-NSO-021902-44 NORMAL 2/19/2002 44 - 46
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	6 U	630 U	10 U	360 R	340 R
2-HEXANONE	NA	NA	6 U	630 U	10 U	360 U	340 U
ACETONE	14000000	7800000	6 U	1400 U	10 U	540 R	510 R
CARBON DISULFIDE	360000	NA	3 U	320 U	5 U	180 U	170 U
CIS-1,2-DICHLOROETHENE	43000	630000	3 U	320 U	5 U	180 U	170 U
METHYLENE CHLORIDE	9100	45000	3 U	1000 U	5 UJ	39 T	170 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	3 U	320 U	5 U	180 U	170 U
TOTAL CHLORINATED VOCS[1]	NA	NA	26	810	280	39	0 U
TRICHLOROETHENE	53	13000	26	810	280 J	180 U	170 U
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA			430 U		
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000			4		
PHENANTHRENE	2300000	40000			6		
TOTAL PAHS[1]	NA	NA			10		
Inorganics (mg/kg)							
ALUMINUM	76000	NA			4690		
ANTIMONY	31	10			0.46 UJ		
ARSENIC	0.39	7			1.6		
BARIUM	5400	5500			12.1		
BERYLLIUM	150	0.4			0.54		
CADMIUM	37	39			0.03 U		
CALCIUM	NA	NA			1150 U		
CHROMIUM	30	1400			6.7		
COBALT	900	NA			3		
COPPER	3100	3100			13.8		
IRON	23000	NA			10500		
LEAD	400	150			4.7		
MAGNESIUM	NA	NA			1850 J		
MANGANESE	1800	390			119 J		
NICKEL	1600	1000			7.2		
POTASSIUM	NA	NA			809 U		
SELENIUM	390	390			0.38 U		
SODIUM	NA	NA			60.6 U		
THALLIUM	5.2	5.5			0.59 U		
VANADIUM	78	550			9.7		
ZINC	23000	6000			25.2		
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA			1700		
PERCENT MOISTURE (%)	NA	NA			16.1		
PH (S.U.)	NA	NA			6.2		
TOTAL ORGANIC CARBON	NA	NA	2000	1100			
TOTAL RESIDUE (%)	NA	NA			79		
TOTAL SOLIDS (%)	NA	NA			83.9		
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

TABLE 4-9
SUMMARY OF CHEMICALS DETECTED IN DEEP SUBSURFACE SOIL SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date Depth Range (feet)	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	06 SB16-30 SB16-30-NSO-022002-57 NORMAL 2/20/2002 57 - 59	06 SB16-31 SB16-31-NSO-022602-36 NORMAL 2/26/2002 36 - 38	06 SB16-31 SB16-31-NSO-022702-56 NORMAL 2/27/2002 56 - 58	06 SB16-32 SB16-32-NSO-021202-36 NORMAL 2/12/2002 36 - 38	06 SB16-32 SB16-32-NSO-021202-56 NORMAL 2/12/2002 56 - 58
Volatile Organics (ug/kg)							
2-BUTANONE	22000000	10000000	880 R	260 R	260 R	170 R	220 R
2-HEXANONE	NA	NA	880 U	260 U	260 U	170 UJ	220 UJ
ACETONE	14000000	7800000	1300 R	280 T	290 T	170 R	220 R
CARBON DISULFIDE	360000	NA	440 U	130 U	130 U	170 UJ	220 UJ
CIS-1,2-DICHLOROETHENE	43000	630000	440 U	130 U	130 U	170 U	220 U
METHYLENE CHLORIDE	9100	45000	440 U	130 U	51 T	280 T	570 T
TOTAL 1,2-DICHLOROETHENE	43000	630000	440 U	130 U	130 U	170 U	220 U
TOTAL CHLORINATED VOCS[1]	NA	NA	0 U	0 U	881	280	4570
TRICHLOROETHENE	53	13000	440 U	130 U	830	170 U	4000
Semivolatile Organics (ug/kg)							
DI-N-BUTYL PHTHALATE	6100000	NA					
Polyaromatic Hydrocarbons (ug/kg)							
FLUORANTHENE	2300000	20000					
PHENANTHRENE	2300000	40000					
TOTAL PAHS[1]	NA	NA					
Inorganics (mg/kg)							
ALUMINUM	76000	NA					
ANTIMONY	31	10					
ARSENIC	0.39	7					
BARIUM	5400	5500					
BERYLLIUM	150	0.4					
CADMIUM	37	39					
CALCIUM	NA	NA					
CHROMIUM	30	1400					
COBALT	900	NA					
COPPER	3100	3100					
IRON	23000	NA					
LEAD	400	150					
MAGNESIUM	NA	NA					
MANGANESE	1800	390					
NICKEL	1600	1000					
POTASSIUM	NA	NA					
SELENIUM	390	390					
SODIUM	NA	NA					
THALLIUM	5.2	5.5					
VANADIUM	78	550					
ZINC	23000	6000					
Miscellaneous Parameters (mg/kg)							
CARBON	NA	NA					
PERCENT MOISTURE (%)	NA	NA					
PH (S.U.)	NA	NA					
TOTAL ORGANIC CARBON	NA	NA					
TOTAL RESIDUE (%)	NA	NA					
TOTAL SOLIDS (%)	NA	NA					
Petroleum Hydrocarbons (mg/kg)							
TOTAL RECOVERABLE TPH	NA	NA					

Investigation Description:
02 - EBS Phase II Follow-On Sampling
04 - State I Phase I RI Sampling Event
05 - Stage II Phase I RI Sampling Event
06 - Phase II RI Sampling Event
09 - CTO 107 HRC Injection Study

Qualifiers:
J - Estimated value.
U - Nondetected result.
UJ - Nondetected result is estimated.
B - Result is qualified due to blank contamination.
R - Rejected value.
E - Positive result is detected in the equipment blank.
T - Positive result is detected in the trip blank.

Sample Code Description:
NORMAL - One sample was collected at this location.
ORIG - First of two samples collected at this location.
DUP - Second of two samples collected at this location.

Acronyms:
NA = Not Applicable/Not Available
PAH = Polyaromatic Hydrocarbon
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
TPH = Total Petroleum Hydrocarbon
VOC = Volatile Organic Compound

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

TABLE 4-10
SUMMARY OF DESCRIPTIVE STATISTICS - SURFACE SOIL - DIRECT CONTACT CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil - Residential[3]	Region 9 PRG for Soil -Industrial[3]	RIDEM Soil Direct Exposure Residential[4]	RIDEM Soil Direct Exposure Industrial[4]	Ecological Criteria	Source
Dioxins (ng/kg)													
1,2,3,4,6,7,8,9-OCDD	8/8	740	3310	---	1620	1620	SB16-25-NSO-062600-00	39000 C[5]	160000 C[5]	NA	NA	NA	
1,2,3,4,6,7,8,9-OCDF	8/8	15.1	113	---	61.8	61.8	SB16-25-NSO-062600-00	39000 C[5]	160000 C[5]	NA	NA	NA	
1,2,3,4,6,7,8-HPCDD	8/8	22.5	664	---	171	171	SB16-25-NSO-062600-00	390 C[5]	1600 C[5]	NA	NA	NA	
1,2,3,4,6,7,8-HPCDF	8/8	7.4	69.2	---	30.6	30.6	SB16-25-NSO-062600-00	390 C[5]	1600 C[5]	NA	NA	NA	
1,2,3,4,7,8,9-HPCDF	6/8	0.96	4	4.95 - 5	2.18	2.07	SB16-25-NSO-062600-00	390 C[5]	1600 C[5]	NA	NA	NA	
1,2,3,4,7,8-HXCDD	7/8	0.66	8.8	5	2.65	2.67	SB16-25-NSO-062600-00	39 C[5]	160 C[5]	NA	NA	NA	
1,2,3,4,7,8-HXCDF	6/8	0.98	24.4	2.2 - 7.6	5.25	6.13	SB16-25-NSO-062600-00	39 C[5]	160 C[5]	NA	NA	NA	
1,2,3,6,7,8-HXCDD	7/8	2.7	36.7	5	9.19	10.1	SB16-25-NSO-062600-00	39 C[5]	160 C[5]	NA	NA	NA	
1,2,3,6,7,8-HXCDF	8/8	0.54	10	---	2.82	2.82	SB16-25-NSO-062600-00	39 C[5]	160 C[5]	NA	NA	NA	
1,2,3,7,8,9-HXCDD	7/8	1.8	38	5	9.37	10.4	SB16-25-NSO-062600-00	39 C[5]	160 C[5]	NA	NA	NA	
1,2,3,7,8,9-HXCDF	1/8	0.31	0.31	4.88 - 5.03	2.22	0.310	SB16-28-NSO-062700-00	39 C[5]	160 C[5]	NA	NA	NA	
1,2,3,7,8-PECDD	5/8	1.1	10	5 - 5.03	3.35	3.86	SB16-25-NSO-062600-00	3.9 C[5]	16 C[5]	NA	NA	NA	
1,2,3,7,8-PECDF	4/8	1	20.5 J	4.88 - 5.03	4.67	6.85	SB16-25-NSO-062600-00	78 C[5]	320 C[5]	NA	NA	NA	
2,3,4,6,7,8-HXCDF	8/8	1.4	11.5	5	3.91	3.91	SB16-25-NSO-062600-00	39 C[5]	160 C[5]	NA	NA	NA	
2,3,4,7,8-PECDF	8/8	0.71 J	20 J	---	4.48	4.48	SB16-25-NSO-062600-00	7.8 C[5]	32 C[5]	NA	NA	NA	
2,3,7,8-TCDD	4/8	0.26	4	0.99 - 1	1.04	1.58	SB16-25-NSO-062600-00	3.9 C	16 C	NA	NA	NA	
2,3,7,8-TCDF	6/8	0.73	28.3	0.57 - 1.4	5.39	7.02	SB16-25-NSO-062600-00	39 C[5]	160 C[5]	NA	NA	NA	
TEQ	8/8	1.19	48.5	---	11.5	11.5	SB16-25-NSO-062600-00	3.9 C[5]	16 C	NA	NA	NA	
TEQ BIRD	8/8	2.03	75.3	---	16.2	16.2	SB16-25-NSO-062600-00	NA	NA	NA	NA	NA	
TOTAL HPCDD	8/8	50.8	1220	---	321	321	SB16-25-NSO-062600-00	NA	NA	NA	NA	NA	
TOTAL HPCDF	8/8	17.9	156	---	73.4	73.4	SB16-25-NSO-062600-00	NA	NA	NA	NA	NA	
TOTAL HXCDD	8/8	7.4	340	---	84.3	84.3	SB16-25-NSO-062600-00	NA	NA	NA	NA	NA	
TOTAL HXCDF	8/8	7.8	125	14.3	47.5	47.5	SB16-25-NSO-062600-00	NA	NA	NA	NA	NA	
TOTAL PECDD	5/8	1.8	101	5 - 12.6	22.7	34.3	SB16-25-NSO-062600-00	NA	NA	NA	NA	NA	
TOTAL PECDF	8/8	7	197	7.3	52.0	52.0	SB16-25-NSO-062600-00	NA	NA	NA	NA	NA	
TOTAL TCDD	7/8	0.55	54.4	1	11.2	12.7	SB16-25-NSO-062600-00	NA	NA	NA	NA	NA	
TOTAL TCDF	8/8	4.6 J	495	---	97.2	97.2	SB16-25-NSO-062600-00	NA	NA	NA	NA	NA	
Volatile Organics (ug/kg)													
2-BUTANONE	4/27	10	55 J	4 - 13	7.66	22.0	EBS85-SB01-050196-00	22000000 N	110000000 N	10000000	10000000	NA	
ACETONE	16/27	15 J	3700 J	3 - 13	345	579	28SB-04-NSO-061897-00	14000000 N	54000000 N	7800000	10000000	NA	
BTEX	2/27	6	36	---	1.56	21.0	EBS85-SB01-050196-00	NA	NA	NA	NA	NA	
METHYLENE CHLORIDE	3/27	4 J	4 J	1 - 13	4.56	4.00	3 Samples	9100 C	21000 C	45000	760000	400	4
TOLUENE	2/27	6 J	36	1 - 13	5.53	21.0	EBS85-SB01-050196-00	520000 SAT	520000 SAT	190000	10000000	200000	2a
TOTAL CHLORINATED VOCS	3/27	4	4	---	0.444	4.00	3 Samples	NA	NA	NA	NA	NA	
Semivolatile Organics (ug/kg)													
2-METHYLNAPHTHALENE	6/31	4.15 J	10012 J	56 - 440	771	3268	SOURCE2-2-NSD-032604	56000 N[6]	190000 N[6]	123000	10000000	600 [6]	3
ACENAPHTHENE	7/31	4.93	749	57 - 440	178	197	SOURCE2-2-NSD-032604	3700000 N	29000000 N	43000	10000000	20000	2a
ACENAPHTHYLENE	6/30	11.3 J	963 J	54 - 440	208	350	SOURCE1-2-NSD-032604	3700000 N[7]	29000000 N[7]	23000	10000000	700 [10]	3
ANTHRACENE	9/31	20.8	1885 J	51 - 440	257	463	SOURCE1-2-NSD-032604	22000000 N	100000000 MAX	35000	10000000	700 [10]	3
BAP EQUIVALENT	16/31	3.9	4608	---	389	754	SOURCE1-2-NSD-032604	62 C	210 C	400	800	NA	
BENZO(A)ANTHRACENE	13/31	59.0	3812 J	330 - 440	411	730	SOURCE1-2-NSD-032604	620 C	2100 C	900	7800	700 [10]	3
BENZO(A)PYRENE	14/31	40 J	2339 J	330 - 440	321	492	SOURCE1-2-NSD-032604	62 C	210 C	400	800	700	3
BENZO(B)FLUORANTHENE	16/31	39 J	7236 J	330 - 440	608	1008	SOURCE1-2-NSD-032604	620 C	2100 C	900	7800	700 [10]	3
BENZO(G,H,I)PERYLENE	12/31	44.7	1904 J	96 - 440	274	435	SOURCE1-2-NSD-032604	2300000 N[8]	29000000 N[8]	800	10000000	700 [10]	3
BENZO(K)FLUORANTHENE	11/31	45 J	6221 J	66 - 440	464	996	SOURCE1-2-NSD-032604	6200 C	21000 C	900	78000	700 [10]	3
BIS(2-ETHYLHEXYL)PHTHALATE	2/25	36 J	37 J	130 - 440	162	36.5	28SB-08-NSO-061897-00-D	35000 C	120000 C	46000	410000	100000 [11]	2a
CARBAZOLE	2/25	66 J	550 J	69 - 440	178	236	SB16-21-NSO-062600-00	24000 C	86000 C	NA	NA	NA	---
CHRYSENE	15/31	36 J	6549 J	330 - 440	546	937	SOURCE1-2-NSD-032604	62000 C	210000 C	400	780000	700 [10]	3
DI-N-BUTYL PHTHALATE	6/25	37 J	56 J	93 - 440	142	46.3	28SB-05-NSO-061897-00	6100000 N	62000000 N	NA	NA	200000	2a

TABLE 4-10
SUMMARY OF DESCRIPTIVE STATISTICS - SURFACE SOIL - DIRECT CONTACT CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil - Residential[3]	Region 9 PRG for Soil -Industrial[3]	RIDEM Soil Direct Exposure Residential[4]	RIDEM Soil Direct Exposure Industrial[4]	Ecological Criteria	S urc
DIBENZO(A,H)ANTHRACENE	10/31	13.1	825 J	77 - 440	176	183	SOURCE1-2-NSD-032604	62 C	210 C	400	800	700 [10]	3
FLUORANTHENE	15/31	50 J	6958 J	330 - 440	700	1254	SOURCE1-2-NSD-032604	2300000 N	22000000 N	20000	10000000	700 [10]	3
FLUORENE	7/31	5.49	984	64 - 440	197	283	SOURCE2-2-NSD-032604	2700000 N	26000000 N	28000	10000000	30000	2b
INDENO(1,2,3-CD)PYRENE	12/31	50 J	2708 J	89 - 440	319	552	SOURCE1-2-NSD-032604	620 C	2100 C	900	7800	700 [10]	3
NAPHTHALENE	6/31	13.5 J	3685 J	95 - 440	377	1228	SOURCE2-2-NSD-032604	56000 N	190000 N	54000	10000000	600	3
PHENANTHRENE	12/31	63 J	2767	330 - 440	353	627	SOURCE2-2-NSD-032604	2300000 N[8]	29000000 N[8]	40000	10000000	700 [10]	3
PYRENE	16/31	38 J	8017 J	330 - 440	715	1215	SOURCE1-2-NSD-032604	2300000 N	29000000 N	13000	10000000	700 [10]	3
TOTAL PAHS	17/31	38	50739	---	4954	9033	SOURCE1-2-NSD-032604	NA	NA	NA	NA	NA	
Polyaromatic Hydrocarbons (ug/kg)													
2-METHYLNAPHTHALENE	2/8	16	30	20 - 2200	16.4	23.0	SB16-28-NSO-062700-00	56000 N[6]	190000 N[6]	123000	10000000	600 [6]	3
ACENAPHTHENE	5/12	14	2400 J	20 - 2200	348	815	28SB-01B-NSO-042496-00	3700000 N	29000000 N	43000	10000000	20000	2a
ACENAPHTHYLENE	4/12	12	440	20 - 2200	183	135	SB16-21-NSO-062600-00	3700000 N[7]	29000000 N[7]	23000	10000000	700 [10]	3
ANTHRACENE	9/12	5 J	4600 J	20 - 2200	568	753	28SB-01B-NSO-042496-00	22000000 N	100000000 MAX	35000	10000000	700 [10]	3
BAP EQUIVALENT	12/12	5.45	4128	---	617	617	SB16-21-NSO-062600-00-D	62 C	210 C	400	800	NA	
BENZO(A)ANTHRACENE	12/12	4	4800	---	567	567	SB16-21-NSO-062600-00	620 C	2100 C	900	7800	700 [10]	3
BENZO(A)PYRENE	12/12	4 J	2700	---	384	384	SB16-21-NSO-062600-00-D	62 C	210 C	400	800	700	3
BENZO(B)FLUORANTHENE	12/12	8	7400	---	921	921	SB16-21-NSO-062600-00 and Dup	620 C	2100 C	900	7800	700 [10]	3
BENZO(G,H,I)PERYLENE	12/12	3 J	1200	---	206	206	SB16-21-NSO-062600-00-D	2300000 N[8]	29000000 N[8]	800	10000000	700 [10]	3
BENZO(K)FLUORANTHENE	11/12	3	2300	20	272	296	SB16-21-NSO-062600-00-D	6200 C	21000 C	900	78000	700 [10]	3
CHRYSENE	12/12	15 J	5300	---	756	756	SB16-21-NSO-062600-00-D	62000 C	210000 C	400	780000	700 [10]	3
DIBENZO(A,H)ANTHRACENE	7/12	9	400	2 - 2200	56.4	87.4	SB16-21-NSO-062600-00	62 C	210 C	400	800	700 [10]	3
FLUORANTHENE	12/12	17 J	7900	---	821	821	SB16-21-NSO-062600-00-D	2300000 N	22000000 N	20000	10000000	700 [10]	3
FLUORENE	5/12	5 J	510 J	7 - 2200	73.6	159	28SB-01B-NSO-042496-00	2700000 N	26000000 N	28000	10000000	30000	2b
INDENO(1,2,3-CD)PYRENE	12/12	2 J	2500	---	299	299	SB16-21-NSO-062600-00-D	620 C	2100 C	900	7800	700 [10]	3
NAPHTHALENE	3/12	14	30 J	20 - 2200	87.1	19.7	28SB-01A-NSO-042496-00	56000 N	190000 N	54000	10000000	600	3
PHENANTHRENE	12/12	6 J	920	2200	258	258	SB16-28-NSO-062700-00	2300000 N[8]	29000000 N[8]	40000	10000000	700 [10]	3
PYRENE	12/12	13 J	6600	---	968	968	SB16-21-NSO-062600-00-D	2300000 N	29000000 N	13000	10000000	700 [10]	3
TOTAL PAHS	12/12	80	40000	---	6526	6526	SB16-21-NSO-062600-00-D	NA	NA	NA	NA	NA	
P sticides PCBs (ug/kg)													
4,4'-DDT	1/8	3.7	3.7	3.4 - 4.2	2.04	3.70	SB16-26-NSO-062300-00	1700 C	7000 C	NA	NA	12500	3
ALPHA-BHC	1/8	2.4 J	2.4 J	1.8 - 1.9	1.09	2.40	SB16-28-NSO-062700-00	90 C	360 C	NA	NA	3	4
AROCLOR-1260	1/9	19	19	18 - 36	10.7	14.0	SB16-21-NSO-062600-00-D	220 C[9]	740 C[9]	NA	NA	40000	2a
GAMMA-CHLORDANE	1/9	2.9 J	2.9 J	1.8 - 2.1	1.14	2.90	SB16-21-NSO-062600-00	1600 C[11]	6500 C[11]	NA	NA	0.03	4
TOTAL AROCLOR	1/9	19	19	18 - 36	10.7	14.0	SB16-21-NSO-062600-00-D	220 C[9]	740 C[9]	10000	10000	40000	2a
Inorganics (mg/kg)													
ALUMINUM	9/9	2570	8590	---	4612	4612	SB16-28-NSO-062700-00	76000 N	100000 MAX	NA	NA	50	2a
ARSENIC	7/9	1.3	4	1.7 - 1.9	2.04	2.37	SB16-28-NSO-062700-00	0.39 C	1.6 C	7	7	18	1a
BARIUM	9/9	14.8	40.6	---	24.6	24.6	SB16-26-NSO-062300-00	5400 N	67000 N	5500	10000	330	1b
BERYLLIUM	9/9	0.33	0.64	---	0.478	0.478	SB16-28-NSO-062700-00	150 N	1900 N	0.4	1.3	40	1b
CADMIUM	2/9	0.35 J	0.56	0.07 - 0.46	0.214	0.455	SB16-24-NSO-062600-00	37 N	450 N	39	1000	32	1a
CALCIUM	8/9	282	1200	550	510	539	SB16-23-NSO-062600-00	NA	NA	NA	NA	NA	
CHROMIUM	9/9	2.9	11.6	---	6.11	6.11	SB16-28-NSO-062700-00	30 C[12]	64 C[12]	1400	10000	0.4	2b
COBALT	9/9	2	7.8	---	4.16	4.16	SB16-28-NSO-062700-00	900 C	1900 C	NA	NA	13	1a
COPPER	9/9	7 J	40.2 J	---	19.7	19.7	SB16-23-NSO-062600-00	3100 N	41000 N	3100	10000	60	2b
IRON	9/9	5930	21200	---	10856	10856	SB16-28-NSO-062700-00	23000 N	100000 MAX	NA	NA	pH	1a
LEAD	9/9	10.8	98.4	---	45.0	45.0	SB16-24-NSO-062600-00	400	800	150	500	120	1a
MAGNESIUM	9/9	540	2140	---	1272	1272	SB16-28-NSO-062700-00	NA	NA	NA	NA	NA	
MANGANESE	9/9	84.4 J	248 J	---	145	145	SB16-28-NSO-062700-00	1800 N	19000 N	390	10000	500	2a
MERCURY	1/9	0.11	0.11	0.01 - 0.05	0.0206	0.110	SB16-25-NSO-062600-00	23 N	310 N	23	610	0.1	2b
NICKEL	6/9	2.6	11	4.1 - 7.6	5.44	6.80	SB16-28-NSO-062700-00	1600 N	20000 N	1000	10000	30	2a

TABLE 4-10
SUMMARY OF DESCRIPTIVE STATISTICS - SURFACE SOIL - DIRECT CONTACT CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil - Residential[3]	Region 9 PRG for Soil -Industrial[3]	RIDEM Soil Direct Exposure Residential[4]	RIDEM Soil Direct Exposure Industrial[4]	Ecological Criteria	Source
POTASSIUM	8/9	381	921 J	562	517	546	SB16-21-NSO-062600-00-D	NA	NA	NA	NA	NA	
SELENIUM	1/9	0.88	0.88	0.26 - 0.45	0.233	0.880	SB16-28-NSO-062700-00	390 N	5100 N	390	10000	1	2a
SILVER	1/9	0.32 J	0.32 J	0.2 - 0.51	0.167	0.320	SB16-25-NSO-062600-00	390 N	5100 N	200	10000	2	2a
SODIUM	5/9	27.5	82	20.8 - 35.2	33.4	50.3	SB16-23-NSO-062600-00	NA	NA	NA	NA	NA	
THALLIUM	1/9	0.65 J	0.65 J	0.25 - 0.4	0.216	0.650	SB16-27-NSO-062600-00	5.2 N	67 N	5.5	140	1	2a
VANADIUM	9/9	4.7	16.1	---	9.07	9.07	SB16-28-NSO-062700-00	78 N	1000 N	550	10000	2	2a
ZINC	9/9	29.8	85.3 J	---	48.6	48.6	SB16-28-NSO-062700-00	23000 N	100000 MAX	6000	10000	50	2a
Miscellan ous Parameters (mg/kg)													
PH (S.U.)	8/8	5.5	7.8	---	6.53	6.53	SB16-23-NSO-062600-00	NA	NA	NA	NA	NA	
TOTAL INORGANIC CARBON (%)	1/1	0.8	0.8	---	0.800	0.800	SOURCE3-1-NSD-032604	NA	NA	NA	NA	NA	
TOTAL ORGANIC CARBON	8/8	1900	6300	---	3469	3469	SB16-25-NSO-062600-00	NA	NA	NA	NA	NA	
TOTAL RESIDUE (%)	8/8	79	97	---	92.3	92.3	SB16-22-NSO-062700-00	NA	NA	NA	NA	NA	
Petrol um Hydrocarbons (mg/kg)													
TOTAL RECOVERABLE TPH	12/17	28	1750	25 - 33	293	410	28SB-09-NSO-061897-00	NA	NA	NA	NA	NA	

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
4 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
5 - Value is derived by multiplying criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
6 - The value for naphthalene is used as a surrogate for 2-methylnaphthalene.
7 - The value for acenaphthene is used as a surrogate for acenaphthylene.
8 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
9 - The value for Total PCB congeners (Aroclors) is presented.
10 - The value for benzo(a)pyrene is used as a surrogate.
11- The value for chlordane is used as a surrogate.
12 - The value for chromium VI is presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Sources for Ecological Screening Criteria (See Table 4-1):
1a - Eco-SSL Plant Benchmark (USEPA, 2003)
1b - Eco-SSL Invertebrate Benchmark (USEPA, 2003)
2a - ORNL Plant Benchmark (Efroymson, 1997a)
2b - ORNL Invertebrate Benchmark (Efroymson, 1997b)
3 - Canadian Soil Quality Guidelines (1997)

Qualifiers:
C - Carcinogen.
N - Noncarcinogen.
MAX - Ceiling limit.
SAT - Saturation limit.
J - Estimated Value
4 - Dutch Target Value (MHSPE, 2000)

TABLE 4-10
SUMMARY OF DESCRIPTIVE STATISTICS - SURFACE SOIL - DIRECT CONTACT CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Paramet r	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil - Residential[3]	Region 9 PRG for Soil -Industrial[3]	RIDEM Soil Direct Exposure Residential[4]	RIDEM Soil Direct Exposure Industrial[4]	Ecological Criteria	Source

Acronyms:
HI = Hazard Index
NA = Not Available
PAH = Polyaromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
TPH = Total Petroleum Hydrocarbons
VOC = Volatile Organic Carbon

TABLE 4-11
SUMMARY OF DESCRIPTIVE STATISTICS FOR SURFACE SOIL - MIGRATION CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Param t r	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Federal SSLs[3] Inhalation - Residential	Fed. SSL[3] Prot. GW for DAF = 20 - Residential	Federal SSLs[3] Inhalation - Industrial	RIDEM GA Leachability Criteria[4]
Dioxins (ng/kg)											
1,2,3,4,6,7,8,9-OCDD	8/8	740	3310	---	1620	1620	SB16-25-NSO-062600-00	430000 C[5]	56000 [5]	800000 C[5]	NA
1,2,3,4,6,7,8,9-OCDF	8/8	15.1	113	---	61.8	61.8	SB16-25-NSO-062600-00	430000 C[5]	56000 [5]	800000 C[5]	NA
1,2,3,4,6,7,8-HPCDD	8/8	22.5	664	---	171	171	SB16-25-NSO-062600-00	4300 C[5]	560 [5]	8000 C[5]	NA
1,2,3,4,6,7,8-HPCDF	8/8	7.4	69.2	---	30.6	30.6	SB16-25-NSO-062600-00	4300 C[5]	560 [5]	8000 C[5]	NA
1,2,3,4,7,8,9-HPCDF	6/8	0.96	4	4.95 - 5	2.18	2.07	SB16-25-NSO-062600-00	4300 C[5]	560 [5]	8000 C[5]	NA
1,2,3,4,7,8-HXCDD	7/8	0.66	8.8	5	2.65	2.67	SB16-25-NSO-062600-00	430 C[5]	56 [5]	800 C[5]	NA
1,2,3,4,7,8-HXCDF	6/8	0.98	24.4	2.2 - 7.6	5.25	6.13	SB16-25-NSO-062600-00	430 C[5]	56 [5]	800 C[5]	NA
1,2,3,6,7,8-HXCDD	7/8	2.7	36.7	5	9.19	10.1	SB16-25-NSO-062600-00	430 C[5]	56 [5]	800 C[5]	NA
1,2,3,6,7,8-HXCDF	8/8	0.54	10	---	2.82	2.82	SB16-25-NSO-062600-00	430 C[5]	56 [5]	800 C[5]	NA
1,2,3,7,8,9-HXCDD	7/8	1.8	38	5	9.37	10.4	SB16-25-NSO-062600-00	430 C[5]	56 [5]	800 C[5]	NA
1,2,3,7,8,9-HXCDF	1/8	0.31	0.31	4.88 - 5.03	2.22	0.31	SB16-28-NSO-062700-00	430 C[5]	56 [5]	800 C[5]	NA
1,2,3,7,8-PECDD	5/8	1.1	10	5 - 5.03	3.35	3.86	SB16-25-NSO-062600-00	43 C[5]	5.6 [5]	80 C[5]	NA
1,2,3,7,8-PECDF	4/8	1	20.5 J	4.88 - 5.03	4.67	6.85	SB16-25-NSO-062600-00	860 C[5]	112 [5]	1600 C[5]	NA
2,3,4,6,7,8-HXCDF	8/8	1.4	11.5	5	3.91	3.91	SB16-25-NSO-062600-00	430 C[5]	56 [5]	800 C[5]	NA
2,3,4,7,8-PECDF	8/8	0.71 J	20 J	---	4.48	4.48	SB16-25-NSO-062600-00	86 C[5]	11.2 [5]	160 C[5]	NA
2,3,7,8-TCDD	4/8	0.26	4	0.99 - 1	1.04	1.58	SB16-25-NSO-062600-00	43 C	5.6 MCL	80 C	NA
2,3,7,8-TCDF	6/8	0.73	28.3	0.57 - 1.4	5.39	7.02	SB16-25-NSO-062600-00	430 C[5]	56 [5]	800 C[5]	NA
TEQ	8/8	1.19	48.5	---	11.5	11.5	SB16-25-NSO-062600-00	43 C[5]	5.6 [5]	80 C	NA
TOTAL HPCDD	8/8	50.8	1220	---	321	321	SB16-25-NSO-062600-00	NA	NA	NA	NA
TOTAL HPCDF	8/8	17.9	156	---	73.4	73.4	SB16-25-NSO-062600-00	NA	NA	NA	NA
TOTAL HXCDD	8/8	7.4	340	---	84.3	84.3	SB16-25-NSO-062600-00	NA	NA	NA	NA
TOTAL HXCDF	8/8	7.8	125	14.3	47.5	47.5	SB16-25-NSO-062600-00	NA	NA	NA	NA
TOTAL PECDD	5/8	1.8	101	5 - 12.6	22.7	34.3	SB16-25-NSO-062600-00	NA	NA	NA	NA
TOTAL PECDF	8/8	7	197	7.3	52	52	SB16-25-NSO-062600-00	NA	NA	NA	NA
TOTAL TCDD	7/8	0.55	54.4	1	11.2	12.7	SB16-25-NSO-062600-00	NA	NA	NA	NA
TOTAL TCDF	8/8	4.6 J	495	---	97.2	97.2	SB16-25-NSO-062600-00	NA	NA	NA	NA
Volatile Organics (ug/kg)											
2-BUTANONE	4/27	10	55 J	4 - 13	7.66	22	EBS85-SB01-050196-00	24000000 sat	89000 N	24000000 sat	NA
ACETONE	16/27	15 J	3700 J	3 - 13	345	579	28SB-04-NSO-061897-00	NA	130000 N	NA	NA
BTEX	2/27	6	36	---	1.56	21	EBS85-SB01-050196-00	NA	NA	NA	NA
METHYLENE CHLORIDE	3/27	4 J	4 J	1 - 13	4.56	4	3 Samples	13000 C	23 MCL	24000 C	NA
TOLUENE	2/27	6 J	36	1 - 13	5.53	21	EBS85-SB01-050196-00	650000 sat	12000 MCLG	650000 sat	32000
TOTAL CHLORINATED VOCS	3/27	4	4	---	0.444	4	3 Samples	NA	NA	NA	NA
Semivolatile Organics (ug/kg)											
2-METHYLNAPHTHALENE	6/31	4.15 J	10012 J	56 - 440	771	3268	SOURCE2-2-NSD-032604	NA	NA	NA	NA
ACENAPHTHENE	7/31	4.93	749	57 - 440	178	197	SOURCE2-2-NSD-032604	NA	630000 N	NA	NA
ACENAPHTHYLENE	6/30	11.3 J	963 J	54 - 440	208	350	SOURCE1-2-NSD-032604	NA	NA	NA	NA
ANTHRACENE	9/31	20.8	1885 J	51 - 440	257	463	SOURCE1-2-NSD-032604	NA	13000000 N	NA	NA
BAP EQUIVALENT	16/31	3.9	4608	---	389	754	SOURCE1-2-NSD-032604	NA	8200 MCL	NA	240000
BENZO(A)ANTHRACENE	13/31	59.0	3812 J	330 - 440	411	730	SOURCE1-2-NSD-032604	NA	3200 MCL	NA	NA
BENZO(A)PYRENE	14/31	40 J	2339 J	330 - 440	321	492	SOURCE1-2-NSD-032604	NA	8200 MCL	NA	240000
BENZO(B)FLUORANTHENE	16/31	39 J	7236 J	330 - 440	608	1008	SOURCE1-2-NSD-032604	NA	9800 MCL	NA	NA
BENZO(G,H,I)PERYLENE	12/31	44.7	1904 J	96 - 440	274	435	SOURCE1-2-NSD-032604	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	11/31	45 J	6221 J	66 - 440	464	996	SOURCE1-2-NSD-032604	NA	9800 MCL	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	2/25	36 J	37 J	130 - 440	162	36.5	28SB-08-NSO-061897-00-D	NA	3600000 MCL	NA	120000

TABLE 4-11
SUMMARY OF DESCRIPTIVE STATISTICS FOR SURFACE SOIL - MIGRATION CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Paramet r	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Federal SSLs[3] Inhalation - Residential	Fed. SSL[3] Prot. GW for DAF = 20 - Residential	Federal SSLs[3] Inhalation - Industrial	RIDEM GA Leachability Criteria[4]
CARBAZOLE	2/25	66 J	550 J	69 - 440	178	236	SB16-21-NSO-062600-00	NA	590 C	NA	NA
CHRYSENE	15/31	36 J	6549 J	330 - 440	546	937	SOURCE1-2-NSD-032604	NA	**3200 MCL**	NA	NA
DI-N-BUTYL PHTHALATE	6/25	37 J	56 J	93 - 440	142	46.3	28SB-05-NSO-061897-00	NA	5000000 N	NA	NA
DIBENZO(A,H)ANTHRACENE	10/31	13.1	825 J	77 - 440	176	183	SOURCE1-2-NSD-032604	NA	30000 MCL	NA	NA
FLUORANTHENE	15/31	50 J	6958 J	330 - 440	700	1254	SOURCE1-2-NSD-032604	NA	6300000 N	NA	NA
FLUORENE	7/31	5.49	984	64 - 440	197	283	SOURCE2-2-NSD-032604	NA	810000 N	NA	NA
INDENO(1,2,3-CD)PYRENE	12/31	50 J	2708 J	89 - 440	319	552	SOURCE1-2-NSD-032604	NA	28000 MCL	NA	NA
NAPHTHALENE	6/31	13.5 J	3685 J	95 - 440	377	1228	SOURCE2-2-NSD-032604	170000 N	61000 N	270000 N	**800**
PHENANTHRENE	12/31	63 J	2767	330 - 440	353	627	SOURCE2-2-NSD-032604	NA	NA	NA	NA
PYRENE	16/31	38 J	8017 J	330 - 440	715	1215	SOURCE1-2-NSD-032604	NA	4600000 N	NA	NA
TOTAL PAHS	17/31	38	50739	---	4954	9033	SOURCE1-2-NSD-032604	NA	NA	NA	NA
Polyaromatic Hydrocarbons (ug/kg)											
2-METHYLNAPHTHALENE	2/8	16	30	20 - 2200	16.4	23	SB16-28-NSO-062700-00	NA	NA	NA	NA
ACENAPHTHENE	5/12	14	2400 J	20 - 2200	348	815	28SB-01B-NSO-042496-00	NA	630000 N	NA	NA
ACENAPHTHYLENE	4/12	12	440	20 - 2200	183	135	SB16-21-NSO-062600-00	NA	NA	NA	NA
ANTHRACENE	9/12	5 J	4600 J	20 - 2200	568	753	28SB-01B-NSO-042496-00	NA	13000000 N	NA	NA
BAP EQUIVALENT	12/12	5.45	4128	---	617	617	SB16-21-NSO-062600-00-D	NA	8200 MCL	NA	240000
BENZO(A)ANTHRACENE	12/12	4	4800	---	567	567	SB16-21-NSO-062600-00	NA	**3200 MCL**	NA	NA
BENZO(A)PYRENE	12/12	4 J	2700	---	384	384	SB16-21-NSO-062600-00-D	NA	8200 MCL	NA	240000
BENZO(B)FLUORANTHENE	12/12	8	7400	---	921	921	SB16-21-NSO-062600-00 and Dup	NA	9800 MCL	NA	NA
BENZO(G,H,I)PERYLENE	12/12	3 J	1200	---	206	206	SB16-21-NSO-062600-00-D	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	11/12	3	2300	20	272	296	SB16-21-NSO-062600-00-D	NA	9800 MCL	NA	NA
CHRYSENE	12/12	15 J	5300	---	756	756	SB16-21-NSO-062600-00-D	NA	**3200 MCL**	NA	NA
DIBENZO(A,H)ANTHRACENE	7/12	9	400	2 - 2200	56.4	87.4	SB16-21-NSO-062600-00	NA	30000 MCL	NA	NA
FLUORANTHENE	12/12	17 J	7900	---	821	821	SB16-21-NSO-062600-00-D	NA	6300000 N	NA	NA
FLUORENE	5/12	5 J	510 J	7 - 2200	73.6	159	28SB-01B-NSO-042496-00	NA	810000 N	NA	NA
INDENO(1,2,3-CD)PYRENE	12/12	2 J	2500	---	299	299	SB16-21-NSO-062600-00-D	NA	28000 MCL	NA	NA
NAPHTHALENE	3/12	14	30 J	20 - 2200	87.1	19.7	28SB-01A-NSO-042496-00	170000 N	61000 N	270000 N	800
PHENANTHRENE	12/12	6 J	920	2200	258	258	SB16-28-NSO-062700-00	NA	NA	NA	NA
PYRENE	12/12	13 J	6600	---	968	968	SB16-21-NSO-062600-00-D	NA	4600000 N	NA	NA
TOTAL PAHS	12/12	80	40000	---	6526	6526	SB16-21-NSO-062600-00-D	NA	NA	NA	NA
Pesticid s PCBs (ug/kg)											
4,4'-DDT	1/8	3.7	3.7	3.4 - 4.2	2.04	3.7	SB16-26-NSO-062300-00	750000 C	26000 C	1400000 C	NA
ALPHA-BHC	1/8	2.4 J	2.4 J	1.8 - 1.9	1.09	2.4	SB16-28-NSO-062700-00	760 C	**0.72 C**	1400 C	NA
AROCLOR-1260	1/9	19	19	18 - 36	10.7	14	SB16-21-NSO-062600-00-D	NA	NA	NA	NA
GAMMA-CHLORDANE	1/9	2.9 J	2.9 J	1.8 - 2.1	1.14	2.9	SB16-21-NSO-062600-00	72000 C[6]	9600 MCL[6]	120000 **C**	NA
TOTAL AROCLOR	1/9	19	19	18 - 36	10.7	14	SB16-21-NSO-062600-00-D	NA	NA	NA	10000
Inorganics (mg/kg)											
ALUMINUM	9/9	2570	8590	---	4612	4612	SB16-28-NSO-062700-00	6860000 N	**170 N**	10700000 N	NA
ARSENIC	7/9	1.3	4	1.7 - 1.9	2.04	2.37	SB16-28-NSO-062700-00	745 C	5.8 C	1390 C	NA
BARIUM	9/9	14.8	40.6	---	24.6	24.6	SB16-26-NSO-062300-00	686000 N	1600 MCLG	1070000 N	[7]
BERYLLIUM	9/9	0.33	0.64	---	0.478	0.478	SB16-28-NSO-062700-00	1330 C	63 MCLG	2490 C	[7]
CADMIUM	2/9	0.35 J	0.56	0.07 - 0.46	0.214	0.455	SB16-24-NSO-062600-00	1780 C	7.5 MCLG	3320 C	[7]
CALCIUM	8/9	282	1200	550	510	539	SB16-23-NSO-062600-00	NA	NA	NA	NA
CHROMIUM	9/9	2.9	11.6	---	6.11	6.11	SB16-28-NSO-062700-00	267 C[8]	42 N[8]	498 C[8]	[7]
COBALT	9/9	2	7.8	---	4.16	4.16	SB16-28-NSO-062700-00	1140 C	**3.3 N**	2140 C	NA
COPPER	9/9	7 J	40.2 J	---	19.7	19.7	SB16-23-NSO-062600-00	NA	11000 MCLG	NA	NA

TABLE 4-11
SUMMARY OF DESCRIPTIVE STATISTICS FOR SURFACE SOIL - MIGRATION CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration(1)	Maximum Concentration(1)	Range of Nondetects(2)	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Federal SSLs(3) Inhalation - Residential	Fed. SSL(3) Prot. GW for DAF = 20 - Residential	Federal SSLs(3) Inhalation - Industrial	RIDEM GA Leachability Criteria(4)
IRON	9/9	5930	21200	---	10856	10856	SB16-28-NSO-062700-00	NA	NA	NA	NA
LEAD	9/9	10.8	98.4	---	45	45	SB16-24-NSO-062600-00	NA	NA	NA	(7)
MAGNESIUM	9/9	540	2140	---	1272	1272	SB16-28-NSO-062700-00	NA	NA	NA	NA
MANGANESE	9/9	84.4 J	248 J	---	145	145	SB16-28-NSO-062700-00	68600 N	2200 N	107000 N	NA
MERCURY	1/9	0.11	0.11	0.01 - 0.05	0.0206	0.11	SB16-25-NSO-062600-00	2.9 sat	2.1 MCLG	2.9 sat	(7)
NICKEL	6/9	2.6	11	4.1 - 7.6	5.44	6.8	SB16-28-NSO-062700-00	NA	280 N	NA	(7)
POTASSIUM	8/9	381	921 J	562	517	546	SB16-21-NSO-062600-00-D	NA	NA	NA	NA
SELENIUM	1/9	0.88	0.88	0.26 - 0.45	0.233	0.88	SB16-28-NSO-062700-00	NA	5.2 MCLG	NA	(7)
SILVER	1/9	0.32 J	0.32 J	0.2 - 0.51	0.167	0.32	SB16-25-NSO-062600-00	NA	31 N	NA	NA
SODIUM	5/9	27.5	82	20.8 - 35.2	33.4	50.3	SB16-23-NSO-062600-00	NA	NA	NA	NA
THALLIUM	1/9	0.65 J	0.65 J	0.25 - 0.4	0.216	0.65	SB16-27-NSO-062600-00	NA	1.1 N	NA	(7)
VANADIUM	9/9	4.7	16.1	---	9.07	9.07	SB16-28-NSO-062700-00	NA	5100 N	NA	NA
ZINC	9/9	29.8	85.3 J	---	48.6	48.6	SB16-28-NSO-062700-00	NA	14000 N	NA	NA
Misc llaneous Parameters (mg/kg)											
PH (S.U.)	8/8	5.5	7.8	---	6.53	6.53	SB16-23-NSO-062600-00	NA	NA	NA	NA
TOTAL INORGANIC CARBON (%)	1/1	0.8	0.8	---	0.8	0.8	SOURCE3-1-NSD-032604	NA	NA	NA	NA
TOTAL ORGANIC CARBON	8/8	1900	6300	---	3469	3469	SB16-25-NSO-062600-00	NA	NA	NA	NA
TOTAL RESIDUE (%)	8/8	79	97	---	92.3	92.3	SB16-22-NSO-062700-00	NA	NA	NA	NA
P troleum Hydrocarbons (mg/kg)											
TOTAL RECOVERABLE TPH	12/17	28	1750	25 - 33	293	410	28SB-09-NSO-061897-00	NA	NA	NA	NA

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - U.S. EPA Soil Screening Levels. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.htm.
4 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
5 - Value is derived by multiplying criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
6 - The value for chlordane was used as a surrogate for alpha- and gamma-chlordane.
7 - Leachability criteria for inorganics are based on SPLP/TCLP analysis.
8 - The value for chromium VI is presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers:
C - Carcinogenic
N - Noncarcinogenic
MCL - Maximum Contaminant Level - Indicates that the value presented is based on the MCL
MCLG - Maximum Contaminant Level Goal - Indicates that the value presented is based on the MCLG
sat - Soil satuation concentration
J - Estimated value

TABLE 4-11
SUMMARY OF DESCRIPTIVE STATISTICS FOR SURFACE SOIL - MIGRATION CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Param ter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Federal SSLs[3] Inhalation - Residential	Fed. SSL[3] Prot. GW for DAF = 20 - Residential	Federal SSLs[3] Inhalation - Industrial	RIDEM GA L achability Criteria[4]

Acronyms:
BAP = Benzo(a)pyrene
DAF = Dilution and Attenuation Factor
GA = Drinking water suitability
GW = Groundwater
NA = No Criteria Available
PAH = Polyaromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SSL = Soil Screening Level
VOC = Volatile Organic Carbon

TABLE 4-12
SUMMARY OF DESCRIPTIVE STATISTICS - SHALLOW SUBSURFACE SOIL - DIRECT CONTACT
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil - Residential[3]	Region 9 PRG for Soil -Industrial[3]	RIDEM Soil Direct Exposure Residential[4]	RIDEM Soil Direct Exposure Industrial[4]
Dioxins (ng/kg)											
1,2,3,4,6,7,8,9-OCDD	8/8	1310	34930 J	---	10025	10025	SB16-23-NSO-062600-03	39000 C[5]	160000 C[5]	NA	NA
1,2,3,4,6,7,8,9-OCDF	5/8	9.5	1790	9.83 - 10.06	355	565	SB16-23-NSO-062600-03	39000 C[5]	160000 C[5]	NA	NA
1,2,3,4,6,7,8-HPCDD	8/8	16	8340 J	---	2030	2030	SB16-28-NSO-062700-04	390 C[5]	1600 C[5]	NA	NA
1,2,3,4,6,7,8-HPCDF	5/8	6.4	1870	4.91 - 5.03	333	532	SB16-23-NSO-062600-03	390 C[5]	1600 C[5]	NA	NA
1,2,3,4,7,8,9-HPCDF	2/8	1.1	48.4	4.85 - 5.03	8.05	24.8	SB16-23-NSO-062600-03	390 C[5]	1600 C[5]	NA	NA
1,2,3,4,7,8-HXCDD	4/8	0.77	88.1	4.91 - 5.03	23.4	44.3	SB16-28-NSO-062700-04	39 C[5]	160 C[5]	NA	NA
1,2,3,4,7,8-HXCDF	5/8	1	310 J	4.91 - 5.03	48.8	76.6	SB16-28-NSO-062700-04	39 C[5]	160 C[5]	NA	NA
1,2,3,6,7,8-HXCDD	5/8	2.3	505	4.91 - 5.03	116	183	SB16-28-NSO-062700-04	39 C[5]	160 C[5]	NA	NA
1,2,3,6,7,8-HXCDF	3/8	1.2	26	4.85 - 5.03	5.10	9.47	SB16-23-NSO-062600-03	39 C[5]	160 C[5]	NA	NA
1,2,3,7,8,9-HXCDD	5/8	1.6	556	4.91 - 5.03	123	195	SB16-28-NSO-062700-04	39 C[5]	160 C[5]	NA	NA
1,2,3,7,8-PECDD	3/8	0.75	119	4.91 - 5.03	25.2	63.0	SB16-28-NSO-062700-04	3.9 C[5]	16 C[5]	NA	NA
1,2,3,7,8-PECDF	4/8	0.69	121	4.91 - 5.03	21.0	39.4	SB16-28-NSO-062700-04	78 C[5]	320 C[5]	NA	NA
2,3,4,6,7,8-HXCDF	4/8	1.7	215 J	4.91 - 5.03	33.6	64.7	SB16-28-NSO-062700-04	39 C[5]	160 C[5]	NA	NA
2,3,4,7,8-PECDF	4/8	0.76 J	125	4.91 - 5.03	19.6	36.7	SB16-28-NSO-062700-04	7.8 C[5]	32 C[5]	NA	NA
2,3,7,8-TCDD	2/8	18.8	44.5	0.98 - 1	8.29	31.7	SB16-28-NSO-062700-04	3.9 C[5]	16 C[5]	NA	NA
2,3,7,8-TCDF	3/8	0.58	125	0.82 - 1.1	18.1	47.5	SB16-28-NSO-062700-04	39 C[5]	160 C[5]	NA	NA
TEQ	8/8	0.41	505	---	102	102	SB16-28-NSO-062700-04	3.9 C[5]	16 C	NA	NA
TOTAL HPCDD	8/8	38.1	15510 J	---	3786	3786	SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL HPCDF	5/8	13.5	4030 J	1.4 - 10.1	827	1321	SB16-23-NSO-062600-03	NA	NA	NA	NA
TOTAL HXCDD	6/8	13.9	4630 J	3.3	1100	1466	SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL HXCDF	5/8	6.3	1190	19.7 - 20.1	307	486	SB16-23-NSO-062600-03	NA	NA	NA	NA
TOTAL PECDD	4/8	4.2	897	4.91 - 5.03	223	444	SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL PECDF	5/8	1.9	789	0.47 - 10.1	138	219	SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL TCDD	5/8	0.72	505	0.98 - 1	105	168	SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL TCDF	5/8	3.2 J	1900 J	0.98 - 1	291	466	SB16-28-NSO-062700-04	NA	NA	NA	NA
Volatile Organics (ug/kg)											
1,1,2-TRICHLOROETHANE	1/50	5 J	5 J	1 - 340	15.2	5.00	SB16-07-NSO-051404-04	730 C	1600 C	3600	100000
2-BUTANONE	12/48	4 J	120	4 - 670	25.7	34.5	SB16-45-NSO-051204-14-D	22000000 N	110000000 N	10000000	10000000
2-HEXANONE	1/50	400 J	400 J	4 - 670	32.7	400	SB16-07-NSO-051404-04	NA	NA	NA	NA
4-METHYL-2-PENTANONE	1/50	7 J	7 J	6 - 670	24.9	7.00	SB16-07-NSO-051404-04	5300000 N	47000000 N	1200000	10000000
ACETONE	31/48	7 J	75000 J	3 - 190	2100	3246	28SB-06-NSO-061997-08	14000000 N	54000000 N	7800000	10000000
BENZENE	4/50	0.9 J	34 J	1 - 340	12.8	13.0	SB16-28-NSO-062700-04	640 C	1400 C	2500	200000
BROMODICHLOROMETHANE	1/50	7 J	7 J	1 - 340	15.3	7.00	SB16-07-NSO-051404-04	820 C	1800 C	10000	92000
BTEX	8/50	2.9	1464	---	32.3	202	SB16-28-NSO-062700-04	NA	NA	NA	NA
CARBON DISULFIDE	8/50	3 J	29	2 - 340	16.3	9.75	SB16-45-NSO-051204-14-D	360000 N	720000 SAT	NA	NA
CHLOROFORM	1/50	2 J	2 J	1 - 340	15.2	2.00	SB16-07-NSO-051404-04	220 C	470 C	1200	940000
CHLOROMETHANE	1/50	2 J	2 J	2 - 340	15.2	2.00	SB16-46-NSO-051304-12	47000 N	160000 N	NA	NA
CIS-1,2-DICHLOROETHENE	3/26	280	1800	4 - 340	155	1132	SB16-41-NSO-051104-16	43000 N	150000 N	630000	10000000
ETHYLBENZENE	2/50	12 J	350	2 - 340	19.2	181	SB16-28-NSO-062700-04	400000 SAT	400000 SAT	71000	10000000
M+P-XYLENES	3/26	2 J	620	5 - 340	44.9	222	SB16-28-NSO-062700-04	270000 N[6]	420000 SAT[6]	NA	NA
METHYLENE CHLORIDE	7/50	3 J	230 J	1 - 320	16.0	54.4	MW16-07S-NSO-061900-05	9100 C	21000 C	45000	760000
O-XYLENE	3/26	4 J	290	4 - 340	31.0	109	SB16-28-NSO-062700-04	270000 N[6]	420000 SAT[6]	NA	NA
STYRENE	1/49	1 J	1 J	1 - 340	15.4	1.00	SB16-07-NSO-051404-04	1700000 SAT	1700000 SAT	13000	190000
TOLUENE	7/50	2 J	170	1 - 340	15.7	30.1	SB16-28-NSO-062700-04	520000 SAT	520000 SAT	190000	10000000

TABLE 4-12
SUMMARY OF DESCRIPTIVE STATISTICS - SHALLOW SUBSURFACE SOIL - DIRECT CONTACT
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil - Residential[3]	Region 9 PRG for Soil -Industrial[3]	RIDEM Soil Direct Exposure Residential[4]	RIDEM Soil Direct Exposure Industrial[4]
TOTAL 1,2-DICHLOROETHENE	3/50	314	1875	1 - 340	85.9	1183	SB16-41-NSO-051104-16	43000 N[7]	150000 N[7]	630000	10000000
TOTAL CHLORINATED VOCS	14/50	1	1896	---	80.5	287	SB16-41-NSO-051104-16	NA	NA	NA	NA
TOTAL XYLENES	3/50	6 J	910	2 - 340	31.8	331	SB16-28-NSO-062700-04	270000 N	420000 SAT	110000	10000000
TRANS-1,2-DICHLOROETHENE	3/26	34	75	4 - 340	30.2	50.8	SB16-41-NSO-051104-16	69000 N	230000 N	1100000	10000000
TRICHLOROETHENE	4/50	1 J	55	1 - 340	16.3	15.8	SB16-29-NSO-011701-20	53 C	110 C	13000	520000
VINYL CHLORIDE	2/50	3 J	21	2 - 670	22.7	12.0	SB16-41-NSO-051104-16	79 C[8]	750 C[8]	20	3000
Semivolatile Organics (ug/kg)											
2,4-DIMETHYLPHENOL	1/45	270 J	270 J	52 - 5900	252	270	SB16-46-NSO-051304-12	1200000 N	12000000 N	1400000	10000000
2,6-DINITROTOLUENE	1/45	2000	2000	55 - 5900	274	2000	SB16-07-NSO-051404-10	61000 N	620000 N	NA	NA
2-METHYLNAPHTHALENE	5/45	360 J	120000 J	57 - 650	3277	28136	SB16-07-NSO-051404-04	56000 N	190000 N[9]	123000	10000000
2-METHYLPHENOL	1/45	200 J	200 J	58 - 5900	251	200	SB16-46-NSO-051304-12	3100000 N	31000000 N	NA	NA
4-CHLOROANILINE	1/45	260 J	260 J	110 - 5900	254	260	SB16-46-NSO-051304-12	240000 N	2500000 N	310000	8200000
4-METHYLPHENOL	1/45	830	830	49 - 5900	264	830	SB16-46-NSO-051304-12	310000 N	3100000 N	NA	NA
ACENAPHTHENE	2/37	530	640	58 - 430	192	578	MW16-07S-NSO-061900-05-D	3700000 N	29000000 N	43000	10000000
ANTHRACENE	1/37	53 J	53 J	52 - 430	167	53.0	28SB-08-NSO-061997-02	22000000 N	100000000 MAX	35000	10000000
BAP EQUIVALENT	7/37	45.5	909	---	57.7	305	SB16-26-NSO-062300-02	62 C	210 C	400	800
BENZO(A)ANTHRACENE	6/37	43 J	480	71 - 430	171	175	SB16-23-NSO-062600-03	620 C	2100 C	900	7800
BENZO(A)PYRENE	7/37	36 J	690	49 - 430	178	226	SB16-26-NSO-062300-02	62 C	210 C	400	800
BENZO(B)FLUORANTHENE	7/37	51 J	1300	75 - 430	206	364	SB16-26-NSO-062300-02	620 C	2100 C	900	7800
BENZO(G,H,I)PERYLENE	5/37	66 J	480	98 - 430	177	217	SB16-26-NSO-062300-02	2300000 N[10]	29000000 N[10]	800	10000000
BENZO(K)FLUORANTHENE	4/37	43 J	380	67 - 430	171	180	SB16-26-NSO-062300-02	6200 C	21000 C	900	78000
BIS(2-ETHYLHEXYL)PHTHALATE	9/45	40 J	2200	130 - 5900	324	524	MW16-49I-NSO-080404-10-D	35000 C	120000 C	46000	410000
CARBAZOLE	1/45	120 J	120 J	71 - 5900	249	120	SB16-46-NSO-051304-12	24000 C	86000 C	NA	NA
CHRYSENE	7/37	50 J	490	74 - 430	172	186	SB16-23-NSO-062600-03	62000 C	210000 C	400	780000
DI-N-BUTYL PHTHALATE	5/45	53 J	130 J	96 - 5900	241	83.2	SB16-46-NSO-051304-12	6100000 N	62000000 N	NA	NA
DIBENZO(A,H)ANTHRACENE	1/37	58 J	58 J	79 - 430	169	58.0	28SB-08-NSO-061997-02	62 C	210 C	400	800
DIBENZOFURAN	2/45	160 J	240 J	53 - 5900	250	200	SB16-46-NSO-051304-12	150000 N	1600000 N	NA	NA
DIETHYL PHTHALATE	1/45	61 J	61 J	36 - 5900	245	61.0	28SB-12-NSO-061997-06	49000000 N	100000000 MAX	340000	10000000
FLUORANTHENE	9/37	67 J	560	64 - 430	179	218	SB16-23-NSO-062600-03	2300000 N	22000000 N	20000	10000000
FLUORENE	2/37	140 J	700	65 - 430	182	400	MW16-07S-NSO-061900-05-D	2700000 N	26000000 N	28000	10000000
INDENO(1,2,3-CD)PYRENE	5/37	56 J	650	91 - 430	180	245	SB16-26-NSO-062300-02	620 C	2100 C	900	7800
NAPHTHALENE	1/37	2300	2300	97 - 430	229	2300	28SB-12-NSO-061997-06	56000 N	190000 N	54000	10000000
PHENANTHRENE	7/37	49 J	1200	71 - 430	186	262	MW16-07S-NSO-061900-05-D	2300000 N[10]	29000000 N[10]	40000	10000000
PYRENE	9/37	66 J	500	81 - 430	181	222	SB16-23-NSO-062600-03	2300000 N	29000000 N	13000	10000000
TOTAL PAHS	10/37	371	11350	---	730	2699	MW16-07S-NSO-061900-05-D	NA	NA	NA	NA
Polyaromatic Hydrocarbons (ug/kg)											
2-METHYLNAPHTHALENE	2/16	5900	49000	22 - 2400	3551	27725	SB16-28-NSO-062700-04	56000 N[9]	190000 N[9]	123000	10000000
ACENAPHTHENE	6/27	51	21000 J	20 - 2400	1042	4442	28SB-01D-NSO-042696-02-D	3700000 N	29000000 N	43000	10000000
ACENAPHTHYLENE	4/28	29	310 J	22 - 2400	159	93.6	MW16-07S-NSO-061900-05	3700000 N[11]	29000000 N[11]	23000	10000000
ANTHRACENE	12/28	11	2800	2.2 - 2400	243	455	SB16-28-NSO-062700-04	22000000 N	100000000 MAX	35000	10000000
BAP EQUIVALENT	17/28	0.008	3948	---	357	588	28SB-01D-NSO-042696-02-D	62 C	210 C	400	800
BENZO(A)ANTHRACENE	12/26	11	2700 J	2 - 2400	294	529	28SB-01D-NSO-042696-02-D	620 C	2100 C	900	7800
BENZO(A)PYRENE	14/26	8	2700 J	2.2 - 2400	334	528	28SB-01D-NSO-042696-02-D	62 C	210 C	400	800
BENZO(B)FLUORANTHENE	14/26	5 J	3800 J	3.9 - 2400	374	602	28SB-01D-NSO-042696-02-D	620 C	2100 C	900	7800
BENZO(G,H,I)PERYLENE	12/27	6	2700 J	4.4 - 2400	235	320	28SB-01D-NSO-042696-02-D	2300000 N[10]	29000000 N[10]	800	10000000
BENZO(K)FLUORANTHENE	12/26	7	1500 J	2 - 2400	192	207	28SB-01D-NSO-042696-02-D	6200 C	21000 C	900	78000

TABLE 4-12
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SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil - Residential[3]	Region 9 PRG for Soil -Industrial[3]	RIDEM Soil Direct Exposure Residential[4]	RIDEM Soil Direct Exposure Industrial[4]
CHRYSENE	15/28	6 J	2700 J	2 - 2400	273	424	28SB-01D-NSO-042696-02-D	62000 C	210000 C	400	780000
DIBENZO(A,H)ANTHRACENE	6/28	10	420 J	2 - 2400	116	111	28SB-01D-NSO-042696-02-D	62 C	210 C	400	800
FLUORANTHENE	16/28	6	5500	3.9 - 2400	446	700	SB16-28-NSO-062700-04	2300000 N	22000000 N	20000	10000000
FLUORENE	9/26	7	5100 J	4.4 - 2400	438	1113	SB16-28-NSO-062700-04	2700000 N	26000000 N	28000	10000000
INDENO(1,2,3-CD)PYRENE	13/26	4	1600 J	2.2 - 2400	216	332	28SB-01D-NSO-042696-02-D	620 C	2100 C	900	7800
NAPHTHALENE	9/28	6	14000 J	22 - 2400	1065	3126	SB16-07-NSO-051404-04	56000 N	190000 N	54000	10000000
PHENANTHRENE	13/28	4.4	13000 J	2 - 2400	746	1505	SB16-28-NSO-062700-04	2300000 N[10]	29000000 N[10]	40000	10000000
PYRENE	15/27	5 J	5000	2 - 2400	496	807	SB16-28-NSO-062700-04	2300000 N	29000000 N	13000	10000000
TOTAL PAHS	20/28	4.4	139111	---	12220	17108	SB16-07-NSO-051404-04	NA	NA	NA	NA
P sticides (ug/kg)											
4,4'-DDD	1/20	4.1 J	4.1 J	3.5 - 8	2.08	2.93	SB16-27-NSO-062600-02-D	2400 C	10000 C	NA	NA
4,4'-DDT	1/20	3.7	3.7	3.5 - 8	2.12	3.70	SB16-26-NSO-062300-02	1700 C	7000 C	NA	NA
ENDRIN ALDEHYDE	1/20	4.7	4.7	3.5 - 8	2.16	4.70	SB16-23-NSO-062600-03	18000 N[12]	180000 N[12]	NA	NA
GAMMA-CHLORDANE	1/20	8.9 J	8.9 J	1.8 - 2.1	1.38	8.90	SB16-28-NSO-062700-04	1600 C[13]	6500 C[13]	NA	NA
Inorganics (mg/kg)											
ALUMINUM	20/20	2810	12400	---	5962	5962	SB16-22-NSO-062700-06	76000 N	100000 MAX	NA	NA
ANTIMONY	5/20	0.58 J	8.7	0.18 - 0.53	1.15	4.18	SB16-28-NSO-062700-04	31 N	410 N	10	820
ARSENIC	20/23	1.4	10.6	1.5 - 1.7	2.80	3.10	SB16-28-NSO-062700-04	0.39 C	1.6 C	7	7
BARIUM	23/23	3 J	1100	---	76.6	76.6	SB16-28-NSO-062700-04	5400 N	67000 N	5500	10000
BERYLLIUM	20/20	0.27 J	0.71	---	0.476	0.476	SB16-22-NSO-062700-06	150 N	1900 N	0.4	1.3
CADMIUM	3/23	0.33 J	2.4	0.03 - 1.1	0.275	1.18	SB16-28-NSO-062700-04	37 N	450 N	39	1000
CALCIUM	14/20	358 J	23400	341 - 1050	1969	2696	SB16-28-NSO-062700-04	NA	NA	NA	NA
CHROMIUM	22/23	1.9	67.2	4 - 4.5	10.4	10.8	SB16-28-NSO-062700-04	30 C[14]	64 C[14]	1400	10000
COBALT	20/20	2.6	10.2	---	5.65	5.65	MW16-03S-NSO-061200-03	900 C	1900 C	NA	NA
COPPER	20/20	6.7 J	452 J	---	46.5	46.5	SB16-28-NSO-062700-04	3100 N	41000 N	3100	10000
IRON	20/20	5900	54300	---	16102	16102	SB16-28-NSO-062700-04	23000 N	100000 MAX	NA	NA
LEAD	23/23	3.6	2650	---	152	152	SB16-28-NSO-062700-04	400	800	150	500
MAGNESIUM	18/20	969 J	4910	509 - 966	1833	2002	SB16-28-NSO-062700-04	NA	NA	NA	NA
MANGANESE	20/20	66.8	587 J	---	176	176	SB16-28-NSO-062700-04	1800 N	19000 N	390	10000
MERCURY	4/23	0.05 J	0.96	0.01 - 0.1	0.0857	0.418	SB16-28-NSO-062700-04	23 N	310 N	23	610
NICKEL	17/20	3.9	34.5	2.7 - 7.5	10.4	11.8	SB16-28-NSO-062700-04	1600 N	20000 N	1000	10000
POTASSIUM	14/20	401 J	1170	270 - 1390	606	742	28SB-18-NSO-101398-10	NA	NA	NA	NA
SELENIUM	4/23	0.3 J	0.92	0.17 - 0.99	0.269	0.625	MW16-03S-NSO-061200-03	390 N	5100 N	390	10000
SILVER	6/23	0.28 J	6.8	0.07 - 0.51	0.531	1.65	SB16-28-NSO-062700-04	390 N	5100 N	200	10000
SODIUM	14/20	24.6	596	18.4 - 43.9	81.7	111	SB16-28-NSO-062700-04	NA	NA	NA	NA
VANADIUM	20/20	4.6	18.9	---	10.9	10.9	SB16-22-NSO-062700-06	78 N	1000 N	550	10000
ZINC	20/20	15.9 J	1610 J	---	186	186	SB16-28-NSO-062700-04	23000 N	100000 MAX	6000	10000
Miscellaneous Parameters (mg/kg)											
CARBON	1/1	1200	1200	---	1200	1200	SB16-29-NSO-011701-20	NA	NA	NA	NA
PERCENT MOISTURE (%)	1/1	17.5	17.5	---	17.5	17.5	SB16-29-NSO-011701-20	NA	NA	NA	NA
PH (S.U.)	24/24	5.8	8.2	---	7.07	7.07	SB16-23-NSO-062600-03, SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL ORGANIC CARBON	23/23	890	34000	---	7473	7473	SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL RESIDUE (%)	16/16	81	93	---	85.7	85.7	3 SAMPLES	NA	NA	NA	NA
TOTAL SOLIDS (%)	1/1	82.5	82.5	---	82.5	82.5	SB16-29-NSO-011701-20	NA	NA	NA	NA
Petrol um Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS	3/6	11	82.9	27.8 - 28.3	27.4	40.8	28SB-20-NSO-101398-08	NA	NA	NA	NA

TABLE 4-12
SUMMARY OF DESCRIPTIVE STATISTICS - SHALLOW SUBSURFACE SOIL - DIRECT CONTACT
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration(1)	Maximum Concentration(1)	Range of Nondetects(2)	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil - Residential(3)	Region 9 PRG for Soil -Industrial(3)	RIDEM Soil Direct Exposur Residential(4)	RIDEM Soil Direct Exposur Industrial(4)
OIL & GREASE	8/10	1.3	3360	1 - 100	579	718	SB16-46-NSO-051304-12	NA	NA	NA	NA
PHC AS DIESEL	6/6	36	7800	---	1835	1835	SB16-07-NSO-051404-04	NA	NA	NA	NA
TOTAL PETROLEUM HYDROCARBONS	3/3	27.1	124	---	66.7	66.7	EBS60-RSPT-01-071497-02	NA	NA	500	2500
TOTAL RECOVERABLE TPH	5/14	44	810 J	27 - 33	94.9	240	28SB-08-NSO-061997-02	NA	NA	NA	NA

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
4 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
5 - Value is derived by multiplying criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
6 - Value is for total xylenes
7 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
8 - Residential PRGs are based on CSF for lifetime exposures by a child/adult. Industrial PRG is based on CSF for exposures by an adult.
9 - The value for naphthalene was used as a surrogate for 2-methylnaphthalene.
10 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 - The value for acenaphthene was used as a surrogate for acenaphthylene.
12 - The value for endrin have been used as surrogates for endrin aldehyde.
13 - The value for chlordane was used as a surrogate for gamma-chlordane.
14 - The values for chromium VI are presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers:
C - Carcinogen.
N - Noncarcinogen.
MAX - Ceiling limit.
SAT - Saturation limit.
J - Estimated Value

Acronyms:
BAP = Benzo(a)pyrene
HI = Hazard Index
NA = Criteria Not Available
PAH = Polyaromatic Hydrocarbon
PHC = Petroleum Hydrocarbon
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
TPH = Total Petroleum Hydrocarbons
VOC = Volatile Organic Compound

TABLE 4-13
SUMMARY OF DESCRIPTIVE STATISTICS - SHALLOW SUBSURFACE SOIL - MIGRATION CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Federal SSLs[3] Inhalation - Residential	Fed. SSL[3] Prot. GW for DAF = 20 - Residential	Federal SSLs[3] Inhalation - Industrial	RIDEM GA Leachability Criteria[4]
Dioxins (ng/kg)											
1,2,3,4,6,7,8,9-OCDD	8/8	1310	34930 J	---	10025	10025	SB16-23-NSO-062600-03	430000 C[5]	56000 [5]	800000 C[5]	NA
1,2,3,4,6,7,8,9-OCDF	5/8	9.5	1790	9.83 - 10.06	355	565	SB16-23-NSO-062600-03	430000 C[5]	56000 [5]	800000 C[5]	NA
1,2,3,4,6,7,8-HPCDD	8/8	16	8340 J	---	2030	2030	SB16-28-NSO-062700-04	4300 C[5]	560 [5]	8000 C[5]	NA
1,2,3,4,6,7,8-HPCDF	5/8	6.4	1870	4.91 - 5.03	333	532	SB16-23-NSO-062600-03	4300 C[5]	560 [5]	8000 C[5]	NA
1,2,3,4,7,8,9-HPCDF	2/8	1.1	48.4	4.85 - 5.03	8.05	24.8	SB16-23-NSO-062600-03	4300 C[5]	560 [5]	8000 C[5]	NA
1,2,3,4,7,8-HXCDD	4/8	0.77	88.1	4.91 - 5.03	23.4	44.3	SB16-28-NSO-062700-04	430 C[5]	56 [5]	800 C[5]	NA
1,2,3,4,7,8-HXCDF	5/8	1	310 J	4.91 - 5.03	48.8	76.6	SB16-28-NSO-062700-04	430 C[5]	56 [5]	800 C[5]	NA
1,2,3,6,7,8-HXCDD	5/8	2.3	505	4.91 - 5.03	116	183	SB16-28-NSO-062700-04	430 C[5]	56 [5]	800 C[5]	NA
1,2,3,6,7,8-HXCDF	3/8	1.2	26	4.85 - 5.03	5.1	9.47	SB16-23-NSO-062600-03	430 C[5]	56 [5]	800 C[5]	NA
1,2,3,7,8,9-HXCDD	5/8	1.6	556	4.91 - 5.03	123	195	SB16-28-NSO-062700-04	430 C[5]	56 [5]	800 C[5]	NA
1,2,3,7,8-PECDD	3/8	0.75	119	4.91 - 5.03	25.2	63	SB16-28-NSO-062700-04	43 C[5]	5.6 [5]	80 C[5]	NA
1,2,3,7,8-PECDF	4/8	0.69	121	4.91 - 5.03	21	39.4	SB16-28-NSO-062700-04	860 C[5]	112 [5]	1600 C[5]	NA
2,3,4,6,7,8-HXCDF	4/8	1.7	215 J	4.91 - 5.03	33.6	64.7	SB16-28-NSO-062700-04	430 C[5]	56 [5]	800 C[5]	NA
2,3,4,7,8-PECDF	4/8	0.76 J	125	4.91 - 5.03	19.6	36.7	SB16-28-NSO-062700-04	86 C[5]	11.2 [5]	160 C[5]	NA
2,3,7,8-TCDD	2/8	18.8	44.5	0.98 - 1	8.29	31.7	SB16-28-NSO-062700-04	43 C	5.6 MCL	80 C	NA
2,3,7,8-TCDF	3/8	0.58	125	0.82 - 1.1	18.1	47.5	SB16-28-NSO-062700-04	430 C[5]	56 [5]	800 C[5]	NA
TEQ	8/8	0.41	505	---	102	102	SB16-28-NSO-062700-04	43 C[5]	5.6 [5]	80 C[5]	NA
TOTAL HPCDD	8/8	38.1	15510 J	---	3786	3786	SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL HPCDF	5/8	13.5	4030 J	1.4 - 10.1	827	1321	SB16-23-NSO-062600-03	NA	NA	NA	NA
TOTAL HXCDD	6/8	13.9	4630 J	3.3	1100	1466	SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL HXCDF	5/8	6.3	1190	19.7 - 20.1	307	486	SB16-23-NSO-062600-03	NA	NA	NA	NA
TOTAL PECDD	4/8	4.2	897	4.91 - 5.03	223	444	SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL PECDF	5/8	1.9	789	0.47 - 10.1	138	219	SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL TCDD	5/8	0.72	505	0.98 - 1	105	168	SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL TCDF	5/8	3.2 J	1900 J	0.98 - 1	291	466	SB16-28-NSO-062700-04	NA	NA	NA	NA
Volatile Organics (ug/kg)											
1,1,2-TRICHLOROETHANE	1/50	5 J	5 J	1 - 340	15.2	5	SB16-07-NSO-051404-04	980 C	18 MCLG	1800 C	100
2-BUTANONE	12/48	4 J	120	4 - 670	25.7	34.5	SB16-45-NSO-051204-14-D	24000000 sat	89000 N	24000000 sat	NA
2-HEXANONE	1/50	400 J	400 J	4 - 670	32.7	400	SB16-07-NSO-051404-04	NA	NA	NA	NA
4-METHYL-2-PENTANONE	1/50	7 J	7 J	6 - 670	24.9	7	SB16-07-NSO-051404-04	2700000 sat	12000 N	2700000 sat	NA
ACETONE	31/48	7 J	75000 J	3 - 190	2100	3246	28SB-06-NSO-061997-08	NA	130000 N	NA	NA
BENZENE	4/50	0.9 J	34 J	1 - 340	12.8	13	SB16-28-NSO-062700-04	840 C	34 MCL	1600 C	200
BROMODICHLOROMETHANE	1/50	7 J	7 J	1 - 340	15.3	7	SB16-07-NSO-051404-04	NA	630 MCL	NA	NA
BTEX	8/50	2.9	1464	---	32.3	202	SB16-28-NSO-062700-04	NA	NA	NA	NA
CARBON DISULFIDE	8/50	3 J	29	2 - 340	16.3	9.75	SB16-45-NSO-051204-14-D	720000 sat	29000 N	720000 sat	NA
CHLOROFORM	1/50	2 J	2 J	1 - 340	15.2	2	SB16-07-NSO-051404-04	280 C	590 MCL	520 C	NA
CHLOROMETHANE	1/50	2 J	2 J	2 - 340	15.2	2	SB16-46-NSO-051304-12	2100 C	40 N	3900 C	NA
CIS-1,2-DICHLOROETHENE	3/26	280	1800	4 - 340	155	1132	SB16-41-NSO-051104-16	NA	400 MCLG	NA	1700
ETHYLBENZENE	2/50	12 J	350	2 - 340	19.2	181	SB16-28-NSO-062700-04	400000 sat	13000 MCLG	400000 sat	27000
M+P-XYLENES	3/26	2 J	620	5 - 340	44.9	222	SB16-28-NSO-062700-04	NA	190000 MCL	NA	NA
METHYLENE CHLORIDE	7/50	3 J	230 J	1 - 320	16	54.4	MW16-07S-NSO-061900-05	13000 C	23 MCL	24000 C	NA
O-XYLENE	3/26	4 J	290	4 - 340	31	109	SB16-28-NSO-062700-04	NA	190000 MCL	NA	NA
STYRENE	1/49	1 J	1 J	1 - 340	15.4	1	SB16-07-NSO-051404-04	1500000 sat	3500 MCLG	1500000 sat	2900
TOLUENE	7/50	2 J	170	1 - 340	15.7	30.1	SB16-28-NSO-062700-04	650000 sat	12000 MCLG	650000 sat	32000
TOTAL 1,2-DICHLOROETHENE	3/50	314	1875	1 - 340	85.9	1183	SB16-41-NSO-051104-16	NA	NA	NA	NA

TABLE 4-13
SUMMARY OF DESCRIPTIVE STATISTICS - SHALLOW SUBSURFACE SOIL - MIGRATION CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Federal SSLs[3] Inhalation - Residential	Fed. SSL[3] Prot. GW for DAF = 20 - Residential	Federal SSLs[3] Inhalation - Industrial	RIDEM GA Leachability Criteria[4]
TOTAL CHLORINATED VOCS	14/50	1	1896	---	80.5	287	SB16-41-NSO-051104-16	NA	NA	NA	NA
TOTAL XYLENES	3/50	6 J	910	2 - 340	31.8	331	SB16-28-NSO-062700-04	710000 N	140000 N	1100000 N	540000
TRANS-1,2-DICHLOROETHENE	3/26	34	75	4 - 340	30.2	50.8	SB16-41-NSO-051104-16	NA	680 MCLG	NA	3300
TRICHLOROETHENE	4/50	1 J	55	1 - 340	16.3	15.8	SB16-29-NSO-011701-20	71 C	57 C	130 C	200
VINYL CHLORIDE	2/50	3 J	21	2 - 670	22.7	12	SB16-41-NSO-051104-16	280 C	13 MCL	530 C	300
Semivolatil Organics (ug/kg)											
2,4-DIMETHYLPHENOL	1/45	270 J	270 J	52 - 5900	252	270	SB16-46-NSO-051304-12	NA	9000 N	NA	NA
2,6-DINITROTOLUENE	1/45	2000	2000	55 - 5900	274	2000	SB16-07-NSO-051404-10	NA	0.85 N	NA	NA
2-METHYLNAPHTHALENE	5/45	360 J	120000 J	57 - 650	3277	28136	SB16-07-NSO-051404-04	NA	NA	NA	NA
2-METHYLPHENOL	1/45	200 J	200 J	58 - 5900	251	200	SB16-46-NSO-051304-12	NA	14000 N	NA	NA
4-CHLOROANILINE	1/45	260 J	260 J	110 - 5900	254	260	SB16-46-NSO-051304-12	NA	970 N	NA	NA
4-METHYLPHENOL	1/45	830	830	49 - 5900	264	830	SB16-46-NSO-051304-12	NA	1300 N	NA	NA
ACENAPHTHENE	2/37	530	640	58 - 430	192	578	MW16-07S-NSO-061900-05-D	NA	630000 N	NA	NA
ANTHRACENE	1/37	53 J	53 J	52 - 430	167	53	28SB-08-NSO-061997-02	NA	13000000 N	NA	NA
BAP EQUIVALENT	7/37	45.5	909	---	57.7	305	SB16-26-NSO-062300-02	NA	8200 MCL	NA	240000
BENZO(A)ANTHRACENE	6/37	43 J	480	71 - 430	171	175	SB16-23-NSO-062600-03	NA	3200 MCL	NA	NA
BENZO(A)PYRENE	7/37	36 J	690	49 - 430	178	226	SB16-26-NSO-062300-02	NA	8200 MCL	NA	240000
BENZO(B)FLUORANTHENE	7/37	51 J	1300	75 - 430	206	364	SB16-26-NSO-062300-02	NA	9800 MCL	NA	NA
BENZO(G,H,I)PERYLENE	5/37	66 J	480	98 - 430	177	217	SB16-26-NSO-062300-02	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	4/37	43 J	380	67 - 430	171	180	SB16-26-NSO-062300-02	NA	9800 MCL	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	9/45	40 J	2200	130 - 5900	324	524	MW16-49I-NSO-080404-10-D	NA	3600000 MCL	NA	120000
CARBAZOLE	1/45	120 J	120 J	71 - 5900	249	120	SB16-46-NSO-051304-12	NA	590 C	NA	NA
CHRYSENE	7/37	50 J	490	74 - 430	172	186	SB16-23-NSO-062600-03	NA	3200 MCL	NA	NA
DI-N-BUTYL PHTHALATE	5/45	53 J	130 J	96 - 5900	241	83.2	SB16-46-NSO-051304-12	NA	5000000 N	NA	NA
DIBENZO(A,H)ANTHRACENE	1/37	58 J	58 J	79 - 430	169	58	28SB-08-NSO-061997-02	NA	30000 MCL	NA	NA
DIBENZOFURAN	2/45	160 J	240 J	53 - 5900	250	200	SB16-46-NSO-051304-12	NA	48000 N	NA	NA
DIETHYL PHTHALATE	1/45	61 J	61 J	36 - 5900	245	61	28SB-12-NSO-061997-06	NA	450000 N	NA	NA
FLUORANTHENE	9/37	67 J	560	64 - 430	179	218	SB16-23-NSO-062600-03	NA	6300000 N	NA	NA
FLUORENE	2/37	140 J	700	65 - 430	182	400	MW16-07S-NSO-061900-05-D	NA	810000 N	NA	NA
INDENO(1,2,3-CD)PYRENE	5/37	56 J	650	91 - 430	180	245	SB16-26-NSO-062300-02	NA	28000 MCL	NA	NA
NAPHTHALENE	1/37	2300	2300	97 - 430	229	2300	28SB-12-NSO-061997-06	170000 N	61000 N	270000 N	800
PHENANTHRENE	7/37	49 J	1200	71 - 430	186	262	MW16-07S-NSO-061900-05-D	NA	NA	NA	NA
PYRENE	9/37	66 J	500	81 - 430	181	222	SB16-23-NSO-062600-03	NA	4600000 N	NA	NA
TOTAL PAHS	10/37	371	11350	---	730	2699	MW16-07S-NSO-061900-05-D	NA	NA	NA	NA
Polyaromatic Hydrocarbons (ug/kg)											
2-METHYLNAPHTHALENE	2/16	5900	49000	22 - 2400	3551	27725	SB16-28-NSO-062700-04	NA	NA	NA	NA
ACENAPHTHENE	6/27	51	21000 J	20 - 2400	1042	4442	28SB-01D-NSO-042696-02-D	NA	630000 N	NA	NA
ACENAPHTHYLENE	4/28	29	310 J	22 - 2400	159	93.6	MW16-07S-NSO-061900-05	NA	NA	NA	NA
ANTHRACENE	12/28	11	2800	2.2 - 2400	243	455	SB16-28-NSO-062700-04	NA	13000000 N	NA	NA
BAP EQUIVALENT	17/28	0.008	3948	---	357	588	28SB-01D-NSO-042696-02-D	NA	8200 MCL	NA	240000
BENZO(A)ANTHRACENE	12/26	11	2700 J	2 - 2400	294	529	28SB-01D-NSO-042696-02-D	NA	3200 MCL	NA	NA
BENZO(A)PYRENE	14/26	8	2700 J	2.2 - 2400	334	528	28SB-01D-NSO-042696-02-D	NA	8200 MCL	NA	240000
BENZO(B)FLUORANTHENE	14/26	5 J	3800 J	3.9 - 2400	374	602	28SB-01D-NSO-042696-02-D	NA	9800 MCL	NA	NA
BENZO(G,H,I)PERYLENE	12/27	6	2700 J	4.4 - 2400	235	320	28SB-01D-NSO-042696-02-D	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	12/26	7	1500 J	2 - 2400	192	207	28SB-01D-NSO-042696-02-D	NA	9800 MCL	NA	NA
CHRYSENE	15/28	6 J	2700 J	2 - 2400	273	424	28SB-01D-NSO-042696-02-D	NA	3200 MCL	NA	NA
DIBENZO(A,H)ANTHRACENE	6/28	10	420 J	2 - 2400	116	111	28SB-01D-NSO-042696-02-D	NA	30000 MCL	NA	NA

TABLE 4-13
SUMMARY OF DESCRIPTIVE STATISTICS - SHALLOW SUBSURFACE SOIL - MIGRATION CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Federal SSLs[3] Inhalation - Residential	Fed. SSL[3] Prot. GW for DAF = 20 - Residential	Federal SSLs[3] Inhalation - Industrial	RIDEM GA Leachability Criteria[4]
FLUORANTHENE	16/28	6	5500	3.9 - 2400	446	700	SB16-28-NSO-062700-04	NA	6300000 N	NA	NA
FLUORENE	9/26	7	5100 J	4.4 - 2400	438	1113	SB16-28-NSO-062700-04	NA	810000 N	NA	NA
INDENO(1,2,3-CD)PYRENE	13/26	4	1600 J	2.2 - 2400	216	332	28SB-01D-NSO-042696-02-D	NA	28000 MCL	NA	NA
NAPHTHALENE	9/28	6	14000 J	22 - 2400	1065	3126	SB16-07-NSO-051404-04	170000 N	61000 N	270000 N	800
PHENANTHRENE	13/28	4.4	13000 J	2 - 2400	746	1505	SB16-28-NSO-062700-04	NA	NA	NA	NA
PYRENE	15/27	5 J	5000	2 - 2400	496	807	SB16-28-NSO-062700-04	NA	4600000 N	NA	NA
TOTAL PAHS	20/28	4.4	139111	---	12220	17108	SB16-07-NSO-051404-04	NA	NA	NA	NA
Pesticides (ug/kg)											
4,4'-DDD	1/20	4.1 J	4.1 J	3.5 - 8	2.08	2.93	SB16-27-NSO-062600-02-D	NA	14000 C	NA	NA
4,4'-DDT	1/20	3.7	3.7	3.5 - 8	2.12	3.7	SB16-26-NSO-062300-02	750000 C	26000 C	1400000 C	NA
ENDRIN ALDEHYDE	1/20	4.7	4.7	3.5 - 8	2.16	4.7	SB16-23-NSO-062600-03	NA	NA	NA	NA
GAMMA-CHLORDANE	1/20	8.9 J	8.9 J	1.8 - 2.1	1.38	8.9	SB16-28-NSO-062700-04	72000 C[6]	9600 MCL[6]	120000 C[6]	NA
Inorganics (mg/kg)											
ALUMINUM	20/20	2810	12400	---	5962	5962	SB16-22-NSO-062700-06	6860000 N	170 N	10700000 N	NA
ANTIMONY	5/20	0.58 J	8.7	0.18 - 0.53	1.15	4.18	SB16-28-NSO-062700-04	NA	5.4 MCLG	NA	[7]
ARSENIC	20/23	1.4	10.6	1.5 - 1.7	2.8	3.1	SB16-28-NSO-062700-04	745 C	5.8 C	1390 C	NA
BARIUM	23/23	3 J	1100	---	76.6	76.6	SB16-28-NSO-062700-04	686000 N	1600 MCLG	1070000 N	[7]
BERYLLIUM	20/20	0.27 J	0.71	---	0.476	0.476	SB16-22-NSO-062700-06	1330 C	63 MCLG	2490 C	[7]
CADMIUM	3/23	0.33 J	2.4	0.03 - 1.1	0.275	1.18	SB16-28-NSO-062700-04	1780 C	7.5 MCLG	3320 C	[7]
CALCIUM	14/20	358 J	23400	341 - 1050	1969	2696	SB16-28-NSO-062700-04	NA	NA	NA	NA
CHROMIUM	22/23	1.9	67.2	4 - 4.5	10.4	10.8	SB16-28-NSO-062700-04	267 C[8]	42 N[8]	498 C[8]	[7]
COBALT	20/20	2.6	10.2	---	5.65	5.65	MW16-03S-NSO-061200-03	1140 C	3.3 N	2140 C	NA
COPPER	20/20	6.7 J	452 J	---	46.5	46.5	SB16-28-NSO-062700-04	NA	11000 MCLG	NA	NA
IRON	20/20	5900	54300	---	16102	16102	SB16-28-NSO-062700-04	NA	NA	NA	NA
LEAD	23/23	3.6	2650	---	152	152	SB16-28-NSO-062700-04	NA	NA	NA	[7]
MAGNESIUM	18/20	969 J	4910	509 - 966	1833	2002	SB16-28-NSO-062700-04	NA	NA	NA	NA
MANGANESE	20/20	66.8	587 J	---	176	176	SB16-28-NSO-062700-04	68600 N	2200 N	107000 N	NA
MERCURY	4/23	0.05 J	0.96	0.01 - 0.1	0.0857	0.418	SB16-28-NSO-062700-04	2.9 sat	2.1 MCLG	2.9 sat	[7]
NICKEL	17/20	3.9	34.5	2.7 - 7.5	10.4	11.8	SB16-28-NSO-062700-04	NA	280 N	NA	[7]
POTASSIUM	14/20	401 J	1170	270 - 1390	606	742	28SB-18-NSO-101398-10	NA	NA	NA	NA
SELENIUM	4/23	0.3 J	0.92	0.17 - 0.99	0.269	0.625	MW16-03S-NSO-061200-03	NA	5.2 MCLG	NA	[7]
SILVER	6/23	0.28 J	6.8	0.07 - 0.51	0.531	1.65	SB16-28-NSO-062700-04	NA	31 N	NA	NA
SODIUM	14/20	24.6	596	18.4 - 43.9	81.7	111	SB16-28-NSO-062700-04	NA	NA	NA	NA
VANADIUM	20/20	4.6	18.9	---	10.9	10.9	SB16-22-NSO-062700-06	NA	5100 N	NA	NA
ZINC	20/20	15.9 J	1610 J	---	186	186	SB16-28-NSO-062700-04	NA	14000 N	NA	NA
Miscellaneous Parameters (mg/kg)											
CARBON	1/1	1200	1200	---	1200	1200	SB16-29-NSO-011701-20	NA	NA	NA	NA
PERCENT MOISTURE (%)	1/1	17.5	17.5	---	17.5	17.5	SB16-29-NSO-011701-20	NA	NA	NA	NA
PH (S.U.)	24/24	5.8	8.2	---	7.07	7.07	SB16-23-NSO-062600-03, SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL ORGANIC CARBON	23/23	890	34000	---	7473	7473	SB16-28-NSO-062700-04	NA	NA	NA	NA
TOTAL RESIDUE (%)	16/16	81	93	---	85.7	85.7	3 SAMPLES	NA	NA	NA	NA
TOTAL SOLIDS (%)	1/1	82.5	82.5	---	82.5	82.5	SB16-29-NSO-011701-20	NA	NA	NA	NA
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS	3/6	11	82.9	27.8 - 28.3	27.4	40.8	28SB-20-NSO-101398-08	NA	NA	NA	NA
OIL & GREASE	8/10	1.3	3360	1 - 100	579	718	SB16-46-NSO-051304-12	NA	NA	NA	NA

TABLE 4-13
SUMMARY OF DESCRIPTIVE STATISTICS - SHALLOW SUBSURFACE SOIL - MIGRATION CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration(1)	Maximum Concentration(1)	Range of Nondetects(2)	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Federal SSLs(3) Inhalation - Residential	Fed. SSL(3) Prot. GW for DAF = 20 - Residential	Federal SSLs(3) Inhalation - Industrial	RIDEM GA Leachability Criteria(4)
PHC AS DIESEL	6/6	36	7800	---	1835	1835	SB16-07-NSO-051404-04	NA	NA	NA	NA
TOTAL PETROLEUM HYDROCARBONS	3/3	27.1	124	---	66.7	66.7	EBS60-RSPT-01-071497-02	NA	NA	NA	NA
TOTAL RECOVERABLE TPH	5/14	44	810 J	27 - 33	94.9	240	28SB-08-NSO-061997-02	NA	NA	NA	NA

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - U.S. EPA Soil Screening Levels. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.htm.
4 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
5 - Value is derived by multiplying criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
6 - The value for chlordane was used as a surrogate for gamma-chlordane.
7 - Leachability criteria for inorganics are based on SPLP/TCLP analysis.
8 - The value for chromium VI is presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers:
C - Carcinogenic
N - Noncarcinogenic
Max - Ceiling limit
MCL - Maximum Contaminant Level - Indicates that the value presented is based on the MCL
MCLG - Maximum Contaminant Level Goal - Indicates that the value presented is based on the MCLG
sat - Soil satuation concentration
J - Estimated Value

Acronyms:
BAP = Benzo(a)pyrene
DAF = Dilution and Attenuation Factor
GA = Drinking water suitability
GW = Groundwater
NA = No criteria available
PAH = Polyaromatic Hydrocarbon
PHC = Petroleum Hydrocarbon
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SSL = Soil Screening Level
TPH = Total Petroleum Hydrocarbons

TABLE 4-14
SUMMARY OF DESCRIPTIVE STATISTICS - DEEP SUBSURFACE SOIL - DIRECT CONTACT CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Paramet r	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil - Residential[3]	Region 9 PRG for Soil - Industrial[3]	RIDEM Soil Direct Exposure Residential[4]	RIDEM Soil Dir ct Exposure Industrial[4]
Volatil Organics (ug/kg)											
2-BUTANONE	5/65	1 J	3 J	3 - 1300	119	2.20	INJ16-05D-NSO-090704-46, INJ16-09D-NSO-082404-58	22000000 N	110000000 N	10000000	10000000
2-HEXANONE	2/73	210 J	230 J	5 - 1300	125	220	MW16-59D-NSO-072104-64	NA	NA	NA	NA
ACETONE	10/68	5 J	290 T	6 - 1400	148	69.1	SB16-31-NSO-022702-56	14000000 N	54000000 N	7800000	10000000
CARBON DISULFIDE	6/73	0.8 J	3	3 - 630	66.1	1.40	MW16-67D-NSO-083104-56	360000 N	720000 SAT	NA	NA
CIS-1,2-DICHLOROETHENE	2/71	1 J	1 J	3 - 630	67.7	1.00	MW16-69D-NSO-081204-54, MW16-69D-NSO-081204-56	43000 N	150000 N	630000	10000000
METHYLENE CHLORIDE	6/73	4 J	570 T	2 - 1000	91.0	158	SB16-32-NSO-021202-56	9100 C	21000 C	45000	760000
TOTAL 1,2-DICHLOROETHENE	2/73	1 J	1 J	3 - 630	66.0	1.00	MW16-69D-NSO-081204-54, MW16-69D-NSO-081204-56	43000 N[5]	150000 N[5]	630000	10000000
TOTAL CHLORINATED VOCS	64/73	2	7800	---	701	800	MW16-59I-NSO-072604-46	NA	NA	NA	NA
TRICHLOROETHENE	61/73	2 J	7800	3 - 440	696	823	MW16-59I-NSO-072604-46	**53 C**	**110 C**	13000	520000
Semivolatil Organics (ug/kg)											
DI-N-BUTYL PHTHALATE	1/15	47 J	47 J	330 - 430	180	47.0	28SB-15-NSO-062497-30	6100000 N	62000000 N	NA	NA
Polyaromatic Hydrocarbons (ug/kg)											
FLUORANTHENE	1/13	4	4	20 - 24	10.7	4.00	SB16-29-NSO-011701-32	2300000 N	22000000 N	20000	10000000
PHENANTHRENE	1/13	6	6	20 - 24	10.9	6.00	SB16-29-NSO-011701-32	2300000 N[6]	29000000 N[6]	40000	10000000
TOTAL PAHS	1/13	10	10	---	0.769	10.0	SB16-29-NSO-011701-32	NA	NA	NA	NA
Inorganics (mg/kg)											
ALUMINUM	13/13	2840	9200	---	5954	5954	MW16-22D-NSO-011601-59	76000 N	100000 MAX	NA	NA
ANTIMONY	1/13	0.4 J	0.4 J	0.18 - 0.46	0.168	0.400	MW16-14D-NSO-013001-57	31 N	410 N	10	820
ARSENIC	11/13	0.85	2.8	0.97 - 1.2	1.49	1.67	MW16-23D-NSO-011001-54	**0.39 C**	**1.6 C**	7	7
BARIUM	13/13	9.5	24.4	---	16.2	16.2	MW16-02D-NSO-052200-64	5400 N	67000 N	5500	10000
BERYLLIUM	12/13	0.31	0.71	0.46	0.470	0.490	MW16-06D-NSO-062200-40	150 N	1900 N	**0.4**	1.3
CADMIUM	3/13	0.24 J	0.29 J	0.02 - 0.28	0.0915	0.239	MW16-03D-NSO-060100-46-D	37 N	450 N	39	1000
CALCIUM	6/13	739	1900	1150 - 3420	1153	1417	MW16-01D-NSO-051500-48, MW16-14D-NSO-013001-57	NA	NA	NA	NA
CHROMIUM	13/13	5.1	14.5	---	9.77	9.77	MW16-02D-NSO-052200-64	30 C[7]	64 C[7]	1400	10000
COBALT	13/13	3	10.6	---	7.19	7.19	MW16-02D-NSO-052200-64	900 C	1900 C	NA	NA
COPPER	13/13	7.2	43.3 J	---	15.7	15.7	MW16-22D-NSO-011601-59-D	3100 N	41000 N	3100	10000
IRON	13/13	9630	21200	---	15128	15128	MW16-22D-NSO-011601-59	23000 N	100000 MAX	NA	NA
LEAD	13/13	4.2	8.3	---	5.72	5.72	MW16-02D-NSO-052200-64	400	800	150	500
MAGNESIUM	13/13	1300 J	4910 J	---	3067	3067	MW16-22D-NSO-011601-59	NA	NA	NA	NA
MANGANESE	13/13	92.8 J	243 J	---	164	164	MW16-13D-NSO-011601-58	1800 N	19000 N	390	10000
NICKEL	12/13	7.2	21	13	13.4	14.0	MW16-02D-NSO-052200-64	1600 N	20000 N	1000	10000
POTASSIUM	6/13	1160	1900	480 - 2250	956	1345	MW16-02D-NSO-052200-64	NA	NA	NA	NA
SELENIUM	1/13	0.42 J	0.42 J	0.24 - 0.38	0.175	0.420	MW16-14D-NSO-013001-57	390 N	5100 N	390	10000
SODIUM	4/13	32.7	79.1	37.4 - 82.8	34.9	54.0	MW16-02D-NSO-052200-64	NA	NA	NA	NA
THALLIUM	1/13	0.51 J	0.51 J	0.26 - 0.82	0.226	0.383	MW16-22D-NSO-011601-59	5.2 N	67 N	5.5	140
VANADIUM	13/13	7.5	18.4	---	13.1	13.1	MW16-22D-NSO-011601-59	78 N	1000 N	550	10000
ZINC	13/13	20.4	53.7	---	36.8	36.8	MW16-22D-NSO-011601-59	23000 N	100000 MAX	6000	10000
Miscellaneous Param ters (mg/kg)											
CARBON	6/6	1300	2600	---	1733	1733	MW16-22D-NSO-011601-59	NA	NA	NA	NA
PERCENT MOISTURE (%)	6/6	7.7	17.4	---	12.7	12.7	MW16-23D-NSO-011001-54	NA	NA	NA	NA
PH (S.U.)	13/13	5.6	7.2	---	6.33	6.33	MW16-06D-NSO-062200-40	NA	NA	NA	NA

TABLE 4-14
SUMMARY OF DESCRIPTIVE STATISTICS - DEEP SUBSURFACE SOIL - DIRECT CONTACT CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Param ter	Frequency of Detection	Minimum Concentration(1)	Maximum Concentration(1)	Range of Nondetects(2)	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil - Residential(3)	Region 9 PRG for Soil - Industrial(3)	RIDEM Soil Direct Exposure Residential(4)	RIDEM Soil Dir ct Exposure Industrial(4)
TOTAL ORGANIC CARBON	37/58	1100	11000	1100 - 1200	1667	2292	MW16-01D-NSO-051500-48	NA	NA	NA	NA
TOTAL RESIDUE (%)	13/13	79	96	---	87.3	87.3	MW16-03D-NSO-060100-46	NA	NA	NA	NA
TOTAL SOLIDS (%)	6/6	82.6	92.3	---	87.3	87.3	MW16-15R-NSO-012201-51	NA	NA	NA	NA
Petroleum Hydrocarbons (mg/kg)											
TOTAL RECOVERABLE TPH	1/2	31	31	30	23.0	31.0	28SB-15-NSO-062497-30	NA	NA	NA	NA

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
4 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
5 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
6 - The value for pyrene is used as a surrogate for phenanthrene.
7 - The values for chromium VI are presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers:
C - Carcinogen.
N - Noncarcinogen.
MAX - Ceiling limit.
SAT - Saturation limit.
J - Estimated value
T - Detected in the trip blank

Acronyms:
NA = No Criteria Available
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
PAH = Polyaromatic Hydrocarbon
TPH = Total Petroleum Hydrocarbon

TABLE 4-15
SUMMARY OF DESCRIPTIVE STATISTICS - DEEP SUBSURFACE SOIL - MIGRATION CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Fed. SSL[3] Prot. GW for DAF = 20 - Residential	RIDEM GA Leachability Criteria[4]
Volatile Organics (ug/kg)									
2-BUTANONE	5/65	1 J	3 J	3 - 1300	119	2.2	INJ16-05D-NSO-090704-46, INJ16-09D-NSO-082404-58	89000 N	NA
2-HEXANONE	2/73	210 J	230 J	5 - 1300	125	220	MW16-59D-NSO-072104-64	NA	NA
ACETONE	10/68	5 J	290 T	6 - 1400	148	69.1	SB16-31-NSO-022702-56	130000 N	NA
CARBON DISULFIDE	6/73	0.8 J	3	3 - 630	66.1	1.4	MW16-67D-NSO-083104-56	29000 N	NA
CIS-1,2-DICHLOROETHENE	2/71	1 J	1 J	3 - 630	67.7	1	MW16-69D-NSO-081204-54, MW16-69D-NSO-081204-56	400 MCLG	1700
METHYLENE CHLORIDE	6/73	4 J	570 T	2 - 1000	91	158	SB16-32-NSO-021202-56	23 MCL	NA
TOTAL 1,2-DICHLOROETHENE	2/73	1 J	1 J	3 - 630	66	1	MW16-69D-NSO-081204-54, MW16-69D-NSO-081204-56	NA	NA
TOTAL CHLORINATED VOCS	64/73	2	7800	---	701	800	MW16-59I-NSO-072604-46	NA	NA
TRICHLOROETHENE	61/73	2 J	7800	3 - 440	696	823	MW16-59I-NSO-072604-46	57 C	200
Semivolatile Organics (ug/kg)									
DI-N-BUTYL PHTHALATE	1/15	47 J	47 J	330 - 430	180	47	28SB-15-NSO-062497-30	5000000 N	NA
Polyaromatic Hydrocarbons (ug/kg)									
FLUORANTHENE	1/13	4	4	20 - 24	10.7	4	SB16-29-NSO-011701-32	6300000 N	NA
PHENANTHRENE	1/13	6	6	20 - 24	10.9	6	SB16-29-NSO-011701-32	NA	NA
TOTAL PAHS	1/13	10	10	---	0.769	10	SB16-29-NSO-011701-32	NA	NA
Inorganics (mg/kg)									
ALUMINUM	13/13	2840	9200	---	5954	5954	MW16-22D-NSO-011601-59	170 N	NA
ANTIMONY	1/13	0.4 J	0.4 J	0.18 - 0.46	0.168	0.4	MW16-14D-NSO-013001-57	5.4 MCLG	(5)
ARSENIC	11/13	0.85	2.8	0.97 - 1.2	1.49	1.67	MW16-23D-NSO-011001-54	5.8 C	NA
BARIUM	13/13	9.5	24.4	---	16.2	16.2	MW16-02D-NSO-052200-64	1600 MCLG	(5)
BERYLLIUM	12/13	0.31	0.71	0.46	0.47	0.49	MW16-06D-NSO-062200-40	63 MCLG	(5)
CADMIUM	3/13	0.24 J	0.29 J	0.02 - 0.28	0.0915	0.239	MW16-03D-NSO-060100-46-D	7.5 MCLG	(5)
CALCIUM	6/13	739	1900	1150 - 3420	1153	1417	MW16-01D-NSO-051500-48, MW16-14D-NSO-013001-57	NA	NA
CHROMIUM	13/13	5.1	14.5	---	9.77	9.77	MW16-02D-NSO-052200-64	42 N[6]	(5)
COBALT	13/13	3	10.6	---	7.19	7.19	MW16-02D-NSO-052200-64	3.3 N	NA
COPPER	13/13	7.2	43.3 J	---	15.7	15.7	MW16-22D-NSO-011601-59-D	11000 MCLG	NA
IRON	13/13	9630	21200	---	15128	15128	MW16-22D-NSO-011601-59	NA	NA
LEAD	13/13	4.2	8.3	---	5.72	5.72	MW16-02D-NSO-052200-64	NA	(5)
MAGNESIUM	13/13	1300 J	4910 J	---	3067	3067	MW16-22D-NSO-011601-59	NA	NA
MANGANESE	13/13	92.8 J	243 J	---	164	164	MW16-13D-NSO-011601-58	2200 N	NA
NICKEL	12/13	7.2	21	13	13.4	14	MW16-02D-NSO-052200-64	280 N	(5)
POTASSIUM	6/13	1160	1900	480 - 2250	956	1345	MW16-02D-NSO-052200-64	NA	NA
SELENIUM	1/13	0.42 J	0.42 J	0.24 - 0.38	0.175	0.42	MW16-14D-NSO-013001-57	5.2 MCLG	(5)
SODIUM	4/13	32.7	79.1	37.4 - 82.8	34.9	54	MW16-02D-NSO-052200-64	NA	NA
THALLIUM	1/13	0.51 J	0.51 J	0.26 - 0.82	0.226	0.383	MW16-22D-NSO-011601-59	1.1 N	(5)
VANADIUM	13/13	7.5	18.4	---	13.1	13.1	MW16-22D-NSO-011601-59	5100 N	NA
ZINC	13/13	20.4	53.7	---	36.8	36.8	MW16-22D-NSO-011601-59	14000 N	NA
Miscellaneous Paramet rs (mg/kg)									
CARBON	6/6	1300	2600	---	1733	1733	MW16-22D-NSO-011601-59	NA	NA
PERCENT MOISTURE (%)	6/6	7.7	17.4	---	12.7	12.7	MW16-23D-NSO-011001-54	NA	NA

TABLE 4-15
SUMMARY OF DESCRIPTIVE STATISTICS - DEEP SUBSURFACE SOIL - MIGRATION CRITERIA
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Fed. SSL[3] Prot. GW for DAF = 20 - Residential	RIDEM GA Leachability Criteria[4]
PH (S.U.)	13/13	5.6	7.2	---	6.33	6.33	MW16-06D-NSO-062200-40	NA	NA
TOTAL ORGANIC CARBON	37/58	1100	11000	1100 - 1200	1667	2292	MW16-01D-NSO-051500-48	NA	NA
TOTAL RESIDUE (%)	13/13	79	96	---	87.3	87.3	MW16-03D-NSO-060100-46	NA	NA
TOTAL SOLIDS (%)	6/6	82.6	92.3	---	87.3	87.3	MW16-15R-NSO-012201-51	NA	NA
Petroleum Hydrocarbons (mg/kg)									
TOTAL RECOVERABLE TPH	1/2	31	31	30	23	31	28SB-15-NSO-062497-30	NA	NA

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - U.S. EPA Soil Screening Levels. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.htm.
4 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
5 - Leachability criteria for inorganics are based on SPLP/TCLP analysis.
6 - The value for chromium VI is presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers:
C - Carcinogenic.
N - Noncarcinogenic.
MCL - Maximum Contaminant Level - Indicates that the value presented is based on the MCL.
MCLG - Maximum Contaminant Level Goal - Indicates that the value presented is based on the MCLG.
J - Estimated value.
T - Detected in the trip blank.

Acronyms:
DAF = Dilution and Attenuation Factor
GA = Drinking water suitability
GW = Groundwater
NA = No criteria available
PAH = Polyaromatic Hydrocarbon
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SSL = Soil Screening Level
TPH = Total Petroleum Hydrocarbon

TABLE 4-16
COMPARISON OF INORGANIC CONCENTRATIONS IN SITE SOILS
TO LITERATURE BACKGROUND CONCENTRATIONS
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Eastern United States (mg/kg)	Surface Soil (mg/kg) 0 to 2 feet	Shallow Subsurface Soil (mg/kg) 2 to 25 feet	Deep Subsurface Soil (mg/kg) >25 feet
Aluminum	7000 - > 100,000	8590	12400	9200
Antimony	<1 - 8.8	ND	8.7	0.4
Arsenic	<0.1 - 73	4	10.6	2.8
Barium	10 - 1,500	40.6	1100	24.4
Beryllium	<1 - 7	0.64	0.71	0.71
Cadmium	NA	0.56	2.4	0.29
Calcium	100 - 280000	1200	23400	1900
Chromium	1 - 1,000	11.6	67.2	14.5
Cobalt	<0.3 - 70	7.8	10.2	10.6
Copper	<1 - 700	40.2	452	43.3
Iron	100 - > 100,000	21200	54300	21200
Lead	<10 - 300	98.4	2650	8.3
Magnesium	50 - 50,000	2140	4910	4910
Manganese	<2 - 7,000	248	587	243
Mercury	0.01 - 3.4	0.11	0.96	ND
Nickel	<5 - 700	11	34.5	21
Potassium	50 - 37,000	921	1170	1900
Selenium	<0.1 - 3.9	0.88	0.92	0.42
Silver	NA	0.32	6.8	ND
Sodium	500 - 50,000	82	596	79.1
Thallium	2.2 - 23	0.65	ND	0.51
Vanadium	<7 - 300	16.1	18.9	18.4
Zinc	<5 - 2,900	85.3	1610	53.7

Source:
Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Paper 1270. H.T. Shacklette and J.G. Boerngen, 1984.

Notes:
Values presented are maximum concentrations.

Acronyms:
RI = Remedial Investigation

TAB [illegible]7

SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-01S MW16-01S-NWG-100704 NORMAL 10/7/2004	08 MW16-02S MW16-02S-NWG-100604 NORMAL 10/6/2004	08 MW16-03S MW16-03S-NWG-100804 NORMAL 10/8/2004	08 MW16-04S MW16-04S-NWG-100404 NORMAL 10/4/2004	08 MW16-05S MW16-05S-NWG-110104 NORMAL 11/1/2004
Volatile Organics (ug/L)								
ACETONE	5500	NA	NA	5 U	5 UR	5 U	5 UR	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0.501	0 U
CARBON DISULFIDE	1000	NA	NA	1 UJ	1 U	1 UJ	1 U	0.162 J
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U	0.166 J	1 U	1 U	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.3 J	5.8 U
ETHYLBENZENE	1300	700	700	1 U	1 U	1 U	1 U	1 U
M+P-XYLENES	210	10000	10000	2 U	2 U	2 U	2 U	2 U
METHANE	NA	NA	NA	3.3 U	1.8 J	140	12000	65
O-XYLENE	210	10000	10000	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	0.166 J	1 U	1 U	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	1.28	1.38	0.0202	0.548	0.0121
TOTAL XYLENES	210	10000	10000	1 U	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	1.28	1.19	1 U	1 U	1 U
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.0121 J
1,1-DICHLOROETHENE	340	7	7	0.1 UJ	0.0287 J	0.0202 J	0.0269 J	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U	0.501	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.1 U	0.521	0.1 U
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	70.3	27.8	10.1	28.9	8.7
ARSENIC	0.045	10	NA	0.42 U	0.67 J	1.2	2.3	1
BARIUM	2600	2000	2000	102	16.3	13.1	247	5.8
BERYLLIUM	73	4	4	0.11 U	0.11 U	0.11 U	0.11 UJ	0.11 U
CADMIUM	18	5	5	0.14	0.06 U	0.06 U	0.1 J	0.08 U
CALCIUM	NA	NA	NA	20100	33400	22000	53500	13000
CHROMIUM	110	100	100	0.82 U	0.89	0.63 U	0.85 U	0.34 U
COBALT	730	NA	NA	0.15	0.07 U	1.3	0.78	8.7
COPPER	1500	1300	NA	2.1	3.6	0.74 J	0.95 J	1.7 U
IRON	11000	NA	NA	68.8 J	173	4400	21200	18200
LEAD	NA	15	15	0.12	0.21	0.05 U	0.51 J	0.05 U
MAGNESIUM	NA	NA	NA	7530	3360	2770	4450	1810
MANGANESE	880	NA	NA	78.7	0.94	212	281	1530
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.54	0.13 U
NICKEL	730	NA	100	1.1	1.2	0.66 J	2 J	3.2
POTASSIUM	NA	NA	NA	2860	5960	3170	5310	2170
SELENIUM	180	50	50	0.29 U	0.52 J	0.29 U	0.29 U	0.29 U

TABLE 4-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-01S MW16-01S-NWG-100704 NORMAL 10/7/2004	08 MW16-02S MW16-02S-NWG-100604 NORMAL 10/6/2004	08 MW16-03S MW16-03S-NWG-100804 NORMAL 10/8/2004	08 MW16-04S MW16-04S-NWG-100404 NORMAL 10/4/2004	08 MW16-05S MW16-05S-NWG-110104 NORMAL 11/1/2004
SILVER	180	NA	NA	0.12	0.05 U	0.05 U	0.05 U	0.05 U
SODIUM	NA	NA	NA	161000	417000	18200	21500	4820 J
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.57 J	0.4 U	0.65 J	0.4 U
ZINC	11000	NA	NA	8.9 J	3.6	2.9 J	13.7	7.3
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	59.2	2.4	1.4 J	4.5	3.4
ARSENIC	0.045	10	NA	0.09 U	1.1	0.4	3.3	0.96
BARIUM	2600	2000	2000	99.5	16.6	11.9	259	5.6
CADMIUM	18	5	5	0.18 U	0.02 U	0.02 U	0.02 U	0.07 U
CALCIUM	NA	NA	NA	20600	35700	21900	55300	12900
CHROMIUM	110	100	100	1.3	4.8	3.7	4.8	3.5
COBALT	730	NA	NA	0.01 U	0.02 J	1.1	0.74	8.7
COPPER	1500	1300	NA	5.1 J	3.3	0.27 J	0.18 J	0.45 U
IRON	11000	NA	NA	65.4 J	144	2510	21700	17800
LEAD	NA	15	15	1.6 J	0.17	0.078 UJ	0.08 J	0.09 U
MAGNESIUM	NA	NA	NA	7270	3630	2770	4820	1770
MANGANESE	880	NA	NA	73.3	0.25	154	291	1500
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.027 J
NICKEL	730	NA	100	1.2	0.97	0.51	2.2 J	3.1
POTASSIUM	NA	NA	NA	3120	6500	3130	5790	2200
SELENIUM	180	50	50	0.3 U	0.88	0.3 U	0.35 J	0.3 U
SILVER	180	NA	NA	0.11	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	158000	450000	17300	21400	4480
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.16	1.5	1	1.4	0.91
ZINC	11000	NA	NA	6.5 J	3.8	2.4 J	2 J	6.9
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	1.1	161	46.5	203	46.5
AMMONIA	NA	NA	NA	0.1	0.1 U	0.21	0.7	0.23
CHLORIDE	NA	NA	NA	371	520	37.9	16	5.51
DISSOLVED INORGANIC CARBON	NA	NA	NA	1	13	10	1	34
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	4	3	3	4
NITRATE	10000	10000	NA	4.83	5.53	11.6	0.1 U	0.1 U
NITRITE	1000	1000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.772	1.26	0.138	0.247	0.081
SULFATE	NA	NA	NA	7.44	19	10.3	10.8	14.8

TAB[illegible]7.
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-06S MW16-06S-NWG-100604 NORMAL 10/6/2004	08 MW16-07S MW16-07S-NWG-100604 NORMAL 10/6/2004	08 MW16-08S MW16-08S-NWG-102804 NORMAL 10/28/2004	08 MW16-11S MW16-11S-NWG-100604 NORMAL 10/6/2004	08 MW16-12S MW16-12S-NWG-102704 NORMAL 10/27/2004
Volatile Organics (ug/L)								
ACETONE	5500	NA	NA	5 U	5 U	19 U	5 U	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	1.87	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	1 UJ	1 UJ	0.184 J	1 UJ	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	0.152 J	1 U	1 U	1 U	1 U
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U	1 U	1 U	1 U	0.972 J
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
ETHYLBENZENE	1300	700	700	1 U	0.288 J	1 U	1 U	1 U
M+P-XYLENES	210	10000	10000	2 U	0.352 J	2 U	2 U	2 U
METHANE	NA	NA	NA	1.3 J	200	3.3 U	3.3 U	3.3 U
O-XYLENE	210	10000	10000	1 U	0.929 J	1 U	1 U	1 U
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	0.143 J	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	1 U	1 U	1 U	0.972 J
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	0.25	0.546	4.19	0.266	4.49
TOTAL XYLENES	210	10000	10000	1 U	1.28 J	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	0.25 J	0.546 J	4.19	0.266 J	3.52
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BENZENE	0.35	5	5	0.1 U	0.159 J	0.1 U	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	9.8	4.8 U	134	242	19
ARSENIC	0.045	10	NA	0.42 U	4.7	0.42 U	0.42 U	0.42 U
BARIUM	2600	2000	2000	18.9	171	121	12.4	3.9
BERYLLIUM	73	4	4	0.11 U	0.11 U	0.11 UJ	0.14 J	0.11 UR
CADMIUM	18	5	5	0.07 J	0.06 U	0.11 U	0.66	0.09 U
CALCIUM	NA	NA	NA	16500	77400	15600	1270	3450 J
CHROMIUM	110	100	100	0.45 J	0.34 U	1 U	1.2	1.1 U
COBALT	730	NA	NA	0.05 U	0.2 J	3.5	0.55	0.05 U
COPPER	1500	1300	NA	7.4	0.55 U	2.9 U	1.6	0.4 U
IRON	11000	NA	NA	76.6 J	12000	51.7 J	267	50 U
LEAD	NA	15	15	2.8	0.1 J	0.17	0.72	0.05 J
MAGNESIUM	NA	NA	NA	3790	6980	3420	332	1190
MANGANESE	880	NA	NA	15.2	184	293	23	12.2
MERCURY	11	2	2	0.021 U	0.021 U	0.095 U	0.021 U	0.021 U
NICKEL	730	NA	100	1.1	1.7 J	6.8 J	2.9	0.64 J
POTASSIUM	NA	NA	NA	2560	3940	3180	696	1080
SELENIUM	180	50	50	0.29 U	0.29 U	0.43 U	0.29 U	0.33 J

TABLE 4-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-06S MW16-06S-NWG-100604 NORMAL 10/6/2004	08 MW16-07S MW16-07S-NWG-100604 NORMAL 10/6/2004	08 MW16-08S MW16-08S-NWG-102804 NORMAL 10/28/2004	08 MW16-11S MW16-11S-NWG-100604 NORMAL 10/6/2004	08 MW16-12S MW16-12S-NWG-102704 NORMAL 10/27/2004
SILVER	180	NA	NA	0.05 U	0.05 U	0.1 J	0.05 U	0.05 U
SODIUM	NA	NA	NA	55700	21500	319000 J	4900	4690 J
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.09 J	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.4 U	0.4 U	0.45 J	0.4 U
ZINC	11000	NA	NA	14.2	2.7 J	11.6 J	166	10.2
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	6.2	2.8	123	29.1	3.9
ARSENIC	0.045	10	NA	0.09 U	6.5	0.09 UJ	0.31	0.09 U
BARIUM	2600	2000	2000	19.1	173	121	9.8	4.1 J
CADMIUM	18	5	5	0.07 U	0.07 U	0.1 U	0.63	0.02 U
CALCIUM	NA	NA	NA	17000	79400	17300	1180	3150
CHROMIUM	110	100	100	2	6.7	2	0.98	0.85 U
COBALT	730	NA	NA	0.02 J	0.24 J	3.2	0.51	0.02 J
COPPER	1500	1300	NA	6.9	0.16 U	3.1 U	1.3	0.16 U
IRON	11000	NA	NA	73.2 J	12700	50 U	50 U	50 U
LEAD	NA	15	15	3	0.08 U	0.26	0.19	0.15 J
MAGNESIUM	NA	NA	NA	3780	7000	3600	285	1160
MANGANESE	880	NA	NA	15.2	200	274	19.9	10.9
MERCURY	11	2	2	0.021 U	0.021 U	0.062 U	0.026 U	0.021 U
NICKEL	730	NA	100	1.2	2.1 J	6.9 J	2.9	0.71
POTASSIUM	NA	NA	NA	2730	4170	2900	731	975
SELENIUM	180	50	50	0.3 U	0.3 U	0.36 J	0.3 U	0.3 U
SILVER	180	NA	NA	0.02 U	0.02 U	0.09 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	50 U	20600 J	250000 J	4680	4830
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.074 UJ	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.46	1.9	0.43 U	0.29	0.17 U
ZINC	11000	NA	NA	13.2	1.1 J	10.2 J	136	10.6
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	12	257	5.2	1 U	9.5
AMMONIA	NA	NA	NA	0.1 U	0.57	0.12	0.1 U	0.1 U
CHLORIDE	NA	NA	NA	105	53.3	470	2.6	4.48
DISSOLVED INORGANIC CARBON	NA	NA	NA	7	37	5	2	2
DISSOLVED ORGANIC CARBON	NA	NA	NA	3	7	4	3	2
NITRATE	10000	10000	NA	0.987	0.1 U	4.31	3.54	4.84
NITRITE	1000	1000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.235	0.332	0.883	0.023	0.028
SULFATE	NA	NA	NA	6.19	1.77	16.8	7.95	6.44

TABLE 7-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-15S MW16-15S-NWG-102804 NORMAL 10/28/2004	08 MW16-17S MW16-17S-NWG-100404 NORMAL 10/4/2004	08 MW16-23S MW16-23S-NWG-102804 NORMAL 10/28/2004	08 MW16-25S MW16-25S-NWG-110104 NORMAL 11/1/2004	08 MW16-33S MW16-33S-NWG-100404 ORIG 10/4/2004
Volatile Organics (ug/L)								
ACETONE	5500	NA	NA	5.03 U	5 UR	14 U	17 U	5 UR
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	1 U	1 U	0.149 J	0.151 J	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U	1 U	0.61 J	0.233 J	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
ETHYLBENZENE	1300	700	700	1 U	1 U	1 U	1 U	1 U
M+P-XYLENES	210	10000	10000	2 U	2 U	2 U	2 U	2 U
METHANE	NA	NA	NA	3.3 U	1 J	5.3 U	3.3 U	1.1 J
O-XYLENE	210	10000	10000	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	0.317 J
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	1 U	0.61 J	0.233 J	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	6.15	0 U	31.6	3.13	0.317
TOTAL XYLENES	210	10000	10000	1 U	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	6.15	1 U	31	2.9	1 U
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.116	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	56.4	323	20.8	94.7	6.7
ARSENIC	0.045	10	NA	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
BARIUM	2600	2000	2000	73.8	3.7	51.8	3.5	2.6
BERYLLIUM	73	4	4	0.11 U	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ
CADMIUM	18	5	5	0.1 U	0.06 U	0.061 UJ	0.13 U	0.06 U
CALCIUM	NA	NA	NA	11000	1140	21200	1770 J	1560
CHROMIUM	110	100	100	1 U	1.8 U	0.85 U	0.87 U	1 U
COBALT	730	NA	NA	0.37	0.19	0.13	0.07 U	0.05 U
COPPER	1500	1300	NA	1.7	1.2	1.4 U	0.61 U	1.1
IRON	11000	NA	NA	94.4 J	605	50 U	141	50 U
LEAD	NA	15	15	0.13	0.5	0.06 J	0.19	0.14
MAGNESIUM	NA	NA	NA	2470	427	5670	644	476
MANGANESE	880	NA	NA	13.3	7.7	18.7	8.5	2
MERCURY	11	2	2	0.021 U	0.021 U	0.067 U	0.09 U	0.021 U
NICKEL	730	NA	100	0.81	0.67 J	1.1 J	0.61 J	0.35 U
POTASSIUM	NA	NA	NA	4550	669	6170	1110 J	458
SELENIUM	180	50	50	1.7	0.29 U	0.31 U	0.29 UJ	0.29 U

TABLE 4-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-15S MW16-15S-NWG-102804 NORMAL 10/28/2004	08 MW16-17S MW16-17S-NWG-100404 NORMAL 10/4/2004	08 MW16-23S MW16-23S-NWG-102804 NORMAL 10/28/2004	08 MW16-25S MW16-25S-NWG-110104 NORMAL 11/1/2004	08 MW16-33S MW16-33S-NWG-100404 ORIG 10/4/2004
SILVER	180	NA	NA	0.08 J	0.05 U	0.15	0.05 U	0.05 U
SODIUM	NA	NA	NA	102000 J	2860	140000 J	8650 J	6120
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.71 J	0.4 U	0.4 U	0.4 U
ZINC	11000	NA	NA	7 U	4.2	2.9 U	4.3 U	3.6
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	11.9	2	17.8	8.2 J	5.2
ARSENIC	0.045	10	NA	0.09 U	0.09 U	0.09 UJ	0.09 UJ	0.09 U
BARIUM	2600	2000	2000	70	2.7 J	52.3	3 J	3.2 J
CADMIUM	18	5	5	0.05 U	0.04 U	0.02 U	0.07 U	0.04 U
CALCIUM	NA	NA	NA	10500	1110	24700	1590	1540
CHROMIUM	110	100	100	1.2	0.92	0.85 U	0.92 U	0.48
COBALT	730	NA	NA	0.37	0.01 U	0.13	0.03	0.01 U
COPPER	1500	1300	NA	0.87	0.28 J	1.3 U	0.18 U	0.63
IRON	11000	NA	NA	50 U	50 U	50 U	50 U	50 U
LEAD	NA	15	15	0.08 U	0.17	0.18	0.11 J	0.23
MAGNESIUM	NA	NA	NA	2590	378	6550	619 J	510
MANGANESE	880	NA	NA	11.3	1.2 J	16	3.9 J	1.9 J
MERCURY	11	2	2	0.021 U	0.031 U	0.063 U	0.058 U	0.021 U
NICKEL	730	NA	100	0.49	0.35	0.97 J	0.3 U	0.34
POTASSIUM	NA	NA	NA	4220	641	6010	1040	467
SELENIUM	180	50	50	0.74	0.3 U	0.3 UJ	0.3 UJ	0.3 U
SILVER	180	NA	NA	0.04 J	0.02 U	0.14 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	96800	2850	113000 J	7730	6130
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.074 UJ	0.074 UJ	0.07 U
VANADIUM	36	NA	NA	0.19 U	0.08 U	0.17 U	0.18 U	0.08 U
ZINC	11000	NA	NA	7.4	1.9 J	2.4 J	5.1 J	1.8 J
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	7	1.5	4.8	10.1	2.3
AMMONIA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLORIDE	NA	NA	NA	131	3.18	244	7.62	6.22
DISSOLVED INORGANIC CARBON	NA	NA	NA	3	1 U	1	4	1 U
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	2	3	2	2
NITRATE	10000	10000	NA	8.63	1.28	16.7	1.43	3.43
NITRITE	1000	1000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.305	0.015	0.473	0.036	0.025
SULFATE	NA	NA	NA	29.4	3.96	5.1	7.51	5.91

TABLE 17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-33S MW16-33S-NWG-100404-AVG AVG 10/4/2004	08 MW16-33S MW16-33S-NWG-100404-D DUP 10/4/2004	08 MW16-34S MW16-34S-NWG-092904 NORMAL 9/29/2004	08 MW16-35S MW16-35S-NWG-092904 NORMAL 9/29/2004	08 MW16-37S MW16-37S-NWG-100504 NORMAL 10/5/2004
Volatile Organics (ug/L)								
ACETONE	5500	NA	NA	5 U	5 U	5 UR	5 UR	5 UR
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0.0106	0 U
CARBON DISULFIDE	1000	NA	NA	1 U	1 U	1 U	1 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U	1 U	1 U	1 U	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
ETHYLBENZENE	1300	700	700	1 U	1 U	1 U	1 U	1 U
M+P-XYLENES	210	10000	10000	2 U	2 U	2 U	2 U	2 U
METHANE	NA	NA	NA	1.1 J	3.3 U	3.3 U	3.3 U	1.1 J
O-XYLENE	210	10000	10000	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	0.1	5	5	0.322 J	0.327 J	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	1 U	1 U	1 U	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	0.492	0.497	0 U	0 U	93
TOTAL XYLENES	210	10000	10000	1 U	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	0.17 J	0.17 J	1 U	1 U	93
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U	0.0106 J	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	6.3 J	5.9 J	27.5 J	27.3	10.4
ARSENIC	0.045	10	NA	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
BARIUM	2600	2000	2000	2.55	2.5	3.7	3.7	5.6
BERYLLIUM	73	4	4	0.11 UJ	0.11 UJ	0.11 U	0.11 U	0.11 UJ
CADMIUM	18	5	5	0.06 U	0.06 U	0.13 U	0.06 U	0.26
CALCIUM	NA	NA	NA	1525	1490	2510	1800	1700
CHROMIUM	110	100	100	0.995 U	0.99 U	1.1 U	0.85 U	1.4 U
COBALT	730	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.06 J
COPPER	1500	1300	NA	0.93 J	0.76 J	0.4 U	0.4 U	0.4 U
IRON	11000	NA	NA	50 U	50 U	50 U	50 U	50 U
LEAD	NA	15	15	0.0825	0.05 U	0.05 U	0.06 J	0.05 U
MAGNESIUM	NA	NA	NA	466.5	457	876	618	677
MANGANESE	880	NA	NA	1.95	1.9	11.4	3.4	7.1
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.066 U
NICKEL	730	NA	100	0.35 U	0.35 U	0.35 U	0.35 U	2.7
POTASSIUM	NA	NA	NA	451.5	445	776	713	712
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U

TABLE 4-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-33S MW16-33S-NWG-100404-AVG AVG 10/4/2004	08 MW16-33S MW16-33S-NWG-100404-D DUP 10/4/2004	08 MW16-34S MW16-34S-NWG-092904 NORMAL 9/29/2004	08 MW16-35S MW16-35S-NWG-092904 NORMAL 9/29/2004	08 MW16-37S MW16-37S-NWG-100504 NORMAL 10/5/2004
SILVER	180	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
SODIUM	NA	NA	NA	6035	5950	4750 J	3710	3910
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.85
ZINC	11000	NA	NA	2.8	2	2.9	7.2 J	108
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	5.4	5.6	19.7	8.4	9.9
ARSENIC	0.045	10	NA	0.09 U	0.09 U	0.09 U	0.092 U	0.17 J
BARIUM	2600	2000	2000	3 J	2.8 J	4.1 J	4.4	6.4
CADMIUM	18	5	5	0.04 U	0.04 U	0.08 U	0.05 U	0.24
CALCIUM	NA	NA	NA	1560	1580	2510	1840 J	1760
CHROMIUM	110	100	100	0.47	0.46	0.49	0.72 U	0.56
COBALT	730	NA	NA	0.01 U	0.01 U	0.02 J	0.03	0.07
COPPER	1500	1300	NA	0.74	0.85	0.2 J	0.16 U	0.28 J
IRON	11000	NA	NA	50 U	50 U	50 U	50 U	50 U
LEAD	NA	15	15	0.135	0.08 U	0.25	0.12 J	0.2
MAGNESIUM	NA	NA	NA	521	532	804	614	722
MANGANESE	880	NA	NA	1.95 J	2 J	10.5	2.7	7.5
MERCURY	11	2	2	0.021 U	0.021 U	0.034 U	0.033 U	0.021 U
NICKEL	730	NA	100	0.205	0.14 U	0.62	0.25	3.1
POTASSIUM	NA	NA	NA	465.5	464	780	728	811
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	6210	6290	4260	3420	4250
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.08 U	0.08 U	0.08 U	0.14 U	0.12 J
ZINC	11000	NA	NA	2.2 J	2.6 J	2.9 J	9.3 J	115
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	2.3	2.3	8.3	3.2	2.5
AMMONIA	NA	NA	NA	0.085	0.12	0.23	0.31 U	0.1 U
CHLORIDE	NA	NA	NA	6.37	6.52	9.44	5.2	5.33
DISSOLVED INORGANIC CARBON	NA	NA	NA	1 U	1 U	1 U	1 U	2
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	2	2	8	2
NITRATE	10000	10000	NA	3.385	3.34	2.2	2.25	3.98
NITRITE	1000	1000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.025	0.025	0.028	0.021	0.023
SULFATE	NA	NA	NA	5.865	5.82	3.27	3.69	4.16

TABLE 4-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-40S MW16-40S-NWG-100804 ORIG 10/8/2004	08 MW16-40S MW16-40S-NWG-100804-AVG AVG 10/8/2004	08 MW16-40S MW16-40S-NWG-100804-D DUP 10/8/2004	08 MW16-41S MW16-41S-NWG-093004 ORIG 9/30/2004	08 MW16-41S MW16-41S-NWG-093004-AVG AVG 9/30/2004
Volatile Organics (ug/L)								
ACETONE	5500	NA	NA	5 U	5 U	5 U	5 UR	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	1.58	1.63
CARBON DISULFIDE	1000	NA	NA	1 UJ	1 UJ	1 UJ	1 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	91	87	83	3.83	3.86
ETHANE	NA	NA	NA	9.6	9.55	9.5	11	10.5
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
ETHYLBENZENE	1300	700	700	1 U	1 U	1 U	0.0936 J	0.1018 J
M+P-XYLENES	210	10000	10000	2 U	2 U	2 U	0.275 J	0.2915 J
METHANE	NA	NA	NA	2700	2600	2500	1600	1650
O-XYLENE	210	10000	10000	1 U	1 U	1 U	0.548 J	0.578 J
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	0.228 J	0.2265 J
TOTAL 1,2-DICHLOROETHENE	61	NA	70	96.2	92.2	88.2	4.93	4.96
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	175	168	161	33.8	30.6
TOTAL XYLENES	210	10000	10000	1 U	1 U	1 U	0.823 J	0.87 J
TRANS-1,2-DICHLOROETHENE	120	100	100	5.18	5.175	5.17	1.1	1.1
TRICHLOROETHENE	0.028	5	5	14	14	14	0.701 J	0.418 J
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	6.98	6.68	6.38	1.2	1.24
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U	0.432	0.4335
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	58	55	52	27	24
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	49.7	46.1	42.5	13.2	11.4
ARSENIC	0.045	10	NA	0.49 J	0.53 J	0.57 J	12.4	11.5
BARIUM	2600	2000	2000	15.7	15.5	15.3	36	34.85
BERYLLIUM	73	4	4	0.11 U	0.11 U	0.11 U	0.11 UJ	0.11 UJ
CADMIUM	18	5	5	0.06 U	0.05 J	0.07 J	0.06 J	0.065 J
CALCIUM	NA	NA	NA	12500	12350	12200	49000	48750
CHROMIUM	110	100	100	0.48 U	0.595 U	0.71 U	0.51 U	0.525 U
COBALT	730	NA	NA	19.3	19.4	19.5	1.4	1.4
COPPER	1500	1300	NA	1.1	1.15	1.2	1.3 J	1.25 J
IRON	11000	NA	NA	5130	5095	5060	50600	49150
LEAD	NA	15	15	0.05 U	0.0775	0.13	0.07 J	0.0475 J
MAGNESIUM	NA	NA	NA	3800	3760	3720	4320	4295
MANGANESE	880	NA	NA	1970	1945	1920	1050	1035
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U
NICKEL	730	NA	100	14	14.1	14.2	2.9 J	2.8 J
POTASSIUM	NA	NA	NA	2970	2960	2950	4710	4695
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U

TABLE 4-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-40S MW16-40S-NWG-100804 ORIG 10/8/2004	08 MW16-40S MW16-40S-NWG-100804-AVG AVG 10/8/2004	08 MW16-40S MW16-40S-NWG-100804-D DUP 10/8/2004	08 MW16-41S MW16-41S-NWG-093004 ORIG 9/30/2004	08 MW16-41S MW16-41S-NWG-093004-AVG AVG 9/30/2004
SILVER	180	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
SODIUM	NA	NA	NA	26500	25950	25400	34200	33200
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
ZINC	11000	NA	NA	12.9 J	15.75 J	18.6 J	11.9 J	14.3 J
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	23	22	21	3.7	3.75
ARSENIC	0.045	10	NA	0.5	0.5	0.5	16.1	15.45
BARIUM	2600	2000	2000	16.6	16.65	16.7	32.6	33.2
CADMIUM	18	5	5	0.14 U	0.13 U	0.12 U	0.1 U	0.085 U
CALCIUM	NA	NA	NA	13000	12850	12700	48700	48000
CHROMIUM	110	100	100	3.1	3.05	3	10.6	9.85
COBALT	730	NA	NA	19.5	19.55	19.6	1.3	1.25
COPPER	1500	1300	NA	0.62 J	0.495 J	0.37 J	0.32	0.315 J
IRON	11000	NA	NA	5030	4960	4890	48500	48700
LEAD	NA	15	15	0.19 J	0.175 J	0.16 J	0.08 U	0.08 U
MAGNESIUM	NA	NA	NA	3620	3620	3620	4630	4520
MANGANESE	880	NA	NA	1880	1880	1880	1020 J	1020 J
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.062 U	0.0415 U
NICKEL	730	NA	100	14.1	14.1	14.1	2.5	2.4
POTASSIUM	NA	NA	NA	3030	3020	3010	4650	4585
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 U	0.35 J	0.39 J
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	25600	25400	25200	36300	35950
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.83	0.805	0.78	3	2.8
ZINC	11000	NA	NA	12.5 J	12.8 J	13.1 J	9.4	8.6
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	27.5	27.5	27.5	175	171.5
AMMONIA	NA	NA	NA	1.3	1.325	1.35	4.05	4
CHLORIDE	NA	NA	NA	59.5	61.8	64.1	51.4	49.95
DISSOLVED INORGANIC CARBON	NA	NA	NA	7	7.5	8	3 J	4.5 J
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	2	2	3 J	5 J
NITRATE	10000	10000	NA	0.101	0.0755	0.1 U	0.1 U	0.1 U
NITRITE	1000	1000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.149	0.1495	0.15	0.285	0.279
SULFATE	NA	NA	NA	10.8	10.55	10.3	15.6	16.3

TAB[illegible]17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-41S MW16-41S-NWG-093004-D DUP 9/30/2004	08 MW16-42S MW16-42S-NWG-093004 ORIG 9/30/2004	08 MW16-42S MW16-42S-NWG-093004-AVG AVG 9/30/2004	08 MW16-42S MW16-42S-NWG-093004-D DUP 9/30/2004	08 MW16-43S MW16-43S-NWG-093004 NORMAL 9/30/2004
Volatile Organics (ug/L)								
ACETONE	5500	NA	NA	5 U	5 UR	5 UR	5 UR	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	1.686	0.0475	0.0484	0.0493	0.0549
CARBON DISULFIDE	1000	NA	NA	1 U	1 U	1 U	1 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	3.89	4.69	5.195	5.7	4.1
ETHANE	NA	NA	NA	10	2.6 J	2.85 J	3.1 J	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
ETHYLBENZENE	1300	700	700	0.11 J	1 U	1 U	1 U	1 U
M+P-XYLENES	210	10000	10000	0.308 J	2 U	2 U	2 U	2 U
METHANE	NA	NA	NA	1700	1800	1750	1700	1500
O-XYLENE	210	10000	10000	0.608 J	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	0.225 J	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	4.99	5.23	5.77	6.31	4.31
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	27.4	14.5	15.8	17.1	5.09
TOTAL XYLENES	210	10000	10000	0.916 J	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	120	100	100	1.1	0.537 J	0.575 J	0.613 J	0.213 J
TRICHLOROETHENE	0.028	5	5	0.135 J	1 U	1 U	1 U	0.901 U
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	1.28	0.713	0.7455	0.778	0.357
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BENZENE	0.35	5	5	0.435	0.0475 J	0.0484 J	0.0493 J	0.0549 J
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	21	8.56	9.28	10	0.415
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	9.6	8.1 J	10.3 J	12.5 J	12.9 J
ARSENIC	0.045	10	NA	10.6	0.42 U	0.42 U	0.42 U	6.8
BARIUM	2600	2000	2000	33.7	6.9	7.1	7.3	157
BERYLLIUM	73	4	4	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U
CADMIUM	18	5	5	0.07 J	0.06 U	0.095 U	0.13 U	0.08 U
CALCIUM	NA	NA	NA	48500	56800	58600	60400	38900
CHROMIUM	110	100	100	0.54 U	0.34 U	0.34 U	0.34 U	0.73 U
COBALT	730	NA	NA	1.4	0.12 J	0.15 J	0.18 J	0.13
COPPER	1500	1300	NA	1.2	0.4 U	0.4 U	0.4 U	1
IRON	11000	NA	NA	47700	12000	13350	14700	31700
LEAD	NA	15	15	0.05 U	0.05 U	0.0575 J	0.09 J	0.18
MAGNESIUM	NA	NA	NA	4270	2690 J	2815 J	2940 J	3480
MANGANESE	880	NA	NA	1020	2090	2225	2360	827
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U
NICKEL	730	NA	100	2.7	1.5 J	1.65 J	1.8 J	0.67 J
POTASSIUM	NA	NA	NA	4680	3660	3765	3870	3020
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U

TABLE 4-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-41S MW16-41S-NWG-093004-D DUP 9/30/2004	08 MW16-42S MW16-42S-NWG-093004 ORIG 9/30/2004	08 MW16-42S MW16-42S-NWG-093004-AVG AVG 9/30/2004	08 MW16-42S MW16-42S-NWG-093004-D DUP 9/30/2004	08 MW16-43S MW16-43S-NWG-093004 NORMAL 9/30/2004
SILVER	180	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
SODIUM	NA	NA	NA	32200	18100	18500	18900	8370 J
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
ZINC	11000	NA	NA	16.7 J	5.1 J	6.45 J	7.8 J	22.7
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	3.8	2	1.95	1.9	0.72 U
ARSENIC	0.045	10	NA	14.8	0.17 J	0.175 J	0.18 J	5.1
BARIUM	2600	2000	2000	33.8	6.5	6.5	6.5	124
CADMIUM	18	5	5	0.07 U	0.15 U	0.135 U	0.12 U	0.05 U
CALCIUM	NA	NA	NA	47300	60900	61350	61800	38800
CHROMIUM	110	100	100	9.1	3.7	3.6	3.5	1.7
COBALT	730	NA	NA	1.2	0.16 J	0.155 J	0.15 J	0.12
COPPER	1500	1300	NA	0.31 J	0.26 J	0.225 J	0.19 J	0.16 J
IRON	11000	NA	NA	48900	10200	10200	10200	24200
LEAD	NA	15	15	0.08 U	0.47 J	0.42 J	0.37 J	0.11 J
MAGNESIUM	NA	NA	NA	4410	2710	2700	2690	3140
MANGANESE	880	NA	NA	1020 J	2300	2305	2310	811
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.042 U
NICKEL	730	NA	100	2.3	2.7 J	2.45 J	2.2 J	0.96
POTASSIUM	NA	NA	NA	4520	3920	3920	3920	2990
SELENIUM	180	50	50	0.43 J	0.3 U	0.3 U	0.3 U	0.3 U
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	35600	17800	17850	17900	7010
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	2.6	0.97	0.945	0.92	0.44
ZINC	11000	NA	NA	7.8	4.1 J	3.35 J	2.6 J	16.5 J
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	168	170	174	178	140
AMMONIA	NA	NA	NA	3.95	0.39	0.4	0.41	0.4
CHLORIDE	NA	NA	NA	48.5	29.9	31.05	32.2	7.68
DISSOLVED INORGANIC CARBON	NA	NA	NA	6 J	1 U	1 U	1 U	1 U
DISSOLVED ORGANIC CARBON	NA	NA	NA	7 J	3	3.5	4	4
NITRATE	10000	10000	NA	0.1 U	1.12	1.085	1.05	0.543
NITRITE	1000	1000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.273	0.265	0.269	0.273	0.187
SULFATE	NA	NA	NA	17	25.5	25.65	25.8	5.25

TAB[illegible]-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-44S MW16-44S-NWG-092704 ORIG 9/27/2004	08 MW16-44S MW16-44S-NWG-092704-AVG AVG 9/27/2004	08 MW16-44S MW16-44S-NWG-092704-D DUP 9/27/2004	08 MW16-45S MW16-45S-NWG-092804 ORIG 9/28/2004	08 MW16-45S MW16-45S-NWG-092804-AVG AVG 9/28/2004
Volatile Organics (ug/L)								
ACETONE	5500	NA	NA	5 UR	5 UR	5 UR	5 UR	5 UR
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0.521	0.525	0.529	0.219	0.215
CARBON DISULFIDE	1000	NA	NA	1 U	1 U	1 U	1 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	20	19.5	19	3.26	3.405
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
ETHYLBENZENE	1300	700	700	1 U	1 U	1 U	1 U	1 U
M+P-XYLENES	210	10000	10000	2 U	2 U	2 U	2 U	2 U
METHANE	NA	NA	NA	3000	2700	2400	570 J	1385 J
O-XYLENE	210	10000	10000	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	21.8	21.3	20.8	3.99	4.13
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	40.9	39.1	37.3	5	5.09
TOTAL XYLENES	210	10000	10000	1 U	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	120	100	100	1.77	1.76	1.75	0.733 J	0.729 J
TRICHLOROETHENE	0.028	5	5	3.69	3.625	3.56	1 U	1 U
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	2.47	2.23	1.99	0.804	0.7605
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.0188 J	0.01725 J
BENZENE	0.35	5	5	0.521	0.525	0.529	0.219	0.2145
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	13	12	11	0.185	0.1805
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	14.3 J	16.6 J	18.9	118 J	126 J
ARSENIC	0.045	10	NA	7	7.05	7.1	19.8	19.5
BARIUM	2600	2000	2000	40.7	40.9	41.1	14.3	14.25
BERYLLIUM	73	4	4	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
CADMIUM	18	5	5	0.06 U	0.06 U	0.06 U	0.07 U	0.065 U
CALCIUM	NA	NA	NA	49200	48750	48300	60200	59650
CHROMIUM	110	100	100	0.46 U	0.475 U	0.49 U	0.77 U	0.845 U
COBALT	730	NA	NA	15.2	15.1	15	0.47	0.47
COPPER	1500	1300	NA	0.59 J	0.55 J	0.51 J	0.91 J	0.945 J
IRON	11000	NA	NA	30500	29950	29400	26800	26800
LEAD	NA	15	15	0.06 J	0.065 J	0.07 J	0.97 J	0.895 J
MAGNESIUM	NA	NA	NA	3990	3860	3730	7250	7180
MANGANESE	880	NA	NA	1370	1360	1350	600	600.5
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U
NICKEL	730	NA	100	3.3	3.35	3.4	1.5 J	1.4 J
POTASSIUM	NA	NA	NA	4790 J	4675 J	4560	5250 J	5170 J
SELENIUM	180	50	50	0.36 J	0.375 J	0.39 J	0.29 U	0.29 U

TABLE 4-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-44S MW16-44S-NWG-092704 ORIG 9/27/2004	08 MW16-44S MW16-44S-NWG-092704-AVG AVG 9/27/2004	08 MW16-44S MW16-44S-NWG-092704-D DUP 9/27/2004	08 MW16-45S MW16-45S-NWG-092804 ORIG 9/28/2004	08 MW16-45S MW16-45S-NWG-092804-AVG AVG 9/28/2004
SILVER	180	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
SODIUM	NA	NA	NA	25700 J	25250 J	24800 J	39500	38900
THALLIUM	2.4	2	2	0.07 U	0.0525 J	0.07 J	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
ZINC	11000	NA	NA	10.6 J	9.9 J	9.2 J	3.8 U	3.9 J
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	6.8	6.75	6.7	0.91 J	0.94 J
ARSENIC	0.045	10	NA	8.8 J	8.8 J	8.8 J	27.4 J	26.9 J
BARIUM	2600	2000	2000	36	36.25	36.5	13.2	13.3
CADMIUM	18	5	5	0.03 U	0.025 U	0.02 U	0.03 U	0.035 U
CALCIUM	NA	NA	NA	44300	44550	44800	63100	62750 J
CHROMIUM	110	100	100	12.8	12.5	12.2	9	8.2
COBALT	730	NA	NA	15	14.9	14.8	0.41	0.395
COPPER	1500	1300	NA	0.17 J	0.21 J	0.25 J	0.31 J	0.32 J
IRON	11000	NA	NA	25900	25950	26000	27500	27050
LEAD	NA	15	15	0.08 U	0.105	0.17	0.08 U	0.085 J
MAGNESIUM	NA	NA	NA	3530	3645	3760	7180	7055
MANGANESE	880	NA	NA	1330	1325	1320	613	611
MERCURY	11	2	2	0.048 U	0.0545 U	0.061 U	0.021 U	0.037 U
NICKEL	730	NA	100	3	3.05	3.1	0.79 J	1.045 J
POTASSIUM	NA	NA	NA	4120	4235	4350	5300	5245
SELENIUM	180	50	50	0.36 J	0.38 J	0.4 J	0.3 U	0.3 U
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	20900 J	22800 J	24700 J	42600 J	42150 J
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	3.6	3.5	3.4	2.5	2.25
ZINC	11000	NA	NA	7.3 J	6.7 J	6.1 J	12.7 J	8.45 J
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	179	179	179	236	235.5
AMMONIA	NA	NA	NA	2.8	2.625	2.45	1.2	1.17
CHLORIDE	NA	NA	NA	30	30.5	31	48	49.65
DISSOLVED INORGANIC CARBON	NA	NA	NA	11 J	7 J	3 J	11	10
DISSOLVED ORGANIC CARBON	NA	NA	NA	45 J	37 J	29 J	25	20
NITRATE	10000	10000	NA	0.1 U	0.1 U	0.1 U	1.24 J	0.734 J
NITRITE	1000	1000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.233	0.2305	0.228	0.292	0.298
SULFATE	NA	NA	NA	25.2	25.2	25.2	4.68	5.145

TAB[illegible]17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-45S MW16-45S-NWG-092804-D DUP 9/28/2004	08 MW16-46S MW16-46S-NWG-092804 NORMAL 9/28/2004	08 MW16-47S MW16-47S-NWG-092704 NORMAL 9/27/2004	08 MW16-48S MW16-48S-NWG-100404 NORMAL 10/4/2004	08 MW16-53S MW16-53S-NWG-100704 NORMAL 10/7/2004
Volatile Organics (ug/L)								
ACETONE	5500	NA	NA	5 UR	5 UR	5 U	3.46 J	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0.21	2.24	0 U	0 U	1.079
CARBON DISULFIDE	1000	NA	NA	1 U	1 U	1 U	1 U	1 UJ
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	3.55	0.731 J	1 U	1 U	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
ETHYLBENZENE	1300	700	700	1 U	0.262 J	1 U	1 U	1 U
M+P-XYLENES	210	10000	10000	2 U	2 U	2 U	2 U	0.747 J
METHANE	NA	NA	NA	2200 J	4100	3.3 U	2900	1200
O-XYLENE	210	10000	10000	1 U	1 U	1 U	1 U	0.332 J
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	4.28	0.976 J	1 U	1 U	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	5.18	3.08	0 U	0 U	0.177
TOTAL XYLENES	210	10000	10000	1 U	1 U	1 U	1 U	1.079 J
TRANS-1,2-DICHLOROETHENE	120	100	100	0.725 J	0.245 J	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	1 U	1 U	1 U	1 U	0.177 J
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.717	0.244	0.1 U	0.1 U	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.0157 J	0.1 U	0.1 U	0.1 U	0.1 U
BENZENE	0.35	5	5	0.21	1.98	0.1 U	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.176	1.86	0.1 U	0.1 U	0.1 U
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	134	7.2 J	28.3 J	433	6.7
ARSENIC	0.045	10	NA	19.2	12.3	0.42 U	8.9	1.1
BARIUM	2600	2000	2000	14.2	39.8	21.7	5	4
BERYLLIUM	73	4	4	0.11 U	0.11 U	0.11 U	0.11 UJ	0.11 U
CADMIUM	18	5	5	0.06 U	0.06 U	0.1 U	0.07 J	0.06 U
CALCIUM	NA	NA	NA	59100	70100	119000	13500	17500
CHROMIUM	110	100	100	0.92 U	0.34 U	0.79 U	0.98 U	0.87
COBALT	730	NA	NA	0.47	0.21 J	0.23 J	2	0.43
COPPER	1500	1300	NA	0.98 J	0.4 U	0.96 J	1.5	0.45 U
IRON	11000	NA	NA	26800	31700	283	33000	13900
LEAD	NA	15	15	0.82 J	0.15 J	0.06 J	0.85	0.05 U
MAGNESIUM	NA	NA	NA	7110	9530	8950	2910	1050
MANGANESE	880	NA	NA	601	613	93.6	915	116
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U
NICKEL	730	NA	100	1.3 J	1.1 J	2.8 J	1.3	0.9
POTASSIUM	NA	NA	NA	5090	6840 J	6840 J	2890	1640
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U

TABLE 4-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-45S MW16-45S-NWG-092804-D DUP 9/28/2004	08 MW16-46S MW16-46S-NWG-092804 NORMAL 9/28/2004	08 MW16-47S MW16-47S-NWG-092704 NORMAL 9/27/2004	08 MW16-48S MW16-48S-NWG-100404 NORMAL 10/4/2004	08 MW16-53S MW16-53S-NWG-100704 NORMAL 10/7/2004
SILVER	180	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
SODIUM	NA	NA	NA	38300	32000	22000 J	13800	4040
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.12 J	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.4 U	0.4 U	1.2	0.4 U
ZINC	11000	NA	NA	5.9 J	6.3 J	4.6 J	14.5	3.2
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	0.97 J	1 J	1.6	2	3.5
ARSENIC	0.045	10	NA	26.4 J	20.7 J	0.27 J	6.3	1.4
BARIUM	2600	2000	2000	13.4	26.6	20.3	4.1 J	4.2
CADMIUM	18	5	5	0.04 U	0.04 U	0.09 U	0.03 J	0.09 U
CALCIUM	NA	NA	NA	62400 J	75300	117000	14000	17700
CHROMIUM	110	100	100	7.4	11.9	19.3	2.7	3.1
COBALT	730	NA	NA	0.38	0.28 J	0.2 J	1.9	0.56
COPPER	1500	1300	NA	0.33 J	0.35 J	0.89 J	0.16 U	0.16 U
IRON	11000	NA	NA	26600	33500	228	29100	13000
LEAD	NA	15	15	0.13 J	0.08 U	0.08 U	0.09 J	0.08 U
MAGNESIUM	NA	NA	NA	6930	9890	8930	3130	1050
MANGANESE	880	NA	NA	609	646	95.5	968	127
MERCURY	11	2	2	0.053 U	0.064 U	0.021 U	0.021 U	0.057 U
NICKEL	730	NA	100	1.3 J	1 J	2.3 J	1.5	1.1
POTASSIUM	NA	NA	NA	5190	7330	6940	3180	1710
SELENIUM	180	50	50	0.3 U	0.36 J	0.3 U	0.35 J	0.3 U
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	41700	37600 J	25500 J	14700	3890
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.09 J	0.07 U	0.07 U
VANADIUM	36	NA	NA	2	3.3	5.4	0.74	0.64
ZINC	11000	NA	NA	4.2 J	6.6 J	12 J	3.7	6.8
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	235	276	283	52	55.5
AMMONIA	NA	NA	NA	1.14	1.9	0.1 U	2.12	0.27
CHLORIDE	NA	NA	NA	51.3	39.3	50.5	27.5	7.1
DISSOLVED INORGANIC CARBON	NA	NA	NA	9	27	56	2	16
DISSOLVED ORGANIC CARBON	NA	NA	NA	15	13	28	1	4
NITRATE	10000	10000	NA	0.228 J	0.1 U	17.9	0.1 U	0.1 U
NITRITE	1000	1000	NA	0.1 U	0.1 U	0.1 U	0.1 U	1.5
SALINITY (g/kg)	NA	NA	NA	0.304	0.318	0.419	0.136	0.076
SULFATE	NA	NA	NA	5.61	1.14	38.2	4.86	2.82

TAB[illegible]17

SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-58S MW16-58S-NWG-101304 NORMAL 10/13/2004	08 MW16-59S MW16-59S-NWG-102504 NORMAL 10/25/2004	08 MW16-65S MW16-65S-NWG-102804 NORMAL 10/28/2004	09 MW16-66S MW16-66S-NWG-111604 NORMAL 11/16/2004	09 MW16-67S MW16-67S-NWG-111604 NORMAL 11/16/2004
Volatile Organics (ug/L)								
ACETONE	5500	NA	NA	5 U	6.93 U	7.61 U	5 U	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	0.166 J	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	1 U	1 U	1 U	0.146 J	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	0.269 J	1 U
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U	1 U	1 U	1 U	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
ETHYLBENZENE	1300	700	700	1 U	1 U	1 U	1 U	1 U
M+P-XYLENES	210	10000	10000	2 U	2 U	2 U	2 U	2 U
METHANE	NA	NA	NA	22	3.3 U	5.3 U	5 U	4.4 U
O-XYLENE	210	10000	10000	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U		
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	1 U	1 U	2 U	2 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	0.0266	21	1.24	4.01	6.81
TOTAL XYLENES	210	10000	10000	1 U	1 U	1 U	3 U	3 U
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	1 U	21	1.24	4.01	6.81
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U		
1,1-DICHLOROETHENE	340	7	7	0.1 U	0.1 U	0.1 U		
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U		
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U		
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U		
VINYL CHLORIDE	0.02	2	2	0.0266 J	0.1 U	0.1 U		
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	27.3	26.8	411		
ARSENIC	0.045	10	NA	0.42 U	0.42 U	0.42 U		
BARIUM	2600	2000	2000	13.2	27.4	39.7		
BERYLLIUM	73	4	4	0.11 UJ	0.11 U	0.11 UJ		
CADMIUM	18	5	5	0.06 U	0.06 U	0.06 U		
CALCIUM	NA	NA	NA	25500	10100	16200		
CHROMIUM	110	100	100	1.3 U	1.4 U	1.8 U		
COBALT	730	NA	NA	0.05 U	0.05 U	0.26		
COPPER	1500	1300	NA	0.43 U	1.1	1.2 U		
IRON	11000	NA	NA	4340	50 U	627		
LEAD	NA	15	15	0.05 U	0.12	0.4		
MAGNESIUM	NA	NA	NA	2460	3460	5350		
MANGANESE	880	NA	NA	12 J	12.2	27.6		
MERCURY	11	2	2	0.021 U	0.021 U	0.093 U		
NICKEL	730	NA	100	0.62 J	0.75	0.86 J		
POTASSIUM	NA	NA	NA	3320	2250	2230		
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 UJ		

TABLE 4-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-58S MW16-58S-NWG-101304 NORMAL 10/13/2004	08 MW16-59S MW16-59S-NWG-102504 NORMAL 10/25/2004	08 MW16-65S MW16-65S-NWG-102804 NORMAL 10/28/2004	09 MW16-66S MW16-66S-NWG-111604 NORMAL 11/16/2004	09 MW16-67S MW16-67S-NWG-111604 NORMAL 11/16/2004
SILVER	180	NA	NA	0.05 U	0.05 U	0.05 U		
SODIUM	NA	NA	NA	26600 J	62300 J	30300 J		
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U		
VANADIUM	36	NA	NA	0.9 J	0.4 U	1.8		
ZINC	11000	NA	NA	3.7 J	8	12.7 J		
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	2.9	14.7	32.3		
ARSENIC	0.045	10	NA	0.19	0.09 U	0.24 J		
BARIUM	2600	2000	2000	6.2	26	37.2		
CADMIUM	18	5	5	0.03 U	0.02 U	0.07 U		
CALCIUM	NA	NA	NA	30000	9520	18100		
CHROMIUM	110	100	100	1.7	0.93 U	1.1		
COBALT	730	NA	NA	0.03	0.01 U	0.11		
COPPER	1500	1300	NA	0.42 U	0.74	0.3 U		
IRON	11000	NA	NA	269	50 U	50 U	32.2 U	32.2 U
LEAD	NA	15	15	0.08 U	0.08 U	0.15 J		
MAGNESIUM	NA	NA	NA	2740	3320	5650		
MANGANESE	880	NA	NA	12.5 J	11.4	15.5	4.8	11
MERCURY	11	2	2	0.021 U	0.021 U	0.047 U		
NICKEL	730	NA	100	0.71 J	0.7	0.55 J		
POTASSIUM	NA	NA	NA	3450	2150	2040		
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 UJ		
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U		
SODIUM	NA	NA	NA	32800	59900	26500 J		
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.074 UJ		
VANADIUM	36	NA	NA	0.64	0.11 U	1		
ZINC	11000	NA	NA	4.2 J	2.5	9.8 J		
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	67.8	4.5	23.5	6.3	4.5
AMMONIA	NA	NA	NA	0.15	0.1 U	0.1 U	0.29	0.17
CHLORIDE	NA	NA	NA	68.7	102	79.6	6.65	25.8
DISSOLVED INORGANIC CARBON	NA	NA	NA	7	1	2	5	3
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	2	2	1	1
NITRATE	10000	10000	NA	3.42	9.12	26.7	8.01	5.21
NITRITE	1000	1000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.202	0.224	0.162		
SULFATE	NA	NA	NA	8.37	6.46	5.11	3.91	5.43

TAB[illegible]-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	09 MW16-68S MW16-68S-NWG-120904 NORMAL 12/9/2004	09 MW16-69S MW16-69S-NWG-111704 NORMAL 11/17/2004	09 MW16-70S MW16-70S-NWG-111704 NORMAL 11/17/2004	09 MW16-71S MW16-71S-NWG-111704 NORMAL 11/17/2004
Volatile Organics (ug/L)							
ACETONE	5500	NA	NA	5 U	5.45 U	5 U	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	0.167 J	1 U	1 U	0.262 J
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U
CHLOROMETHANE	160	NA	NA	0.101 J	1 UJ	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U	1 U	1 U	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U
ETHYLBENZENE	1300	700	700	1 U	1 U	1 U	1 U
M+P-XYLENES	210	10000	10000		2 U	2 U	2 U
METHANE	NA	NA	NA	14 U	3.3 U	4.6 U	4.2 U
O-XYLENE	210	10000	10000		1 U	1 U	1 U
TETRACHLOROETHENE	0.1	5	5				
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	2 U	2 U	2 U	2 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	12.1	10	20	4.58
TOTAL XYLENES	210	10000	10000	1 U	3 U	3 U	3 U
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	12	10	20	4.58
Low-Level Volatile Organics (ug/L)							
1,1,2-TRICHLOROETHANE	0.2	5	5				
1,1-DICHLOROETHENE	340	7	7				
1,2-DICHLOROETHANE	0.12	5	5				
BENZENE	0.35	5	5				
CHLOROFORM	0.17	80	NA				
VINYL CHLORIDE	0.02	2	2				
Total Metals (ug/L)							
ALUMINUM	36000	NA	NA				
ARSENIC	0.045	10	NA				
BARIUM	2600	2000	2000				
BERYLLIUM	73	4	4				
CADMIUM	18	5	5				
CALCIUM	NA	NA	NA				
CHROMIUM	110	100	100				
COBALT	730	NA	NA				
COPPER	1500	1300	NA				
IRON	11000	NA	NA				
LEAD	NA	15	15				
MAGNESIUM	NA	NA	NA				
MANGANESE	880	NA	NA				
MERCURY	11	2	2				
NICKEL	730	NA	100				
POTASSIUM	NA	NA	NA				
SELENIUM	180	50	50				

TABLE 4-17
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	09 MW16-68S MW16-68S-NWG-120904 NORMAL 12/9/2004	09 MW16-69S MW16-69S-NWG-111704 NORMAL 11/17/2004	09 MW16-70S MW16-70S-NWG-111704 NORMAL 11/17/2004	09 MW16-71S MW16-71S-NWG-111704 NORMAL 11/17/2004
SILVER	180	NA	NA				
SODIUM	NA	NA	NA				
THALLIUM	2.4	2	2				
VANADIUM	36	NA	NA				
ZINC	11000	NA	NA				
Dissolved Metals (ug/L)							
ALUMINUM	36000	NA	NA				
ARSENIC	0.045	10	NA				
BARIUM	2600	2000	2000				
CADMIUM	18	5	5				
CALCIUM	NA	NA	NA				
CHROMIUM	110	100	100				
COBALT	730	NA	NA				
COPPER	1500	1300	NA				
IRON	11000	NA	NA	32.2 UJ	32.2 U	32.2 UJ	32.2 UJ
LEAD	NA	15	15				
MAGNESIUM	NA	NA	NA				
MANGANESE	880	NA	NA	27	23.4	32.6	6.6
MERCURY	11	2	2				
NICKEL	730	NA	100				
POTASSIUM	NA	NA	NA				
SELENIUM	180	50	50				
SILVER	180	NA	NA				
SODIUM	NA	NA	NA				
THALLIUM	2.4	2	2				
VANADIUM	36	NA	NA				
ZINC	11000	NA	NA				
Miscellaneous Parameters (ug/L)							
ALKALINITY	NA	NA	NA	5.2	2.8	2.5	13.5
AMMONIA	NA	NA	NA	0.12	0.1 U	0.21	0.23
CHLORIDE	NA	NA	NA	300	93.6	307	128
DISSOLVED INORGANIC CARBON	NA	NA	NA	5	3	3	3
DISSOLVED ORGANIC CARBON	NA	NA	NA	1	1	2	2
NITRATE	10000	10000	NA	4.7	11	38.9	7.09
NITRITE	1000	1000	NA	0.01 U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA				
SULFATE	NA	NA	NA	42	4.55	13	11.5

Investigation Description:
08 - CTO 97 Supplemental Phase II Investigation
09 - CTO 107 HRC Injection Study

Qualifiers:
J - Estimated value.
U - Nondetected result.
UJ - Nondetected result is estimated.
UR - Nondetected result is rejected.

Sample Code Description:
NORMAL - One sample was collected at this location.
ORIG - First of two samples collected at this location.
DUP - Second of two samples collected at this location.
AVG - Average of the two samples collected at this location.

Acronyms:
GA = Drinking water suitability
GW = Groundwater
MCL = Maximum Contaminant Level
NA = Not Applicable/Not Available
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
TPH = Total Petroleum Hydrocarbon
VOC = Volatile Organic Compound

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

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SUMMARY OF DESCRIPTIVE STATISTICS
PRE-2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
Volatile Organics (ug/L)											
2-BUTANONE	2/16	1	6	3 - 5	2.5	3.5	MW16-07S-NWG-032301 and Dup	NA	7000 N	NA	NA
4-METHYL-2-PENTANONE	1/27	2	2	2 - 5	2.15	2	MW16-07S-NWG-032301	NA	2000 N	NA	NA
ACETONE	2/16	1	2.94 J	1 - 7	2.4	1.97	MW16-40S-NWG-121102-D	NA	5500 N	NA	NA
BENZENE	7/18	0.2	3	1 - 2	0.706	0.814	28-GW08-NGW-101698-8 and Dup	NA	0.35 C	5	5
BTEX	16/41	0.06	11.2	---	0.556	1.43	MW16-46S-NWG-120902	NA	NA	NA	NA
CARBON DISULFIDE	6/41	0.21 J	0.38 J	1 - 4	0.551	0.267	MW16-42S-NWG-120202	NA	1000 N	NA	NA
CHLORODIBROMOMETHANE	2/41	0.19 J	0.22 J	1 - 2	0.498	0.205	MW16-01S-NWG-121002	NA	0.13 C	80	NA
CHLOROMETHANE	1/41	0.23 J	0.23 J	1 - 2	0.615	0.23	MW16-47S-NWG-120202	NA	160 N	NA	NA
CIS-1,2-DICHLOROETHENE	7/30	0.5 J	98	1 - 2	4.82	18.5	MW16-40S-NWG-121102	NA	61 N	70	70
ETHANE	1/23	3.9 J	3.9 J	2 - 20	1.91	3.9	MW16-41S-NWG-121702	NA	NA	NA	NA
ETHYLBENZENE	3/41	0.12 J	1.73	1 - 2	0.561	0.833	MW16-46S-NWG-120902	NA	1300 N	700	700
M+P-XYLENES	4/30	0.11 J	0.36 J	1 - 2	0.776	0.195	MW16-53S-NWG-120602	NA	210 N[7]	10000 [7]	10000 [7]
METHANE	14/23	5.6 J	720	1	199	326	MW16-45S-NWG-120302	NA	NA	NA	NA
O-XYLENE	5/30	0.14 J	0.52 J	1	0.468	0.306	MW16-07S-NWG-120302	NA	210 N[7]	10000 [7]	10000 [7]
TETRACHLOROETHENE	4/41	0.34 J	1.42	1 - 2	0.561	0.746	MW16-33S-NWG-120202-D	NA	0.1 C	5	5
TOLUENE	5/41	0.1	0.5	1 - 2	0.5	0.198	MW16-07S-NWG-032301-D	NA	720 N	1000	1000
TOTAL 1,2-DICHLOROETHENE	10/41	0.4	103	1 - 5	4.92	17.8	MW16-40S-NWG-121102	NA	61 N[8]	NA	70
TOTAL CHLORINATED VOCS	28/41	0.23	841	---	28.8	42.2	MW16-37S-NWG-120402	NA	NA	NA	NA
TOTAL XYLENES	5/41	0.31	0.63	1 - 6	0.63	0.462	MW16-07S-NWG-120302	NA	210 N	10000	10000
TRANS-1,2-DICHLOROETHENE	7/30	0.27 J	5.48	1 - 2	0.835	1.44	MW16-40S-NWG-121102	NA	120 N	100	100
TRICHLOROETHENE	17/41	0.18 J	840	1 - 2.94	21.6	51.3	MW16-37S-NWG-120402	NA	0.028 C	5	5
VINYL CHLORIDE	6/18	0.9	10	1 - 3	2.19	4.65	28-GW04-NGW-100898-7	NA	0.02 C[9]	2	2
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	2/23	0.5	0.6	0.1 - 2	0.135	0.55	MW16-37S-NWG-120402	NA	0.2 C	5	5
1,1-DICHLOROETHANE	1/23	0.1	0.1	0.1 - 2	0.0935	0.1	MW16-34S-NWG-112602	NA	810 N	NA	NA
1,1-DICHLOROETHENE	3/23	0.09 J	0.3 J	0.1 - 2	0.104	0.147	MW16-44S-NWG-121202	NA	340 C	7	7
1,4-DICHLOROBENZENE	1/23	0.05 J	0.05 J	0.1 - 2	0.0913	0.05	MW16-46S-NWG-120902	NA	0.5 C	75	75
BENZENE	7/23	0.06 J	9	0.1 - 2	0.566	1.61	MW16-46S-NWG-120902	NA	0.35 C	5	5
CHLOROFORM	1/23	0.05 J	0.05 J	0.1 - 2	0.0913	0.05	MW16-34S-NWG-112602	NA	0.17 C	80	NA
VINYL CHLORIDE	8/23	0.1	44	0.1	4.35	12.4	MW16-44S-NWG-121202 and Dup	NA	0.02 C[9]	2	2
Semivolatile Organics (ug/L)											
2-METHYLNAPHTHALENE	1/23	31	31	1 - 10	4.22	31	28-GW07-NGW-101498-6	NA	6.2 N[10]	NA	NA
ACENAPHTHENE	2/18	3	230	1 - 10	15.9	117	28-GW07-NGW-101498-6	NA	370 N	NA	NA
ANTHRACENE	1/18	5	5	1 - 10	3.25	5	28-GW07-NGW-101498-6	NA	1800 N	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	5/24	1 J	53 J	2 - 10	5.67	17.1	28-GW1A-NGW-071797-D	NA	4.8 C	6	6
CARBAZOLE	1/23	49	49	1 - 10	5	49	28-GW07-NGW-101498-6	NA	3.4 C	NA	NA
DIBENZOFURAN	2/23	1	130	1 - 10	8.54	65.5	28-GW07-NGW-101498-6	NA	12 N	NA	NA
FLUORANTHENE	1/18	14	14	1 - 10	3.75	14	28-GW07-NGW-101498-6	NA	1500 N	NA	NA
FLUORENE	2/18	1	150	1 - 10	11.3	75.5	28-GW07-NGW-101498-6	NA	240 N	NA	NA
NAPHTHALENE	2/18	11	41	2 - 10	6	26	28-GW07-NGW-101498-6	NA	6.2 N	NA	20
PHENANTHRENE	1/18	160	160	1 - 10	11.9	160	28-GW07-NGW-101498-6	NA	180 N[11]	NA	NA
PYRENE	1/18	7	7	1 - 10	3.36	7	28-GW07-NGW-101498-6	NA	180 N	NA	NA
TOTAL PAHS	2/18	15	638	---	36.3	327	28-GW07-NGW-101498-6	NA	NA	NA	NA
Polyaromatric Hydrocarbons (ug/L)											
ACENAPHTHENE	1/13	0.1	0.1	0.2 - 2	0.235	0.1	MW16-04S-NWG-032101	NA	370 N	NA	NA
FLUORANTHENE	2/13	0.1	1 J	0.1 - 1	0.158	0.425	MW16-07S-NWG-032301-D	NA	1500 N	NA	NA
FLUORENE	1/13	0.1	0.1	0.1 - 2	0.142	0.1	MW16-04S-NWG-032101	NA	240 N	NA	NA
NAPHTHALENE	2/13	0.1	0.25 J	0.2 - 2	0.235	0.175	MW16-45S-NWG-120302	NA	6.2 N	NA	20
PHENANTHRENE	2/13	0.04 J	0.1	0.05 - 2	0.132	0.07	MW16-04S-NWG-032101	NA	180 N[11]	NA	NA
TOTAL PAHS	4/13	0.04	1	---	0.118	0.385	MW16-07S-NWG-032301-D	NA	NA	NA	NA
Pesticides (ug/L)											
4,4'-DDD	1/21	0.0049 J	0.0049 J	0.002 - 0.1	0.0187	0.0049	28-GW02-NGW-101498-8	NA	0.28 C	NA	NA
4,4'-DDT	1/21	0.0063	0.0063	0.003 - 0.1	0.0189	0.0063	28-GW02-NGW-101498-8	NA	0.2 C	NA	NA
GAMMA-BHC (LINDANE)	2/21	0.0019 J	0.0049	0.001 - 0.05	0.00948	0.00305	28-GW04-NGW-100898-7	NA	0.052 C	0.2	NA
HEPTACHLOR EPOXIDE	2/21	0.0025 J	0.06 J	0.001 - 0.05	0.0123	0.0313	28-GW07-NGW-101498-6	NA	0.0074 C	0.2	NA
Total Metals (ug/L)											
ALUMINUM	3/13	80 J	850 J	122 - 338	202	556	MW16-48S-NWG-121102	5315	36000 N	NA	NA
ARSENIC	3/13	3.5	23.4	1.3 - 7.2	3.46	10.7	MW16-45S-NWG-120302	6.4	0.045 C	10	NA
BARIUM	12/13	6.4 J	938	200	112	113	MW16-07S-NWG-032301	80.5	2600 N	2000	2000
CADMIUM	3/13	0.07 J	0.25	0.07 - 0.24	0.114	0.157	MW16-40S-NWG-121102	3	18 N	5	5
CALCIUM	13/13	1800	152000 J	---	38256	38256	MW16-07S-NWG-032301	13302	NA	NA	NA
CHROMIUM	3/13	0.63 J	0.85 J	0.57 - 50	4.1	0.703	MW16-06S-NWG-032201	214	110 N[12]	100 [12]	100
COBALT	4/7	1 J	3.6	0.92	1.24	1.83	MW16-05S-NWG-032101	24.9	730 N	NA	NA
IRON	10/13	69 J	37000 J	24.4 - 100	13003	16895	MW16-48S-NWG-121102	25500	11000 N	NA	NA
LEAD	5/13	0.11 J	3.7	0.12 - 1.48	0.832	1.27	MW16-07S-NWG-032301-D	4.8	NA	15 [13]	15

TABLE 4-18
SUMMARY OF DESCRIPTIVE STATISTICS
PRE-2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
MAGNESIUM	13/13	630	14200	---	4782	4782	MW16-07S-NWG-032301	5126	NA	NA	NA
MANGANESE	13/13	1.5	4100	---	952	952	MW16-41S-NWG-121702	3292	880 N	NA	NA
MERCURY	1/13	0.27 J	0.27 J	0.03 - 0.2	0.0723	0.27	MW16-45S-NWG-120302	ND	11 N	2	2
NICKEL	7/13	1.1 J	56 J	1.5 - 200	19.8	13.7	MW16-40S-NWG-121102	154	730 N	NA	100
POTASSIUM	13/13	830	6990	---	3630	3630	MW16-04S-NWG-032101	3843	NA	NA	NA
SELENIUM	1/13	0.79 J	0.79 J	1 - 6.3	1.89	0.79	MW16-48S-NWG-121102	2.2	180 N	50	50
SODIUM	13/13	4000	99800	---	26706	26706	MW16-01S-NWG-032901	12346	NA	NA	NA
THALLIUM	1/13	0.18	0.18	0.07 - 4.74	1.45	0.18	MW16-34S-NWG-112602	4.1	2.4 N	2	2
ZINC	7/13	5	590	0.47 - 31	54.1	95.5	MW16-37S-NWG-120402	89.9	11000 N	NA	NA
Dissolved Metals (ug/L)											
ALUMINUM	3/14	62 J	300 J	14 - 200	78.3	157	MW16-45S-NWG-120302	NA	36000 N	NA	NA
ANTIMONY	2/14	0.28 J	4.2 J	0.25 - 2.5	1.29	2.24	28-GW06-NGW-100698-7	NA	15 N	6	6
ARSENIC	5/16	2.2 J	24.5	1.3 - 3.1	4.21	11.4	28-GW04-NGW-100898-7	NA	0.045 C	10	NA
BARIUM	10/16	15	447	7.4 - 200	97.9	126	28-GW06-NGW-100698-7	NA	2600 N	2000	2000
CADMIUM	2/16	0.16	0.19	0.14 - 1.3	0.223	0.178	MW16-40S-NWG-121102	NA	18 N	5	5
CALCIUM	10/14	1400	72200	21.3 - 45800	30104	37295	28-GW08-NGW-101698-8	NA	NA	NA	NA
IRON	17/31	170	42000 J	100 - 30900	11599	19264	MW16-05S-NWG-120602	NA	11000 N	NA	NA
MAGNESIUM	12/14	570	8400	32.9 - 2210	4052	4634	MW16-45S-NWG-120302	NA	NA	NA	NA
MANGANESE	25/31	3.8	3900	1 - 539	667	800	MW16-41S-NWG-121702	NA	880 N	NA	NA
NICKEL	2/14	27	44 J	9.6 - 40	13.3	34	MW16-40S-NWG-121102	NA	730 N	NA	100
POTASSIUM	9/14	700	6600	3010 - 8190	3130	3477	MW16-45S-NWG-120302	NA	NA	NA	NA
SODIUM	9/14	4100	37000 J	9340 - 33300	14431	16494	MW16-41S-NWG-121702	NA	NA	NA	NA
ZINC	4/14	7.8 J	83	6.8 - 22	19	51.9	MW16-37S-NWG-120402	NA	11000 N	NA	NA
Miscellaneous Parameters (ug/L)											
ALKALINITY	23/23	2	328	2	114	114	MW16-47S-NWG-120202	NA	NA	NA	NA
AMMONIA	16/23	0.11	5.92	0.1	0.89	1.26	MW16-41S-NWG-121702	NA	NA	NA	NA
CHLORIDE	23/23	2.97	372	---	36.3	36.3	MW16-01S-NWG-121002	NA	NA	NA	NA
DISSOLVED ORGANIC CARBON	13/19	5	150	5	53.5	77	MW16-47S-NWG-120202	NA	NA	NA	NA
NITRATE	19/21	0.17	29.8	0.1	4.02	4.43	MW16-47S-NWG-120202	NA	10000 N	10000	NA
SALINITY (g/kg)	7/29	0.0004 J	1.22	0.1 - 1	0.438	0.309	MW16-04S-NWG-121002	NA	NA	NA	NA
SULFATE	23/23	0.45	69.8	---	16.1	16.1	MW16-47S-NWG-120202	NA	NA	NA	NA
SULFIDE	7/23	0.06 J	0.34	0.05	0.0542	0.121	MW16-43S-NWG-120302	NA	NA	NA	NA
TOTAL INORGANIC CARBON	7/23	1 J	16	5	4	7.43	MW16-07S-NWG-120302	NA	NA	NA	NA
TOTAL ORGANIC CARBON	3/4	30	87	5	40.1	52.7	MW16-44S-NWG-121202	NA	NA	NA	NA
Field Parameters (ug/L)											
CARBON DIOXIDE	23/23	5.64	360	---	106	106	MW16-05S-NWG-120602	NA	NA	NA	NA
DISSOLVED OXYGEN	23/23	0.02	12.67	---	4.48	4.48	MW16-17S-NWG-120502	NA	NA	NA	NA
FERRIC IRON	18/18	0.01	186	---	22.2	22.2	MW16-46S-NWG-120902	NA	NA	NA	NA
OXIDATION REDUCTION POTENTIAL (MV)	23/23	-126.3	304.7	---	80.9	80.9	MW16-34S-NWG-112602	NA	NA	NA	NA
PH (S.U.)	23/23	5.13	7.15	---	6.24	6.24	MW16-02S-NWG-120502	NA	NA	NA	NA
TEMPERATURE (C)	23/23	5.76	15.44	---	11.3	11.3	MW16-11S-NWG-112102	NA	NA	NA	NA

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - Background values from Table 7-4 from Stone & Websters Final Background Inorganics Groundwater Study Report, December 1996.
The groundwater background values are based on the more conservative value of the 95% UCL and the maximum detected concentration.
4 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. (Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0).
5 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Winter 2004).
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
7 - Value is for total xylenes
8 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
9 - PRG is based on CSF for lifetime exposures by a child/adult.
10 - The value for napthalene is used as a surrogate for 2-methylnaphthalene.
11 - The value for pyrene is used as a surrogate for phenanthrene.
12 - The value for hexavalent chromium is presented.
13 - The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

TA[illegible]-18
SUMMARY OF DESCRIPTIVE STATISTICS
PRE-2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]

Qualifiers:
C - Carcinogen.
N - Noncarcinogen.
J - Estimated value.

Acronyms:
BKG = Background
GA = Drinking water suitability
GW = Groundwater
HI = Hazard Index
MCL = Maximum Contaminant Level
NA = Criteria Not Available
PAH = Polyaromatic Hydrocarbon
PRG = Preliminary Remediation goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SDWA = Safe Drinking Water Act
U.S. EPA = United States Environmental Protection Agency

TABLE 4-19
SUMMARY OF DESCRIPTIVE STATISTICS
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
Volatile Organics (ug/L)											
ACETONE	1/27	3.46 J	3.46 J	5 - 19	3.28	3.46	MW16-48S-NWG-100404	NA	5500 N	NA	NA
BROMODICHLOROMETHANE	1/37	0.166 J	0.166 J	1	0.491	0.166	MW16-66S-NWG-111604	NA	0.18 C	80	NA
BTEX	10/37	0.0106	2.24	---	0.221	0.817	MW16-46S-NWG-092804	NA	NA	NA	NA
CARBON DISULFIDE	7/37	0.146 J	0.262 J	1	0.438	0.174	MW16-71S-NWG-111704	NA	1000 N	NA	NA
CHLORODIBROMOMETHANE	2/37	0.152 J	0.269 J	1	0.484	0.211	MW16-66S-NWG-111604	NA	**0.13 C**	80	NA
CHLOROMETHANE	1/37	0.101 J	0.101 J	1	0.489	0.101	MW16-68S-NWG-120904	NA	160 N	NA	NA
CIS-1,2-DICHLOROETHENE	11/37	0.166 J	91	1	3.75	11.4	MW16-40S-NWG-100804	NA	**61 N**	**70**	**70**
ETHANE	3/37	2.6 J	11	6.2	3.47	7.63	MW16-41S-NWG-093004	NA	NA	NA	NA
ETHENE	1/37	5.3 J	5.3 J	5.8	2.96	5.3	MW16-04S-NWG-100404	NA	NA	NA	NA
ETHYLBENZENE	3/37	0.0936 J	0.288 J	1	0.477	0.217	MW16-07S-NWG-100604	NA	1300 N	700	700
M+P-XYLENES	3/36	0.275 J	0.747 J	2	0.955	0.464	MW16-53S-NWG-100704	NA	210 N[7]	10000 [7]	10000
METHANE	19/37	1 J	12000	3.3 - 14	872	1696	MW16-04S-NWG-100404	NA	NA	NA	NA
O-XYLENE	3/36	0.332 J	0.929 J	1	0.509	0.613	MW16-07S-NWG-100604	NA	210 N[7]	10000 [7]	10000
TETRACHLOROETHENE	1/31	0.317 J	0.327 J	1	0.494	0.322	MW16-33S-NWG-100404-D	NA	**0.1 C**	5	5
TOLUENE	2/37	0.143 J	0.228 J	1	0.483	0.185	MW16-41S-NWG-093004	NA	720 N	1000	1000
TOTAL 1,2-DICHLOROETHENE	11/37	0.166 J	96.2	1 - 2	4.1	12.3	MW16-40S-NWG-100804	NA	**61 N[8]**	NA	**70**
TOTAL CHLORINATED VOCS	32/37	0.0121	175	---	13.4	15.4	MW16-40S-NWG-100804	NA	NA	NA	NA
TOTAL XYLENES	3/37	0.823 J	1.28 J	1 - 3	0.682	1.08	MW16-07S-NWG-100604	NA	210 N	10000	10000
TRANS-1,2-DICHLOROETHENE	7/37	0.213 J	5.18	1	0.67	1.4	MW16-40S-NWG-100804	NA	120 N	100	100
TRICHLOROETHENE	24/37	0.135 J	93	0.901 - 1	6.72	10.1	MW16-37S-NWG-100504	NA	**0.028 C**	**5**	**5**
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	1/31	0.0121 J	0.0121 J	0.1	0.0488	0.0121	MW16-05S-NWG-110104	NA	0.2 C	5	5
1,1-DICHLOROETHENE	10/31	0.0202 J	6.98	0.1	0.432	1.23	MW16-40S-NWG-100804	NA	340 C	7	7
1,2-DICHLOROETHANE	1/31	0.0157 J	0.0188 J	0.1	0.0489	0.0173	MW16-45S-NWG-092804	NA	0.12 C	5	5
BENZENE	9/31	0.0106 J	1.98	0.1	0.162	0.436	MW16-46S-NWG-092804	NA	**0.35 C**	5	5
CHLOROFORM	1/31	0.116	0.116	0.1	0.0521	0.116	MW16-23S-NWG-102804	NA	0.17 C	80	NA
VINYL CHLORIDE	9/31	0.0266 J	58	0.1	3.37	11.5	MW16-40S-NWG-100804	NA	**0.02 C[9]**	**2**	**2**
Total Metals (ug/L)											
ALUMINUM	30/31	5.9 J	433	4.8	73.6	76	MW16-48S-NWG-100404	5315	36000 N	NA	NA
ARSENIC	13/31	0.49 J	19.8	0.42	2.62	5.97	MW16-45S-NWG-092804	6.4	**0.045 C**	**10**	NA
BARIUM	31/31	2.5	247	---	41.3	41.3	MW16-04S-NWG-100404	80.5	2600 N	2000	2000
BERYLLIUM	1/30	0.14 J	0.14 J	0.11	0.0578	0.14	MW16-11S-NWG-100604	1.3	73 N	4	4
CADMIUM	8/31	0.06 J	0.66	0.06 - 0.13	0.074	0.177	MW16-11S-NWG-100604	3	18 N	5	5
CALCIUM	31/31	1140	119000	---	27025	27025	MW16-47S-NWG-092704	13302	NA	NA	NA
CHROMIUM	4/31	0.45 J	1.2	0.34 - 1.8	0.498	0.853	MW16-11S-NWG-100604	214	110 N[10]	100 [10]	100
COBALT	22/31	0.06 J	19.5	0.05 - 0.07	1.81	2.53	MW16-40S-NWG-100804-D	24.9	730 N	NA	NA
COPPER	17/31	0.51 J	7.4	0.4 - 2.9	1.11	1.69	MW16-06S-NWG-100604	25.8	1500 N	1300 [11]	NA
IRON	24/31	51.7 J	50600	50	9592	12382	MW16-41S-NWG-093004	25500	**11000 N**	NA	NA
LEAD	25/31	0.05 J	2.8	0.05	0.282	0.344	MW16-06S-NWG-100604	4.8	NA	15 [11]	15
MAGNESIUM	31/31	332	9530	---	3438	3438	MW16-46S-NWG-092804	5126	NA	NA	NA
MANGANESE	31/31	0.94	2360	---	403	403	MW16-42S-NWG-093004-D	3292	**880 N**	NA	NA
MERCURY	1/31	0.54	0.54	0.021 - 0.13	0.0343	0.54	MW16-04S-NWG-100404	ND	11 N	2	2
NICKEL	28/31	0.61 J	14.2	0.35	1.94	2.12	MW16-40S-NWG-100804-D	154	730 N	NA	100
POTASSIUM	31/31	445	6840 J	---	3109	3109	MW16-46S-NWG-092804, MW16-47S-NWG-092704	3843	NA	NA	NA
SELENIUM	4/31	0.33 J	1.7	0.29 - 0.43	0.223	0.731	MW16-15S-NWG-102804	2.2	180 N	50	50
SILVER	4/31	0.08 J	0.15	0.05	0.0363	0.113	MW16-23S-NWG-102804	1	180 N	NA	NA
SODIUM	31/31	2860	417000	---	52950	52950	MW16-02S-NWG-100604	12346	NA	NA	NA
THALLIUM	3/31	0.07 J	0.12 J	0.07	0.0401	0.0875	MW16-47S-NWG-092704	4.1	2.4 N	2	2
VANADIUM	8/31	0.45 J	1.8	0.4	0.378	0.891	MW16-65S-NWG-102804	24.4	36 N	NA	NA
ZINC	28/31	2	166	2.9 - 7	16.1	17.6	MW16-11S-NWG-100604	89.9	11000 N	NA	NA
Dissolved Metals (ug/L)											
ALUMINUM	30/31	0.91 J	123	0.72	13.3	13.8	MW16-08S-NWG-102804	NA	36000 N	NA	NA
ARSENIC	19/31	0.17 J	27.4 J	0.09 - 0.092	3.2	5.2	MW16-45S-NWG-092804	NA	**0.045 C**	**10**	NA
BARIUM	31/31	2.7 J	259	---	39.4	39.4	MW16-04S-NWG-100404	NA	2600 N	2000	2000
CADMIUM	3/31	0.03 J	0.63	0.02 - 0.18	0.0568	0.3	MW16-11S-NWG-100604	NA	18 N	5	5
CALCIUM	31/31	1110	117000	---	27739	27739	MW16-47S-NWG-092704	NA	NA	NA	NA

TABLE 4-19
SUMMARY OF DESCRIPTIVE STATISTICS
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
CHROMIUM	26/31	0.46	19.3	0.72 - 0.93	3.69	4.31	MW16-47S-NWG-092704	NA	110 N[10]	100 [10]	100
COBALT	27/31	0.02 J	19.6	0.01	1.76	2.02	MW16-40S-NWG-100804-D	NA	730 N	NA	NA
COPPER	20/31	0.16 J	6.9	0.16 - 3.1	0.852	1.16	MW16-06S-NWG-100604	NA	1500 N	1300 [11]	NA
IRON	18/37	65.4 J	48900	32.2 - 50	7367	15119	MW16-41S-NWG-093004-D	NA	11000 N	NA	NA
LEAD	21/31	0.08 J	3	0.078 - 0.09	0.263	0.369	MW16-06S-NWG-100604	NA	NA	15 [11]	15
MAGNESIUM	31/31	285	9890	---	3493	3493	MW16-46S-NWG-092804	NA	NA	NA	NA
MANGANESE	37/37	0.25	2310	---	339	339	MW16-42S-NWG-093004-D	NA	880 N	NA	NA
MERCURY	1/31	0.027 J	0.027 J	0.021 - 0.064	0.0168	0.027	MW16-05S-NWG-110104	NA	11 N	2	2
NICKEL	30/31	0.25	14.1	0.14 - 0.3	1.93	1.99	MW16-40S-NWG-100804, MW16-40S-NWG-100804-D	NA	730 N	NA	100
POTASSIUM	31/31	464	7330	---	3153	3153	MW16-46S-NWG-092804	NA	NA	NA	NA
SELENIUM	8/31	0.35 J	0.88	0.3	0.234	0.476	MW16-02S-NWG-100604	NA	180 N	50	50
SILVER	2/31	0.04 J	0.11	0.02 - 0.14	0.0173	0.075	MW16-01S-NWG-100704	NA	180 N	NA	NA
SODIUM	30/31	2850	450000	50	49093	50729	MW16-02S-NWG-100604	NA	NA	NA	NA
THALLIUM	1/31	0.09 J	0.09 J	0.07 - 0.074	0.037	0.09	MW16-47S-NWG-092704	NA	2.4 N	2	2
VANADIUM	21/31	0.12 J	5.4	0.08 - 0.43	1	1.44	MW16-47S-NWG-092704	NA	36 N	NA	NA
ZINC	31/31	1.1 J	136	---	14.2	14.2	MW16-11S-NWG-100604	NA	11000 N	NA	NA
Miscellaneous Parameters (mg/L)											
ALKALINITY	36/37	1.1	283	1	67.7	69.6	MW16-47S-NWG-092704	NA	NA	NA	NA
AMMONIA	23/37	0.1	4.05	0.1 - 0.31	0.498	0.766	MW16-41S-NWG-093004	NA	NA	NA	NA
CHLORIDE	37/37	2.6	520	---	93.6	93.6	MW16-02S-NWG-100604	NA	NA	NA	NA
DISSOLVED INORGANIC CARBON	31/37	1	56	1	7.76	9.16	MW16-47S-NWG-092704	NA	NA	NA	NA
DISSOLVED ORGANIC CARBON	37/37	1	45 J	---	5.12	5.12	MW16-44S-NWG-092704	NA	NA	NA	NA
NITRATE	29/37	0.101	38.9	0.1	5.69	7.24	MW16-70S-NWG-111704	NA	10 N	10	NA
NITRITE	1/37	1.5	1.5	0.01 - 0.1	0.088	1.5	MW16-53S-NWG-100704	NA	1 N	1	NA
SALINITY (g/kg)	31/31	0.015	1.26	---	0.254	0.254	MW16-02S-NWG-100604	NA	NA	NA	NA
SULFATE	37/37	1.14	42	---	10.8	10.8	MW16-68S-NWG-120904	NA	NA	NA	NA

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - Background values from Table 7-4 from Stone & Websters Final Background Inorganics Groundwater Study Report, December 1996.
The groundwater background values are based on the more conservative value of the 95% UCL and the maximum detected concentration.
4 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
5 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Winter 2004).
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
7 - Value is for total xylenes
8 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
9 - PRG is based on CSF for lifetime exposures by a child/adult.
10 - The value for hexavalent chromium is presented.
11 - The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers:
C - Carcinogen.
N - Noncarcinogen
J - Estimated Value.

TABLE 4-19
SUMMARY OF DESCRIPTIVE STATISTICS
2004 SHALLOW OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]

Acronyms:
BKG = Background
CSF = Cancer Slope Factor
GA = Drinking water suitability
GW = Groundwater
HI = Hazard Index
MCL = Maximum Contaminant Level
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SDWA = Safe Drinking Water Act
U.S. EPA = United States Environmental Protection Agency

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node Investigation Sample Code	28-GW-01 Round 3 NORMAL	28-GW-02 Round 3 NORMAL	28-GW-03 Round 3 NORMAL	28-GW-04 Round 3 NORMAL	28-GW-05 Round 3 NORMAL	28-GW-06 Round 3 NORMAL	28-GW-07 Round 3 NORMAL	28-GW-08 Round 3 AVG	28-GW-01A Round 2 AVG	EBS81-01 Round 3 NORMAL	EBS81-02 Round 3 NORMAL
Parameters (ug/L)					Shallow Overburden						
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2 U
TRICHLOROETHENE	1 U	0.8	4	1	1 U	1 U	1 U	1 U	2 U	2 U	2 U
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2 U
1,1-DICHLOROETHANE, LV											
1,1-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	3 U	3 U
1,1-DICHLOROETHENE, LV											
CIS-1,2-DICHLOROETHENE											
TRANS-1,2-DICHLOROETHENE											
TOTAL 1,2-DICHLOROETHENE	1 U	1 U	7 J	31 J	1 U	0.4	1 U	1 U	2 U	5 U	5 U
1,2-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2 U
1,2-DICHLOROETHANE, LV											
VINYL CHLORIDE	1 U	1 U	2 J	10	3	8	1 U	4	2 U	3 U	3 U
VINYL CHLORIDE, LV											
CHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2 U
ETHANE											
ETHENE											
METHANE											

Well Node Investigation Sample Code	28-GW-01 Round 3 NORMAL	28-GW-02 Round 3 NORMAL	28-GW-03 Round 3 NORMAL	28-GW-04 Round 3 NORMAL	28-GW-05 Round 3 NORMAL	28-GW-06 Round 3 NORMAL	28-GW-07 Round 3 NORMAL	28-GW-08 Round 3 NORMAL	28-GW-01A Round 2 NS	EBS81-01 Round 3 NS	EBS81-02 Round 3 NS
					Intermediate Overburden						
TETRACHLOROETHENE	1 U	1 U		1 U	1 U	1 U	1 U	1 U			
TRICHLOROETHENE	1 U	0.8 U		570 J	210 J	2	1 U	49 J			
1,1-DICHLOROETHANE	1 U	1 U		1 U	1 U	1 U	1 U	1 U			
1,1-DICHLOROETHANE, LV											
1,1-DICHLOROETHENE	1 U	1 U		0.4	1	1 U	1 U	1 U			
1,1-DICHLOROETHENE, LV											
CIS-1,2-DICHLOROETHENE											
TRANS-1,2-DICHLOROETHENE											
TOTAL 1,2-DICHLOROETHENE	1 U	1 U		13 J	4	1 U	1 U	2			
1,2-DICHLOROETHANE	1 U	1 U		1 U	1 U	1 U	1 U	1 U			
1,2-DICHLOROETHANE, LV											
VINYL CHLORIDE	1 U	1 U		1 U	1 U	1 U	1 U	3			
VINYL CHLORIDE, LV											
CHLOROETHANE	1 U	1 U		1 U	1 U	1 U	1 U	1 U			
ETHANE											
ETHENE											
METHANE											

Well Node Investigation Sample Code	28-GW-01 Round 3 NS	28-GW-02 Round 3 NS	28-GW-03 Round 3 NORMAL	28-GW-04 Round 3 NS	28-GW-05 Round 3 NS	28-GW-06 Round 3 NS	28-GW-07 Round 3 NS	28-GW-08 Round 3 NS	28-GW-01A Round 2 NS	EBS81-01 Round 3 NS	EBS81-02 Round 3 NS
					Deep Overburden						
TETRACHLOROETHENE			1 UJ								
TRICHLOROETHENE			160 J								
1,1-DICHLOROETHANE			1 UJ								
1,1-DICHLOROETHANE, LV											
1,1-DICHLOROETHENE			0.3 J								
1,1-DICHLOROETHENE, LV											
CIS-1,2-DICHLOROETHENE											
TRANS-1,2-DICHLOROETHENE											
TOTAL 1,2-DICHLOROETHENE			2 J								
1,2-DICHLOROETHANE			1 UJ								
1,2-DICHLOROETHANE, LV											
VINYL CHLORIDE			1 UJ								
VINYL CHLORIDE, LV											
CHLOROETHANE			1 UJ								
ETHANE											
ETHENE											
METHANE											

Well Node Investigation Sample Code	28-GW-01 Round 3 NS	28-GW-02 Round 3 NS	28-GW-03 Round 3 NS	28-GW-04 Round 3 NS	28-GW-05 Round 3 NS	28-GW-06 Round 3 NS	28-GW-07 Round 3 NS	28-GW-08 Round 3 NS	28-GW-01A Round 2 NS	EBS81-01 Round 3 NS	EBS81-02 Round 3 NS
					Shallow Bedrock						
TETRACHLOROETHENE											
TRICHLOROETHENE											
1,1-DICHLOROETHANE											
1,1-DICHLOROETHANE, LV											
1,1-DICHLOROETHENE											
1,1-DICHLOROETHENE, LV											
CIS-1,2-DICHLOROETHENE											
TRANS-1,2-DICHLOROETHENE											
TOTAL 1,2-DICHLOROETHENE											
1,2-DICHLOROETHANE											
1,2-DICHLOROETHANE, LV											
VINYL CHLORIDE											
VINYL CHLORIDE, LV											
CHLOROETHANE											
ETHANE											
ETHENE											
METHANE											

Well Node Investigation Sample Code	28-GW-01 Round 3 NS	28-GW-02 Round 3 NS	28-GW-03 Round 3 NS	28-GW-04 Round 3 NS	28-GW-05 Round 3 NS	28-GW-06 Round 3 NS	28-GW-07 Round 3 NS	28-GW-08 Round 3 NS	28-GW-01A Round 2 NS	EBS81-01 Round 3 NS	EBS81-02 Round 3 NS
					Deep Bedrock						
TETRACHLOROETHENE											
TRICHLOROETHENE											
1,1-DICHLOROETHANE											
1,1-DICHLOROETHANE, LV											
1,1-DICHLOROETHENE											
1,1-DICHLOROETHENE, LV											
CIS-1,2-DICHLOROETHENE											
TRANS-1,2-DICHLOROETHENE											
TOTAL 1,2-DICHLOROETHENE											
1,2-DICHLOROETHANE											
1,2-DICHLOROETHANE, LV											
VINYL CHLORIDE											
VINYL CHLORIDE, LV											
CHLOROETHANE											
ETHANE											
ETHENE											
METHANE											

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node	MW16-01			MW16-02			MW16-03			MW16-04		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	AVG	NORMAL	NORMAL	NORMAL	NORMAL
Parameters (ug/L)						Shallow Overburden						
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	1	1.65	1.28	1 U	1 U	1.19	1 U	1.62 U	1 U	0.5	1 U	1 U
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE, LV		0.1 U			0.1 U			0.1 U			0.1 U	
1,1-DICHLOROETHENE	1 U			1 U			1 U			1 U		
1,1-DICHLOROETHENE, LV		0.1 U	0.1 UJ		0.1 U	0.029 J		0.1 U	0.0202 J		0.1 U	0.027 J
CIS-1,2-DICHLOROETHENE	2 U	1 U	1 U	2 U	1 U	0.166 J	2 U	1 U	1 U	2 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	2 U	1 U	1 U	2 U	1 U	1 U	2 U	1 U	1 U	2 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	2 U	1 U	1 U	2 U	1 U	0.166 J	2 U	1 U	1 U	2 U	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 U		1 U	1 U		1 U	1 U		1 U	1 U	
1,2-DICHLOROETHANE, LV			0.1 U			0.1 U			0.1 U			0.1 U
VINYL CHLORIDE	2 U			2 U			2 U			0.9		
VINYL CHLORIDE, LV		0.1 U	0.1 U		0.1 U	0.1 U		0.1 U	0.1 U		0.3	0.521
CHLOROETHANE	2 U	1 U	1 U	2 U	1 UJ	1 U	2 U	1 U	1 U	2 U	1 U	1 U
ETHANE		2 U	6.2 U		2 UJ	6.2 U		2 UJ	6.2 U		20 U	6.2 U
ETHENE		3 U	5.8 U		3 UJ	5.8 U		3 UJ	5.8 U		30 U	5.3 J
METHANE		1 U	3.3 U		7.3 J	1.8 J		55.5	140		700	12000

Well Node	MW16-01			MW16-02			MW16-03			MW16-04		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NORMAL	NORMAL	NS	NS	NS	NS	NORMAL	AVG
						Intermediate Overburden						
TETRACHLOROETHENE					1 U	2 U					1 U	1 U
TRICHLOROETHENE					61	63					0.63 J	0.527 J
1,1-DICHLOROETHANE					1 U	2 U					1 U	1 U
1,1-DICHLOROETHANE, LV					0.1 U						0.1 U	
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV					0.1 U	0.641					0.1 U	0.1 U
CIS-1,2-DICHLOROETHENE					0.53 J	0.603 J					1 U	1 U
TRANS-1,2-DICHLOROETHENE					1 U	0.515 J					1 U	1 U
TOTAL 1,2-DICHLOROETHENE					0.53	1.12 J					1 U	1 U
1,2-DICHLOROETHANE					1 U						1 U	
1,2-DICHLOROETHANE, LV						0.1 U						0.1 U
VINYL CHLORIDE												
VINYL CHLORIDE, LV					0.1 U	0.1 U					0.1 U	0.011 J
CHLOROETHANE					1 UJ	2 U					1 U	1 U
ETHANE					2 UJ	6.2 U					2 U	6.2 U
ETHENE					3 UJ	5.8 U					3 U	5.8 U
METHANE					1 UJ	3.3 U					1 U	6.5 J

Well Node	MW16-01			MW16-02			MW16-03			MW16-04		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	AVG	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
						Deep Overburden						
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	0.14 J	50 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	3	3.78	6.04	2100	1500 J	1200	1 U	1 U	0.142 J	560	260	340
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE, LV		0.1 U			0.07 J			0.1 U			0.1 U	
1,1-DICHLOROETHENE	1 U			1			1 U			2 U		
1,1-DICHLOROETHENE, LV		0.1 U	0.1 U		1.5 J	0.598		0.1 U	0.021 J		0.9 J	0.382
CIS-1,2-DICHLOROETHENE	2 U	1 U	1 U	5	6.295	50 U	2 U	1 U	1 U	6	4.21	4.79
TRANS-1,2-DICHLOROETHENE	2 U	1 U	1 U	0.8	0.95 J	50 U	2 U	1 U	1 U	2 U	0.22 J	0.26 J
TOTAL 1,2-DICHLOROETHENE	2 U	1 U	1 U	5.8	7.25	50 U	2 U	1 U	1 U	6	4.43	5.05
1,2-DICHLOROETHANE	1 U	1 U		1 U	1 U		1 U	1 U		1 U	1 U	
1,2-DICHLOROETHANE, LV			0.1 U			0.023 U			0.1 U			0.1 U
VINYL CHLORIDE	2 U			2 U			2 U			2 U		
VINYL CHLORIDE, LV		0.1 U	0.1 U		0.085 J	0.04 J		0.1 U	0.1 U		0.09 J	0.134
CHLOROETHANE	2 U	1 U	1 U	2 U	1 UJ	50 U	2 U	1 U	1 U	2 U	1 U	1 U
ETHANE		2 U	6.2 U		2 UJ	6.2 U		2 UJ	6.2 U		2 U	6.2 U
ETHENE		3 U	5.8 U		3 UJ	5.8 U		3 UJ	5.8 U		3 U	5.8 U
METHANE		1 U	3.3 U		1 UJ	3.3 U		1 U	3.3 U		1 U	2.7 J

Well Node	MW16-01			MW16-02			MW16-03			MW16-04		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NORMAL	NORMAL	NORMAL	AVG	NS	NS	NORMAL	NS	NS	NS
						Shallow Bedrock						
TETRACHLOROETHENE			1 U	1 U	1 U	37.5 U			1 U			
TRICHLOROETHENE			4.92	3100	840	1150			31			
1,1-DICHLOROETHANE			1 U	1 U	0.12 J	37.5 U			1 U			
1,1-DICHLOROETHANE, LV					0.2							
1,1-DICHLOROETHENE				2								
1,1-DICHLOROETHENE, LV			0.1 U		5	1.46			0.0433 J			
CIS-1,2-DICHLOROETHENE			1 U	7	19	19.5 J			3.32 U			
TRANS-1,2-DICHLOROETHENE			1 U	0.9	0.95 J	37.5 U			1 U			
TOTAL 1,2-DICHLOROETHENE			1 U	7.9	20	19.5 J			1 U			
1,2-DICHLOROETHANE				1 U	1 U							
1,2-DICHLOROETHANE, LV			0.1 U			0.1 U			0.1 U			
VINYL CHLORIDE				2 U								
VINYL CHLORIDE, LV			0.1 U		0.4	0.371			0.0373 J			
CHLOROETHANE			1 U	2 U	1 U	37.5 U			1 U			
ETHANE			6.2 U		2 U	4.75 J			6.2 U			
ETHENE			5.8 U		3 U	2.05 J			5.8 U			
METHANE			3.3 U		1 U	8.4			3.3 U			

Well Node	MW16-01			MW16-02			MW16-03			MW16-04		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NORMAL	AVG	NS	NS	NS	NS	NS	NS
						Deep Bedrock						
TETRACHLOROETHENE					1 U	5.5 U						
TRICHLOROETHENE					120	465						
1,1-DICHLOROETHANE					0.13 J	0.184 J						
1,1-DICHLOROETHANE, LV					0.2							
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV					2	0.589						
CIS-1,2-DICHLOROETHENE					3.24	5.74 J						
TRANS-1,2-DICHLOROETHENE					0.18 J	0.448 J						
TOTAL 1,2-DICHLOROETHENE					3.42	5.96 J						
1,2-DICHLOROETHANE					1 U							
1,2-DICHLOROETHANE, LV						0.1 U						
VINYL CHLORIDE												
VINYL CHLORIDE, LV					0.2	0.345						
CHLOROETHANE					1 U	5.5 U						
ETHANE					2 U	6.2 U						
ETHENE					3 U	5.8 U						
METHANE					1 U	1.05 J						

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node	MW16-05			MW16-06			MW16-07			MW16-08		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	AVG	NORMAL	NORMAL	NS	NS	NORMAL
Parameters (ug/L)						Shallow Overburden						
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U			1 U
TRICHLOROETHENE	1 U	1 UJ	1 U	1	0.73 J	0.25 J	0.8	1 U	0.546 J			4.19
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U			1 U
1,1-DICHLOROETHANE, LV		0.1 U			0.1 U			0.1 U				
1,1-DICHLOROETHENE	1 U			1 U			1 U					
1,1-DICHLOROETHENE, LV		0.1 U	0.1 U		0.1 U	0.1 U		0.1 U	0.1 U			0.1 U
CIS-1,2-DICHLOROETHENE	2 U	1 U	1 U	2 U	1 UJ	1 U	2 U	1 U	1 U			1 U
TRANS-1,2-DICHLOROETHENE	2 U	1 U	1 U	2 U	1 UJ	1 U	2 U	1 U	1 U			1 U
TOTAL 1,2-DICHLOROETHENE	2 U	1 U	1 U	2 U	1 U	1 U	2 U	1 U	1 U			1 U
1,2-DICHLOROETHANE	1 U	1 U		1 U	1 UJ		1 U	1 U				
1,2-DICHLOROETHANE, LV			0.1 U			0.1 U			0.1 U			0.1 U
VINYL CHLORIDE	2 U			2 U			2 U					
VINYL CHLORIDE, LV		0.1 U	0.1 U		0.1 U	0.1 U		0.1 U	0.1 U			0.1 U
CHLOROETHANE	2 U	1 U	1 U	2 U	1 UJ	1 U	2 U	1 U	1 U			1 U
ETHANE		2 U	6.2 U		2 U	6.2 U		2 UJ	6.2 U			6.2 U
ETHENE		3 U	5.8 U		3 U	5.8 U		3 UJ	5.8 U			5.8 U
METHANE		18	65		1 U	1.3 J		5.6 J	200			3.3 U

Well Node	MW16-05			MW16-06			MW16-07			MW16-08		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NORMAL	NORMAL	NS	NS	NS	NS	NS	NS	NS	NS	NS
						Intermediate Overburden						
TETRACHLOROETHENE		1 U	1 U									
TRICHLOROETHENE		750	470									
1,1-DICHLOROETHANE		1 U	1 U									
1,1-DICHLOROETHANE, LV		0.05 J										
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV		0.6	1.52									
CIS-1,2-DICHLOROETHENE		19	23									
TRANS-1,2-DICHLOROETHENE		0.73 J	1.1									
TOTAL 1,2-DICHLOROETHENE		19.7	24.1									
1,2-DICHLOROETHANE		1 U										
1,2-DICHLOROETHANE, LV			0.1 U									
VINYL CHLORIDE												
VINYL CHLORIDE, LV		0.3	0.413									
CHLOROETHANE		1 U	1 U									
ETHANE		2 U	6.2 U									
ETHENE		3 U	5.8 U									
METHANE		270	1600									

Well Node	MW16-05			MW16-06			MW16-07			MW16-08		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	AVG	AVG	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
						Deep Overburden						
TETRACHLOROETHENE	1 U	0.11 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 J	1 U
TRICHLOROETHENE	2250	1450 J	1100	1 U	1.72 J	1.33	1	1 U	2.82	190	140	320
1,1-DICHLOROETHANE	1 U	0.195 J	0.164 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE, LV		0.125 J			0.1 U			0.1 U			0.1 U	
1,1-DICHLOROETHENE	2 U			1 U			1 U			1 U		
1,1-DICHLOROETHENE, LV		1.1 J	0.948		0.1 U	0.1 U		0.1 U	0.1 U		0.2	0.188
CIS-1,2-DICHLOROETHENE	6.5	5.075 J	4.83	2 U	1 U	1 U	2 U	1 U	1 U	2	2.44	3.76
TRANS-1,2-DICHLOROETHENE	0.85	0.445 J	0.527 J	2 U	1 U	1 U	2 U	1 U	1 U	2 U	1 U	0.158 J
TOTAL 1,2-DICHLOROETHENE	7.35	5.52	5.36	2 U	1 U	1 U	2 U	1 U	1 U	2	2.44	3.92
1,2-DICHLOROETHANE	1 U	1 U		1 U	1 U		1 U	1 U		1 UJ	1 U	
1,2-DICHLOROETHANE, LV			0.1 U			0.1 U			0.1 U			0.1 U
VINYL CHLORIDE	2 U			2 U			2 U			2 U		
VINYL CHLORIDE, LV		0.075 J	0.049 J		0.1 U	0.1 U		0.1 U	0.013 J		0.3	0.386
CHLOROETHANE	2 U	1 U	1 U	2 U	1 U	1 U	2 U	1 U	1 U	2 U	1 U	1 U
ETHANE		2 U	6.2 U		2 U	6.2 U		2 U	6.2 U		2 U	6.2 U
ETHENE		3 U	5.8 U		3 U	5.8 U		3 U	5.8 U		3 U	5.8 U
METHANE		2.1 J	23		1 U	3.3 U		5.7	3.3 U		1 U	3.3 U

Well Node	MW16-05			MW16-06			MW16-07			MW16-08		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NORMAL	NORMAL	NS	NORMAL	NORMAL	NS	NS	NS	NS	NS	NS
						Shallow Bedrock						
TETRACHLOROETHENE		1 U	1 U		1 U	1 U						
TRICHLOROETHENE		750 J	860		1.09 J	1 U						
1,1-DICHLOROETHANE		0.1 J	1 U		1 U	1 U						
1,1-DICHLOROETHANE, LV		0.2 J			0.1 U							
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV		2 J	0.549		0.1 U	0.1 U						
CIS-1,2-DICHLOROETHENE		8.2 J	8.08		1 U	1 U						
TRANS-1,2-DICHLOROETHENE		0.29 J	0.376 J		1 U	1 U						
TOTAL 1,2-DICHLOROETHENE		8.49	8.46		1 U	1 U						
1,2-DICHLOROETHANE		1 U			1 U							
1,2-DICHLOROETHANE, LV			0.1 U			0.1 U						
VINYL CHLORIDE												
VINYL CHLORIDE, LV		0.2 J	0.141		0.1 U	0.1 U						
CHLOROETHANE		1 U	1 U		1 U	1 U						
ETHANE		2 U	6.2 U		2 U	6.2 U						
ETHENE		3 U	5.8 U		3 U	5.8 U						
METHANE		1 UJ	5.3 U		1 U	78						

Well Node	MW16-05			MW16-06			MW16-07			MW16-08		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NORMAL	NS	NS	NS	NS	NS	NS	NS	NS	NS
						Deep Bedrock						
TETRACHLOROETHENE			1 U									
TRICHLOROETHENE			9.37									
1,1-DICHLOROETHANE			1 U									
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV			0.093 J									
CIS-1,2-DICHLOROETHENE			0.597 J									
TRANS-1,2-DICHLOROETHENE			1 U									
TOTAL 1,2-DICHLOROETHENE			0.597 J									
1,2-DICHLOROETHANE												
1,2-DICHLOROETHANE, LV			0.1 U									
VINYL CHLORIDE												
VINYL CHLORIDE, LV			0.1 U									
CHLOROETHANE			1 U									
ETHANE			6.2 U									
ETHENE			5.8 U									
METHANE			4.3 U									

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node	MW16-09			MW16-10			MW16-11			MW16-12		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NORMAL	NORMAL	NS	NS	NORMAL
Parameters (ug/L)						Shallow Overburden						
TETRACHLOROETHENE								1 U	1 U			1 U
TRICHLOROETHENE								0.9 J	0.266 J			3.52
1,1-DICHLOROETHANE								1 U	1 U			1 U
1,1-DICHLOROETHANE, LV								0.1 U				
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV								0.1 U	0.1 U			0.1 U
CIS-1,2-DICHLOROETHENE								1 U	1 U			0.972 J
TRANS-1,2-DICHLOROETHENE								1 U	1 U			1 U
TOTAL 1,2-DICHLOROETHENE								1 U	1 U			0.972 J
1,2-DICHLOROETHANE								1 U				
1,2-DICHLOROETHANE, LV									0.1 U			0.1 U
VINYL CHLORIDE												
VINYL CHLORIDE, LV								0.1 U	0.1 U			0.1 U
CHLOROETHANE								1 U	1 U			1 U
ETHANE								2 UJ	6.2 U			6.2 U
ETHENE								3 UJ	5.8 U			5.8 U
METHANE								1 UJ	3.3 U			3.3 U

Well Node	MW16-09			MW16-10			MW16-11			MW16-12		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
						Intermediate Overburden						
TETRACHLOROETHENE												
TRICHLOROETHENE												
1,1-DICHLOROETHANE												
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV												
CIS-1,2-DICHLOROETHENE												
TRANS-1,2-DICHLOROETHENE												
TOTAL 1,2-DICHLOROETHENE												
1,2-DICHLOROETHANE												
1,2-DICHLOROETHANE, LV												
VINYL CHLORIDE												
VINYL CHLORIDE, LV												
CHLOROETHANE												
ETHANE												
ETHENE												
METHANE												

Well Node	MW16-09			MW16-10			MW16-11			MW16-12		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	AVG	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
						Deep Overburden						
TETRACHLOROETHENE	1 U	1 UJ	1 U	0.55	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	1 U	7.66 J	0.216 J	1 U	1 UJ	0.497 J	1 U	4.94	1 U	21	23	32
1,1-DICHLOROETHANE	1 U	1 UJ	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE, LV		0.1 U			0.1			0.1 U			0.1	
1,1-DICHLOROETHENE	1 U			1 U			1 U			1 U		
1,1-DICHLOROETHENE, LV		0.1 U	0.0197 J		0.6	0.1 U		0.1 U	0.1 U		0.08 J	0.021 J
CIS-1,2-DICHLOROETHENE	2 U	1 UJ	1 U	2 U	1 UJ	1 U	2 U	1 U	1 U	2 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	2 U	1 UJ	1 U	2 U	1 UJ	1 U	2 U	1 U	1 U	2 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	2 U	1 U	1 U	2 U	1 U	1 U	2 U	1 U	1 U	2 U	1 U	1 U
1,2-DICHLOROETHANE	0.4	1 UJ		0.3	1 UJ		0.4	1 U		1 U	1 U	
1,2-DICHLOROETHANE, LV			0.1 U			0.1 U			0.1 U			0.1 U
VINYL CHLORIDE	2 U			2 U			2 U			2 U		
VINYL CHLORIDE, LV		0.1 U	0.1 U		0.1 U	0.1 U		0.1 U	0.1 U		0.1 U	0.1 U
CHLOROETHANE	2 U	1 UJ	1 U	2 U	1 UJ	1 U	2 U	1 U	1 U	2 U	1 U	1 U
ETHANE		2 U	6.2 U		2 U	6.2 U		2 UJ	6.2 U		2 U	6.2 U
ETHENE		3 U	5.8 U		3 U	5.8 U		3 UJ	5.8 U		3 U	5.8 U
METHANE		1 U	3.3 U		1 U	3.3 U		1 UJ	3.3 U		1 U	3.3 U

Well Node	MW16-09			MW16-10			MW16-11			MW16-12		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NORMAL	NORMAL	NORMAL	NS	NS	NS	NS	NS	NS
						Shallow Bedrock						
TETRACHLOROETHENE				1 U	1 U	1 U						
TRICHLOROETHENE				1 U	1 U	1 U						
1,1-DICHLOROETHANE				1 U	1 U	1 U						
1,1-DICHLOROETHANE, LV					0.1 U							
1,1-DICHLOROETHENE				1 U								
1,1-DICHLOROETHENE, LV					0.1 U	0.027 J						
CIS-1,2-DICHLOROETHENE				2 U	1 U	1 U						
TRANS-1,2-DICHLOROETHENE				2 U	1 U	1 U						
TOTAL 1,2-DICHLOROETHENE				2 U	1 U	1 U						
1,2-DICHLOROETHANE				1 U	1 U							
1,2-DICHLOROETHANE, LV						0.1 U						
VINYL CHLORIDE				2 U								
VINYL CHLORIDE, LV					0.1 U	0.065 J						
CHLOROETHANE				2 U	1 U	1 U						
ETHANE					2 U	6.2 U						
ETHENE					3 U	5.8 U						
METHANE					40	540						

Well Node	MW16-09			MW16-10			MW16-11			MW16-12		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
						Deep Bedrock						
TETRACHLOROETHENE												
TRICHLOROETHENE												
1,1-DICHLOROETHANE												
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV												
CIS-1,2-DICHLOROETHENE												
TRANS-1,2-DICHLOROETHENE												
TOTAL 1,2-DICHLOROETHENE												
1,2-DICHLOROETHANE												
1,2-DICHLOROETHANE, LV												
VINYL CHLORIDE												
VINYL CHLORIDE, LV												
CHLOROETHANE												
ETHANE												
ETHENE												
METHANE												

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node	MW16-13			MW16-14			MW16-15			MW16-16		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NORMAL	NS	NS	NS
Parameters (ug/L)						Shallow Overburden						
TETRACHLOROETHENE									1 U			
TRICHLOROETHENE									6.15			
1,1-DICHLOROETHANE									1 U			
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV									0.1 U			
CIS-1,2-DICHLOROETHENE									1 U			
TRANS-1,2-DICHLOROETHENE									1 U			
TOTAL 1,2-DICHLOROETHENE									1 U			
1,2-DICHLOROETHANE												
1,2-DICHLOROETHANE, LV									0.1 U			
VINYL CHLORIDE												
VINYL CHLORIDE, LV									0.1 U			
CHLOROETHANE									1 U			
ETHANE									6.2 U			
ETHENE									5.8 U			
METHANE									3.3 U			

Well Node	MW16-13			MW16-14			MW16-15			MW16-16		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NORMAL	NORMAL	NS	NORMAL	NORMAL	NS	NS	NS	NS	NORMAL	NORMAL
						Intermediate Overburden						
TETRACHLOROETHENE		1.64	0.473 J		0.17 J	1 U					1 U	1 U
TRICHLOROETHENE		5.28	9.15		26	10					200 J	49
1,1-DICHLOROETHANE		1 U	1 U		1 U	1 U					1 U	1 U
1,1-DICHLOROETHANE, LV		0.1 U			0.1 U						0.1 U	
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV		0.1 U	0.1 U		0.1 U	0.1 U					0.07 J	0.0235 J
CIS-1,2-DICHLOROETHENE		1 U	1 U		0.34 J	1 U					0.47 J	0.441 J
TRANS-1,2-DICHLOROETHENE		1 U	1 U		1 U	1 U					1 U	1 U
TOTAL 1,2-DICHLOROETHENE		1 U	1 U		0.34	1 U					0.47	0.441 J
1,2-DICHLOROETHANE		1 U			1 U						1 U	
1,2-DICHLOROETHANE, LV			0.1 U			0.1 U						0.1 U
VINYL CHLORIDE												
VINYL CHLORIDE, LV		0.1 U	0.1 U		0.1 U	0.1 U					0.1 U	0.1 U
CHLOROETHANE		1 U	1 U		1 U	1 U					1 U	1 U
ETHANE		2 UJ	6.2 U		2 UJ	6.2 U					2 UJ	6.2 U
ETHENE		3 UJ	5.8 U		3 UJ	5.8 U					3 UJ	5.8 U
METHANE		1 UJ	3.3 U		1 UJ	1.6 J					1 UJ	3.3 U

Well Node	MW16-13			MW16-14			MW16-15			MW16-16		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	AVG	NORMAL	NORMAL	NORMAL	NORMAL	AVG
						Deep Overburden						
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	0.3 J	50 U	0.7	0.67 J	1 U	1 U	1 U	1 U
TRICHLOROETHENE	1 U	0.32 J	0.326 J	4900	3000 J	2000	6300	2700 J	1400	89	51 J	.44
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	50 U	1 U	1 U	1 U	0.6	0.35 J	0.2505 J
1,1-DICHLOROETHANE, LV		0.1 U			0.1 U			0.1 U			0.5	
1,1-DICHLOROETHENE	1 U			1 U			0.85 J			0.7		
1,1-DICHLOROETHENE, LV		0.1 U	0.1 UJ		0.5	0.137		0.1 U	0.442		0.5	0.1 U
CIS-1,2-DICHLOROETHENE	2 U	0.23 J	1 U	5	1.87	50 U	3	2.18	2.19	2 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	2 U	1 U	1 U	2 U	0.27 J	50 U	0.7	0.25 J	0.275 J	2 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	2 U	0.23	1 U	5	2.14	50 U	3.35	2.43	2.47	2 U	1 U	1 U
1,2-DICHLOROETHANE	0.3	1 U		1 U	1 U		1 UJ	1 U		1 U	1 U	
1,2-DICHLOROETHANE, LV			0.1 UJ			0.1 U			0.1 U			0.1 U
VINYL CHLORIDE	2 U			2 U			2 UJ			2 U		
VINYL CHLORIDE, LV		0.1 U	0.1 UJ		0.1 U	0.1 U		0.1 U	0.0193 J		0.1 U	0.1 U
CHLOROETHANE	2 U	1 U	1 U	0.6	1 U	50 U	2 U	1 U	1 U	2 U	1 U	1 U
ETHANE		2 UJ	6.2 U		2 UJ	6.2 U		2 U	6.2 U		2 U	6.2 U
ETHENE		3 UJ	5.8 U		3 UJ	5.8 U		3 U	5.8 U		3 U	5.8 U
METHANE		92 J	210		1 UJ	3.3 U		1 U	3.3 U		1 U	1.1 J

Well Node	MW16-13			MW16-14			MW16-15			MW16-16		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NORMAL	NORMAL	NORMAL	AVG	NS	NS	NS
						Shallow Bedrock						
TETRACHLOROETHENE						1 U	50 U	1 U	1 U			
TRICHLOROETHENE						0.85 J	4600	1300 J	705 J			
1,1-DICHLOROETHANE						1 U	50 U	1 U	1 U			
1,1-DICHLOROETHANE, LV								0.1				
1,1-DICHLOROETHENE							50 U					
1,1-DICHLOROETHENE, LV						0.1 U		1	0.8185 J			
CIS-1,2-DICHLOROETHENE						1 U	110	52 J	54.5			
TRANS-1,2-DICHLOROETHENE						1 U	100 U	0.3 J	0.213 J			
TOTAL 1,2-DICHLOROETHENE						1 U	110	52.3	54.7			
1,2-DICHLOROETHANE							50 U	1 U				
1,2-DICHLOROETHANE, LV						0.1 U			0.0263 J			
VINYL CHLORIDE							100 U					
VINYL CHLORIDE, LV						0.1 U		0.4	0.2705			
CHLOROETHANE						1 U	100 U	1 U	1 U			
ETHANE						6.2 U		9.1	5.05 J			
ETHENE						5.8 U		6.8	3.9 J			
METHANE						3.3 U		1 U	835 J			

Well Node	MW16-13			MW16-14			MW16-15			MW16-16		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NORMAL	NORMAL	NS	NS	NS
						Deep Bedrock						
TETRACHLOROETHENE								1 U	1 U			
TRICHLOROETHENE								160 J	210			
1,1-DICHLOROETHANE								1 U	1 U			
1,1-DICHLOROETHANE, LV								0.06 J				
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV								0.8	1.31			
CIS-1,2-DICHLOROETHENE								21	27			
TRANS-1,2-DICHLOROETHENE								0.35 J	0.306 J			
TOTAL 1,2-DICHLOROETHENE								21.4	27.3			
1,2-DICHLOROETHANE								1 U				
1,2-DICHLOROETHANE, LV									0.1 U			
VINYL CHLORIDE												
VINYL CHLORIDE, LV								0.1 U	0.19			
CHLOROETHANE								1 U	1 U			
ETHANE								2 U	6.2 U			
ETHENE								3 U	5.8 U			
METHANE								1 U	3.3 U			

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node	MW16-17			MW16-18			MW16-19		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NORMAL	NORMAL	NS	NS	NS	NS	NS	NS
Parameters (ug/L)					Shallow Overburden				
TETRACHLOROETHENE		1 U	1 U						
TRICHLOROETHENE		1 U	1 U						
1,1-DICHLOROETHANE		1 U	1 U						
1,1-DICHLOROETHANE, LV		0.1 U							
1,1-DICHLOROETHENE									
1,1-DICHLOROETHENE, LV		0.1 U	0.1 U						
CIS-1,2-DICHLOROETHENE		1 U	1 U						
TRANS-1,2-DICHLOROETHENE		1 U	1 U						
TOTAL 1,2-DICHLOROETHENE		1 U	1 U						
1,2-DICHLOROETHANE		1 U							
1,2-DICHLOROETHANE, LV			0.1 U						
VINYL CHLORIDE									
VINYL CHLORIDE, LV		0.1 U	0.1 U						
CHLOROETHANE		1 UJ	1 U						
ETHANE		2 UJ	6.2 U						
ETHENE		3 UJ	5.8 U						
METHANE		1 UJ	1 J						

Well Node	MW16-17			MW16-18			MW16-19		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	AVG	NORMAL	NS	NORMAL	AVG	NS	NORMAL	NORMAL
					Intermediate Overburden				
TETRACHLOROETHENE		0.835 J	0.766 J		1.08	1.975		1 UJ	1 U
TRICHLOROETHENE		0.43 J	1 U		23	72.5		32 J	15
1,1-DICHLOROETHANE		1 U	1 U		1 U	1 U		1 UJ	1 U
1,1-DICHLOROETHANE, LV		0.1 U			0.1 U			0.1 U	
1,1-DICHLOROETHENE									
1,1-DICHLOROETHENE, LV		0.1 U	0.1 U		0.1 U	0.1 U		0.1 U	0.1 U
CIS-1,2-DICHLOROETHENE		1 U	1 U		1 U	1 U		1 UJ	1 U
TRANS-1,2-DICHLOROETHENE		1 U	1 U		1 U	1 U		1 UJ	1 U
TOTAL 1,2-DICHLOROETHENE		1 U	1 U		1 U	1 U		1 U	1 U
1,2-DICHLOROETHANE		1 U			1 U			1 U	
1,2-DICHLOROETHANE, LV			0.1 U			0.1 U			0.1 U
VINYL CHLORIDE									
VINYL CHLORIDE, LV		0.1 U	0.1 U		0.1 U	0.1 U		0.1 U	0.1 U
CHLOROETHANE		1 U	1 U		1 UJ	1 U		1 UJ	1 U
ETHANE		2 U	6.2 U		2 UJ	6.2 U		2 U	6.2 U
ETHENE		3 U	5.8 U		3 UJ	5.8 U		3 U	5.8 U
METHANE		1 U	1 J		1 UJ	1.1 J		1 U	1 J

Well Node	MW16-17			MW16-18			MW16-19		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
					Deep Overburden				
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	1 U	1 U	1 U	0.7	1 U	0.165 J	390	320	260
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.17 J	1 U
1,1-DICHLOROETHANE, LV		0.1 U			0.2			0.2	
1,1-DICHLOROETHENE	1 U			1 U			1 U		
1,1-DICHLOROETHENE, LV		0.1 U	0.1 U		0.1 U	0.1 U		0.3	0.0274 J
CIS-1,2-DICHLOROETHENE	2 U	1 U	1 U	2 U	1 U	1 U	2 U	0.62 J	0.492 J
TRANS-1,2-DICHLOROETHENE	2 U	1 U	1 U	2 U	1 U	1 U	2 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	2 U	1 U	1 U	2 U	1 U	1 U	2 U	0.62	0.492 J
1,2-DICHLOROETHANE	1 UJ	1 U		1 U	1 U		1 U	1 U	
1,2-DICHLOROETHANE, LV			0.1 U			0.1 U			0.1 U
VINYL CHLORIDE	2 U			2 U			2 U		
VINYL CHLORIDE, LV		0.1 U	0.1 U		0.1 U	0.1 U		0.1 U	0.125
CHLOROETHANE	2 U	1 UJ	1 U	2 U	1 UJ	1 U	2 U	1 U	1 U
ETHANE		2 UJ	6.2 U		2 UJ	6.2 U		2 U	6.2 U
ETHENE		3 UJ	5.8 U		3 UJ	5.8 U		3 U	5.8 U
METHANE		1 UJ	1.1 J		1 UJ	1.1 J		1 U	1.3 J

Well Node	MW16-17			MW16-18			MW16-19		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NORMAL	NORMAL	NS	NS	NS	NS	NS	NS
					Shallow Bedrock				
TETRACHLOROETHENE		1 U	1 U						
TRICHLOROETHENE		0.34 J	1 U						
1,1-DICHLOROETHANE		1 U	1 U						
1,1-DICHLOROETHANE, LV		0.1 U							
1,1-DICHLOROETHENE									
1,1-DICHLOROETHENE, LV		0.1 U	0.1 U						
CIS-1,2-DICHLOROETHENE		1 U	1 U						
TRANS-1,2-DICHLOROETHENE		1 U	1 U						
TOTAL 1,2-DICHLOROETHENE		1 U	1 U						
1,2-DICHLOROETHANE		1 U							
1,2-DICHLOROETHANE, LV			0.1 U						
VINYL CHLORIDE									
VINYL CHLORIDE, LV		0.1 U	0.1 U						
CHLOROETHANE		1 U	1 U						
ETHANE		2 U	6.2 U						
ETHENE		3 U	5.8 U						
METHANE		1 U	44						

Well Node	MW16-17			MW16-18			MW16-19		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NS
					Deep Bedrock				
TETRACHLOROETHENE									
TRICHLOROETHENE									
1,1-DICHLOROETHANE									
1,1-DICHLOROETHANE, LV									
1,1-DICHLOROETHENE									
1,1-DICHLOROETHENE, LV									
CIS-1,2-DICHLOROETHENE									
TRANS-1,2-DICHLOROETHENE									
TOTAL 1,2-DICHLOROETHENE									
1,2-DICHLOROETHANE									
1,2-DICHLOROETHANE, LV									
VINYL CHLORIDE									
VINYL CHLORIDE, LV									
CHLOROETHANE									
ETHANE									
ETHENE									
METHANE									

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node	MW16-20			MW16-21			MW16-22			MW16-23		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NORMAL
Shallow Overburden												
TETRACHLOROETHENE												1 U
TRICHLOROETHENE												31
1,1-DICHLOROETHANE												1 U
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV												0.1 U
CIS-1,2-DICHLOROETHENE												0.61 J
TRANS-1,2-DICHLOROETHENE												1 U
TOTAL 1,2-DICHLOROETHENE												0.61 J
1,2-DICHLOROETHANE												
1,2-DICHLOROETHANE, LV												0.1 U
VINYL CHLORIDE												
VINYL CHLORIDE, LV												0.1 U
CHLOROETHANE												1 U
ETHANE												6.2 U
ETHENE												5.8 U
METHANE												5.3 U

Well Node	MW16-20			MW16-21			MW16-22			MW16-23		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NORMAL	NORMAL	NS	NORMAL	NORMAL	NS	NORMAL	NORMAL	NS	NS	NS
Intermediate Overburden												
TETRACHLOROETHENE		1 U	1 U		1 UJ	1 U		1.28	0.905 J			
TRICHLOROETHENE		12	7.34		14 J	43		190	110			
1,1-DICHLOROETHANE		1 U	1 U		1 UJ	1 U		1 U	1 U			
1,1-DICHLOROETHANE, LV		0.1 U			0.1 U			0.1 U				
1,1-DICHLOROETHENE								1 U				
1,1-DICHLOROETHENE, LV		0.1 U	0.1 U		0.1 U	0.1 U		0.1 U	0.017 J			
CIS-1,2-DICHLOROETHENE		0.28 J	0.158 J		0.18 J	0.304 J			0.681 J			
TRANS-1,2-DICHLOROETHENE		1 U	1 U		1 UJ	1 U			1 U			
TOTAL 1,2-DICHLOROETHENE		0.28	0.158 J		0.18	0.304 J		2 U	0.681 J			
1,2-DICHLOROETHANE		1 U			1 UJ			1 U				
1,2-DICHLOROETHANE, LV			0.1 U			0.1 U			0.1 U			
VINYL CHLORIDE												
VINYL CHLORIDE, LV		0.1 U	0.1 U		0.1 U	0.1 U		0.1 U	0.1 U			
CHLOROETHANE		1 U	1 U		1 UJ	1 U		1 U	1 U			
ETHANE		2 U	6.2 U		2 UJ	6.2 U		2 UJ	6.2 U			
ETHENE		3 U	5.8 U		3 UJ	5.8 U		3 UJ	5.8 U			
METHANE		1 U	3.3 U		1 UJ	2.3 J		1 UJ	1.2 J			

Well Node	MW16-20			MW16-21			MW16-22			MW16-23		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Deep Overburden												
TETRACHLOROETHENE	1 U	1 U	1 U	0.4	0.24 J	0.371 J	1 U	0.29 J	1 U	1 U	20 U	1 U
TRICHLOROETHENE	1	11	9.96	1900	650 J	860	2600	920	1500	3500	500	1900
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	0.17 J	0.176 J	1 U	1 U	1 U	1 U	20 U	1 U
1,1-DICHLOROETHANE, LV		0.1 U			0.8			0.1			0.1 U	
1,1-DICHLOROETHENE	1 U			0.7			1	1 U		0.5	20 U	
1,1-DICHLOROETHENE, LV		0.1 U	0.048 J		2	0.386		1	0.422		0.4	0.844
CIS-1,2-DICHLOROETHENE	2 U	1 U	1 U	1	0.78 J	1.31	10		2.39	4		25
TRANS-1,2-DICHLOROETHENE	2 U	1 U	1 U	2 U	0.12 J	0.255 J	0.6		0.38 J	2 U		0.48 J
TOTAL 1,2-DICHLOROETHENE	2 U	1 U	1 U	1	0.9	1.57	10.6	2 U	2.77	4	40 U	25.5
1,2-DICHLOROETHANE	1 U	1 U		1 U	1 U		1 UJ	1 U		1 U	20 U	
1,2-DICHLOROETHANE, LV			0.053 J			0.1 U			0.1 U			0.1 U
VINYL CHLORIDE	2 U			2 U			2 U			2 U		
VINYL CHLORIDE, LV		0.1 U	0.059 J		0.1 U	0.0322 J		0.05 J	0.027 J		0.05 J	0.092 J
CHLOROETHANE	2 U	1 U	1 U	2 U	1 U	1 U	2 U	1 U	1 U	2 U	20 U	1 U
ETHANE		2 U	6.2 U		2 U	6.2 U		2 UJ	6.2 U		2 UJ	6.2 U
ETHENE		3 U	5.8 U		3 U	5.8 U		3 UJ	5.8 U		3 UJ	5.8 U
METHANE		1 U	3.3 U		1 U	1.6 J		1 UJ	1 J		24 J	6.6 J

Well Node	MW16-20			MW16-21			MW16-22			MW16-23		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Shallow Bedrock												
TETRACHLOROETHENE												
TRICHLOROETHENE												
1,1-DICHLOROETHANE												
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV												
CIS-1,2-DICHLOROETHENE												
TRANS-1,2-DICHLOROETHENE												
TOTAL 1,2-DICHLOROETHENE												
1,2-DICHLOROETHANE												
1,2-DICHLOROETHANE, LV												
VINYL CHLORIDE												
VINYL CHLORIDE, LV												
CHLOROETHANE												
ETHANE												
ETHENE												
METHANE												

Well Node	MW16-20			MW16-21			MW16-22			MW16-23		
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Deep Bedrock												
TETRACHLOROETHENE												
TRICHLOROETHENE												
1,1-DICHLOROETHANE												
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV												
CIS-1,2-DICHLOROETHENE												
TRANS-1,2-DICHLOROETHENE												
TOTAL 1,2-DICHLOROETHENE												
1,2-DICHLOROETHANE												
1,2-DICHLOROETHANE, LV												
VINYL CHLORIDE												
VINYL CHLORIDE, LV												
CHLOROETHANE												
ETHANE												
ETHENE												
METHANE												

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node	MW16-24		MW16-25			MW16-26			MW16-27		
Investigation	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NORMAL	NS	NS	NS	NS	NS	NS
Shallow Overburden											
TETRACHLOROETHENE					1 U						
TRICHLOROETHENE					2.9						
1,1-DICHLOROETHANE					1 U						
1,1-DICHLOROETHANE, LV											
1,1-DICHLOROETHENE											
1,1-DICHLOROETHENE, LV					0.1 U						
CIS-1,2-DICHLOROETHENE					0.233 J						
TRANS-1,2-DICHLOROETHENE					1 U						
TOTAL 1,2-DICHLOROETHENE					0.233 J						
1,2-DICHLOROETHANE											
1,2-DICHLOROETHANE, LV					0.1 U						
VINYL CHLORIDE											
VINYL CHLORIDE, LV					0.1 U						
CHLOROETHANE					1 U						
ETHANE					6.2 U						
ETHENE					5.8 U						
METHANE					3.3 U						

Well Node	MW16-24		MW16-25			MW16-26			MW16-27		
Investigation	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NORMAL	AVG	NS	NORMAL	NORMAL	NS	NS	NS	NS	NS	NORMAL
Intermediate Overburden											
TETRACHLOROETHENE	0.11 J	1 U		1 UJ	5 U						1 U
TRICHLOROETHENE	41	35		220 J	120						120
1,1-DICHLOROETHANE	1 U	1 U		1 UJ	5 U						1 U
1,1-DICHLOROETHANE, LV	0.1 U			0.1 U							
1,1-DICHLOROETHENE											
1,1-DICHLOROETHENE, LV	0.1 U	0.1425		0.07 J	0.0326 J						0.314
CIS-1,2-DICHLOROETHENE	0.63 J	1.54		1.11 J	5 U						6.93
TRANS-1,2-DICHLOROETHENE	1 U	1 U		1 UJ	5 U						0.238 J
TOTAL 1,2-DICHLOROETHENE	0.63	1.54		1.11	5 U						7.17
1,2-DICHLOROETHANE	1 U			1 U							
1,2-DICHLOROETHANE, LV		0.1 U			0.1 U						0.1 U
VINYL CHLORIDE											
VINYL CHLORIDE, LV	0.1 U	0.1 U		0.1 U	0.1 U						0.1 U
CHLOROETHANE	1 U	1 U		1 UJ	5 U						1 U
ETHANE	2 U	6.2 U		2 U	6.2 U						6.2 U
ETHENE	3 U	5.8 U		3 U	5.8 U						5.8 U
METHANE	1 U	1.2 J		1 U	3.3 U						3.3 U

Well Node	MW16-24		MW16-25			MW16-26			MW16-27		
Investigation	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	AVG	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Deep Overburden											
TETRACHLOROETHENE	1 U	1 U	0.5	1 UJ	0.3825 J	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	520	690	890	470 J	415	0.7	1 UJ	1 U	310	240	190
1,1-DICHLOROETHANE	1 U	1 U	0.4 J	1 UJ	0.136 J	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE, LV	0.2			0.2			0.1 U			0.1 U	
1,1-DICHLOROETHENE			0.7			1 U			1		
1,1-DICHLOROETHENE, LV	14	0.624		0.3	0.0257 J		0.1 U	0.1 U		1	0.811
CIS-1,2-DICHLOROETHENE	48	11	2	1 UJ	0.2285 J	2 U	1 U	1 U	9	10	8.95
TRANS-1,2-DICHLOROETHENE	0.66 J	0.367 J	2 UJ	1 UJ	1 U	2 U	1 U	1 U	0.7	0.75 J	0.686 J
TOTAL 1,2-DICHLOROETHENE	48.7	11.4	2	1 U	0.229 J	2 U	1 U	1 U	9.7	10.8	9.64
1,2-DICHLOROETHANE	1 U		0.4	1 U		1 U	1 U		1 UJ	1 U	
1,2-DICHLOROETHANE, LV		0.0933 J			0.1 U			0.1 U			0.0753 J
VINYL CHLORIDE			2 UJ			2 U			2 U		
VINYL CHLORIDE, LV	22	7.87		0.1 U	0.1 U		0.1 U	0.0786 J		0.06 J	0.0506 J
CHLOROETHANE	1 U	1 U	2 U	1 UJ	1 U	2 U	1 U	1 U	2 U	1 U	1 U
ETHANE	2 U	6.2 U		2 U	6.2 U		2 U	6.2 U		2 UJ	6.2 U
ETHENE	3 U	5.8 U		3 U	5.8 U		3 U	5.8 U		3 UJ	5.8 U
METHANE	1 U	6.9		1 U	1.1 J		35	14		3.4 J	11

Well Node	MW16-24		MW16-25			MW16-26			MW16-27		
Investigation	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	AVG	NORMAL	NORMAL	NS	NS	NS	NORMAL	AVG	NORMAL
Shallow Bedrock											
TETRACHLOROETHENE			1 U	1 UJ	1 U				1 U	1 U	1 U
TRICHLOROETHENE			1 U	1.08 J	0.445 J				1	1.895 U	2.01 U
1,1-DICHLOROETHANE			1 U	1 UJ	0.285 J				1 U	1 U	1 U
1,1-DICHLOROETHANE, LV				0.4						0.1 U	
1,1-DICHLOROETHENE			1 U						1 U		
1,1-DICHLOROETHENE, LV				0.1 U	0.1 U					0.1 U	0.1 U
CIS-1,2-DICHLOROETHENE			2 U	1 UJ	1 U				1	1.35	1.64 U
TRANS-1,2-DICHLOROETHENE			2 U	1 UJ	1 U				2 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE			2 U	1 U	1 U				1	1.35	1 U
1,2-DICHLOROETHANE			1 UJ	1 U					1 UJ	1 U	
1,2-DICHLOROETHANE, LV					0.1 U						0.1 U
VINYL CHLORIDE			2 U						2 U		
VINYL CHLORIDE, LV				0.1 U	0.1 U					0.1 U	0.66 J
CHLOROETHANE			2 U	1 UJ	1 U				2 U	1 U	1 U
ETHANE				2 U	6.2 U					2 UJ	6.2 U
ETHENE				3 U	5.8 U					3 UJ	5.8 U
METHANE				1 U	26					1 UJ	3.3 U

Well Node	MW16-24		MW16-25			MW16-26			MW16-27		
Investigation	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Deep Bedrock											
TETRACHLOROETHENE											
TRICHLOROETHENE											
1,1-DICHLOROETHANE											
1,1-DICHLOROETHANE, LV											
1,1-DICHLOROETHENE											
1,1-DICHLOROETHENE, LV											
CIS-1,2-DICHLOROETHENE											
TRANS-1,2-DICHLOROETHENE											
TOTAL 1,2-DICHLOROETHENE											
1,2-DICHLOROETHANE											
1,2-DICHLOROETHANE, LV											
VINYL CHLORIDE											
VINYL CHLORIDE, LV											
CHLOROETHANE											
ETHANE											
ETHENE											
METHANE											

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node	MW16-28			MW16-29			MW16-30		MW16-31		MW16-32	
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Shallow Overburden												
TETRACHLOROETHENE												
TRICHLOROETHENE												
1,1-DICHLOROETHANE												
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV												
CIS-1,2-DICHLOROETHENE												
TRANS-1,2-DICHLOROETHENE												
TOTAL 1,2-DICHLOROETHENE												
1,2-DICHLOROETHANE												
1,2-DICHLOROETHANE, LV												
VINYL CHLORIDE												
VINYL CHLORIDE, LV												
CHLOROETHANE												
ETHANE												
ETHENE												
METHANE												

Well Node	MW16-28			MW16-29			MW16-30		MW16-31		MW16-32	
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NS	NS	NORMAL	NS	NS	NS	NS	NS	NS	NS	NS	NS
Intermediate Overburden												
TETRACHLOROETHENE			1 U									
TRICHLOROETHENE			1.29									
1,1-DICHLOROETHANE			1 U									
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV			0.1 U									
CIS-1,2-DICHLOROETHENE			1 U									
TRANS-1,2-DICHLOROETHENE			1 U									
TOTAL 1,2-DICHLOROETHENE			1 U									
1,2-DICHLOROETHANE												
1,2-DICHLOROETHANE, LV			0.1 U									
VINYL CHLORIDE												
VINYL CHLORIDE, LV			0.1 U									
CHLOROETHANE			1 U									
ETHANE			6.2 U									
ETHENE			5.8 U									
METHANE			6.7 J									

Well Node	MW16-28			MW16-29			MW16-30		MW16-31		MW16-32	
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Deep Overburden												
TETRACHLOROETHENE	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	0.14 J	1 U	0.61 J	10 U
TRICHLOROETHENE	120	59 J	200	2700	1200	2900	0.38 J	1 U	210	150	2700	290
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U
1,1-DICHLOROETHANE, LV		0.1 U			0.1 U		0.1 U		0.1 U		0.09 J	
1,1-DICHLOROETHENE	1 U			3 UJ			1 U					
1,1-DICHLOROETHENE, LV		0.5	0.18		4	1.17	0.1 U	0.1 U	0.1	0.197	2	0.479
CIS-1,2-DICHLOROETHENE	0.8	0.94 J	1.15	52 J	61	35		1 U	0.82 J	1 U	7.03	10 U
TRANS-1,2-DICHLOROETHENE	2 U	1 U	1 U	3 J	2.03	2.02		1 U	0.13 J	0.143 J	1.81	10 U
TOTAL 1,2-DICHLOROETHENE	0.8	0.94	1.15	55	63	37	2 U	1 U	0.95	0.143 J	8.84	10 U
1,2-DICHLOROETHANE	1 U	1 U		1 UJ	1 U		1 U		1 U		1 U	
1,2-DICHLOROETHANE, LV			0.1 U			0.1 U		0.1 U		0.1 U		0.1 U
VINYL CHLORIDE	2 U			2 J								
VINYL CHLORIDE, LV		0.1 U	0.1 U		1	0.515	0.1 U	0.0717 J	0.1 U	0.111	0.1 U	0.023 J
CHLOROETHANE	2 U	1 U	1 U	2 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U
ETHANE		2 U	6.2 U		2 U	6.2 U	2 UJ	6.2 U	2 UJ	6.2 U	2 UJ	1.3 J
ETHENE		3 U	5.8 U		3 U	5.8 U	3 UJ	5.8 U	3 UJ	5.8 U	3 UJ	5.8 U
METHANE		1 U	3.3 U		410 J	3000	1.5 J	110	1 UJ	3.3 U	1 UJ	1.7 U

Well Node	MW16-28			MW16-29			MW16-30		MW16-31		MW16-32	
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	NS	NS	NS	NS	NS	NS	NS	NS	NORMAL
Shallow Bedrock												
TETRACHLOROETHENE	1 U	1 U	1 U									5 U
TRICHLOROETHENE	0.9	1 UJ	1 U									110
1,1-DICHLOROETHANE	1 U	1 U	1 U									5 U
1,1-DICHLOROETHANE, LV		0.1 U										
1,1-DICHLOROETHENE	1 U											
1,1-DICHLOROETHENE, LV		0.1 U	0.1 U									0.12
CIS-1,2-DICHLOROETHENE	2 U	1 U	1 U									5 U
TRANS-1,2-DICHLOROETHENE	2 U	1 U	1 U									5 U
TOTAL 1,2-DICHLOROETHENE	2 U	1 U	1 U									5 U
1,2-DICHLOROETHANE	1 UJ	1 U										
1,2-DICHLOROETHANE, LV			0.016 J									0.1 U
VINYL CHLORIDE	2 U											
VINYL CHLORIDE, LV		0.1 U	0.1 U									0.1 U
CHLOROETHANE	2 U	1 U	1 U									5 U
ETHANE		2 U	6.2 U									1 J
ETHENE		3 U	5.8 U									5.8 U
METHANE		1 U	28									3.3 U

Well Node	MW16-28			MW16-29			MW16-30		MW16-31		MW16-32	
Investigation	Round 5	Round 6	Round 8	Round 5	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Deep Bedrock												
TETRACHLOROETHENE												
TRICHLOROETHENE												
1,1-DICHLOROETHANE												
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV												
CIS-1,2-DICHLOROETHENE												
TRANS-1,2-DICHLOROETHENE												
TOTAL 1,2-DICHLOROETHENE												
1,2-DICHLOROETHANE												
1,2-DICHLOROETHANE, LV												
VINYL CHLORIDE												
VINYL CHLORIDE, LV												
CHLOROETHANE												
ETHANE												
ETHENE												
METHANE												

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node	MW16-33		MW16-34		MW16-35		MW16-36		MW16-37		MW16-38		MW16-39	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	AVG	AVG	NORMAL	NORMAL	NORMAL	NORMAL	NS	NS	NORMAL	NORMAL	NS	NS	NS	NS
Shallow Overburden														
TETRACHLOROETHENE	1.375	0.322 J	0.69 J	1 U	0.34 J	1 U			0.58 J	1 U				
TRICHLOROETHENE	0.75 J	0.17 J	1 U	1 U	1 U	1 U			840	93				
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U			1 U	1 U				
1,1-DICHLOROETHANE, LV	0.1 U		0.1		0.1 U				0.1 U					
1,1-DICHLOROETHENE														
1,1-DICHLOROETHENE, LV	0.1 U	0.1 U	0.09 J	0.1 U	0.1 U	0.1 U			0.1 U	0.1 U				
CIS-1,2-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U			1 U	1 U				
TRANS-1,2-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U			1 U	1 U				
TOTAL 1,2-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U			1 U	1 U				
1,2-DICHLOROETHANE	1 U		1 U		1 U				1 U					
1,2-DICHLOROETHANE, LV		0.1 U		0.1 U		0.1 U				0.1 U				
VINYL CHLORIDE														
VINYL CHLORIDE, LV	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			0.1 U	0.1 U				
CHLOROETHANE	1 U	1 U	1 U	1 U	1 UJ	1 U			1 U	1 U				
ETHANE	2 UJ	6.2 U	2 U	6.2 U	2 UJ	6.2 U			2 UJ	6.2 U				
ETHENE	3 U	5.8 U	3 U	5.8 U	3 UJ	5.8 U			3 UJ	5.8 U				
METHANE	1 U	1.1 J	1 U	3.3 U	1 UJ	3.3 U			1 UJ	1.1 J				

Well Node	MW16-33		MW16-34		MW16-35		MW16-36		MW16-37		MW16-38		MW16-39	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	AVG	NORMAL	AVG	NORMAL	NORMAL	NORMAL	NS	NS	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Intermediate Overburden														
TETRACHLOROETHENE	24	18	4.77 J	3.9	3.76	3.81			0.94 J	50 U	0.64 J	20 U	0.26 J	2 U
TRICHLOROETHENE	2.015 U	1.5	2.74 J	1 U	0.6 J	0.555 J			1100	1700	1200	820	86 J	77
1,1-DICHLOROETHANE	1 U	1 U	1 UJ	1 U	1 U	1 U			1 U	50 U	0.1 J	20 U	1 U	2 U
1,1-DICHLOROETHANE, LV	0.1 U		0.1 U		0.1 U				0.1 U		0.2		0.1 U	
1,1-DICHLOROETHENE														
1,1-DICHLOROETHENE, LV	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			0.1 U	0.044 J	0.4	0.299	0.1	0.095 J
CIS-1,2-DICHLOROETHENE	1 U	1 U	1 UJ	1 U	1 U	1 U			1 U	50 U	0.49 J	20 U	0.29 J	2 U
TRANS-1,2-DICHLOROETHENE	1 U	1 U	1 UJ	1 U	1 U	1 U			1 U	50 U	1 U	20 U	1 U	2 U
TOTAL 1,2-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U			1 U	50 U	0.49	20 U	0.29	2 U
1,2-DICHLOROETHANE	1 U		1 UJ		1 U				1 U		1 U		1 U	
1,2-DICHLOROETHANE, LV		0.1 U		0.1 U		0.1 U				0.1 U		0.048 J		0.1 U
VINYL CHLORIDE														
VINYL CHLORIDE, LV	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROETHANE	1 U	1 U	1 UJ	1 U	1 U	1 U			1 U	50 U	1 U	20 U	1 U	2 U
ETHANE	2 UJ	6.2 U	2 U	6.2 U	2 UJ	6.2 U			2 UJ	6.2 U	2 U	6.2 U	2 U	6.2 U
ETHENE	3 U	5.8 U	3 U	5.8 U	3 UJ	5.8 U			3 UJ	5.8 U	3 U	5.8 U	3 U	5.8 U
METHANE	1 UJ	1.1 J	1 U	3.3 U	1 UJ	3.3 U			1 UJ	1.3 J	1 U	3.3 U	1 U	3.3 U

Well Node	MW16-33		MW16-34		MW16-35		MW16-36		MW16-37		MW16-38		MW16-39	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NS	NS	NORMAL	NORMAL
Deep Overburden														
TETRACHLOROETHENE	1 U	1 U	23	7.91	1 U	1 U	1 UJ	1 U	1.35	1.58			1 U	1 U
TRICHLOROETHENE	1 U	0.399 J	5.03	1.61	1 U	0.633 J	1 UJ	1 U	21	13			1 U	1.44
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	0.16 J	1 U			1 U	1 U
1,1-DICHLOROETHANE, LV	0.06 J		0.1		0.1		0.1 U		0.1				0.2	
1,1-DICHLOROETHENE														
1,1-DICHLOROETHENE, LV	0.1 U	0.1 U	0.09 J	0.1 U	0.07 J	0.1 U	0.1 U	0.1 U	0.2	0.1 U			0.1 U	0.1 U
CIS-1,2-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U			1 U	1 U
TRANS-1,2-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U			1 U	1 U
TOTAL 1,2-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U			1 U	1 U
1,2-DICHLOROETHANE	1 U		1 U		1 U		1 UJ		1 U				1 U	
1,2-DICHLOROETHANE, LV		0.1 U		0.1 U		0.032 J		0.1 U		0.1 U				0.1 U
VINYL CHLORIDE														
VINYL CHLORIDE, LV	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			0.1 U	0.056 J
CHLOROETHANE	1 U	1 U	1 U	1 U	1 UJ	1 U	1 UJ	1 U	1 U	1 U			1 U	1 U
ETHANE	2 UJ	6.2 U	2 U	6.2 U	2 UJ	6.2 U	2 UJ	6.2 U	2 UJ	6.2 U			2 U	6.2 U
ETHENE	3 U	5.8 U	3 U	5.8 U	3 UJ	5.8 U	3 UJ	5.8 U	3 UJ	5.8 U			3 U	5.8 U
METHANE	1 U	1.6 J	1 U	3.3 U	1 UJ	3.3 U	1 UJ	1.1 J	1 UJ	3.3 U			1 U	1.6 J

Well Node	MW16-33		MW16-34		MW16-35		MW16-36		MW16-37		MW16-38		MW16-39	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NORMAL	NORMAL	NS	NS	NS	NS	NS	NS
Shallow Bedrock														
TETRACHLOROETHENE							1 U	1 U						
TRICHLOROETHENE							1 U	1 U						
1,1-DICHLOROETHANE							1 U	1 U						
1,1-DICHLOROETHANE, LV							0.1 U							
1,1-DICHLOROETHENE														
1,1-DICHLOROETHENE, LV							0.1 U	0.1 U						
CIS-1,2-DICHLOROETHENE							1 U	1 U						
TRANS-1,2-DICHLOROETHENE							1 U	1 U						
TOTAL 1,2-DICHLOROETHENE							1 U	1 U						
1,2-DICHLOROETHANE							1 U							
1,2-DICHLOROETHANE, LV								0.1 U						
VINYL CHLORIDE														
VINYL CHLORIDE, LV							0.1 U	0.1 U						
CHLOROETHANE							1 U	1 U						
ETHANE							2 UJ	6.2 U						
ETHENE							3 UJ	5.8 U						
METHANE							1 UJ	1.6 J						

Well Node	MW16-33		MW16-34		MW16-35		MW16-36		MW16-37		MW16-38		MW16-39	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Deep Bedrock														
TETRACHLOROETHENE														
TRICHLOROETHENE														
1,1-DICHLOROETHANE														
1,1-DICHLOROETHANE, LV														
1,1-DICHLOROETHENE														
1,1-DICHLOROETHENE, LV														
CIS-1,2-DICHLOROETHENE														
TRANS-1,2-DICHLOROETHENE														
TOTAL 1,2-DICHLOROETHENE														
1,2-DICHLOROETHANE														
1,2-DICHLOROETHANE, LV														
VINYL CHLORIDE														
VINYL CHLORIDE, LV														
CHLOROETHANE														
ETHANE														
ETHENE														
METHANE														

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node	MW16-40		MW16-41		MW16-42		MW16-43		MW16-44		MW16-45	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	AVG	AVG	NORMAL	AVG	NORMAL	AVG	NORMAL	NORMAL	AVG	AVG	NORMAL	AVG
Shallow Overburden												
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	14.5	14	1 U	0.418 J	1 U	1 U	0.37 J	0.901 U	2.475	3.625	1 U	1 U
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE, LV	0.1 U		2 U		0.1 U		0.1 U		0.1 U		0.1 U	
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV	0.1	6.68	2 U	1.24	0.1 U	0.7455	0.1 U	0.357	0.25 J	2.23	0.1 U	0.7605
CIS-1,2-DICHLOROETHENE	93.5	87	7.06	3.86	2.5	5.195	7.17	4.1	15	19.5	3.9	3.405
TRANS-1,2-DICHLOROETHENE	5.37	5.175	1.44	1.1	0.27 J	0.575 J	0.38 J	0.213 J	1.215	1.76	1.06	0.729 J
TOTAL 1,2-DICHLOROETHENE	98.9	92.2	8.5	4.96	2.77	5.77	7.55	4.31	16.2	21.3	4.96	4.13
1,2-DICHLOROETHANE	1 U		1 U		1 U		1 U		1 U		1 U	
1,2-DICHLOROETHANE, LV		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.0173 J
VINYL CHLORIDE												
VINYL CHLORIDE, LV	10	55	36	24	5	9.28	2	0.415	44	12	0.1	0.1805
CHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U
ETHANE	2 U	9.55	3.9 J	10.5	2 UJ	2.85 J	2 U	6.2 U	2 U	6.2 U	2 UJ	6.2 U
ETHENE	3 U	5.8 U	3 UJ	5.8 U	3 UJ	5.8 U	3 U	5.8 U	3 U	5.8 U	3 UJ	5.8 U
METHANE	340 J	2600	300 J	1650	200	1750	580	1500	525 J	2700	720	1385 J

Well Node	MW16-40		MW16-41		MW16-42		MW16-43		MW16-44		MW16-45	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NS	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	AVG	NORMAL	NORMAL	NORMAL
Intermediate Overburden												
TETRACHLOROETHENE		1 U	0.45 J	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE		82	96	89	1 U	1 U	3.09	4.47	2.7525 J	3.14	820	520
1,1-DICHLOROETHANE		1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE, LV			0.1 U		0.1 U		0.1 U		0.1 U		0.06 J	
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV		0.0138 J	0.1 U	0.0144 J	0.1 U	2.99 J	0.1 U	0.187	0.1 U	0.386	2	0.484
CIS-1,2-DICHLOROETHENE		1 U	0.5 J	5 U	51	38	0.87 J	0.333 J	3.28	4.14	7.19	6.15
TRANS-1,2-DICHLOROETHENE		1 U	1 U	5 U	3.75	3.03	0.65 J	0.153 J	0.28 J	0.316 J	0.54 J	0.552 J
TOTAL 1,2-DICHLOROETHENE		1 U	0.5	5 U	54.8	41	1.52	0.486 J	3.56	4.46	7.73	6.7
1,2-DICHLOROETHANE			1 U		1 U		1 U		1 U		1 U	
1,2-DICHLOROETHANE, LV		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.0366 J
VINYL CHLORIDE												
VINYL CHLORIDE, LV		0.0155 J	0.1 U	0.1 U	25	33	0.1 U	0.1 U	0.55 J	0.926	0.3	0.117
CHLOROETHANE		1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHANE		6.2 U	2 UJ	6.2 U	20 UJ	12	2 U	6.2 U	2 U	6.2 U	2 UJ	6.2 U
ETHENE		5.8 U	3 UJ	5.8 U	30 U	5.8 U	3 U	5.8 U	3 U	5.8 U	3 UJ	5.8 U
METHANE		3.3 U	1 UJ	1.1 J	3800	16000	16	13	3.75	37	2.6	6.9 U

Well Node	MW16-40		MW16-41		MW16-42		MW16-43		MW16-44		MW16-45	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NS	NORMAL	NORMAL	NORMAL	NORMAL	AVG	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Deep Overburden												
TETRACHLOROETHENE		0.426 J	0.34 J	20 U	0.66 J	20 U	1 U	1 U	1 U	1 U	1 U	20 U
TRICHLOROETHENE		770	'410	610	990	725	770	810	660 J	1300	780	680
1,1-DICHLOROETHANE		1 U	1 U	20 U	1 U	20 U	1 U	1 U	1 U	1 U	1 U	20 U
1,1-DICHLOROETHANE, LV			0.1 U		0.1 U		0.1 U		0.1 U		0.1 U	
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV		0.441	0.9	0.429	1	0.374	2	0.83	2	0.764	1	0.196
CIS-1,2-DICHLOROETHENE		4.84	4.11	4.4 J	6.87	4.82 J	8.79	6.91	16	13	9.21	6.94 J
TRANS-1,2-DICHLOROETHENE		0.329 J	0.24 J	20 U	0.32 J	20 U	0.42 J	0.618 J	0.28 J	0.618 J	0.37 J	20 U
TOTAL 1,2-DICHLOROETHENE		5.17	4.35	4.4 J	7.19	4.82 J	9.21	7.53	16.3	13.6	9.58	6.94 J
1,2-DICHLOROETHANE			1 U		1 U		1 U		1 U		1 U	
1,2-DICHLOROETHANE, LV		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U
VINYL CHLORIDE												
VINYL CHLORIDE, LV		0.189	0.1	0.106	0.2	0.135	0.1 U	0.139	0.3	0.322	0.2	0.0212 J
CHLOROETHANE		1 U	1 U	20 U	1 U	20 U	1 U	1 U	1 U	1 U	1 U	20 U
ETHANE		6.2 U	2 UJ	6.2 U	2 UJ	6.2 U	2 U	6.2 U	2 U	6.2 U	2 UJ	6.2 U
ETHENE		5.8 U	3 UJ	5.8 U	3 UJ	5.8 U	3 U	5.8 U	3 U	5.8 U	3 UJ	5.8 U
METHANE		3.3 U	1 UJ	1.6 J	1 U	3.3 U	1 U	3.3 U	1 U	1.6 J	1 U	3.3 U

Well Node	MW16-40		MW16-41		MW16-42		MW16-43		MW16-44		MW16-45	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NORMAL	NORMAL	NS	NS
Shallow Bedrock												
TETRACHLOROETHENE									1 U	1 U		
TRICHLOROETHENE									940 J	1400		
1,1-DICHLOROETHANE									1 U	1 U		
1,1-DICHLOROETHANE, LV									0.1 U			
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV									0.9	0.51		
CIS-1,2-DICHLOROETHENE									15	22		
TRANS-1,2-DICHLOROETHENE									0.13 J	0.405 J		
TOTAL 1,2-DICHLOROETHENE									15.1	22.4		
1,2-DICHLOROETHANE									1 U			
1,2-DICHLOROETHANE, LV										0.1 U		
VINYL CHLORIDE												
VINYL CHLORIDE, LV									0.3 J	0.461		
CHLOROETHANE									1 U	1 U		
ETHANE									2 U	6.6		
ETHENE									3 U	7.8		
METHANE									2	11		

Well Node	MW16-40		MW16-41		MW16-42		MW16-43		MW16-44		MW16-45	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Deep Bedrock												
TETRACHLOROETHENE												
TRICHLOROETHENE												
1,1-DICHLOROETHANE												
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV												
CIS-1,2-DICHLOROETHENE												
TRANS-1,2-DICHLOROETHENE												
TOTAL 1,2-DICHLOROETHENE												
1,2-DICHLOROETHANE												
1,2-DICHLOROETHANE, LV												
VINYL CHLORIDE												
VINYL CHLORIDE, LV												
CHLOROETHANE												
ETHANE												
ETHENE												
METHANE												

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node	MW16-46		MW16-47		MW16-48		MW16-49	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NS	NS
Shallow Overburden								
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U		
TRICHLOROETHENE	0.18 J	1 U	1 U	1 U	1 U	1 U		
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U		
1,1-DICHLOROETHANE, LV	0.1 U		0.1 U		0.1 U			
1,1-DICHLOROETHENE								
1,1-DICHLOROETHENE, LV	0.1 U	0.244	0.1 U	0.1 U	0.1 U	0.1 U		
CIS-1,2-DICHLOROETHENE	0.5 J	0.731 J	1 U	1 U	1 U	1 U		
TRANS-1,2-DICHLOROETHENE	0.32 J	0.245 J	1 U	1 U	1 U	1 U		
TOTAL 1,2-DICHLOROETHENE	0.82	0.976 J	1 U	1 U	1 U	1 U		
1,2-DICHLOROETHANE	1 U		1 U		1 U			
1,2-DICHLOROETHANE, LV		0.1 U		0.1 U		0.1 U		
VINYL CHLORIDE								
VINYL CHLORIDE, LV	2	1.86	0.1 U	0.1 U	0.1 U	0.1 U		
CHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U		
ETHANE	20 U	6.2 U	2 UJ	6.2 U	2 U	6.2 U		
ETHENE	30 U	5.8 U	3 U	5.8 U	3 U	5.8 U		
METHANE	460	4100	1 U	3.3 U	580 J	2900		

Well Node	MW16-46		MW16-47		MW16-48		MW16-49	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	AVG	NORMAL	NS	NS	AVG	AVG	NS	NORMAL
Intermediate Overburden								
TETRACHLOROETHENE	1 U	1 U			1 U	1 U		1 U
TRICHLOROETHENE	0.445 J	0.454 J			1 U	0.2055 J		1 U
1,1-DICHLOROETHANE	1 U	1 U			1 U	1 U		1 U
1,1-DICHLOROETHANE, LV	0.1 U				0.1 U			
1,1-DICHLOROETHENE								
1,1-DICHLOROETHENE, LV	0.1 U	0.497			0.1 U	0.1 U		0.096 J
CIS-1,2-DICHLOROETHENE	0.425 J	0.349 J			1 U	1 U		1.31 U
TRANS-1,2-DICHLOROETHENE	0.435 J	0.494 J			1 U	1 U		1 U
TOTAL 1,2-DICHLOROETHENE	0.86	0.843 J			1 U	1 U		1 U
1,2-DICHLOROETHANE	1 U				1 U			
1,2-DICHLOROETHANE, LV		0.1 U				0.1 U		0.1 U
VINYL CHLORIDE								
VINYL CHLORIDE, LV	0.1 U	0.1 U			0.1 U	0.1 U		0.1 U
CHLOROETHANE	1 U	1 U			1 U	1 U		1 U
ETHANE	2 U	6.2 U			2 U	6.2 U		6.2 U
ETHENE	3 U	5.8 U			3 U	5.8 U		5.8 U
METHANE	54.5	110			1 U	1.5 J		16

Well Node	MW16-46		MW16-47		MW16-48		MW16-49	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Deep Overburden								
TETRACHLOROETHENE	1 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	360	380	1 U	1 U	0.12 J	1 U	1.99	1 U
1,1-DICHLOROETHANE	1 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE, LV	0.1 U		0.1 U		0.1 U		0.1 U	
1,1-DICHLOROETHENE								
1,1-DICHLOROETHENE, LV	2	0.576	0.1 U	0.1 U	0.1 U	0.1 U	0.1	0.1 U
CIS-1,2-DICHLOROETHENE	5.38	5.36 J	1 U	1 U	0.35 J	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	0.54 J	10 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	5.92	5.36 J	1 U	1 U	0.35	1 U	1 U	1 U
1,2-DICHLOROETHANE	1 U		1 U		1 U		1 U	
1,2-DICHLOROETHANE, LV		0.0296 J		0.1 U		0.1 U		0.1 U
VINYL CHLORIDE								
VINYL CHLORIDE, LV	0.2	0.113	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.498
CHLOROETHANE	1 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHANE	2 U	6.2 U	2 UJ	6.2 U	2 U	6.2 U	2 UJ	6.2 U
ETHENE	3 U	5.8 U	3 UJ	5.8 U	3 U	5.8 U	3 UJ	5.8 U
METHANE	1 U	3.6 U	1 U	3.3 U	1 U	1.9 J	7.1 J	3.3 U

Well Node	MW16-46		MW16-47		MW16-48		MW16-49	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS
Shallow Bedrock								
TETRACHLOROETHENE								
TRICHLOROETHENE								
1,1-DICHLOROETHANE								
1,1-DICHLOROETHANE, LV								
1,1-DICHLOROETHENE								
1,1-DICHLOROETHENE, LV								
CIS-1,2-DICHLOROETHENE								
TRANS-1,2-DICHLOROETHENE								
TOTAL 1,2-DICHLOROETHENE								
1,2-DICHLOROETHANE								
1,2-DICHLOROETHANE, LV								
VINYL CHLORIDE								
VINYL CHLORIDE, LV								
CHLOROETHANE								
ETHANE								
ETHENE								
METHANE								

Well Node	MW16-46		MW16-47		MW16-48		MW16-49	
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS
Deep Bedrock								
TETRACHLOROETHENE								
TRICHLOROETHENE								
1,1-DICHLOROETHANE								
1,1-DICHLOROETHANE, LV								
1,1-DICHLOROETHENE								
1,1-DICHLOROETHENE, LV								
CIS-1,2-DICHLOROETHENE								
TRANS-1,2-DICHLOROETHENE								
TOTAL 1,2-DICHLOROETHENE								
1,2-DICHLOROETHANE								
1,2-DICHLOROETHANE, LV								
VINYL CHLORIDE								
VINYL CHLORIDE, LV								
CHLOROETHANE								
ETHANE								
ETHENE								
METHANE								

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node	MW16-50		MW16-51		MW16-52		MW16-53		MW16-54		MW16-55		MW16-56
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NORMAL	NORMAL	NS	NS	NS	NS	NS
Shallow Overburden													
TETRACHLOROETHENE							1 U	1 U					
TRICHLOROETHENE							1.32	0.177 J					
1,1-DICHLOROETHANE							1 U	1 U					
1,1-DICHLOROETHANE, LV							0.1 U						
1,1-DICHLOROETHENE													
1,1-DICHLOROETHENE, LV							0.1 U	0.1 U					
CIS-1,2-DICHLOROETHENE							1 U	1 U					
TRANS-1,2-DICHLOROETHENE							1 U	1 U					
TOTAL 1,2-DICHLOROETHENE							1 U	1 U					
1,2-DICHLOROETHANE							1 U						
1,2-DICHLOROETHANE, LV								0.1 U					
VINYL CHLORIDE													
VINYL CHLORIDE, LV							0.1 U	0.1 U					
CHLOROETHANE							1 U	1 U					
ETHANE							2 UJ	6.2 U					
ETHENE							3 UJ	5.8 U					
METHANE							75 J	1200					

Well Node	MW16-50		MW16-51		MW16-52		MW16-53		MW16-54		MW16-55		MW16-56
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 8
Sample Code	NS	NORMAL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NORMAL
Intermediate Overburden													
TETRACHLOROETHENE		1 U											1 U
TRICHLOROETHENE		1 U											0.851 J
1,1-DICHLOROETHANE		1 U											1 U
1,1-DICHLOROETHANE, LV													
1,1-DICHLOROETHENE													
1,1-DICHLOROETHENE, LV		0.1 U											0.1 U
CIS-1,2-DICHLOROETHENE		1 U											1 U
TRANS-1,2-DICHLOROETHENE		1 U											1 U
TOTAL 1,2-DICHLOROETHENE		1 U											1 U
1,2-DICHLOROETHANE													
1,2-DICHLOROETHANE, LV		0.1 U											0.1 U
VINYL CHLORIDE													
VINYL CHLORIDE, LV		0.1 U											0.1 U
CHLOROETHANE		1 U											1 U
ETHANE		6.2 U											6.2 U
ETHENE		5.8 U											5.8 U
METHANE		12000											3.3 U

Well Node	MW16-50		MW16-51		MW16-52		MW16-53		MW16-54		MW16-55		MW16-56
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 8
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NS	NS	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Deep Overburden													
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U			1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	2.05	1 U	0.44 J	0.504 J	1 U	0.55 J			1 U	1 U	1 UJ	1 U	50
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U			1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE, LV	0.1 U		0.1 U		0.1 U				0.06 J		0.1 U		
1,1-DICHLOROETHENE													
1,1-DICHLOROETHENE, LV	0.07 J	0.1 U	0.08 J	0.0237 J	0.1 U	0.1 U			0.1	0.1 U	0.1 U	0.1 U	0.0809 J
CIS-1,2-DICHLOROETHENE	1 U	1 U	0.26 J	0.336 J	1 U	1 U			1 U	1 U	1 U	1 U	0.33 J
TRANS-1,2-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U			1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	1 U	1 U	0.26	0.336 J	1 U	1 U			1 U	1 U	1 U	1 U	0.33 J
1,2-DICHLOROETHANE	1 U		1 U		1 U				1 U		1 U		
1,2-DICHLOROETHANE, LV		0.1 U		0.1 U		0.1 U				0.1 U		0.1 U	0.0746 J
VINYL CHLORIDE													
VINYL CHLORIDE, LV	0.1 U	0.031 J	0.1 U	0.0198 J	0.1 U	0.0641 J			0.1 U	0.1 U	0.1 U	0.1 U	0.0301 J
CHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U			1 U	1 U	1 U	1 U	1 U
ETHANE	2 UJ	6.2 U	2 U	1.3 J	2 U	6.2 U			2 UJ	6.2 U	2 UJ	6.2 U	6.2 U
ETHENE	3 UJ	5.8 U	3 U	5.8 U	3 U	5.8 U			3 UJ	5.8 U	3 UJ	5.8 U	5.8 U
METHANE	10 J	54 J	23	51	14	61			1 UJ	3.3 U	1 UJ	3.3 U	3.3 U

Well Node	MW16-50		MW16-51		MW16-52		MW16-53		MW16-54		MW16-55		MW16-56
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 8
Sample Code	NS	NS	NORMAL	NORMAL	NORMAL	NORMAL	NS	NS	NS	NS	NORMAL	NORMAL	NORMAL
Shallow Bedrock													
TETRACHLOROETHENE			1 U	1 U	1 U	1 U					1 U	1 U	1 U
TRICHLOROETHENE			0.1 J	1 U	1 U	1 U					1 U	1 U	17
1,1-DICHLOROETHANE			1 U	1 U	1 U	1 U					1 U	1 U	1 U
1,1-DICHLOROETHANE, LV			0.1 U		0.1 U						0.1 U		
1,1-DICHLOROETHENE													
1,1-DICHLOROETHENE, LV			0.1 U	0.1 U	0.1 U	0.1 U					0.1 U	0.1 U	0.279
CIS-1,2-DICHLOROETHENE			1 U	1 U	1 U	1 U					1 U	1 U	1.5
TRANS-1,2-DICHLOROETHENE			1 U	1 U	1 U	1 U					1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE			1 U	1 U	1 U	1 U					1 U	1 U	1.5
1,2-DICHLOROETHANE			1 U		1 U						1 U		
1,2-DICHLOROETHANE, LV				0.1 U		0.1 U						0.1 U	0.0124 J
VINYL CHLORIDE													
VINYL CHLORIDE, LV			0.1 U	0.1 U	0.1 U	0.1 U					0.1 U	0.1 U	0.0498 J
CHLOROETHANE			1 U	1 U	1 U	1 U					1 U	1 U	1 U
ETHANE			2 U	6.2 U	2 U	6.2 U					2 UJ	6.2 U	6.2 U
ETHENE			3 U	5.8 U	3 U	5.8 U					3 UJ	5.8 U	5.8 U
METHANE			3.8	11	3.8	160					1 UJ	3.3 U	3.3 U

Well Node	MW16-50		MW16-51		MW16-52		MW16-53		MW16-54		MW16-55		MW16-56
Investigation	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 6	Round 8	Round 8
Sample Code	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NORMAL	NORMAL	NS
Deep Bedrock													
TETRACHLOROETHENE											1 U	1 U	
TRICHLOROETHENE											1 UJ	1 U	
1,1-DICHLOROETHANE											1 U	1 U	
1,1-DICHLOROETHANE, LV											0.1 U		
1,1-DICHLOROETHENE													
1,1-DICHLOROETHENE, LV											0.1 U	0.1 U	
CIS-1,2-DICHLOROETHENE											1 U	1 U	
TRANS-1,2-DICHLOROETHENE											1 U	1 U	
TOTAL 1,2-DICHLOROETHENE											1 U	1 U	
1,2-DICHLOROETHANE											1 U		
1,2-DICHLOROETHANE, LV												0.1 U	
VINYL CHLORIDE													
VINYL CHLORIDE, LV											0.1 U	0.1 U	
CHLOROETHANE											1 U	1 U	
ETHANE											2 UJ	6.2 U	
ETHENE											3 UJ	5.8 U	
METHANE											1 UJ	3.3 U	

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node Investigation Sample Code	MW16-57 Round 8 NS	MW16-58 Round 8 NORMAL	MW16-59 Round 8 NORMAL	MW16-60 Round 8 NS	MW16-61 Round 8 NS	MW16-62 Round 8 NS	MW16-63 Round 8 NS	MW16-64 Round 8 NS	MW16-65 Round 8 NORMAL	MW16-66 Round 9 NORMAL	MW16-67 Round 9 NORMAL	MW16-68 Round 9 NORMAL
						Shallow Overburden						
TETRACHLOROETHENE		1 U	1 U						1 U			
TRICHLOROETHENE		1 U	21						1.24	4.01	6.81	12
1,1-DICHLOROETHANE		1 U	1 U						1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE										1 U	1 U	1 U
1,1-DICHLOROETHENE, LV		0.1 U	0.1 U						0.1 U			
CIS-1,2-DICHLOROETHENE		1 U	1 U						1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE		1 U	1 U						1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE		1 U	1 U						1 U	2 U	2 U	2 U
1,2-DICHLOROETHANE										1 U	1 U	1 U
1,2-DICHLOROETHANE, LV		0.1 U	0.1 U						0.1 U			
VINYL CHLORIDE										1 U	1 U	1 U
VINYL CHLORIDE, LV		0.0266 J	0.1 U						0.1 U			
CHLOROETHANE		1 U	1 U						1 U	1 U	1 U	1 U
ETHANE		6.2 U	6.2 U						6.2 U	6.2 U	6.2 U	6.2 U
ETHENE		5.8 U	5.8 U						5.8 U	5.8 U	5.8 U	5.8 U
METHANE		22	3.3 U						5.3 U	5 U	4.4 U	14 U

Well Node Investigation Sample Code	MW16-57 Round 8 NORMAL	MW16-58 Round 8 NORMAL	MW16-59 Round 8 NORMAL	MW16-60 Round 8 NS	MW16-61 Round 8 NORMAL	MW16-62 Round 8 NORMAL	MW16-63 Round 8 NORMAL	MW16-64 Round 8 NORMAL	MW16-65 Round 8 NORMAL	MW16-66 Round 9 NORMAL	MW16-67 Round 9 NORMAL	MW16-68 Round 9 NORMAL
						Intermediate Overburden						
TETRACHLOROETHENE	1 U	1 U	1 U		1 U	0.322 J	0.311 J	0.431 J	1 U			
TRICHLOROETHENE	310	1 U	670		9.4	20	19	32	3.19	1.58	11	11
1,1-DICHLOROETHANE	1 U	1 U	1 U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE										1 U	1 U	1 U
1,1-DICHLOROETHENE, LV	0.443	0.1 U	0.131		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			
CIS-1,2-DICHLOROETHENE	1.2	1.67 U	3.3		0.529 J	0.815 J	0.303 J	0.238 J	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	0.307 J	1 U	1 U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	1.5	1 U	3.3		0.529 J	0.815 J	0.303 J	0.238 J	1 U	2 U	2 U	2 U
1,2-DICHLOROETHANE										1 U	1 U	1 U
1,2-DICHLOROETHANE, LV	0.0283 J	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			
VINYL CHLORIDE										1 U	1 U	1 U
VINYL CHLORIDE, LV	0.022 J	0.0304 J	0.158		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			
CHLOROETHANE	1 U	1 U	1 U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHANE	6.2 U	6.2 U	6.2 U		6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	5.8 U	5.8 U	5.8 U		5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	3.3 U	1300	3.3 U		3.3 U	3.3 U	3.3 U	10 U	7.2 U	4.7 U	3.9 U	3.3 U

Well Node Investigation Sample Code	MW16-57 Round 8 NORMAL	MW16-58 Round 8 NORMAL	MW16-59 Round 8 NORMAL	MW16-60 Round 8 NORMAL	MW16-61 Round 8 NORMAL	MW16-62 Round 8 NORMAL	MW16-63 Round 8 NORMAL	MW16-64 Round 8 NORMAL	MW16-65 Round 8 NORMAL	MW16-66 Round 9 NORMAL	MW16-67 Round 9 NORMAL	MW16-68 Round 9 AVG
						Deep Overburden						
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	10 U	20 U	20 U	1 U	1 U			
TRICHLOROETHENE	0.678 J	1400	2300	1600	220	550	540	380	1 U	18	980	780
1,1-DICHLOROETHANE	1 U	0.196 J	0.135 J	1 U	10 U	20 U	20 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE										1 U	0.487 J	0.3355 J
1,1-DICHLOROETHENE, LV	0.1 U	1.85	2.82	0.527	0.0465 J	0.336	0.356	0.289	0.1 U			
CIS-1,2-DICHLOROETHENE	1 U	6.24	14	1.67	10 U	20 U	20 U	1.28	1 U	1.33	2.53	1.76
TRANS-1,2-DICHLOROETHENE	1 U	0.845 J	0.392 J	0.255 J	10 U	20 U	20 U	0.145 J	1 U	1 U	0.245 J	0.133 J
TOTAL 1,2-DICHLOROETHENE	1 U	7.09	14.4	1.93	10 U	20 U	20 U	1.43	1 U	1.33 J	2.53	1.87 J
1,2-DICHLOROETHANE										1 U	1 U	1 U
1,2-DICHLOROETHANE, LV	0.1 U	0.0484 J	0.119	0.0229 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			
VINYL CHLORIDE										1 U	1 U	1 U
VINYL CHLORIDE, LV	0.028 J	0.116	0.947	0.0236 J	0.1 U	0.0306 J	0.1 U	0.1 U	0.1 U			
CHLOROETHANE	1 U	1 U	1 U	1 U	10 U	20 U	20 U	1 U	1 U	1 U	1 U	1 U
ETHANE	6.2 U	6.2 U	0.85 J	0.68 J	6.2 U	1.6 J	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	5.8 U	5.8 U	5.8 U	0.88 J	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.5 U	3.3 U	4.5 U	3.3 U	5.4 U

Well Node Investigation Sample Code	MW16-57 Round 8 NS	MW16-58 Round 8 NORMAL	MW16-59 Round 8 NORMAL	MW16-60 Round 8 NORMAL	MW16-61 Round 8 NS	MW16-62 Round 8 NS	MW16-63 Round 8 NS	MW16-64 Round 8 NS	MW16-65 Round 8 NORMAL	MW16-66 Round 9 NORMAL	MW16-67 Round 9 NORMAL	MW16-68 Round 9 AVG
						Shallow Bedrock						
TETRACHLOROETHENE		1 U	1 U	1 U					0.824 J			
TRICHLOROETHENE		320	1500	1800					0.415 J	3.45	600	610
1,1-DICHLOROETHANE		1 U	0.233 J	1 U					1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE										1 U	0.533 J	0.327 J
1,1-DICHLOROETHENE, LV		0.715	4.2	5.05					0.1 U			
CIS-1,2-DICHLOROETHENE		6.65	23	16					1 U	0.292 J	2.95	1.335
TRANS-1,2-DICHLOROETHENE		0.663 J	0.559 J	0.668 J					1 U	1 U	0.212 J	0.13 J
TOTAL 1,2-DICHLOROETHENE		7.31	23.6	16.7					1 U	0.292 J	3.16	1.5 J
1,2-DICHLOROETHANE										1 U	1 U	1 U
1,2-DICHLOROETHANE, LV		0.1 U	0.0801 J	0.0652 J					0.1 U			
VINYL CHLORIDE										1 U	1 U	1 U
VINYL CHLORIDE, LV		0.112	0.916	0.413					0.1 U			
CHLOROETHANE		1 U	1 U	1 U					1 U	1 U	1 U	1 U
ETHANE		6.2 U	3.2 J	3.1 J					1 J	6.2 U	0.8 J	6.2 U
ETHENE		5.8 U	5.8 U	1.7 J					0.9 J	5.8 U	5.8 U	5.8 U
METHANE		5	3.3 U	3.3 U					5.4 U	4.4 U	3.9 U	5.2 U

Well Node Investigation Sample Code	MW16-57 Round 8 NS	MW16-58 Round 8 NS	MW16-59 Round 8 NS	MW16-60 Round 8 NS	MW16-61 Round 8 NS	MW16-62 Round 8 NS	MW16-63 Round 8 NS	MW16-64 Round 8 NS	MW16-65 Round 8 NS	MW16-66 Round 9 NS	MW16-67 Round 9 NS	MW16-68 Round 9 NS
						Deep Bedrock						
TETRACHLOROETHENE												
TRICHLOROETHENE												
1,1-DICHLOROETHANE												
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV												
CIS-1,2-DICHLOROETHENE												
TRANS-1,2-DICHLOROETHENE												
TOTAL 1,2-DICHLOROETHENE												
1,2-DICHLOROETHANE												
1,2-DICHLOROETHANE, LV												
VINYL CHLORIDE												
VINYL CHLORIDE, LV												
CHLOROETHANE												
ETHANE												
ETHENE												
METHANE												

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node Investigation Sample Code	MW16-69 Round 9 NORMAL	MW16-70 Round 9 NORMAL	MW16-71 Round 9 NORMAL	INJ16-01D Round 9 NS	INJ16-02D Round 9 NS	INJ16-03D Round 9 NS	INJ16-04D Round 9 NS	INJ16-05D Round 9 NS	INJ16-06D Round 9 NS	INJ16-07D Round 9 NS	INJ16-08D Round 9 NS	INJ16-09D Round 9 NS
						Shallow Overburden						
TETRACHLOROETHENE												
TRICHLOROETHENE	10	20	4.58									
1,1-DICHLOROETHANE	1 U	1 U	1 U									
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE	1 U	1 U	1 U									
1,1-DICHLOROETHENE, LV												
CIS-1,2-DICHLOROETHENE	1 U	1 U	1 U									
TRANS-1,2-DICHLOROETHENE	1 U	1 U	1 U									
TOTAL 1,2-DICHLOROETHENE	2 U	2 U	2 U									
1,2-DICHLOROETHANE	1 U	1 U	1 U									
1,2-DICHLOROETHANE, LV												
VINYL CHLORIDE	1 U	1 U	1 U									
VINYL CHLORIDE, LV												
CHLOROETHANE	1 U	1 U	1 U									
ETHANE	6.2 U	6.2 U	6.2 U									
ETHENE	5.8 U	5.8 U	5.8 U									
METHANE	3.3 U	4.6 U	4.2 U									

Well Node Investigation Sample Code	MW16-69 Round 9 NORMAL	MW16-70 Round 9 NORMAL	MW16-71 Round 9 AVG	INJ16-01D Round 9 NS	INJ16-02D Round 9 NS	INJ16-03D Round 9 NS	INJ16-04D Round 9 NS	INJ16-05D Round 9 NS	INJ16-06D Round 9 NS	INJ16-07D Round 9 NS	INJ16-08D Round 9 NS	INJ16-09D Round 9 NS
						Intermediate Overburden						
TETRACHLOROETHENE												
TRICHLOROETHENE	550	11	12									
1,1-DICHLOROETHANE	1 U	1 U	1 U									
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE	0.302 J	1 U	1 U									
1,1-DICHLOROETHENE, LV												
CIS-1,2-DICHLOROETHENE	1.36	1 U	0.174 J									
TRANS-1,2-DICHLOROETHENE	0.201 J	1 U	1 U									
TOTAL 1,2-DICHLOROETHENE	1 J	2 U	0.174 J									
1,2-DICHLOROETHANE	1 U	1 U	1 U									
1,2-DICHLOROETHANE, LV												
VINYL CHLORIDE	1 U	1 U	1 U									
VINYL CHLORIDE, LV												
CHLOROETHANE	1 U	1 U	1 U									
ETHANE	6.2 U	6.2 U	6.2 U									
ETHENE	5.8 U	5.8 U	5.8 U									
METHANE	15 J	5.2 U	3.55 U									

Well Node Investigation Sample Code	MW16-69 Round 9 NORMAL	MW16-70 Round 9 NORMAL	MW16-71 Round 9 NORMAL	INJ16-01D Round 9 NORMAL	INJ16-02D Round 9 NORMAL	INJ16-03D Round 9 NORMAL	INJ16-04D Round 9 NORMAL	INJ16-05D Round 9 NORMAL	INJ16-06D Round 9 NORMAL	INJ16-07D Round 9 NORMAL	INJ16-08D Round 9 NORMAL	INJ16-09D Round 9 NORMAL
						Deep Overburden						
TETRACHLOROETHENE												
TRICHLOROETHENE	970	730	790	710	360	830	770	1200	860	480	640	810
1,1-DICHLOROETHANE	1 U	25 U	1 U	25 U	1 U	25 U	25 U	50 U	25 U	1 U	25 U	25 U
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE	0.74 J	25 U	0.295 J	25 U	1 U	25 U	25 U	50 U	25 U	0.303 J	25 U	25 U
1,1-DICHLOROETHENE, LV												
CIS-1,2-DICHLOROETHENE	7.67	25 U	1.57	25 U	6.25	25 U	25 U	50 U	25 U	1.52	25 U	25 U
TRANS-1,2-DICHLOROETHENE	0.164 J	25 U	1 U	25 U	1 U	25 U	25 U	50 U	25 U	0.111 J	25 U	25 U
TOTAL 1,2-DICHLOROETHENE	8.2	50 U	1.57 J	50 U	6.25	50 U	50 U	100 U	50 U	1.63 J	50 U	50 U
1,2-DICHLOROETHANE	1 U	25 U	1 U	25 U	1 U	25 U	25 U	50 U	25 U	1 U	25 U	25 U
1,2-DICHLOROETHANE, LV												
VINYL CHLORIDE	1 U	25 U	1 U	25 U	0.366 J	25 U	25 U	50 U	25 U	1 U	25 U	25 U
VINYL CHLORIDE, LV												
CHLOROETHANE	1 U	25 U	1 U	25 UJ	1 U	25 UJ	25 UJ	50 UJ	25 U	1 U	25 UJ	25 U
ETHANE	3.5 J	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	6.2 U	5.6 U	3.3 U	4.5 U	15 J	4.4 U	4 U	4.2 U	4.2 U	6.3 U	4.1 U	4.7 U

Well Node Investigation Sample Code	MW16-69 Round 9 AVG	MW16-70 Round 9 NORMAL	MW16-71 Round 9 NORMAL	INJ16-01D Round 9 NS	INJ16-02D Round 9 NS	INJ16-03D Round 9 NS	INJ16-04D Round 9 NS	INJ16-05D Round 9 NS	INJ16-06D Round 9 NS	INJ16-07D Round 9 NS	INJ16-08D Round 9 NS	INJ16-09D Round 9 NS
						Shallow Bedrock						
TETRACHLOROETHENE												
TRICHLOROETHENE	240	59	1100									
1,1-DICHLOROETHANE	10 U	1 U	0.172 J									
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE	10 U	0.403 J	2.56									
1,1-DICHLOROETHENE, LV												
CIS-1,2-DICHLOROETHENE	8.155 J	3.93	23									
TRANS-1,2-DICHLOROETHENE	10 U	1 U	1.04									
TOTAL 1,2-DICHLOROETHENE	8.16 J	4.12	24									
1,2-DICHLOROETHANE	10 U	1 U	1 U									
1,2-DICHLOROETHANE, LV												
VINYL CHLORIDE	10 U	1 U	1 U									
VINYL CHLORIDE, LV												
CHLOROETHANE	10 U	1 U	1 U									
ETHANE	6.2 U	6.2 U	1.3 J									
ETHENE	5.8 U	5.8 U	5.8 U									
METHANE	3.3 U	3.7 U	3.3 U									

Well Node Investigation Sample Code	MW16-69 Round 9 NS	MW16-70 Round 9 NS	MW16-71 Round 9 NS	INJ16-01D Round 9 NS	INJ16-02D Round 9 NS	INJ16-03D Round 9 NS	INJ16-04D Round 9 NS	INJ16-05D Round 9 NS	INJ16-06D Round 9 NS	INJ16-07D Round 9 NS	INJ16-08D Round 9 NS	INJ16-09D Round 9 NS
						Deep Bedrock						
TETRACHLOROETHENE												
TRICHLOROETHENE												
1,1-DICHLOROETHANE												
1,1-DICHLOROETHANE, LV												
1,1-DICHLOROETHENE												
1,1-DICHLOROETHENE, LV												
CIS-1,2-DICHLOROETHENE												
TRANS-1,2-DICHLOROETHENE												
TOTAL 1,2-DICHLOROETHENE												
1,2-DICHLOROETHANE												
1,2-DICHLOROETHANE, LV												
VINYL CHLORIDE												
VINYL CHLORIDE, LV												
CHLOROETHANE												
ETHANE												
ETHENE												
METHANE												

TABLE 4-20
SUMMARY OF PRIMARY CHLORINATED VOCs AND DEGRADATION PRODUCTS
BY GROUNDWATER ZONE
SUPPLEMENTAL PHASE II RI DATA PACKAGE
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
FORMER NORTH KINGSTON, RHODE ISLAND

Well Node Investigation Sample Code	INJ16-10D Round 9 NS	INJ16-11D Round 9 NS	INJ16-12D Round 9 NS
	Shallow Overburden		
TETRACHLOROETHENE			
TRICHLOROETHENE			
1,1-DICHLOROETHANE			
1,1-DICHLOROETHANE, LV			
1,1-DICHLOROETHENE			
1,1-DICHLOROETHENE, LV			
CIS-1,2-DICHLOROETHENE			
TRANS-1,2-DICHLOROETHENE			
TOTAL 1,2-DICHLOROETHENE			
1,2-DICHLOROETHANE			
1,2-DICHLOROETHANE, LV			
VINYL CHLORIDE			
VINYL CHLORIDE, LV			
CHLOROETHANE			
ETHANE			
ETHENE			
METHANE			

Well Node Investigation Sample Code	INJ16-10D Round 9 NS	INJ16-11D Round 9 NS	INJ16-12D Round 9 NS
	Intermediate Overburden		
TETRACHLOROETHENE			
TRICHLOROETHENE			
1,1-DICHLOROETHANE			
1,1-DICHLOROETHANE, LV			
1,1-DICHLOROETHENE			
1,1-DICHLOROETHENE, LV			
CIS-1,2-DICHLOROETHENE			
TRANS-1,2-DICHLOROETHENE			
TOTAL 1,2-DICHLOROETHENE			
1,2-DICHLOROETHANE			
1,2-DICHLOROETHANE, LV			
VINYL CHLORIDE			
VINYL CHLORIDE, LV			
CHLOROETHANE			
ETHANE			
ETHENE			
METHANE			

Well Node Investigation Sample Code	INJ16-10D Round 9 NORMAL	INJ16-11D Round 9 NORMAL	INJ16-12D Round 9 NORMAL
	Deep Overburden		
TETRACHLOROETHENE			
TRICHLOROETHENE	870	760	1700
1,1-DICHLOROETHANE	25 U	25 U	50 U
1,1-DICHLOROETHANE, LV			
1,1-DICHLOROETHENE	25 U	25 U	50 U
1,1-DICHLOROETHENE, LV			
CIS-1,2-DICHLOROETHENE	25 U	25 U	50 U
TRANS-1,2-DICHLOROETHENE	25 U	25 U	50 U
TOTAL 1,2-DICHLOROETHENE	50 U	50 U	100 U
1,2-DICHLOROETHANE	25 U	25 U	50 U
1,2-DICHLOROETHANE, LV			
VINYL CHLORIDE	25 U	25 U	50 U
VINYL CHLORIDE, LV			
CHLOROETHANE	25 U	25 UJ	50 UJ
ETHANE	6.2 U	6.2 U	6.2 U
ETHENE	5.8 U	5.8 U	5.8 U
METHANE	4.8 U	3.8 U	4 U

Well Node Investigation Sample Code	INJ16-10D Round 9 NS	INJ16-11D Round 9 NS	INJ16-12D Round 9 NS
	Shallow Bedrock		
TETRACHLOROETHENE			
TRICHLOROETHENE			
1,1-DICHLOROETHANE			
1,1-DICHLOROETHANE, LV			
1,1-DICHLOROETHENE			
1,1-DICHLOROETHENE, LV			
CIS-1,2-DICHLOROETHENE			
TRANS-1,2-DICHLOROETHENE			
TOTAL 1,2-DICHLOROETHENE			
1,2-DICHLOROETHANE			
1,2-DICHLOROETHANE, LV			
VINYL CHLORIDE			
VINYL CHLORIDE, LV			
CHLOROETHANE			
ETHANE			
ETHENE			
METHANE			

Well Node Investigation Sample Code	INJ16-10D Round 9 NS	INJ16-11D Round 9 NS	INJ16-12D Round 9 NS
	Deep Bedrock		
TETRACHLOROETHENE			
TRICHLOROETHENE			
1,1-DICHLOROETHANE			
1,1-DICHLOROETHANE, LV			
1,1-DICHLOROETHENE			
1,1-DICHLOROETHENE, LV			
CIS-1,2-DICHLOROETHENE			
TRANS-1,2-DICHLOROETHENE			
TOTAL 1,2-DICHLOROETHENE			
1,2-DICHLOROETHANE			
1,2-DICHLOROETHANE, LV			
VINYL CHLORIDE			
VINYL CHLORIDE, LV			
CHLOROETHANE			
ETHANE			
ETHENE			
METHANE			

Investigation Description:
02 - EBS Phase II Follow-On Sampling
03 - EBS Phase II Follow-On Addendum Sampling
05 - Stage II Phase I RI Sampling Event
06 - Phase II RI Sampling Event
08 - CTO 97 Supplemental Phase II Investigation
09 - CTO 107 HRC Injection Study

Qualifiers:
J - Estimated value.
U - Nondetected result.
UJ - Nondetected result is estimated.

Sample Code Description:
NORMAL - One sample was collected at this location.
NS - No sample collected.

Acronyms:
LV = Low Level
RI = Remedial Investigation
VOC = Volatile Organic Compound

T[illegible]-21
SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-02I MW16-02I-NWG-093004 NORMAL 9/30/2004	08 MW16-04I MW16-04I-NWG-100404 ORIG 10/4/2004	08 MW16-04I MW16-04I-NWG-100404-AVG AVG 10/4/2004	08 MW16-04I MW16-04I-NWG-100404-D DUP 10/4/2004	08 MW16-05I MW16-05I-NWG-092904 NORMAL 9/29/2004	08 MW16-13I MW16-13I-NWG-100704 NORMAL 10/7/2004	08 MW16-14I MW16-14I-NWG-100704 NORMAL 10/7/2004
Volatile Organics (ug/L)										
1,1-DICHLOROETHENE	340	7	7							
ACETONE	5500	NA	NA	10 UR	5 UR	5 UR	5 UR	5 UR	5 U	5 U
BROMODICHLOROMETHANE	0.18	80	NA	2 U	1 U	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0.0106	0.016	0.0161	0.0161	0.0169	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	2 U	1 U	1 U	1 U	1 U	1 UJ	1 UJ
CHLORODIBROMOMETHANE	0.13	80	NA	2 U	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	0.603 J	1 U	1 U	1 U	23	1 U	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
METHANE	NA	NA	NA	3.3 U	5 J	6.5 J	8 J	1600	3.3 U	1.6 J
TETRACHLOROETHENE	0.1	5	5	2 U	1 U	1 U	1 U	1 U	0.473 J	1 U
TOLUENE	720	1000	1000	2 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1.12 J	1 U	1 U	1 U	24.1	1 U	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	64.8	0.503	0.538	0.561	496	9.62	10
TRANS-1,2-DICHLOROETHENE	120	100	100	0.515 J	1 U	1 U	1 U	1.1	1 U	1 U
TRICHLOROETHENE	0.028	5	5	63	0.492 J	0.5265 J	0.561 J	470	9.15	10
Low-Level Volatile Organics (ug/L)										
1,1,2-TRICHLOROETHANE	0.2	5	5	0.0114 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.641	0.1 U	0.1 U	0.1 U	1.52	0.1 U	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
BENZENE	0.35	5	5	0.0106 J	0.016 J	0.01605 J	0.0161 J	0.0169 J	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.0113 J	0.0113 J	0.1 U	0.413	0.1 U	0.1 U
Total Metals (ug/L)										
ALUMINUM	36000	NA	NA	13800 J	23.3	13.5 J	3.7 J	29.1 J	1240	230
ARSENIC	0.045	10	NA	0.42 U	0.42 U	0.42 U	0.42 U	0.9	0.64 J	0.42 U
BARIUM	2600	2000	2000	195	8.4	8.8	9.2	27.7	38.3	3.9
BERYLLIUM	73	4	4	2.7	0.11 UJ	0.11 UJ	0.11 UJ	0.11 U	0.19 J	0.11 U
CADMIUM	18	5	5	1.6	0.1 J	0.065 J	0.06 U	0.16 U	0.48	0.06 U
CALCIUM	NA	NA	NA	44700 J	13900	14900	15900	8730	18200	516
CHROMIUM	110	100	100	13.5	0.88 U	0.845 U	0.81 U	1.3 U	2.9	1.4
COBALT	730	NA	NA	19.3	0.05 U	0.05 U	0.05 U	1.4	27.2	0.09 U
COPPER	1500	1300	NA	136	0.4 U	0.4 U	0.4 U	0.89	7.4	2
IRON	11000	NA	NA	16900	96.5 J	60.75 J	50 U	985	4680	305
LEAD	NA	15	15	73.2	0.2	0.145 J	0.09 J	0.35	4.7	0.78
MAGNESIUM	NA	NA	NA	7780 J	9730	10065	10400	10100	6800	160
MANGANESE	880	NA	NA	278	7.6	7.85	8.1	290	320	4.4
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.081 U	0.021 U
NICKEL	730	NA	100	43.1	0.96	1.03	1.1	1.6	41.9	0.41 J
POTASSIUM	NA	NA	NA	3790	2640	2710	2780	5080	2220	428
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
SODIUM	NA	NA	NA	8370 J	23000	22950	22900	25900	32100	22100
THALLIUM	2.4	2	2	0.17	0.07 U	0.07 U	0.07 U	0.07 J	0.13 J	0.07 U
VANADIUM	36	NA	NA	37.9	0.56 J	0.555 J	0.55 J	0.4 U	4	0.58 J
ZINC	11000	NA	NA	170	13.3 J	7.05 J	1.6 U	14	82.6 J	4.7
Dissolved Metals (ug/L)										
ALUMINUM	36000	NA	NA	2.4	2.6	18.95	35.3	0.72 U	4.4	2.1
ARSENIC	0.045	10	NA	0.26	0.13 J	0.145 J	0.16 J	0.47	0.14 J	0.14 J
BARIUM	2600	2000	2000	10	9.1	8.9	8.7	26.8	26.6	2.6 J
CADMIUM	18	5	5	0.06 U	0.02 U	0.035	0.06	0.02 U	0.43	0.03 U
CALCIUM	NA	NA	NA	7150	17200	16200	15200	8550	18100	491
CHROMIUM	110	100	100	0.67	3	3.05	3.1	1.9	1.7	1.5
COBALT	730	NA	NA	1.6	0.04	0.05	0.06	1.3	20.2	0.03
COPPER	1500	1300	NA	0.26 J	0.16 U	0.19 J	0.3 J	0.23 J	0.87 J	0.66
IRON	11000	NA	NA	50 U	50.5 J	90.75 J	131	322	176	50 U
LEAD	NA	15	15	0.4	0.08 U	0.085 J	0.13 J	0.13 J	0.078 UJ	0.26
MAGNESIUM	NA	NA	NA	3400	11100	10850	10600	9150	6510	118
MANGANESE	880	NA	NA	21.4	8.7	8.6	8.5	286	64.7	0.48
NICKEL	730	NA	100	6.2	0.96	0.97	0.98	1.7	36.7	0.31
POTASSIUM	NA	NA	NA	1880	3080	3010	2940	4900	1970	455

TABLE 4-21
SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-02I MW16-02I-NWG-093004 NORMAL 9/30/2004	08 MW16-04I MW16-04I-NWG-100404 ORIG 10/4/2004	08 MW16-04I MW16-04I-NWG-100404-AVG AVG 10/4/2004	08 MW16-04I MW16-04I-NWG-100404-D DUP 10/4/2004	08 MW16-05I MW16-05I-NWG-092904 NORMAL 9/29/2004	08 MW16-13I MW16-13I-NWG-100704 NORMAL 10/7/2004	08 MW16-14I MW16-14I-NWG-100704 NORMAL 10/7/2004
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	8410	22400	22350	22300	25800	31700	21200 J
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.18	0.82	0.85	0.88	0.52	0.21	0.32
ZINC	11000	NA	NA	9.7 J	1.2 J	1.45 J	1.7 J	4.7 J	65.2 J	1.9
Miscellaneous Parameters (ug/L)										
ALKALINITY	NA	NA	NA	11.5	60	55.5	51	89.5	7.3	11
AMMONIA	NA	NA	NA	0.21	0.1 U	0.1 U	0.1 U	0.71	0.12	0.15
CHLORIDE	NA	NA	NA	20.2	48.1	44.9	41.7	23.9	132	19
DISSOLVED INORGANIC CARBON	NA	NA	NA	1 U	3	3	3	5	3	2
DISSOLVED ORGANIC CARBON	NA	NA	NA	3	2	2	2	3	2	2
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	3.9	4.65	4.755	4.86	0.1 U	5.48	6.43
SALINITY (g/kg)	NA	NA	NA	0.068	0.166	0.1575	0.149	0.137	0.258	0.059
SULFATE	NA	NA	NA	9.99	14.4	13.55	12.7	4.94	11.6	3.2

SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-16I MW16-16I-NWG-100604 NORMAL 10/6/2004	08 MW16-17I MW16-17I-NWG-100404 NORMAL 10/4/2004	08 MW16-18I MW16-18I-NWG-100504 ORIG 10/5/2004	08 MW16-18I MW16-18I-NWG-100504-AVG AVG 10/5/2004	08 MW16-18I MW16-18I-NWG-100504-D DUP 10/5/2004
Volatile Organics (ug/L)								
1,1-DICHLOROETHENE	340	7	7					
ACETONE	5500	NA	NA	5 U	5 UR	5 UR	5 UR	5 UR
BROMODICHLOROMETHANE	0.18	80	NA	0.219 J	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	1 UJ	1 U	1 U	1 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	0.387 J	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	0.441 J	1 U	1 U	1 U	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
METHANE	NA	NA	NA	3.3 U	1 J	1.1 J	1.1 J	1.1 J
TETRACHLOROETHENE	0.1	5	5	1 U	0.766 J	2.02	1.975	1.93
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	0.441 J	1 U	1 U	1 U	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	49.5	0.766	79	74.5	69.9
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	49	1 U	77	72.5	68
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.0235 J	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.12 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	107000	18.4	70.8	47.2	23.6
ARSENIC	0.045	10	NA	26.7	0.42 U	0.42 U	0.42 U	0.42 U
BARIUM	2600	2000	2000	383	0.62 J	3.8	3.5	3.2
BERYLLIUM	73	4	4	5.4	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ
CADMIUM	18	5	5	3 J	0.06 U	0.06 U	0.06 U	0.06 U
CALCIUM	NA	NA	NA	42800	1660	2250	2240	2230
CHROMIUM	110	100	100	140	1 U	1.3 U	1.2 U	1.1 U
COBALT	730	NA	NA	129	0.05 U	0.05 U	0.05 U	0.05 U
COPPER	1500	1300	NA	341	0.4 U	0.4 U	0.4 U	0.4 U
IRON	11000	NA	NA	233000	50 U	119	72	50 U
LEAD	NA	15	15	101	0.05 U	0.18	0.135 J	0.09 J
MAGNESIUM	NA	NA	NA	44100	628	821	802.5	784
MANGANESE	880	NA	NA	3350	2.1	2.8	2.35	1.9
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U
NICKEL	730	NA	100	217	0.35 U	0.53 J	0.3525 J	0.35 U
POTASSIUM	NA	NA	NA	15800	465	744	745.5	747
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.25	0.05 U	0.05 U	0.05 U	0.05 U
SODIUM	NA	NA	NA	11800 U	4940	4880	4825	4770
THALLIUM	2.4	2	2	1.2	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	182	0.4 U	0.4 U	0.415 U	0.43 U
ZINC	11000	NA	NA	726	2	4.6 U	3.55 U	2.5 U
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	2	3	3.9	3.95	4
ARSENIC	0.045	10	NA	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U
BARIUM	2600	2000	2000	5.8	2.1 U	3.4 J	3.75 J	4.1 J
CADMIUM	18	5	5	0.05 U	0.03 U	0.02 U	0.02 U	0.02 U
CALCIUM	NA	NA	NA	4190	1720	2270	2335	2400
CHROMIUM	110	100	100	1.2	0.58	0.79	0.8	0.81
COBALT	730	NA	NA	0.09	0.01 U	0.01 U	0.01 U	0.01 U
COPPER	1500	1300	NA	0.17 J	0.16 U	0.16 U	0.16 U	0.16 U
IRON	11000	NA	NA	50 U	50 U	50 U	50 U	50 U
LEAD	NA	15	15	0.27	0.08 U	0.2	0.12	0.08 U
MAGNESIUM	NA	NA	NA	1610	691	811	812.5	814
MANGANESE	880	NA	NA	2.9	1.8 J	1.4	1.4	1.4
NICKEL	730	NA	100	1	0.12 U	0.54	0.395	0.25
POTASSIUM	NA	NA	NA	1230	479	807	804	801

TABLE 4-21
SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-16I MW16-16I-NWG-100604 NORMAL 10/6/2004	08 MW16-17I MW16-17I-NWG-100404 NORMAL 10/4/2004	08 MW16-18I MW16-18I-NWG-100504 ORIG 10/5/2004	08 MW16-18I MW16-18I-NWG-100504-AVG AVG 10/5/2004	08 MW16-18I MW16-18I-NWG-100504-D DUP 10/5/2004
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	9390	4960	5190 J	5120 J	5050
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.24	0.08 J	0.11 J	0.125 J	0.14 J
ZINC	11000	NA	NA	4.3	0.77 J	5.4 J	3.5 J	1.6 J
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	9	2.7	4.8	4.8	4.8
AMMONIA	NA	NA	NA	0.1	0.1 U	0.1 U	0.1 U	0.1 U
CHLORIDE	NA	NA	NA	11.6	6.48	5.13	5.19	5.25
DISSOLVED INORGANIC CARBON	NA	NA	NA	3	1 U	1 U	1 U	1 U
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	2	2	2	2
HYDROGEN SULFIDE	110	NA	NA	0.156	0.05 U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	3.59	2.85	3.32	3.38	3.44
SALINITY (g/kg)	NA	NA	NA	0.051	0.024	0.026	0.0265	0.027
SULFATE	NA	NA	NA	11.2	5.5	6.53	6.875	7.22

T[illegible]1
SUMMARY OF C[illegible]ALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-19I MW16-19I-NWG-100504 NORMAL 10/5/2004	08 MW16-20I MW16-20I-NWG-102804 NORMAL 10/28/2004	08 MW16-21I MW16-21I-NWG-100104 NORMAL 10/1/2004	08 MW16-22I MW16-22I-NWG-100604 NORMAL 10/6/2004	08 MW16-24I MW16-24I-NWG-100104 ORIG 10/1/2004	08 MW16-24I MW16-24I-NWG-100104-AVG AVG 10/1/2004	08 MW16-24I MW16-24I-NWG-100104-D DUP 10/1/2004
Volatile Organics (ug/L)										
1,1-DICHLOROETHENE	340	7	7							
ACETONE	5500	NA	NA	5 UR	5 U	5 UR	5 U	5 UR	5 U	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0 U	0.0122	0.0122	0 U
CARBON DISULFIDE	1000	NA	NA	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U	0.158 J	0.304 J	0.681 J	1.41	1.54	1.67
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
METHANE	NA	NA	NA	1 J	3.3 U	2.3 J	1.2 J	1.2 J	1.2 J	1.2 J
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	0.905 J	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	0.158 J	0.304 J	0.681 J	1.41	1.54	1.67
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	15	7.5	43.3	112	33.5	36.7	39.8
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	15	7.34	43	110	32	35	38
Low-Level Volatile Organics (ug/L)										
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.0143 J	0.0143 J	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.1 U	0.1 U	0.1 U	0.0168 J	0.125	0.1425	0.16
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 UJ	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.0122 J	0.0122 J	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.146	0.252	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Metals (ug/L)										
ALUMINUM	36000	NA	NA	18	9.1	27900	61100	12.6	13.1	13.6
ARSENIC	0.045	10	NA	0.42 U	0.42 U	7.1 J	10.6 J	0.42 U	0.42 U	0.42 U
BARIUM	2600	2000	2000	3.8	6.9	159	310	16.1	16.5	16.9
BERYLLIUM	73	4	4	0.11 UJ	0.11 UJ	2 J	3.9	0.11 UJ	0.11 UJ	0.11 UJ
CADMIUM	18	5	5	0.09 J	0.061 UJ	1.1	1.9 J	0.09 J	0.095 J	0.1 J
CALCIUM	NA	NA	NA	3190	3800	21300	31600	14200	14450	14700
CHROMIUM	110	100	100	1.4 U	1.1 U	41.8	90.5	1.4 U	1.35 U	1.3 U
COBALT	730	NA	NA	0.05 U	0.05 U	27.2	67.8	0.05 U	0.05 U	0.05 U
COPPER	1500	1300	NA	0.4 U	8.4 U	89.4	170	0.89	0.94	0.99
IRON	11000	NA	NA	50 U	50 U	48600	101000	50 U	39.9 J	54.8 J
LEAD	NA	15	15	0.12	0.07 J	34.4	61.6	0.05 U	0.0375 J	0.05 J
MAGNESIUM	NA	NA	NA	2060	1830	13300	26100	5810	6010	6210
MANGANESE	880	NA	NA	2.5	2.9 J	602	1230	13.9	14.1	14.3
MERCURY	11	2	2	0.021 U	0.14 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U
NICKEL	730	NA	100	0.35 U	0.38 J	70.7	148	0.78	0.815	0.85
POTASSIUM	NA	NA	NA	1510	2290	5920	10100	5940	6090	6240
SELENIUM	180	50	50	0.29 U	0.29 UJ	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.05 U	0.05 J	0.14	0.25	0.14	0.145	0.15
SODIUM	NA	NA	NA	7340	19200 J	14300	12300 J	73700	74850	76000
THALLIUM	2.4	2	2	0.08 J	0.07 U	0.29	0.69	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.4 U	67	114	0.4 U	0.4 U	0.4 U
ZINC	11000	NA	NA	3.2 U	11.1 J	200	428	4.3 J	5.9 J	7.5 J
Dissolved Metals (ug/L)										
ALUMINUM	36000	NA	NA	5.9	7	3.8	2.4	10.6	10.8	11
ARSENIC	0.045	10	NA	0.1 J	0.09 UJ	0.2	0.1 J	0.09 U	0.09 U	0.09 U
BARIUM	2600	2000	2000	4.5	7.6	4.8	7.3	16.8	16.85	16.9
CADMIUM	18	5	5	0.02 U	0.02 U	0.07 U	0.06 U	0.16 U	0.16 U	0.16 U
CALCIUM	NA	NA	NA	3290	4360	3640	5620	14800	14800	14800
CHROMIUM	110	100	100	0.93	1 U	1.5	0.89	0.87	0.83	0.79
COBALT	730	NA	NA	0.01 U	0.02 J	1.5	0.67	0.03	0.03	0.03
COPPER	1500	1300	NA	0.16 U	1.3 U	0.49	0.37	1	0.91	0.82
IRON	11000	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U	50 U
LEAD	NA	15	15	0.15 J	0.23	0.4	0.17	0.23	0.23	0.23
MAGNESIUM	NA	NA	NA	2140	2170	1680	1900	6690	6715	6740
MANGANESE	880	NA	NA	2.3	2.5	13.8 J	3.1	13.7 J	13.9 J	14.1 J
NICKEL	730	NA	100	0.45	0.55 J	4	3.5	1.2	1.15	1.1
POTASSIUM	NA	NA	NA	1650	2240	1280	1100	6370	6350	6330

TABLE 4-21
SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-19I MW16-19I-NWG-100504 NORMAL 10/5/2004	08 MW16-20I MW16-20I-NWG-102804 NORMAL 10/28/2004	08 MW16-21I MW16-21I-NWG-100104 NORMAL 10/1/2004	08 MW16-22I MW16-22I-NWG-100604 NORMAL 10/6/2004	08 MW16-24I MW16-24I-NWG-100104 ORIG 10/1/2004	08 MW16-24I MW16-24I-NWG-100104-AVG AVG 10/1/2004	08 MW16-24I MW16-24I-NWG-100104-D DUP 10/1/2004
SELENIUM	180	50	50	0.3 U	0.3 UJ	0.43 J	0.64	0.3 U	0.3 U	0.3 U
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.13	0.135	0.14
SODIUM	NA	NA	NA	7810 J	17800	13400	10500	77400	78700	80000
THALLIUM	2.4	2	2	0.07 U	0.074 UJ	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.21	0.17 U	0.65	0.37	0.14 J	0.135 J	0.13 J
ZINC	11000	NA	NA	1 J	10.8 J	7.4	5.2	7.9	7.35	6.8
Miscellaneous Parameters (ug/L)										
ALKALINITY	NA	NA	NA	4.5	6.5	7.5	11	2.8	2.9	3
AMMONIA	NA	NA	NA	0.11	0.1	0.16	0.14	0.1 U	0.1 U	0.1 U
CHLORIDE	NA	NA	NA	24.2	34.1	18.1	14.8	154	157	160
DISSOLVED INORGANIC CARBON	NA	NA	NA	1 U	2	1 U	2	1 U	1 U	1 U
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	3	2	2	2	2	2
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.143	0.09	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	3.3	3.66	3.46	3.39	5.31	5.32	5.33
SALINITY (g/kg)	NA	NA	NA	0.045	0.075	0.06	0.06	0.309	0.3085	0.308
SULFATE	NA	NA	NA	5.08	7.78	11.9	12.7	2.87	2.65	2.43

SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-25I MW16-25I-NWG-100804 NORMAL 10/8/2004	08 MW16-27I MW16-27I-NWG-101404 NORMAL 10/14/2004	08 MW16-28I MW16-28I-NWG-101404 NORMAL 10/14/2004	08 MW16-33I MW16-33I-NWG-100404 NORMAL 10/4/2004	08 MW16-34I MW16-34I-NWG-092904 NORMAL 9/29/2004	08 MW16-35I MW16-35I-NWG-092904 NORMAL 9/29/2004	08 MW16-37I MW16-37I-NWG-100504 NORMAL 10/5/2004
Volatile Organics (ug/L)										
1,1-DICHLOROETHENE	340	7	7							
ACETONE	5500	NA	NA	25 U	12 U	5 U	5 UR	5 UR	5 UR	250 U
BROMODICHLOROMETHANE	0.18	80	NA	5 U	1 U	1 U	1 U	1 U	1 U	50 U
BTEX[1]	NA	NA	NA	0 U	0.0267	0.0136	0 U	0 U	0.0164	0 U
CARBON DISULFIDE	1000	NA	NA	5 U	1 U	1 U	1 U	0.222 J	1 U	50 UJ
CHLORODIBROMOMETHANE	0.13	80	NA	5 U	1 U	1 U	1 U	1 U	1 U	50 U
CIS-1,2-DICHLOROETHENE	61	70	70	5 U	6.93	1 U	1 U	1 U	1 U	50 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
METHANE	NA	NA	NA	3.3 U	3.3 U	6.7 J	1.1 J	3.3 U	3.3 U	1.3 J
TETRACHLOROETHENE	0.1	5	5	5 U	1 U	1 U	18	3.9	3.81	50 U
TOLUENE	720	1000	1000	5 U	1 U	1 U	1 U	1 U	1 U	50 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	5 U	7.17	1 U	1 U	1 U	1 U	50 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	120	127	1.29	19.5	3.9	4.37	1700
TRANS-1,2-DICHLOROETHENE	120	100	100	5 U	0.238 J	1 U	1 U	1 U	1 U	50 U
TRICHLOROETHENE	0.028	5	5	120	120	1.29	1.5	1 U	0.555 J	1700
Low-Level Volatile Organics (ug/L)										
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.0326 J	0.314	0.1 U	0.1 U	0.1 U	0.1 U	0.044 J
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 UJ	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
BENZENE	0.35	5	5	0.1 U	0.0267 J	0.0136 J	0.1 U	0.1 U	0.0164 J	0.1 U
CHLOROFORM	0.17	80	NA	0.113 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.286
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Metals (ug/L)										
ALUMINUM	36000	NA	NA	739	1640 J	267	16.9	83.3 J	4.3 J	27400
ARSENIC	0.045	10	NA	0.48 J	0.88	0.84	0.56 J	0.42 U	0.42 U	7.3 J
BARIUM	2600	2000	2000	7.1	53.2	43	1.6	2.2	0.74 J	90.6
BERYLLIUM	73	4	4	0.11 U	0.17 J	0.11 U	0.11 UJ	0.11 U	0.11 U	1.2
CADMIUM	18	5	5	0.06 U	0.53	0.061 U	0.06 U	0.06 U	0.06 U	0.51
CALCIUM	NA	NA	NA	4200	19700	30800	2270	2340	1660	9980
CHROMIUM	110	100	100	2.7	3.6	1.6 U	1.4 U	1.9 U	1.6 U	29.6
COBALT	730	NA	NA	0.86	24.5	3.4	0.05 U	0.05 U	0.05 U	10.8
COPPER	1500	1300	NA	1.5	5.7 U	1.4 U	0.47 J	0.49 J	0.4 U	62.4
IRON	11000	NA	NA	1400	3150	1430	104	122	50 U	42500
LEAD	NA	15	15	0.51	1.7	0.47	0.06 J	0.19	0.22	25.1
MAGNESIUM	NA	NA	NA	1940	13900	11000	902	1230	794	10500
MANGANESE	880	NA	NA	29.8	250 J	857 J	16.3	3.2	1	531
MERCURY	11	2	2	0.068 U	0.021 U	0.021 U	0.021 U	0.07 U	0.021 U	0.021 U
NICKEL	730	NA	100	2.8	37	3.1	0.35 U	0.35 U	0.35 U	35.5
POTASSIUM	NA	NA	NA	1520	38700	7820	684	635	526	4680
SELENIUM	180	50	50	0.29 U	0.38 J	0.37 J	0.29 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.05 U	0.052 U	0.052 U	0.05 U	0.05 U	0.05 U	0.11
SODIUM	NA	NA	NA	10200	223000	34300	8830	6460 J	5680	7460 U
THALLIUM	2.4	2	2	0.07 U	0.066 U	0.08 J	0.07 U	0.07 U	0.07 U	0.23
VANADIUM	36	NA	NA	1.3	3	0.86	0.52 J	0.4 U	0.4 U	38.1
ZINC	11000	NA	NA	10 J	35.1	8.7	4.1	4.2	1.1 U	105
Dissolved Metals (ug/L)										
ALUMINUM	36000	NA	NA	4.5	7.9	5.5	3.5	2.8	9.7	3.6
ARSENIC	0.045	10	NA	0.27	0.22	0.37	0.78	0.09 U	0.1 J	0.1 J
BARIUM	2600	2000	2000	4.4	50.4	43.6	2.6 J	2.1 U	2.1 U	2.1 J
CADMIUM	18	5	5	0.06 U	0.51	0.04 U	0.04 U	0.02 U	0.05 U	0.05 U
CALCIUM	NA	NA	NA	4090	22100	33200	2290	2270	1690 J	2370
CHROMIUM	110	100	100	1.5	4.8	7.9	1.1	0.91	1.3	0.95
COBALT	730	NA	NA	0.21	24.1	3.1	0.03	0.01 U	0.01 U	0.02 J
COPPER	1500	1300	NA	0.16 UJ	2 U	0.32 U	0.2 J	0.16 U	0.75	0.16 U
IRON	11000	NA	NA	91.6 J	214	771	74.1 J	50 U	50 U	50 U
LEAD	NA	15	15	0.078 UJ	0.12 J	0.1 J	0.2	0.08 U	0.16	0.22
MAGNESIUM	NA	NA	NA	1550	13100	10500	986	1130	794	941
MANGANESE	880	NA	NA	13	222 J	845 J	15.8 J	1	1.1	3.3
NICKEL	730	NA	100	1.6	36	3	0.66	0.13	0.2	0.38
POTASSIUM	NA	NA	NA	1420 J	39200	8170	712	607	516	893

TABLE 4-21
SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-25I MW16-25I-NWG-100804 NORMAL 10/8/2004	08 MW16-27I MW16-27I-NWG-101404 NORMAL 10/14/2004	08 MW16-28I MW16-28I-NWG-101404 NORMAL 10/14/2004	08 MW16-33I MW16-33I-NWG-100404 NORMAL 10/4/2004	08 MW16-34I MW16-34I-NWG-092904 NORMAL 9/29/2004	08 MW16-35I MW16-35I-NWG-092904 NORMAL 9/29/2004	08 MW16-37I MW16-37I-NWG-100504 NORMAL 10/5/2004
SELENIUM	180	50	50	0.3 U	0.68	0.57 J	0.3 U	0.3 U	0.3 U	0.3 U
SILVER	180	NA	NA	0.02 U	0.021 U	0.021 U	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	9450	225000	34100	8950	5630	5060	6000
THALLIUM	2.4	2	2	0.07 U	0.074 U	0.074 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.29	1.2	2.2	0.29	0.14 J	0.28 U	0.22
ZINC	11000	NA	NA	1.8 J	38.9 J	20.5 J	1.3 J	2.8 J	1.9 J	2
Miscellaneous Parameters (ug/L)										
ALKALINITY	NA	NA	NA	12	50	115	12.2	5	5.2	5.2
AMMONIA	NA	NA	NA	0.1 U	0.1	0.36	0.1 U	0.1 U	0.16 U	0.1 U
CHLORIDE	NA	NA	NA	9.92	358	56.4	5.16	5.72	4.95	6.52
DISSOLVED INORGANIC CARBON	NA	NA	NA	2	11	14	1 U	1 U	7	13
DISSOLVED ORGANIC CARBON	NA	NA	NA	3	2	2	2	3	1	15
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	2.56	4.56 J	3.88 J	2.66	3.36	2.92	4.68
SALINITY (g/kg)	NA	NA	NA	0.05	0.797	0.254	0.037	0.031	0.024	0.032
SULFATE	NA	NA	NA	12.9	62.3	29.3	8.58	8.47	5.46	7.38

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SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-38I MW16-38I-NWG-102704 NORMAL 10/27/2004	08 MW16-39I MW16-39I-NWG-100604 NORMAL 10/6/2004	08 MW16-40I MW16-40I-NWG-101204 NORMAL 10/12/2004	08 MW16-41I MW16-41I-NWG-093004 NORMAL 9/30/2004	08 MW16-42I MW16-42I-NWG-093004 NORMAL 9/30/2004	08 MW16-43I MW16-43I-NWG-093004 NORMAL 9/30/2004
Volatile Organics (ug/L)									
1,1-DICHLOROETHENE	340	7	7						
ACETONE	5500	NA	NA	100 U	10 U	5 U	25 UR	5 UR	5 UR
BROMODICHLOROMETHANE	0.18	80	NA	20 U	2 U	1 U	5 U	1 U	1 U
BTEX[1]	NA	NA	NA	0.0259	0 U	0 U	0 U	0.397	0.0223
CARBON DISULFIDE	1000	NA	NA	20 U	2 U	1 U	5 U	0.166 J	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	20 U	2 U	1 U	5 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	20 U	2 U	1 U	5 U	38	0.333 J
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	12	6.2 U
METHANE	NA	NA	NA	3.3 U	3.3 U	3.3 U	1.1 J	16000	13
TETRACHLOROETHENE	0.1	5	5	20 U	2 U	1 U	5 U	1 U	1 U
TOLUENE	720	1000	1000	20 U	2 U	1 U	5 U	0.302 J	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	20 U	2 U	1 U	5 U	41	0.486 J
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	821	77.2	82	89	77	5.14
TRANS-1,2-DICHLOROETHENE	120	100	100	20 U	2 U	1 U	5 U	3.03	0.153 J
TRICHLOROETHENE	0.028	5	5	820	77	82	89	1 U	4.47
Low-Level Volatile Organics (ug/L)									
1,1,2-TRICHLOROETHANE	0.2	5	5	0.628	0.0901 J	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.299	0.0952 J	0.0138 J	0.0144 J	2.99 J	0.187
1,2-DICHLOROETHANE	0.12	5	5	0.0479 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 U	0.1 U	0.0126 J	0.1 UJ	0.1 UJ	0.1 UJ
BENZENE	0.35	5	5	0.0259 J	0.1 U	0.1 U	0.1 U	0.0951 J	0.0223 J
CHLOROFORM	0.17	80	NA	0.301	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.0155 J	0.1 U	33	0.1 U
Total Metals (ug/L)									
ALUMINUM	36000	NA	NA	71600	428	2960	6.6	323 J	21.7 J
ARSENIC	0.045	10	NA	13.1 J	0.73 J	0.58 J	0.42 U	39.5	1.4
BARIUM	2600	2000	2000	237	3.5	45	8.9	21.4	23.2
BERYLLIUM	73	4	4	3.9 J	0.11 U	0.31 J	0.11 UJ	0.11 U	0.11 U
CADMIUM	18	5	5	2 J	0.06 U	0.21 U	0.06 U	0.06 U	0.15 U
CALCIUM	NA	NA	NA	29800	473	18800	10200	86000	34500
CHROMIUM	110	100	100	111	4	6.8 J	1.1 U	0.84 U	0.48 U
COBALT	730	NA	NA	67.2	0.62	2.2	0.05 U	10	2.2
COPPER	1500	1300	NA	178 J	2.1	12.6	0.4 U	2.7 J	0.92
IRON	11000	NA	NA	135000	738	5310	50 U	38600	7110
LEAD	NA	15	15	58.6	0.81	5.5	0.05 U	1.4 J	0.24
MAGNESIUM	NA	NA	NA	31900	475	6920	3850	7010 J	5550 J
MANGANESE	880	NA	NA	1380	14.8	85.2 J	2.8	566	338
MERCURY	11	2	2	0.11 U	0.021 U	0.021 U	0.39	0.021 U	0.021 U
NICKEL	730	NA	100	165 J	1.4	7.3	2.9	3.6 J	6.7
POTASSIUM	NA	NA	NA	11500	501	6140	2070	8220	3390
SELENIUM	180	50	50	0.29 UJ	2	0.29 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.38	0.05 U	0.09 J	0.05 U	0.05 U	0.05 U
SODIUM	NA	NA	NA	12300 J	19500	82600 J	33000	82200	56100
THALLIUM	2.4	2	2	0.91	0.07 U	0.09 J	0.07 U	0.08 J	0.07 U
VANADIUM	36	NA	NA	146	1.8	7.3 J	0.4 U	1.4	0.4 U
ZINC	11000	NA	NA	486 J	4.6	21 J	3	6.1 J	7.5
Dissolved Metals (ug/L)									
ALUMINUM	36000	NA	NA	21.8 J	7.1	20.3	3	1 J	0.72 U
ARSENIC	0.045	10	NA	0.16 J	0.61	0.09 U	0.09 U	56.8	0.18 J
BARIUM	2600	2000	2000	5.9	2.1 U	25.8	9.5	20.1	20.4
CADMIUM	18	5	5	0.11 U	0.02 U	0.13 U	0.08 U	0.02 U	0.06 U
CALCIUM	NA	NA	NA	6340	448	17800	10400	89500	35000
CHROMIUM	110	100	100	0.72 U	2.1	2	1.6	7	2.2
COBALT	730	NA	NA	2.3	0.32	0.13	0.07	4.8	1.9
COPPER	1500	1300	NA	0.42 U	0.19 J	1 U	0.34	0.64 J	0.5
IRON	11000	NA	NA	350	50 U	54.5 J	50 U	39800	853
LEAD	NA	15	15	0.23	0.18	0.08 U	0.24	0.33 J	0.38
MAGNESIUM	NA	NA	NA	2650 J	384	5860	4100	6660	5120
MANGANESE	880	NA	NA	39.1 J	8.7	15.1 J	2.8 J	588	169
NICKEL	730	NA	100	4 J	0.65	1.8 J	3.1	2.2 J	6.5
POTASSIUM	NA	NA	NA	1300	470	5280	2070	8450	3430

TABLE 4-21
SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-38I MW16-38I-NWG-102704 NORMAL 10/27/2004	08 MW16-39I MW16-39I-NWG-100604 NORMAL 10/6/2004	08 MW16-40I MW16-40I-NWG-101204 NORMAL 10/12/2004	08 MW16-41I MW16-41I-NWG-093004 NORMAL 9/30/2004	08 MW16-42I MW16-42I-NWG-093004 NORMAL 9/30/2004	08 MW16-43I MW16-43I-NWG-093004 NORMAL 9/30/2004
SELENIUM	180	50	50	0.3 UJ	2.1	0.3 U	0.3 U	0.41 J	0.3 U
SILVER	180	NA	NA	0.02 U	0.02 U	0.05	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	9860	19600 J	74100	33200	74900	52300
THALLIUM	2.4	2	2	0.074 UJ	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.31 U	0.8	0.23	0.43	2	0.53
ZINC	11000	NA	NA	8.4 J	1.3	3.8 J	3.3	0.85 J	3.8 J
Miscellaneous Parameters (ug/L)									
ALKALINITY	NA	NA	NA	9.5	16.3	7.2	10.5	364	87.5
AMMONIA	NA	NA	NA	0.15	0.1 U	0.1	0.1 U	2.64	0.11
CHLORIDE	NA	NA	NA	14	7.42	177	92.7	93.1	110
DISSOLVED INORGANIC CARBON	NA	NA	NA	2	4	2	1 U	1 U	1 U
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	4	4	2	6	3
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	1.34	2.6	4.67	4.87	0.103	1.36
SALINITY (g/kg)	NA	NA	NA	0.063	0.053	0.336	0.148	0.532	0.3
SULFATE	NA	NA	NA	19.7	12.2	6.46	8.59	1.92	8.11

T[illegible]21
SUMMARY OF CH[illegible]CALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-44I MW16-44I-NWG-092704 NORMAL 9/27/2004	08 MW16-45I MW16-45I-NWG-092804 NORMAL 9/28/2004	08 MW16-46I MW16-46I-NWG-092804 NORMAL 9/28/2004	08 MW16-48I MW16-48I-NWG-100404 ORIG 10/4/2004	08 MW16-48I MW16-48I-NWG-100404-AVG AVG 10/4/2004	08 MW16-48I MW16-48I-NWG-100404-D DUP 10/4/2004
Volatile Organics (ug/L)									
1,1-DICHLOROETHENE	340	7	7						
ACETONE	5500	NA	NA	5 U	5 UR	5 UR	1.45 J	1.45 J	5 UR
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0.0157	0.0304	0.478	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	1 U	0.153 J	1 U	1 U	1 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	4.14	6.15	0.349 J	1 U	1 U	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
METHANE	NA	NA	NA	37	6.9 U	110	3.3 U	1.5 J	1.5 J
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	4.46	6.7	0.843 J	1 U	1 U	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	8.91	527	1.79	0.137	0.206	0.274
TRANS-1,2-DICHLOROETHENE	120	100	100	0.316 J	0.552 J	0.494 J	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	3.14	520	0.454 J	0.137 J	0.2055 J	0.274 J
Low-Level Volatile Organics (ug/L)									
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.386	0.484	0.497	0.1 U	0.1 U	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.0366 J	0.1 U	0.1 U	0.1 U	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
BENZENE	0.35	5	5	0.0157 J	0.0304 J	0.478	0.1 U	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.926	0.117	0.1 U	0.1 U	0.1 U	0.1 U
Total Metals (ug/L)									
ALUMINUM	36000	NA	NA	68.4 J	184 J	11.7	148	146	144
ARSENIC	0.045	10	NA	0.42 U	3.4	25.2	0.42 U	0.42 U	0.42 U
BARIUM	2600	2000	2000	8.2	29.8	20	18.3	18.2	18.1
BERYLLIUM	73	4	4	0.11 U	0.11 U	0.11 U	0.11 UJ	0.11 UJ	0.11 UJ
CADMIUM	18	5	5	0.53	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
CALCIUM	NA	NA	NA	17400	14900	68400	25500	25150	24800
CHROMIUM	110	100	100	0.51 U	0.58 U	0.34 U	1.8 U	1.45 U	1.1 U
COBALT	730	NA	NA	6.2	2	5.5	1.1	0.995	0.89
COPPER	1500	1300	NA	0.97	2.3	0.4 U	1.2	1.25	1.3
IRON	11000	NA	NA	4200	7380	40500	508	511.5	515
LEAD	NA	15	15	0.19	0.56	0.1 J	1.7	1.65	1.6
MAGNESIUM	NA	NA	NA	2000	4990	7230	4500	4475	4450
MANGANESE	880	NA	NA	621	889	391	29.3	27.4	25.5
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.27	0.14025	0.021 U
NICKEL	730	NA	100	1.9	1.8	3.4 J	0.94	0.94	0.94
POTASSIUM	NA	NA	NA	2630 J	2250 J	4690	2980	2970	2960
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.05 U	0.05 U	0.05 U	0.06 J	0.0425 J	0.05 U
SODIUM	NA	NA	NA	30400 J	35500	28300	12700	12600	12500
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.4 U	0.4 U	0.85	0.78 J	0.71 J
ZINC	11000	NA	NA	3.6 U	9.7 J	5.1 J	8.6 J	5.875 J	6.3 U
Dissolved Metals (ug/L)									
ALUMINUM	36000	NA	NA	1 J	0.72 U	0.72 U	1.3 J	1.35 J	1.4 J
ARSENIC	0.045	10	NA	0.21 J	3.5 J	25.8 J	0.11 J	0.105 J	0.1 J
BARIUM	2600	2000	2000	7.5	28.3	17.7	17.5	17.3	17.1
CADMIUM	18	5	5	0.43	0.02 U	0.04 U	0.02 U	0.02 U	0.02 U
CALCIUM	NA	NA	NA	18100	15200	66300 J	26800	26550	26300
CHROMIUM	110	100	100	5	1.9	7.5	2.8	2.6	2.4
COBALT	730	NA	NA	6.2	1.9	5.6	0.03	0.025 J	0.02 J
COPPER	1500	1300	NA	0.55	0.45	0.27 J	0.44	0.475	0.51
IRON	11000	NA	NA	3350	6710	36500	76.1 J	77.9 J	79.7 J
LEAD	NA	15	15	0.13 J	0.21	0.18 J	0.08 U	0.08 U	0.08 U
MAGNESIUM	NA	NA	NA	2110	4730	6780	4700	4685	4670
MANGANESE	880	NA	NA	632	916	382	1.5	1.55	1.6
NICKEL	730	NA	100	2	1.7	3.7 J	0.8	0.75	0.7
POTASSIUM	NA	NA	NA	2690	2260	4460	3220	3215	3210

TABLE 4-21
SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-44I MW16-44I-NWG-092704 NORMAL 9/27/2004	08 MW16-45I MW16-45I-NWG-092804 NORMAL 9/28/2004	08 MW16-46I MW16-46I-NWG-092804 NORMAL 9/28/2004	08 MW16-48I MW16-48I-NWG-100404 ORIG 10/4/2004	08 MW16-48I MW16-48I-NWG-100404-AVG AVG 10/4/2004	08 MW16-48I MW16-48I-NWG-100404-D DUP 10/4/2004
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	32200 J	38600 J	30900 J	14100	13950	13800
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	1.3	0.47	2	0.66	0.625	0.59
ZINC	11000	NA	NA	13 J	7.3 J	3.7 J	1.8 J	6.45 J	11.1 J
Miscellaneous Parameters (ug/L)									
ALKALINITY	NA	NA	NA	52.5	39.5	317	54.5	54.5	54.5
AMMONIA	NA	NA	NA	0.36 U	0.1 U	0.61 U	0.1 U	0.1 U	0.1 U
CHLORIDE	NA	NA	NA	48.3	63.1	61.2	30.9	38.1	45.3
DISSOLVED INORGANIC CARBON	NA	NA	NA	12	6	27	1	1.5	2
DISSOLVED ORGANIC CARBON	NA	NA	NA	7	2	24	2	2	2
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	1.5	0.1 U	0.1 U	16.2	16.35	16.5
SALINITY (g/kg)	NA	NA	NA	0.144	0.175	0.3	0.144	0.144	0.144
SULFATE	NA	NA	NA	6.16	16.7	16.4	11.6	11.7	11.8

TABLE 1
SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08	08	08	08	08	08	08
Location				MW16-49I	MW16-50I	MW16-56I	MW16-57I	MW16-58I1	MW16-58I2	MW16-59I
Sample Number				MW16-49I-NWG-101104	MW16-50I-NWG-102604	MW16-56I-NWG-101404	MW16-57I-NWG-102604	MW16-58I1-NWG-101304	MW16-58I2-NWG-101304	MW16-59I-NWG-102504
Sample Code				NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date				10/11/2004	10/26/2004	10/14/2004	10/26/2004	10/13/2004	10/13/2004	10/25/2004
Volatile Organics (ug/L)										
1,1-DICHLOROETHENE	340	7	7							
ACETONE	5500	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U	15 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0.0126	0.0314	0.0177	0.322
CARBON DISULFIDE	1000	NA	NA	1 U	0.563 J	1 U	0.134 J	1 U	1 U	0.156 J
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	0.364 J	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1.31 U	1 U	1 U	1.2	1.67 U	28	3.3
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
METHANE	NA	NA	NA	16	12000	3.3 U	3.3 U	1300	6100	3.3 U
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U	1 U	0.303 J
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	1 U	1 U	1.5	1 U	29.7	3.3
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	0.096	0 U	0.851	312	0.0304	113	674
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	0.307 J	1 U	1.73	1 U
TRICHLOROETHENE	0.028	5	5	1 U	1 U	0.851 J	310	1 U	82	670
Low-Level Volatile Organics (ug/L)										
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.0204 J	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.096 J	0.1 U	0.1 U	0.443	0.1 U	0.163	0.131
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.0283 J	0.1 U	0.1 U	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U	0.0126 J	0.0314 J	0.0177 J	0.0188 J
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.1 U	0.022 J	0.0304 J	1.23	0.158
Total Metals (ug/L)										
ALUMINUM	36000	NA	NA	168	85.6	365	4670	19800	1860	245000
ARSENIC	0.045	10	NA	9.2	2.1	0.76 J	4.6	8.2	2.9	13.2
BARIUM	2600	2000	2000	44.1	9.7	100	25.1	64.7	49.9	1230
BERYLLIUM	73	4	4	0.11 UJ	0.11 UR	0.11 U	0.28	0.81 J	0.14 J	10.4 R
CADMIUM	18	5	5	0.06 U	0.06 U	0.061 U	0.06 U	0.27	0.06 U	8.7
CALCIUM	NA	NA	NA	19700	14400 J	40700	687	37600	37600	138000
CHROMIUM	110	100	100	1.5 U	1.2 U	1.4 U	6.5	20.8 J	4.7 J	311
COBALT	730	NA	NA	3.7	0.05 U	0.21	2.4	8.5	4.2	394
COPPER	1500	1300	NA	0.82 U	5.3 J	3.8 U	13.7	40.3	5.8 U	896
IRON	11000	NA	NA	9380	619	749	6510	32500	9890	612000
LEAD	NA	15.	15	0.19	0.12	0.7	6.5	18.3	2.2	149
MAGNESIUM	NA	NA	NA	5020	38600	5390	1210	8790	5680	116000
MANGANESE	880	NA	NA	417 J	55.2	25.2 J	62	959 J	3690 J	12500
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U
NICKEL	730	NA	100	1.2	0.8 J	1.7	8.6	19.7	4.8	642
POTASSIUM	NA	NA	NA	8870	34500	10700	1630	7210	6700	45200
SELENIUM	180	50	50	0.46 J	6.1	1.2	0.29 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.05 U	0.05 U	0.052 U	0.05 U	0.08 J	0.05 U	1.2
SODIUM	NA	NA	NA	30000 J	429000 J	276000	22000 J	90000 J	42000 J	17500 J
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.12 J	0.07 U	0.28	0.07 U	1.2
VANADIUM	36	NA	NA	0.52 U	0.56 J	1.1	7.1	24.5 J	3.9 J	382
ZINC	11000	NA	NA	2.6 J	2.6 U	8.4	18.5	62.3 J	26.9 J	1930
Dissolved Metals (ug/L)										
ALUMINUM	36000	NA	NA	6.1	5.3	3.9	8.5	26.8	3.1	8.7
ARSENIC	0.045	10	NA	10.2	2.4	0.22	3.5	5.9	2.7	1.2
BARIUM	2600	2000	2000	41.2	8.5	108	2.1 U	21	43.7	17.6
CADMIUM	18	5	5	0.26 U	0.02 U	0.025 U	0.02 U	0.02 U	0.06 U	0.02 U
CALCIUM	NA	NA	NA	20700	13400	44800	400	45300	41200	6750
CHROMIUM	110	100	100	3.1	9.3	5.8	0.79 U	3.1	3.6	0.96 U
COBALT	730	NA	NA	3.6	0.01 U	0.14 U	0.06	1	2.3	1.1
COPPER	1500	1300	NA	0.79 U	3.5	2.4 U	0.23 J	1.2 U	0.51 U	0.23 J
IRON	11000	NA	NA	9050	403	154	81.8 J	6130	6430	6050
LEAD	NA	15	15	0.08 U	0.08 U	0.078 U	0.11 J	0.24	0.14 J	0.56
MAGNESIUM	NA	NA	NA	5040	33400	5020	165	3380	5150	2650
MANGANESE	880	NA	NA	404 J	66.7	21.9 J	8.3	784 J	3710 J	271
NICKEL	730	NA	100	0.98 J	0.64	1	0.42	1 J	1.7 J	1.4
POTASSIUM	NA	NA	NA	8540	34700	11100	915	6990	6600	3260

TABLE 4-21
SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-49I MW16-49I-NWG-101104 NORMAL 10/11/2004	08 MW16-50I MW16-50I-NWG-102604 NORMAL 10/26/2004	08 MW16-56I MW16-56I-NWG-101404 NORMAL 10/14/2004	08 MW16-57I MW16-57I-NWG-102604 NORMAL 10/26/2004	08 MW16-58I1 MW16-58I1-NWG-101304 NORMAL 10/13/2004	08 MW16-58I2 MW16-58I2-NWG-101304 NORMAL 10/13/2004	08 MW16-59I MW16-59I-NWG-102504 NORMAL 10/25/2004
SELENIUM	180	50	50	0.6	5.7	1.7	0.3 U	0.3 U	0.3 U	0.3 U
SILVER	180	NA	NA	0.02 U	0.02 U	0.03 J	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	28700	429000	280000	22100	89400	42200	15800
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.09 J	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.82	3.1	1.6	0.29 U	0.87	0.93	0.17 U
ZINC	11000	NA	NA	6.3 J	1.5	19.5 J	0.65 U	9 J	21.9 J	6.2
Miscellaneous Parameters (ug/L)										
ALKALINITY	NA	NA	NA	118	362	101	19.5	155	169	27
AMMONIA	NA	NA	NA	0.62	3.39	0.1 U	0.1 U	0.97	2.34	1.25
CHLORIDE	NA	NA	NA	20	554	413	9.68	287	75.3	13.2
DISSOLVED INORGANIC CARBON	NA	NA	NA	20	23	11	1	14	14	19
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	10	3	2	4	4	3
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	0.1 U	0.1 U	14.2 J	0.121	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.167	1.35	0.898	0.055	0.405	0.29	0.081
SULFATE	NA	NA	NA	10	33.1	18.8	17.2	4.84	0.968	26

TA[illegible]21
SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-61I MW16-61I-NWG-102504 NORMAL 10/25/2004	08 MW16-62I MW16-62I-NWG-102604 NORMAL 10/26/2004	08 MW16-63I MW16-63I-NWG-102604 NORMAL 10/26/2004	08 MW16-64I MW16-64I-NWG-102704 NORMAL 10/27/2004	08 MW16-65I MW16-65I-NWG-102804 NORMAL 10/28/2004	09 MW16-66I MW16-66I-NWG-111604 NORMAL 11/16/2004	09 MW16-67I MW16-67I-NWG-111604 NORMAL 11/16/2004	09 MW16-68I MW16-68I-NWG-111604 NORMAL 11/16/2004
Volatile Organics (ug/L)											
1,1-DICHLOROETHENE	340	7	7						1 U	1 U	1 U
ACETONE	5500	NA	NA	6.16 U	15 U	5 U	10 U	5 U	5 U	5 U	16 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0.0151	0 U	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	0.139 J	1 U	1 U	0.295 J	0.114 J	1 U	1 U	0.355 J
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	0.529 J	0.815 J	0.303 J	0.238 J	1 U	1 U	1 U	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
METHANE	NA	NA	NA	3.3 U	3.3 U	3.3 U	10 U	7.2 U	4.7 U	3.9 U	3.3 U
TETRACHLOROETHENE	0.1	5	5	1 U	0.322 J	0.311 J	0.431 J	1 U			
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	0.529 J	0.815 J	0.303 J	0.238 J	1 U	2 U	2 U	2 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	9.93	21.1	19.6	32.7	3.19	1.58	11	11
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	9.4	20	19	32	3.19	1.58	11	11
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			
1,1-DICHLOROETHENE	340	7	7	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			
1,4-DICHLOROBENZENE	0.5	75	75	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U	0.0151 J	0.1 U			
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			
Total Metals (ug/L)											
ALUMINUM	36000	NA	NA	19700	2690	18300	24500	21300			
ARSENIC	0.045	10	NA	2	0.51 J	1.8 U	2.7	1.5			
BARIUM	2600	2000	2000	101	66.6	56.3	92.9	108			
BERYLLIUM	73	4	4	2.4 R	0.31	1.4	2.3 R	1.2 J			
CADMIUM	18	5	5	0.59	0.19 U	0.37 U	0.55	0.36 J			
CALCIUM	NA	NA	NA	13900 J	21400	9050	16100	17100 J			
CHROMIUM	110	100	100	16.7	3.5	16.3	22.6	26.3			
COBALT	730	NA	NA	11.7	1.3	6.5	10.9	15.3 J			
COPPER	1500	1300	NA	39.5 J	5.6	32.9	42.1	29.5 J			
IRON	11000	NA	NA	28300	4480	23200	33500	27300			
LEAD	NA	15	15	17.3	2.1	14	18.6	13.5			
MAGNESIUM	NA	NA	NA	11600	8520	6970	8890	8850			
MANGANESE	880	NA	NA	397	103	278	384	371			
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.078 U			
NICKEL	730	NA	100	22.8 J	3.5	15.4	30.1	32.5 J			
POTASSIUM	NA	NA	NA	6070	3950	4350	7130	5390 J			
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 UJ			
SILVER	180	NA	NA	0.17	0.1 J	0.1 J	0.11	0.09 J			
SODIUM	NA	NA	NA	110000 J	76100 J	15300 J	13600 J	11400 J			
THALLIUM	2.4	2	2	0.13 U	0.07 U	0.09 U	0.11 U	0.43			
VANADIUM	36	NA	NA	24.2	4.1	22.2	28.8	31.9 J			
ZINC	11000	NA	NA	84.2	13.5	55.7	94.6	87.7 J			
Dissolved Metals (ug/L)											
ALUMINUM	36000	NA	NA	5.7	46.5	6.4	244	63.1 J			
ARSENIC	0.045	10	NA	0.09 U	0.09 U	0.64	1.2	0.89 J			
BARIUM	2600	2000	2000	26.3	53.9	2.5 J	7.7	9.2			
CADMIUM	18	5	5	0.02 U	0.15 U	0.02 U	0.02 U	0.02 U			
CALCIUM	NA	NA	NA	10300	20000	4590	11900	18300			
CHROMIUM	110	100	100	0.7 U	0.89 U	2	1.5	1 U			
COBALT	730	NA	NA	0.38	0.05	0.03	0.04	0.02 J			
COPPER	1500	1300	NA	1.1	0.73	0.22 J	0.37 J	0.16 U			
IRON	11000	NA	NA	50 U	50 U	50 U	50 U	50 U	49.1 U	32.2 U	32.2 U
LEAD	NA	15	15	0.08 U	0.16	0.42	0.12 J	0.08 U			
MAGNESIUM	NA	NA	NA	5920	7940	1880	1410	2520 J			
MANGANESE	880	NA	NA	30	40.3	8	0.81 U	2.1 J	15.4	109	21.6
NICKEL	730	NA	100	0.88	0.62	0.35	0.63 J	0.44 J			
POTASSIUM	NA	NA	NA	4640	3340	2010	5150	2140			

TABLE 4-21
SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-61I MW16-61I-NWG-102504 NORMAL 10/25/2004	08 MW16-62I MW16-62I-NWG-102604 NORMAL 10/26/2004	08 MW16-63I MW16-63I-NWG-102604 NORMAL 10/26/2004	08 MW16-64I MW16-64I-NWG-102704 NORMAL 10/27/2004	08 MW16-65I MW16-65I-NWG-102804 NORMAL 10/28/2004	09 MW16-66I MW16-66I-NWG-111604 NORMAL 11/16/2004	09 MW16-67I MW16-67I-NWG-111604 NORMAL 11/16/2004	09 MW16-68I MW16-68I-NWG-111604 NORMAL 11/16/2004
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 U	0.45 J	0.47 J			
SILVER	180	NA	NA	0.03 J	0.06	0.02 U	0.02 U	0.02 U			
SODIUM	NA	NA	NA	116000	74000	14400	15700	11600			
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.074 UJ			
VANADIUM	36	NA	NA	0.16 U	0.14 U	0.79	1.3	3.1			
ZINC	11000	NA	NA	6.1	2.9	1.6	0.44 U	0.64 U			
Miscellaneous Parameters (ug/L)											
ALKALINITY	NA	NA	NA	7	3.5	7	38	29.7	7	10	5
AMMONIA	NA	NA	NA	0.13	0.12	0.13	0.1 U	0.13	0.2	0.44	0.1 U
CHLORIDE	NA	NA	NA	184	162	31.6	18.1	30.3	11.1	39.5	268
DISSOLVED INORGANIC CARBON	NA	NA	NA	1	1	1	2	1	2	4	2
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	2	2	2	3	2	1	3
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	6.33	4.99	2.92	4.52	4.71	3.76	3.06	9.74
SALINITY (g/kg)	NA	NA	NA	0.379	0.32	0.069	0.087	0.102			
SULFATE	NA	NA	NA	5.98	2.46	10	11.6	12	6.72	7.76	14.2

T[illegible]21
SUMMARY OF C[illegible]CALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	09 MW16-69I MW16-69I-NWG-120904 NORMAL 12/9/2004	09 MW16-70I MW16-70I-NWG-111704 NORMAL 11/17/2004	09 MW16-71I MW16-71I-NWG-111704 ORIG 11/17/2004	09 MW16-71I MW16-71I-NWG-111704-AVG AVG 11/17/2004	09 MW16-71I MW16-71I-NWG-111704-D DUP 11/17/2004
Volatile Organics (ug/L)								
1,1-DICHLOROETHENE	340	7	7	0.302 J	1 U	1 U	1 U	1 U
ACETONE	5500	NA	NA	5 U	5 U	8.2 U	6.6 U	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	1 U	1 U	1 U	1 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1.36	1 U	0.174 J	0.174 J	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
METHANE	NA	NA	NA	15 J	5.2 U	3.8 U	3.55 U	3.3 U
TETRACHLOROETHENE	0.1	5	5					
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 J	2 U	0.174 J	0.174 J	2 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	551	11	12.2	12.2	12
TRANS-1,2-DICHLOROETHENE	120	100	100	0.201 J	1 U	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	550	11	12	12	12
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5					
1,1-DICHLOROETHENE	340	7	7					
1,2-DICHLOROETHANE	0.12	5	5					
1,4-DICHLOROBENZENE	0.5	75	75					
BENZENE	0.35	5	5					
CHLOROFORM	0.17	80	NA					
VINYL CHLORIDE	0.02	2	2					
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA					
ARSENIC	0.045	10	NA					
BARIUM	2600	2000	2000					
BERYLLIUM	73	4	4					
CADMIUM	18	5	5					
CALCIUM	NA	NA	NA					
CHROMIUM	110	100	100					
COBALT	730	NA	NA					
COPPER	1500	1300	NA					
IRON	11000	NA	NA					
LEAD	NA	15	15					
MAGNESIUM	NA	NA	NA					
MANGANESE	880	NA	NA					
MERCURY	11	2	2					
NICKEL	730	NA	100					
POTASSIUM	NA	NA	NA					
SELENIUM	180	50	50					
SILVER	180	NA	NA					
SODIUM	NA	NA	NA					
THALLIUM	2.4	2	2					
VANADIUM	36	NA	NA					
ZINC	11000	NA	NA					
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA					
ARSENIC	0.045	10	NA					
BARIUM	2600	2000	2000					
CADMIUM	18	5	5					
CALCIUM	NA	NA	NA					
CHROMIUM	110	100	100					
COBALT	730	NA	NA					
COPPER	1500	1300	NA					
IRON	11000	NA	NA	32.2 UJ	32.2 UJ	32.2 U	34.65 U	37.1 U
LEAD	NA	15	15					
MAGNESIUM	NA	NA	NA					
MANGANESE	880	NA	NA	93.1	13.4	6.4	6.4	6.4
NICKEL	730	NA	100					
POTASSIUM	NA	NA	NA					

TABLE 4-21
SUMMARY OF CHEMICALS DETECTED
2004 INTERMEDIATE OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	09 MW16-69I MW16-69I-NWG-120904 NORMAL 12/9/2004	09 MW16-70I MW16-70I-NWG-111704 NORMAL 11/17/2004	09 MW16-71I MW16-71I-NWG-111704 ORIG 11/17/2004	09 MW16-71I MW16-71I-NWG-111704-AVG AVG 11/17/2004	09 MW16-71I MW16-71I-NWG-111704-D DUP 11/17/2004
SELENIUM	180	50	50					
SILVER	180	NA	NA					
SODIUM	NA	NA	NA					
THALLIUM	2.4	2	2					
VANADIUM	36	NA	NA					
ZINC	11000	NA	NA					
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	11.5	1 U	9	9	9
AMMONIA	NA	NA	NA	0.11	0.19	0.22	0.135	0.1 U
CHLORIDE	NA	NA	NA	70	126	110	108.5	107
DISSOLVED INORGANIC CARBON	NA	NA	NA	7	3	2	2.5	3
DISSOLVED ORGANIC CARBON	NA	NA	NA	1	3	1	1	1
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	1.4	9.84	8.98	9.03	9.08
SALINITY (g/kg)	NA	NA	NA					
SULFATE	NA	NA	NA	20	13.4	25.8	25.7	25.6

Investigation Description:
08 - CTO 97 Supplemental Phase II Investigation
09 - CTO 107 HRC Injection Study

Qualifiers:
J - Estimated value.
U - Nondetected result.
UJ - Nondetected result is estimated.
UR - Nondetected result is rejected.
R - Rejected value.

Sample Code Description:
NORMAL - One sample was collected at this location.
ORIG - First of two samples collected at this location.
DUP - Second of two samples collected at this location.
AVG - Average of the two samples collected at this location.

Acronyms:
GA = Drinking water suitability
GW = Groundwater
MCL = Maximum Contaminant Level
NA = Not Applicable/Not Available
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
VOC = Volatile Organic Compound

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

T 2
SUMMARY OF DESCRIPTIVE STATISTICS
PRE-2004 INTERMEDIATE OVERBURDEN GROUNDWATER
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	1/34	0.1 J	0.1 J	1	0.488	0.1	MW16-38I-NWG-112702	NA	810 N	NA	NA
1,1-DICHLOROETHENE	2/8	0.4	1	1	0.55	0.7	28-GW05-NGW-100798-44	NA	340 C	7	7
ACETONE	4/9	2.92 J	25 J	5	5.2	8.59	MW16-34I-NWG-112502-D	NA	5500 N	NA	NA
BTEX	7/34	0.008	3	---	0.135	0.656	MW16-46I-NWG-120902 and Dup	NA	NA	NA	NA
CARBON DISULFIDE	13/34	0.19 J	0.97 J	1	0.49	0.473	MW16-42I-NWG-120202	NA	1000 N	NA	NA
CHLORODIBROMOMETHANE	1/34	0.32 J	0.32 J	1	0.495	0.32	MW16-13I-NWG-112102	NA	**0.13 C**	80	NA
CHLOROMETHANE	1/34	0.25 J	0.25 J	1	0.493	0.25	MW16-42I-NWG-120202	NA	160 N	NA	NA
CIS-1,2-DICHLOROETHENE	16/26	0.18 J	51	1	3.52	5.41	MW16-42I-NWG-120202	NA	61 N	70	70
METHANE	6/27	2.6	3800	1	154	691	MW16-42I-NWG-120202	NA	NA	NA	NA
METHYLENE CHLORIDE	2/34	1	6.97 J	1 - 11	1.1	3.99	MW16-21I-NWG-121202	NA	**4.3 C**	**5**	**5**
TETRACHLOROETHENE	13/34	0.11 J	25	1	1.48	3.07	MW16-33I-NWG-120202-D	NA	**0.1 C**	**5**	**5**
TOLUENE	3/34	0.19 J	0.97 J	1	0.495	0.438	MW16-33I-NWG-120202-D	NA	720 N	1000	1000
TOTAL 1,2-DICHLOROETHENE	19/34	0.18	54.8	1 - 2	3.53	5.89	MW16-42I-NWG-120202	NA	61 N[7]	NA	70
TOTAL CHLORINATED VOCS	30/34	0.63	1204	---	174	197	MW16-38I-NWG-112702	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	6/26	0.27 J	3.75	1	0.63	1.06	MW16-42I-NWG-120202	NA	120 N	100	100
TRICHLOROETHENE	28/34	0.22 J	1200	0.8 - 3.33	168	204	MW16-38I-NWG-112702	NA	**0.028 C**	**5**	**5**
VINYL CHLORIDE	1/7	3	3	1	0.857	3	28-GW08-NGW-101698-29	NA	**0.02 C**	**2**	**2**
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	9/27	0.05 J	2 J	0.1	0.168	0.403	MW16-38I-NWG-112702	NA	**0.2 C**	5	5
1,1-DICHLOROETHANE	3/27	0.05 J	0.2	0.1	0.0559	0.103	MW16-38I-NWG-112702	NA	810 N	NA	NA
1,1-DICHLOROETHENE	6/27	0.07 J	2	0.1	0.159	0.54	MW16-45I-NWG-120302	NA	340 C	7	7
1,4-DICHLOROBENZENE	1/27	0.04 J	0.05 J	0.1	0.0498	0.045	MW16-46I-NWG-120902-D	NA	0.5 C	75	75
BENZENE	5/27	0.008 J	3	0.1	0.162	0.656	MW16-46I-NWG-120902 and Dup	NA	**0.35 C**	5	5
CHLOROFORM	15/27	0.01 J	0.7	0.1	0.134	0.201	MW16-22I-NWG-121802	NA	**0.17 C**	80	NA
VINYL CHLORIDE	4/27	0.3	25	0.1	1.01	6.54	MW16-42I-NWG-120202	NA	**0.02 C[8]**	**2**	**2**
Semivolatile Organics (ug/L)											
2,4,5-TRICHLOROPHENOL	1/14	1 J	1 J	1 - 10	2.46	1	MW16-04I-NWG-121002	NA	3600 N	NA	NA
2,4,6-TRICHLOROPHENOL	1/14	1 J	1 J	1 - 5	1.39	1	MW16-04I-NWG-121002	NA	3.6 N	NA	NA
4-BROMOPHENYL PHENYL ETHER	1/14	1 J	1 J	1 - 5	1.39	1	MW16-04I-NWG-121002	NA	NA	NA	NA
4-CHLOROPHENYL PHENYL ETHER	1/14	1 J	1 J	1 - 5	1.39	1	MW16-04I-NWG-121002	NA	NA	NA	NA
ACENAPHTHENE	1/7	2	2	1	0.714	2	28-GW07-NGW-101498-27	NA	370 N	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	3/14	2 J	11	2 - 8	2.57	5.33	MW16-04I-NWG-121002	NA	**4.8 C**	**6**	**6**
BUTYL BENZYL PHTHALATE	1/14	1 J	1 J	1 - 5	1.39	1	MW16-04I-NWG-121002	NA	7300 N	NA	NA
CARBAZOLE	1/14	1 J	1 J	1 - 5	1.39	1	MW16-04I-NWG-121002	NA	3.4 C	NA	NA
DI-N-BUTYL PHTHALATE	2/14	2 J	15	1 - 5	2.36	8.5	MW16-45I-NWG-120302	NA	3600 N	NA	NA
DIBENZOFURAN	2/14	1	1 J	1 - 5	1.43	1	28-GW07-NGW-101498-27, MW16-04I-NWG-121002	NA	12 N	NA	NA
DIETHYL PHTHALATE	1/14	1 J	1 J	1 - 5	1.39	1	MW16-04I-NWG-121002	NA	29000 N	NA	NA
FLUORENE	1/7	1	1	1	0.571	1	28-GW07-NGW-101498-27	NA	240 N	NA	NA
HEXACHLOROBENZENE	1/14	1 J	1 J	2 - 5	1.64	1	MW16-04I-NWG-121002	NA	**0.042 C**	1	1
N-NITROSODIPHENYLAMINE	1/14	1 J	1 J	3 - 5	1.89	1	MW16-04I-NWG-121002	NA	14 C	NA	NA
PHENANTHRENE	1/7	1	1	1	0.571	1	28-GW07-NGW-101498-27	NA	180 N[9]	NA	NA
TOTAL PAHS	1/7	4	4	---	0.571	4	28-GW07-NGW-101498-27	NA	NA	NA	NA
Pesticides (ug/L)											
4,4'-DDD	1/14	0.0037 J	0.0037 J	0.002 - 0.01	0.00319	0.0037	28-GW01-NGW-101598-23	NA	0.28 C	NA	NA
ALPHA-BHC	1/13	0.0073	0.0073	0.001 - 0.005	0.00195	0.0073	28-GW04-NGW-100898-42	NA	0.011 C	NA	NA
ENDRIN ALDEHYDE	1/14	0.0062 J	0.0062 J	0.006 - 0.01	0.00423	0.0062	28-GW01-NGW-101598-23	NA	11 N[10]	NA	NA
GAMMA-BHC (LINDANE)	1/14	0.001 J	0.001 J	0.001 - 0.005	0.00154	0.001	28-GW07-NGW-101498-27	NA	0.052 C	0.2	NA
HEPTACHLOR EPOXIDE	3/14	0.0013 J	0.0034 J	0.001 - 0.005	0.00184	0.0021	28-GW07-NGW-101498-27	NA	0.0074 C	0.2	NA
Total Metals (ug/L)											
ALUMINUM	6/7	74 J	45000 J	1000	6884	7948	MW16-37I-NWG-120402	5315	**36000 N**	NA	NA
ARSENIC	2/7	1.3	3.3	0.52 - 1.3	1.04	2.3	MW16-45I-NWG-120302	6.4	**0.045 C**	10	NA
BARIUM	7/7	5.4 J	200	200	41.9	41.9	MW16-37I-NWG-120402	80.5	2600 N	2000	2000
BERYLLIUM	1/7	0.32	0.32	1.3	0.603	0.32	MW16-37I-NWG-120402	1.3	73 N	4	4
CADMIUM	2/7	0.09 J	0.12	0.09 - 1.3	0.322	0.105	MW16-37I-NWG-120402	3	18 N	5	5
CALCIUM	7/7	560	58000	---	19909	19909	MW16-04I-NWG-121002	13302	NA	NA	NA
CHROMIUM	1/7	48 J	48 J	10 - 50	14	48	MW16-37I-NWG-120402	214	110 N[11]	100 [11]	100
COPPER	2/7	11 J	76 J	25 - 120	28.1	43.5	MW16-37I-NWG-120402	25.8	1500 N	1300 [12]	NA
IRON	6/7	490	78000 J	100	13031	15194	MW16-37I-NWG-120402	25500	**11000 N**	NA	NA
LEAD	5/7	0.4	7.5	1.3	1.96	2.48	MW16-37I-NWG-120402	4.8	NA	15 [12]	15
MAGNESIUM	7/7	590	33000	---	10041	10041	MW16-04I-NWG-121002	5126	NA	NA	NA
MANGANESE	7/7	11	940	---	313	313	MW16-37I-NWG-120402	3292	**880 N**	NA	NA
NICKEL	1/7	62 J	62 J	40 - 200	37.4	62	MW16-37I-NWG-120402	154	730 N	NA	100
POTASSIUM	7/7	1100	13000	---	5007	5007	MW16-37I-NWG-120402	3843	NA	NA	NA
SODIUM	7/7	7400	98000	---	34064	34064	MW16-04I-NWG-121002	12346	NA	NA	NA

TABLE 4-22
SUMMARY OF DESCRIPTIVE STATISTICS
PRE-2004 INTERMEDIATE OVERBURDEN GROUNDWATER
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
VANADIUM	1/7	6.1	6.1	0.52 - 1.3	1.37	6.1	MW16-37I-NWG-120402	24.4	36 N	NA	NA
ZINC	4/7	8.7 J	650 J	9.8 - 20	96	163	MW16-48I-NWG-121102-D	89.9	11000 N	NA	NA
Dissolved Metals (ug/L)											
ALUMINUM	2/14	63 J	70 J	18 - 200	55.9	66.5	MW16-04I-NWG-121002	NA	36000 N	NA	NA
ANTIMONY	1/14	0.8	0.8	2.4 - 2.5	1.19	0.8	MW16-41I-NWG-121702	NA	15 N	6	6
ARSENIC	3/14	0.37 J	3.1	1.3 - 1.8	0.994	1.76	MW16-45I-NWG-120302	NA	0.045 C	10	NA
BARIUM	7/14	5.3 J	77.1 J	7.4 - 200	34.5	24.1	28-GW04-NGW-100898-42	NA	2600 N	2000	2000
CADMIUM	1/14	0.1	0.1	0.08 - 1.3	0.292	0.1	MW16-41I-NWG-121702	NA	18 N	5	5
CALCIUM	10/14	710	56400	7290 - 16700	11330	13881	28-GW04-NGW-100898-42	NA	NA	NA	NA
IRON	21/34	48 J	39000 J	100 - 3460	3050	4739	MW16-46I-NWG-120902 and Dup	NA	11000 N	NA	NA
LEAD	2/14	0.09 J	1 J	1 - 1.5	0.589	0.545	28-GW06-NGW-100698-35	NA	NA	15 [12]	15
MAGNESIUM	14/14	560	7100	---	3906	3906	MW16-04I-NWG-121002	NA	NA	NA	NA
MANGANESE	29/34	5.7	1600	15 - 513	244	274	28-GW08-NGW-101698-29	NA	880 N	NA	NA
NICKEL	2/14	10.2 J	11.8 J	9.6 - 40	13.3	11	28-GW07-NGW-101498-27	NA	730 N	NA	100
POTASSIUM	10/14	990	7370	2110 - 4000	2302	2605	28-GW04-NGW-100898-42	NA	NA	NA	NA
SODIUM	11/14	7400	55000	14100 - 31000	24450	28164	28-GW05-NGW-100798-44	NA	NA	NA	NA
ZINC	7/14	7.6 J	124	8.3 - 68	32.6	50.2	28-GW05-NGW-100798-44	NA	11000 N	NA	NA
Miscellaneous Parameters (ug/L)											
ALKALINITY	27/27	5	358	---	45	45	MW16-42I-NWG-120202	NA	NA	NA	NA
AMMONIA	16/27	0.1	3.36	0.1	0.295	0.464	MW16-42I-NWG-120202	NA	NA	NA	NA
CHLORIDE	27/27	4.5	423	---	42.7	42.7	MW16-14I-NWG-112102	NA	NA	NA	NA
DISSOLVED ORGANIC CARBON	11/21	5	140	5	19	34	MW16-42I-NWG-120202	NA	NA	NA	NA
NITRATE	22/26	0.6	10 J	0.1	2.87	3.39	MW16-48I-NWG-121102	NA	10000 N	10000	NA
NITRITE	3/26	0.13	0.22	0.1	0.0652	0.182	MW16-33I-NWG-120202	NA	1000 N	1000	NA
SALINITY (g/kg)	1/27	0.66	0.66	0.1 - 1	0.439	0.660	MW16-14I-NWG-112102	NA	NA	NA	NA
SULFATE	27/27	0.2	22	---	11.4	11.4	MW16-33I-NWG-120202	NA	NA	NA	NA
SULFIDE	10/27	0.05 J	1.7 J	0.05	0.117	0.274	MW16-35I-NWG-120402	NA	NA	NA	NA
TOTAL INORGANIC CARBON	3/27	1 J	40 J	1 - 5	3.22	13	MW16-46I-NWG-120902	NA	NA	NA	NA
TOTAL ORGANIC CARBON	5/6	7	34	5	14.7	17.1	MW16-44I-NWG-121202	NA	NA	NA	NA
Field Parameters (ug/L)											
CARBON DIOXIDE	26/26	14	465	---	85.6	85.6	MW16-42I-NWG-120202	NA	NA	NA	NA
DISSOLVED OXYGEN	27/27	-0.6	11.47	---	3.74	3.74	MW16-34I-NWG-112502	NA	NA	NA	NA
FERRIC IRON	13/13	0.01	7.04	---	1.64	1.64	MW16-45I-NWG-120302	NA	NA	NA	NA
OXIDATION REDUCTION POTENTIAL (MV)	27/27	-139.8	232.8	---	107	107	MW16-14I-NWG-112102	NA	NA	NA	NA
PH (S.U.)	27/27	5.24	7.09	---	6.19	6.19	MW16-42I-NWG-120202	NA	NA	NA	NA
TEMPERATURE (C)	27/27	7.02	14.38	---	11.2	11.2	MW16-22I-NWG-121802	NA	NA	NA	NA

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - Background values from Table 7-4 from Stone & Websters Final Background Inorganics Groundwater Study Report, December 1996.
The groundwater background values are based on the more conservative value of the 95% UCL and the maximum detected concentration.
4 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
5 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Winter 2004).
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
7 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
8 - PRG is based on CSF for lifetime exposures by a child/adult.
9 - The value for pyrene is used as a surrogate for phenanthrene.
10 - The value for endrin is used as a surrogate for endrin aldehyde.
11 - The value for hexavalent chromium is presented.
12 - The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers:
C - Carcinogen.
N - Noncarcinogen.
J - Estimated value.

T[illegible]-22
SUMMARY OF DESCRIPTIVE STATISTICS
PRE-2004 INTERMEDIATE OVERBURDEN GROUNDWATER
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]

Acronyms:
BKG = Background
CSF = Cancer Slope Factor
GA = Drinking water suitability
GW = Groundwater
HI = Hazard Index
MCL = Maximum Contaminant Level
NA = No Criteria Available
PAH = Polyaromatic Hydrocarbon
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SDWA = Safe Drinking Water Act
U.S. EPA = United States Environmental Protection Agency

TABLE 4-23
SUMMARY OF DESCRIPTIVE STATISTICS
2004 INTERMEDIATE OVERBURDEN GROUNDWATER
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
Volatile Organics (ug/L)											
1,1-DICHLOROETHENE	1/6	0.302 J	0.302 J	1	0.467	0.302	MW16-69I-NWG-120904	NA	340 C	7	7
ACETONE	1/33	1.45 J	1.45 J	5 - 250	8.69	1.45	MW16-48I-NWG-100404	NA	5500 N	NA	NA
BROMODICHLOROMETHANE	1/48	0.219 J	0.219 J	1 - 50	1.31	0.219	MW16-16I-NWG-100604	NA	**0.18 C**	80	NA
BTEX	18/48	0.0106	0.478	---	0.0308	0.0823	MW16-46I-NWG-092804	NA	NA	NA	NA
CARBON DISULFIDE	10/48	0.114 J	0.563 J	1 - 50	1.26	0.23	MW16-50I-NWG-102604	NA	1000 N	NA	NA
CHLORODIBROMOMETHANE	2/48	0.364 J	0.387 J	1 - 50	1.31	0.376	MW16-16I-NWG-100604	NA	**0.13 C**	80	NA
CIS-1,2-DICHLOROETHENE	22/48	0.158 J	38	1 - 50	3.55	5.39	MW16-42I-NWG-093004	NA	61 N	70	70
ETHANE	1/48	12	12	6.2	3.29	12	MW16-42I-NWG-093004	NA	NA	NA	NA
METHANE	23/48	1 J	16000	3.3 - 10	776	1618	MW16-42I-NWG-093004	NA	NA	NA	NA
TETRACHLOROETHENE	10/42	0.311 J	18	1 - 50	2.05	3.09	MW16-33I-NWG-100404	NA	**0.1 C**	**5**	**5**
TOLUENE	2/48	0.302 J	0.303 J	1 - 50	1.3	0.303	MW16-59I-NWG-102504	NA	720 N	1000	1000
TOTAL 1,2-DICHLOROETHENE	22/48	0.158 J	41	1 - 50	3.75	5.75	MW16-42I-NWG-093004	NA	61 N[7]	NA	70
TOTAL CHLORINATED VOCS	47/48	0.0304	1700	---	133	136	MW16-37I-NWG-100504	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	11/48	0.153 J	3.03	1 - 50	1.37	0.785	MW16-42I-NWG-093004	NA	120 N	100	100
TRICHLOROETHENE	42/48	0.137 J	1700	1	129	147	MW16-37I-NWG-100504	NA	**0.028 C**	**5**	**5**
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	5/42	0.0114 J	0.628	0.1	0.0622	0.153	MW16-38I-NWG-102704	NA	**0.2 C**	5	5
1,1-DICHLOROETHENE	21/42	0.0138 J	2.99 J	0.1	0.228	0.406	MW16-42I-NWG-093004	NA	340 C	7	7
1,2-DICHLOROETHANE	3/42	0.0283 J	0.0479 J	0.1	0.0491	0.0376	MW16-38I-NWG-102704	NA	0.12 C	5	5
1,4-DICHLOROBENZENE	1/42	0.0126 J	0.0126 J	0.1	0.0491	0.0126	MW16-40I-NWG-101204	NA	0.5 C	75	75
BENZENE	18/42	0.0106 J	0.478	0.1	0.0494	0.0486	MW16-46I-NWG-092804	NA	**0.35 C**	5	5
CHLOROFORM	4/42	0.146	0.301	0.1 - 0.12	0.0691	0.246	MW16-38I-NWG-102704	NA	**0.17 C**	80	NA
VINYL CHLORIDE	10/42	0.0113 J	33	0.1	0.893	3.59	MW16-42I-NWG-093004	NA	**0.02 C[8]**	**2**	**2**
Total Metals (ug/L)											
ALUMINUM	42/42	3.7 J	245000	---	16089	16089	MW16-59I-NWG-102504	5315	**36000 N**	NA	NA
ARSENIC	28/42	0.48 J	39.5	0.42 - 1.8	4.55	6.7	MW16-42I-NWG-093004	6.4	**0.045 C**	**10**	NA
BARIUM	42/42	0.62 J	1230	---	88.5	88.5	MW16-59I-NWG-102504	80.5	2600 N	2000	2000
BERYLLIUM	15/38	0.14 J	5.4	0.11	0.663	1.59	MW16-16I-NWG-100604	1.3	73 N	**4**	**4**
CADMIUM	17/42	0.09 J	8.7	0.06 - 0.37	0.56	1.32	MW16-59I-NWG-102504	3	18 N	**5**	**5**
CALCIUM	42/42	473	138000	---	22640	22640	MW16-59I-NWG-102504	13302	NA	NA	NA
CHROMIUM	21/42	1.4	311	0.34 - 1.9	21.1	41.7	MW16-59I-NWG-102504	214	**110 N[9]**	**100 [9]**	**100**
COBALT	30/42	0.21	394	0.05 - 0.09	20.7	28.9	MW16-59I-NWG-102504	24.9	730 N	NA	NA
COPPER	29/42	0.47 J	896	0.4 - 8.4	50.8	73	MW16-59I-NWG-102504	25.8	1500 N	1300 [10]	NA
IRON	37/42	54.8 J	612000	50	35292	40057	MW16-59I-NWG-102504	25500	**11000 N**	NA	NA
LEAD	40/42	0.05 J	149	0.05	14.7	15.4	MW16-59I-NWG-102504	4.8	NA	**15 [10]**	**15**
MAGNESIUM	42/42	160	116000	---	11189	11189	MW16-59I-NWG-102504	5126	NA	NA	NA
MANGANESE	42/42	1	12500	---	746	746	MW16-59I-NWG-102504	3292	**880 N**	NA	NA
MERCURY	2/42	0.27	0.39	0.021 - 0.14	0.0276	0.265	MW16-41I-NWG-093004	ND	11 N	2	2
NICKEL	37/42	0.38 J	642	0.35	37.7	42.7	MW16-59I-NWG-102504	154	730 N	NA	**100**
POTASSIUM	42/42	428	45200	---	7090	7090	MW16-59I-NWG-102504	3843	NA	NA	NA
SELENIUM	6/42	0.37 J	6.1	0.29	0.375	1.75	MW16-50I-NWG-102604	2.2	180 N	50	50
SILVER	16/42	0.05 J	1.2	0.05 - 0.052	0.0943	0.207	MW16-59I-NWG-102504	1	180 N	NA	NA
SODIUM	40/42	4770	429000 J	7460 - 11800	49349	51576	MW16-50I-NWG-102604	12346	NA	NA	NA
THALLIUM	16/42	0.07 J	1.2	0.066 - 0.13	0.167	0.378	MW16-16I-NWG-100604, MW16-59I-NWG-102504	4.1	2.4 N	2	2
VANADIUM	28/42	0.52 J	382	0.4 - 0.52	27.2	40.6	MW16-59I-NWG-102504	24.4	**36 N**	NA	NA
ZINC	37/42	2	1930	1.1 - 6.3	113	128	MW16-59I-NWG-102504	89.9	11000 N	NA	NA
Dissolved Metals (ug/L)											
ALUMINUM	38/42	1 J	244	0.72	14	15.5	MW16-64I-NWG-102704	NA	36000 N	NA	NA
ARSENIC	32/42	0.1 J	56.8	0.09	2.86	3.74	MW16-42I-NWG-093004	NA	**0.045 C**	**10**	NA
BARIUM	37/42	2.1 J	108	2.1	17.3	19.5	MW16-56I-NWG-101404	NA	2600 N	2000	2000
CADMIUM	4/42	0.06	0.51	0.02 - 0.26	0.0567	0.351	MW16-27I-NWG-101404	NA	18 N	5	5
CALCIUM	42/42	400	89500	---	16232	16232	MW16-42I-NWG-093004	NA	NA	NA	NA
CHROMIUM	35/42	0.58	9.3	0.7 - 1	2.32	2.69	MW16-50I-NWG-102604	NA	110 N[9]	100 [9]	100
COBALT	35/42	0.02 J	24.1	0.01 - 0.14	2.02	2.42	MW16-27I-NWG-101404	NA	730 N	NA	NA
COPPER	26/42	0.17 J	3.5	0.16 - 2.4	0.486	0.573	MW16-50I-NWG-102604	NA	1500 N	1300 [10]	NA
IRON	22/48	50.5 J	39800	32.2 - 50	2465	5352	MW16-42I-NWG-093004	NA	**11000 N**	NA	NA

TABLE 4-23
SUMMARY OF DESCRIPTIVE STATISTICS
2004 INTERMEDIATE OVERBURDEN GROUNDWATER
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
LEAD	31/42	0.1 J	0.56	0.078 - 0.08	0.174	0.222	MW16-59I-NWG-102504	NA	NA	15 [10]	15
MAGNESIUM	42/42	118	33400	---	4626	4626	MW16-50I-NWG-102604	NA	NA	NA	NA
MANGANESE	47/48	0.48	3710 J	0.81	206	210	MW16-58I2-NWG-101304	NA	880 N	NA	NA
NICKEL	41/42	0.13	36.7	0.12	3.22	3.3	MW16-13I-NWG-100704	NA	730 N	NA	100
POTASSIUM	42/42	455	39200	---	4807	4807	MW16-27I-NWG-101404	NA	NA	NA	NA
SELENIUM	11/42	0.41 J	5.7	0.3	0.438	1.25	MW16-50I-NWG-102604	NA	180 N	50	50
SILVER	5/42	0.03 J	0.14	0.02 - 0.021	0.0161	0.061	MW16-24I-NWG-100104-D	NA	180 N	NA	NA
SODIUM	42/42	4960	429000	---	49282	49282	MW16-50I-NWG-102604	NA	NA	NA	NA
THALLIUM	1/42	0.09 J	0.09 J	0.07 - 0.074	0.0365	0.09	MW16-56I-NWG-101404	NA	2.4 N	2	2
VANADIUM	35/42	0.08 J	3.1	0.14 - 0.31	0.712	0.832	MW16-50I-NWG-102604, MW16-65I-NWG-102804	NA	36 N	NA	NA
ZINC	39/42	0.77 J	65.2 J	0.44 - 0.65	7.62	8.19	MW16-13I-NWG-100704	NA	11000 N	NA	NA
Miscellaneous Parameters (mg/L)											
ALKALINITY	47/48	2.7	364	1	51.4	52.5	MW16-42I-NWG-093004	NA	NA	NA	NA
AMMONIA	29/48	0.1	3.39	0.1 - 0.61	0.35	0.532	MW16-50I-NWG-102604	NA	NA	NA	NA
CHLORIDE	48/48	4.95	554	---	85.1	85.1	MW16-50I-NWG-102604	NA	NA	NA	NA
DISSOLVED INORGANIC CARBON	37/48	1	27	1	5.32	6.76	MW16-46I-NWG-092804	NA	NA	NA	NA
DISSOLVED ORGANIC CARBON	48/48	1	24	---	3.4	3.4	MW16-46I-NWG-092804	NA	NA	NA	NA
HYDROGEN SULFIDE	3/48	0.09	0.156	0.05	0.0315	0.13	MW16-16I-NWG-100604	NA	0.11 N	NA	NA
NITRATE	40/48	0.103	16.5	0.1	3.79	4.54	MW16-48I-NWG-100404-D	NA	10 N	10	NA
SALINITY (g/kg)	42/42	0.024	1.35	---	0.213	0.213	MW16-50I-NWG-102604	NA	NA	NA	NA
SULFATE	48/48	0.968	62.3	---	12.3	12.3	MW16-27I-NWG-101404	NA	NA	NA	NA

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - Background values from Table 7-4 from Stone & Websters Final Background Inorganics Groundwater Study Report, December 1996.
The groundwater background values are based on the more conservative value of the 95% UCL and the maximum detected concentration.
4 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
5 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Winter 2004).
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
7 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
8 - PRG is based on CSF for lifetime exposures by a child/adult.
9 - The value for hexavalent chromium is presented.
10 - The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers:
C - Carcinogen.
N - Noncarcinogen
J - Estimated value.

Acronyms:
BKG = Background
CSF = Cancer Slope Factor
GA = Drinking water suitability
GW = Groundwater
HI = Hazard Index
MCL = Maximum Contaminant Level
PRG = Preliminary Remediation Goal
RI = Remedial Investigation\
RIDEM = Rhode Island Department of Environmental Management
SDWA = Safe Drinking Water Act
U.S. EPA = United States Environmental Protection Agency

TABLE 4
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	09 INJ16-01D INJ16-01D-NWG-111704 NORMAL 11/17/2004	09 INJ16-02D INJ16-02D-NWG-120904 NORMAL 12/9/2004	09 INJ16-03D INJ16-03D-NWG-111704 NORMAL 11/17/2004	09 INJ16-04D INJ16-04D-NWG-112204 NORMAL 11/22/2004	09 INJ16-05D INJ16-05D-NWG-112204 NORMAL 11/22/2004
Volatile Organics (ug/L)								
1,1-DICHLOROETHANE	810	NA	NA	25 U	1 U	25 U	25 U	50 U
1,1-DICHLOROETHENE	340	7	7	25 U	1 U	25 U	25 U	50 U
ACETONE	5500	NA	NA	130 U	5 U	130 U	130 U	250 U
BROMODICHLOROMETHANE	0.18	80	NA	25 U	1 U	25 U	25 U	50 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	25 U	1 U	25 U	25 U	50 U
CHLORODIBROMOMETHANE	0.13	80	NA	25 U	1 U	25 U	25 U	50 U
CHLOROFORM	0.17	80	NA	25 U	1 U	25 U	25 U	50 U
CHLOROMETHANE	160	NA	NA	25 U	1 U	25 U	25 U	50 U
CIS-1,2-DICHLOROETHENE	61	70	70	25 U	6.25	25 U	25 U	50 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	4.5 U	15 J	4.4 U	4 U	4.2 U
TETRACHLOROETHENE	0.1	5	5					
TOLUENE	720	1000	1000	25 U	1 U	25 U	25 U	50 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	50 U	6.25	50 U	50 U	100 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	710	367	830	770	1200
TRANS-1,2-DICHLOROETHENE	120	100	100	25 U	1 U	25 U	25 U	50 U
TRICHLOROETHENE	0.028	5	5	710	360	830	770	1200
VINYL CHLORIDE	0.02	2	2	25 U	0.366 J	25 U	25 U	50 U
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5					
1,1-DICHLOROETHENE	340	7	7					
1,2-DICHLOROETHANE	0.12	5	5					
1,4-DICHLOROBENZENE	0.5	75	75					
BENZENE	0.35	5	5					
CHLOROFORM	0.17	80	NA					
VINYL CHLORIDE	0.02	2	2					
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA					
ANTIMONY	15	6	6					
ARSENIC	0.045	10	NA					
BARIUM	2600	2000	2000					
BERYLLIUM	73	4	4					
CADMIUM	18	5	5					
CALCIUM	NA	NA	NA					
CHROMIUM	110	100	100					
COBALT	730	NA	NA					
COPPER	1500	1300	NA					
IRON	11000	NA	NA					
LEAD	NA	15	15					
MAGNESIUM	NA	NA	NA					
MANGANESE	880	NA	NA					
NICKEL	730	NA	100					
POTASSIUM	NA	NA	NA					
SELENIUM	180	50	50					
SILVER	180	NA	NA					
SODIUM	NA	NA	NA					
THALLIUM	2.4	2	2					
VANADIUM	36	NA	NA					
ZINC	11000	NA	NA					
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA					
ARSENIC	0.045	10	NA					
BARIUM	2600	2000	2000					
BERYLLIUM	73	4	4					
CALCIUM	NA	NA	NA					
CHROMIUM	110	100	100					
COBALT	730	NA	NA					
COPPER	1500	1300	NA					
IRON	11000	NA	NA	482	50.2 J	3090	1160	6620
LEAD	NA	15	15					
MAGNESIUM	NA	NA	NA					
MANGANESE	880	NA	NA	438	191	848	526	493
MERCURY	11	2	2					

TABLE 4-24
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	09 INJ16-01D INJ16-01D-NWG-111704 NORMAL 11/17/2004	09 INJ16-02D INJ16-02D-NWG-120904 NORMAL 12/9/2004	09 INJ16-03D INJ16-03D-NWG-111704 NORMAL 11/17/2004	09 INJ16-04D INJ16-04D-NWG-112204 NORMAL 11/22/2004	09 INJ16-05D INJ16-05D-NWG-112204 NORMAL 11/22/2004
NICKEL	730	NA	100					
POTASSIUM	NA	NA	NA					
SELENIUM	180	50	50					
SODIUM	NA	NA	NA					
VANADIUM	36	NA	NA					
ZINC	11000	NA	NA					
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	15.5	18	28.5	26.5	21.3
AMMONIA	NA	NA	NA	0.56	0.16	0.14	0.14	0.14
CHLORIDE	NA	NA	NA	118	110	17.4	55.7	20.9
DISSOLVED INORGANIC CARBON	NA	NA	NA	4	5	3	3	4
DISSOLVED ORGANIC CARBON	NA	NA	NA	1	2	3	3	2
NITRATE	10000	10000	NA	1.71	2.1	0.1 U	0.288	0.1 U
SALINITY (g/kg)	NA	NA	NA					
SULFATE	NA	NA	NA	16.4	23	18.4	17.6	18.8

SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	09 INJ16-06D INJ16-06D-NWG-112204 NORMAL 11/22/2004	09 INJ16-07D INJ16-07D-NWG-120904 NORMAL 12/9/2004	09 INJ16-08D INJ16-08D-NWG-112204 NORMAL 11/22/2004	09 INJ16-09D INJ16-09D-NWG-112304 NORMAL 11/23/2004	09 INJ16-10D INJ16-10D-NWG-112304 NORMAL 11/23/2004	09 INJ16-11D INJ16-11D-NWG-111904 NORMAL 11/19/2004	09 INJ16-12D INJ16-12D-NWG-111904 NORMAL 11/19/2004	08 MW16-01D MW16-01D-NWG-100704 NORMAL 10/7/2004
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	810	NA	NA	25 U	1 U	25 U	25 U	25 U	25 U	50 U	1 U
1,1-DICHLOROETHENE	340	7	7	25 U	0.303 J	25 U	25 U	25 U	25 U	50 U	
ACETONE	5500	NA	NA	130 U	5 U	130 U	130 U	130 U	130 U	250 U	5 U
BROMODICHLOROMETHANE	0.18	80	NA	25 U	1 U	25 U	25 U	25 U	25 U	50 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	25 U	1 U	25 U	25 U	25 U	25 U	50 U	1 UJ
CHLORODIBROMOMETHANE	0.13	80	NA	25 U	1 U	25 U	25 U	25 U	25 U	50 U	1 U
CHLOROFORM	0.17	80	NA	25 U	0.134 J	25 U	25 U	25 U	25 U	50 U	
CHLOROMETHANE	160	NA	NA	25 U	1 U	25 U	25 U	25 U	25 U	50 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	25 U	1.52	25 U	25 U	25 U	25 U	50 U	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	4.2 U	6.3 U	4.1 U	4.7 U	4.8 U	3.8 U	4 U	3.3 U
TETRACHLOROETHENE	0.1	5	5								1 U
TOLUENE	720	1000	1000	25 U	1 U	25 U	25 U	25 U	25 U	50 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	50 U	1.63 J	50 U	50 U	50 U	50 U	100 U	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	860	482	640	810	870	760	1700	6.04
TRANS-1,2-DICHLOROETHENE	120	100	100	25 U	0.111 J	25 U	25 U	25 U	25 U	50 U	1 U
TRICHLOROETHENE	0.028	5	5	860	480	640	810	870	760	1700	6.04
VINYL CHLORIDE	0.02	2	2	25 U	1 U	25 U	25 U	25 U	25 U	50 U	
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	0.2	5	5								0.1 U
1,1-DICHLOROETHENE	340	7	7								0.1 U
1,2-DICHLOROETHANE	0.12	5	5								0.1 U
1,4-DICHLOROBENZENE	0.5	75	75								0.1 UJ
BENZENE	0.35	5	5								0.1 U
CHLOROFORM	0.17	80	NA								0.1 U
VINYL CHLORIDE	0.02	2	2								0.1 U
Total Metals (ug/L)											
ALUMINUM	36000	NA	NA								44.5
ANTIMONY	15	6	6								0.17 U
ARSENIC	0.045	10	NA								2
BARIUM	2600	2000	2000								19.9
BERYLLIUM	73	4	4								0.11 U
CADMIUM	18	5	5								0.06 U
CALCIUM	NA	NA	NA								15000
CHROMIUM	110	100	100								0.88 U
COBALT	730	NA	NA								5.8
COPPER	1500	1300	NA								0.71 J
IRON	11000	NA	NA								17200
LEAD	NA	15	15								0.11
MAGNESIUM	NA	NA	NA								5400
MANGANESE	880	NA	NA								849
NICKEL	730	NA	100								3.4
POTASSIUM	NA	NA	NA								2230
SELENIUM	180	50	50								0.29 U
SILVER	180	NA	NA								0.23
SODIUM	NA	NA	NA								17800 J
THALLIUM	2.4	2	2								0.07 U
VANADIUM	36	NA	NA								0.4 U
ZINC	11000	NA	NA								20.7 J
Dissolved Metals (ug/L)											
ALUMINUM	36000	NA	NA								0.72 U
ARSENIC	0.045	10	NA								1.1
BARIUM	2600	2000	2000								18.8
BERYLLIUM	73	4	4								0.12 U
CALCIUM	NA	NA	NA								14700
CHROMIUM	110	100	100								0.75
COBALT	730	NA	NA								5.4
COPPER	1500	1300	NA								0.16 UJ
IRON	11000	NA	NA	5840	6180	6120	6280	3580	8240	3000	13100
LEAD	NA	15	15								0.078 UJ
MAGNESIUM	NA	NA	NA								5130
MANGANESE	880	NA	NA	392	386	386	366	584	539	387	786
MERCURY	11	2	2								0.021 U

TABLE 4-24
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	09 INJ16-06D INJ16-06D-NWG-112204 NORMAL 11/22/2004	09 INJ16-07D INJ16-07D-NWG-120904 NORMAL 12/9/2004	09 INJ16-08D INJ16-08D-NWG-112204 NORMAL 11/22/2004	09 INJ16-09D INJ16-09D-NWG-112304 NORMAL 11/23/2004	09 INJ16-10D INJ16-10D-NWG-112304 NORMAL 11/23/2004	09 INJ16-11D INJ16-11D-NWG-111904 NORMAL 11/19/2004	09 INJ16-12D INJ16-12D-NWG-111904 NORMAL 11/19/2004	08 MW16-01D MW16-01D-NWG-100704 NORMAL 10/7/2004
NICKEL	730	NA	100								3.1
POTASSIUM	NA	NA	NA								2250
SELENIUM	180	50	50								0.3 U
SODIUM	NA	NA	NA								16500
VANADIUM	36	NA	NA								0.13 J
ZINC	11000	NA	NA								10.9 J
Miscellaneous Parameters (ug/L)											
ALKALINITY	NA	NA	NA	28.5	27.5	24.5	21.5	33.5	22	15	11
AMMONIA	NA	NA	NA	0.1	0.1 U	0.19	0.11	0.11	0.11	0.1	0.1 U
CHLORIDE	NA	NA	NA	15.2	26	14.3	13.8	19.6	13.6	11.8	83.9
DISSOLVED INORGANIC CARBON	NA	NA	NA	5	7	4	4	5	5	10	2
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	1	2	1	1	1	2	2
NITRATE	10000	10000	NA	0.1 U	1.2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA								0.167
SULFATE	NA	NA	NA	22.5	26	18.7	19.1	18.2	18.4	18.6	18.7

SUMMARY OF [illegible]ALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-02D MW16-02D-NWG-093004 NORMAL 9/30/2004	08 MW16-03D MW16-03D-NWG-100804 NORMAL 10/8/2004	08 MW16-04D MW16-04D-NWG-100404 NORMAL 10/4/2004	08 MW16-05D MW16-05D-NWG-092904 NORMAL 9/29/2004	08 MW16-06D MW16-06D-NWG-092804 NORMAL 9/28/2004	08 MW16-07D MW16-07D-NWG-092804 NORMAL 9/28/2004	08 MW16-08D MW16-08D-NWG-100804 NORMAL 10/8/2004	08 MW16-09D MW16-09D-NWG-100804 NORMAL 10/8/2004
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	810	NA	NA	50 U	1 U	1 U	0.164 J	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	340	7	7								
ACETONE	5500	NA	NA	250 UR	5 U	5 UR	5 U	5 UR	5 UR	5 U	5 U
BROMODICHLOROMETHANE	0.18	80	NA	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0.0277	0.0345	0 U	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	50 U	1 UJ	1 U	1 U	1 U	1 U	1 UJ	1 UJ
CHLORODIBROMOMETHANE	0.13	80	NA	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	0.17	80	NA								
CHLOROMETHANE	150	NA	NA	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	50 U	1 U	4.79	4.83	1 U	1 U	3.76	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	3.3 U	3.3 U	2.7 J	23	3.3 U	3.3 U	3.3 U	3.3 U
TETRACHLOROETHENE	0.1	5	5	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	50 U	1 U	5.05	5.36	1 U	1 U	3.92	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	1201	0.163	346	1107	1.33	2.83	324	0.236
TRANS-1,2-DICHLOROETHENE	120	100	100	50 U	1 U	0.26 J	0.527 J	1 U	1 U	0.158 J	1 U
TRICHLOROETHENE	0.028	5	5	1200	0.142 J	340	1100	1.33	2.82	320	0.216 J
VINYL CHLORIDE	0.02	2	2								
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	0.2	5	5	0.516	0.1 U	0.1 U	0.609	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.598	0.021 J	0.382	0.948	0.1 U	0.1 U	0.188	0.0197 J
1,2-DICHLOROETHANE	0.12	5	5	0.023 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 U	0.1 UJ	0.1 UJ	0.1 U	0.1 UJ	0.1 UJ	1.45 J	0.1 UJ
BENZENE	0.35	5	5	0.1 U	0.1 U	0.0277 J	0.0345 J	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.0397 J	0.1 U	0.134	0.0486 J	0.1 U	0.0132 J	0.386	0.1 U
Total Metals (ug/L)											
ALUMINUM	36000	NA	NA	3.3 UJ	704	33.8	220 J	5.9 J	141 J	3.3 U	387
ANTIMONY	15	6	6	0.23 U	0.17 U	0.2 U	0.26 U	0.17 U	0.31 U	0.17 U	0.17 U
ARSENIC	0.045	10	NA	0.94	0.57 J	5.4	0.42 U	1.4	2	0.42 U	1.8
BARIUM	2600	2000	2000	7.5	10.8	13.1	6.1	15	13.2	11.9	11.5
BERYLLIUM	73	4	4	0.11 U	0.11 U	0.6 J	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
CADMIUM	18	5	5	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.09 J	0.06 U
CALCIUM	NA	NA	NA	5710 J	7470	6010	4210	12700	8370	15200	5420
CHROMIUM	110	100	100	0.41 U	1.7 U	0.74 U	1.7 U	0.34 U	1.3 U	0.58 U	1.5 U
COBALT	730	NA	NA	1.5	0.87	0.83	1.6	3.1	1.8	2.1	1.9
COPPER	1500	1300	NA	0.56 J	3.1	0.67 J	0.89	0.4 U	0.85	4.2	1.4
IRON	11000	NA	NA	1930	1330	12500	736	10200	8640	1190	8350
LEAD	NA	15	15	0.07 J	0.82	0.45	0.38	0.11	0.37	0.31	0.95
MAGNESIUM	NA	NA	NA	2270 J	6040	2080	1910	5760	3300	5490	2250
MANGANESE	880	NA	NA	203	106	228	97.4	656	461	434	484
NICKEL	730	NA	100	1.5	2.3	1	2.1	2.6	1.4	8.6	1.2
POTASSIUM	NA	NA	NA	1320	2020	1280	1180	2090	1690	2210	1590
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.05 U	0.14	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
SODIUM	NA	NA	NA	11100 J	24400	52800	14800 J	20000	40800	28600	12100
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	1.3	0.49 J	0.41 J	0.4 U	0.4 U	0.4 U	0.83
ZINC	11000	NA	NA	9.1	5.3 J	8.9	6.5	8.5 J	7.4	12.2 J	6.4 J
Dissolved Metals (ug/L)											
ALUMINUM	36000	NA	NA	1.1 J	2	0.72 U	1.6	1.1 J	0.72 U	0.78 J	3.7
ARSENIC	0.045	10	NA	1	0.13 J	0.41	0.23	1.6 J	1.7	0.25	1.7
BARIUM	2600	2000	2000	8.8	8.6	10.4	5.1	14.9	12.2	12.5	10.3
BERYLLIUM	73	4	4	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
CALCIUM	NA	NA	NA	5740	7420	6390	4240	12700 J	8020	15100	5390
CHROMIUM	110	100	100	0.49	2.5	1.3	0.75	1.1 U	0.61	0.89	1
COBALT	730	NA	NA	1.6	0.45	0.65	1.1	3.3	0.93	2.1	1.4
COPPER	1500	1300	NA	0.68	0.26 J	0.16 U	0.16 U	0.32	0.29 J	0.28 J	0.16 UJ
IRON	11000	NA	NA	1950	50 U	1170	321	10100	7310	1010	6740
LEAD	NA	15	15	0.19	0.08 J	0.09 J	0.08 U	0.46	0.42	0.078 UJ	0.2 J
MAGNESIUM	NA	NA	NA	2090	5490	2260	1700	5680	2920	5030	2040
MANGANESE	880	NA	NA	204	100	216	85	651	439	443	441
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.04 U	0.035 U	0.051 U	0.021 U	0.021 U

TABLE 4-24
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-02D MW16-02D-NWG-093004 NORMAL 9/30/2004	08 MW16-03D MW16-03D-NWG-100804 NORMAL 10/8/2004	08 MW16-04D MW16-04D-NWG-100404 NORMAL 10/4/2004	08 MW16-05D MW16-05D-NWG-092904 NORMAL 9/29/2004	08 MW16-06D MW16-06D-NWG-092804 NORMAL 9/28/2004	08 MW16-07D MW16-07D-NWG-092804 NORMAL 9/28/2004	08 MW16-08D MW16-08D-NWG-100804 NORMAL 10/8/2004	08 MW16-09D MW16-09D-NWG-100804 NORMAL 10/8/2004
NICKEL	730	NA	100	1.7	1.4	1	1.7	2.7	0.94	8.1	1
POTASSIUM	NA	NA	NA	1280	1920 J	1450	1160	2080	1590	2270 J	1510 J
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
SODIUM	NA	NA	NA	9720	23800	52100	13100	21700	38700	26700	11000
VANADIUM	36	NA	NA	0.08 J	0.67	0.29	0.15	0.25 U	0.08 J	0.18	0.25
ZINC	11000	NA	NA	12.4 J	1.7 J	4.9	5.7 J	15.3 J	2.5 J	6.5 J	3.4 J
Miscellaneous Parameters (ug/L)											
ALKALINITY	NA	NA	NA	14.5	27	41.5	16	20	20.7	9	16.5
AMMONIA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1	0.21	0.11
CHLORIDE	NA	NA	NA	13.8	33.5	57.1	10.9	61.6	57.9	69.5	11.2
DISSOLVED INORGANIC CARBON	NA	NA	NA	1 U	6	1 U	4	4	5	8	2
DISSOLVED ORGANIC CARBON	NA	NA	NA	3	2	2	1	2	2	2	2
NITRATE	10000	10000	NA	0.1 U	8.3	0.1 U	0.1 U	0.1 U	0.1 U	3.65	0.704
SALINITY (g/kg)	NA	NA	NA	0.064	0.118	0.165	0.062	0.146	0.16	0.167	0.066
SULFATE	NA	NA	NA	17.2	17	18.4	17.6	19.7	21.3	17.2	21.4

SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-10D MW16-10D-NWG-100704 NORMAL 10/7/2004	08 MW16-11D MW16-11D-NWG-100604 NORMAL 10/6/2004	08 MW16-12D MW16-12D-NWG-101204 NORMAL 10/12/2004	08 MW16-13D MW16-13D-NWG-100704 NORMAL 10/7/2004	08 MW16-14D MW16-14D-NWG-100704 NORMAL 10/7/2004	08 MW16-15D MW16-15D-NWG-101404 NORMAL 10/14/2004	08 MW16-16D MW16-16D-NWG-100604 ORIG 10/6/2004	08 MW16-16D MW16-16D-NWG-100604-AVG AVG 10/6/2004
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	810	NA	NA	1 U	1 U	1 U	1 U	50 U	1 U	0.247 J	0.2505 J
1,1-DICHLOROETHENE	340	7	7								
ACETONE	5500	NA	NA	5 U	5 U	5 U	2.57 J	250 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	50 U	0.294 J	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0 U	0 U	0.0194	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	1 UJ	1 UJ	1 U	1 UJ	50 UJ	1 U	1 UJ	1 UJ
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	50 U	0.579 J	1 U	1 U
CHLOROFORM	0.17	80	NA								
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	50 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U	1 U	1 U	1 U	50 U	2.19	1 U	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	3.3 U	3.3 U	3.3 U	210	3.3 U	3.3 U	3.3 U	1.1 J
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	50 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	50 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	1 U	1 U	1 U	50 U	2.47	1 U	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	0.497	0 U	32	0.326	2000	1403	44.2	44.3
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	1 U	50 U	0.275 J	1 U	1 U
TRICHLOROETHENE	0.028	5	5	0.497 J	1 U	32	0.326 J	2000	1400	44	44
VINYL CHLORIDE	0.02	2	2								
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.25	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.1 U	0.1 U	0.0212 J	0.1 UJ	0.137	0.442	0.1 U	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 UJ	0.1 UJ
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.0194 J	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.0193 J	0.1 U	0.1 U
Total Metals (ug/L)											
ALUMINUM	36000	NA	NA	197	150	36.7	79.8	5.9 J	174	18.1	16.8
ANTIMONY	15	6	6	0.18 U	0.27 U	0.27 U	0.18 U	0.23 U	0.26 U	0.21 U	0.21 U
ARSENIC	0.045	10	NA	2	2.2	1	2	0.48 J	1.1	0.83 J	0.84 J
BARIUM	2600	2000	2000	7.5	20.5	9.7	8	8.8	12.2	6.4	6.35
BERYLLIUM	73	4	4	0.11 U	0.11 U	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
CADMIUM	18	5	5	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.061 U	0.06 U	0.06 U
CALCIUM	NA	NA	NA	6260	11100	6850	8710	5910	7380	5020	5035
CHROMIUM	110	100	100	1.3 U	0.88	1.5 U	1.7 U	1.5 U	1.4 U	0.84	0.775
COBALT	730	NA	NA	2.2	3.2	6.3	0.65	3	3.9	1.4	1.4
COPPER	1500	1300	NA	4.8	1.2 U	0.54 U	1	0.64 J	1.5 U	0.4 U	0.41 U
IRON	11000	NA	NA	6430	15900	2210	6180	1850	3230	2880	2830
LEAD	NA	15	15	0.52	0.29	0.08 J	0.26	0.14	0.37	0.06 J	0.07 J
MAGNESIUM	NA	NA	NA	2620	4590	2690	2230	2040	2770	1780	1775
MANGANESE	880	NA	NA	721	718	208 J	454	213	243 J	172	172
NICKEL	730	NA	100	2.1	1.5	10.1	0.64 J	3.4	5.6	1.2	1.2
POTASSIUM	NA	NA	NA	2530	1950	1660	1540	2130	2170	1140	1140
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.13	0.23	0.05 U	0.05 U	0.05 U	0.2	0.05 U	0.05 U
SODIUM	NA	NA	NA	12600 J	23100	11000 J	10500 J	8620	14000	8680	8705
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 J	0.066 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.43 J	0.4 U	0.4 U	0.4 U	0.68 J	0.4 U	0.4 U
ZINC	11000	NA	NA	14.3 J	6.6	9 J	3.1 J	9.3 J	14.7	7.1	7.35
Dissolved Metals (ug/L)											
ALUMINUM	36000	NA	NA	0.72 U	0.98 J	1.1 J	0.72 U	0.72 U	0.88 J	0.72 U	0.72 U
ARSENIC	0.045	10	NA	1.7	1.5	0.8	1.7	0.5	0.82	0.87	0.88
BARIUM	2600	2000	2000	6.8	19.1	9.8	7.5	8.8	11.6	7.2	6.7
BERYLLIUM	73	4	4	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 UJ	0.12 U	0.12 U
CALCIUM	NA	NA	NA	6100	11700	7130	8320	5490	7730	5270	5195
CHROMIUM	110	100	100	1.1	0.92	0.68 U	1.4	1.1	1.7	0.92	0.885
COBALT	730	NA	NA	1.9	3.5	6.1	0.49	2.6	3.6	1.6	1.6
COPPER	1500	1300	NA	0.17 J	0.19 J	0.2 U	0.16 UJ	0.16 UJ	0.16 U	0.18 J	0.13 J
IRON	11000	NA	NA	5300	15600	1620	5170	1580	2530	2490	2500
LEAD	NA	15	15	0.16 J	0.15 J	0.15 J	0.08 J	0.078 UJ	0.078 U	0.16	0.1
MAGNESIUM	NA	NA	NA	2230	4830	2710	2080	1780	2560	1820	1795
MANGANESE	880	NA	NA	635	809	202 J	406	180	234 J	190	188.5
MERCURY	11	2	2	0.021 U	0.021 U	0.062	0.021 U	0.021 U	0.021 U	0.12 U	0.085 U

TABLE 4-24
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation	Region 9	Federal	RIDEM	08	08	08	08	08	08	08	08
Location	PRG	MCL	GA GW	MW16-10D	MW16-11D	MW16-12D	MW16-13D	MW16-14D	MW16-15D	MW16-16D	MW16-16D
Sample Number	Tap Water		Objectives	MW16-10D-NWG-100704	MW16-11D-NWG-100604	MW16-12D-NWG-101204	MW16-13D-NWG-100704	MW16-14D-NWG-100704	MW16-15D-NWG-101404	MW16-16D-NWG-100604	MW16-16D-NWG-100604-AVG
Sample Code				NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	AVG
Sample Date				10/7/2004	10/6/2004	10/12/2004	10/7/2004	10/7/2004	10/14/2004	10/6/2004	10/6/2004
NICKEL	730	NA	100	2.1	1.5	9.9 J	0.45	2.9	5	1.4	1.25
POTASSIUM	NA	NA	NA	2470	2080	1640	1460	2330	2200	1260	1240
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
SODIUM	NA	NA	NA	10400 J	23000 J	10300	9670	7660	14300	8690	8510
VANADIUM	36	NA	NA	0.24	0.2	0.14 J	0.16	0.16	0.39 U	0.2	0.195
ZINC	11000	NA	NA	6.6 J	4.6	10.8 J	0.53 J	7.2 J	12.4 J	5.2	5.45
Miscellaneous Parameters (ug/L)											
ALKALINITY	NA	NA	NA	16.3	10.5	19.2	23.7	15	18	12.5	12.5
AMMONIA	NA	NA	NA	0.11	0.1 U	0.1 U	0.12	0.12	0.1 U	0.1 U	0.1 U
CHLORIDE	NA	NA	NA	18.5	69.5	20.9	12.9	10.1	20.9	8.69	8.52
DISSOLVED INORGANIC CARBON	NA	NA	NA	2	4	3	3	3	3	4	3.5
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	2	1	2	2	2	2	2.5
NITRATE	10000	10000	NA	0.1 U	0.527	0.1 U	0.506	0.258	0.1 UJ	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.073	0.157	0.074	0.072	0.059	0.081	0.056	0.056
SULFATE	NA	NA	NA	19	17	21.4	19.1	17.3	21.2	18.3	17.75

SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-16D MW16-16D-NWG-100604-D DUP 10/6/2004	08 MW16-17D MW16-17D-NWG-100404 NORMAL 10/4/2004	08 MW16-18D MW16-18D-NWG-100504 NORMAL 10/5/2004	08 MW16-19D MW16-19D-NWG-100504 NORMAL 10/5/2004	08 MW16-20D MW16-20D-NWG-102804 NORMAL 10/28/2004	08 MW16-21D MW16-21D-NWG-100104 NORMAL 10/1/2004	08 MW16-22D MW16-22D-NWG-100604 NORMAL 10/6/2004	08 MW16-23D MW16-23D-NWG-101404 NORMAL 10/14/2004
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	810	NA	NA	0.254 J	1 U	1 U	1 U	1 U	0.176 J	1 U	1 U
1,1-DICHLOROETHENE	340	7	7								
ACETONE	5500	NA	NA	5 U	5 U	5 UR	1.83 J	5 U	5 UR	5 U	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0.0155	0.013	0.0313	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	1 UJ	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	0.17	80	NA								
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U	1 U	1 U	0.492 J	1 U	1.31	2.39	25
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	1.1 J	1.1 J	1.1 J	1.3 J	3.3 U	1.6 J	1 J	6.6 J
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	1 U	0.371 J	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	1 U	1 U	0.492 J	1 U	1.57	2.77	25.5
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	44.3	0 U	0.165	261	10.3	863	1503	1927
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	1 U	1 U	0.255 J	0.38 J	0.48 J
TRICHLOROETHENE	0.028	5	5	44	1 U	0.165 J	260	9.96	860	1500	1900
VINYL CHLORIDE	0.02	2	2								
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.187	0.018 J	0.1 U	0.464
1,1-DICHLOROETHENE	340	7	7	0.1 U	0.1 U	0.1 U	0.0274 J	0.0483 J	0.386	0.422	0.844
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.0529 J	0.1 U	0.1 U	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 UJ	0.1 UJ	0.1 U
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U	0.0155 J	0.013 J	0.0313 J	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.286	0.152 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.1 U	0.125	0.0592 J	0.0322 J	0.0273 J	0.0918 J
Total Metals (ug/L)											
ALUMINUM	36000	NA	NA	15.5	1490	49.7	4.7 J	459	1240	68.9	1290
ANTIMONY	15	6	6	0.21 U	0.27 U	0.2 U	0.22 U	0.17 U	0.29 U	0.26 U	0.35 U
ARSENIC	0.045	10	NA	0.85	1.5	1.4	0.95	1.5	0.42 U	0.62 J	1.2
BARIUM	2600	2000	2000	6.3	15.2	7.9	14.2	7.8	9.5	10.2	14.7
BERYLLIUM	73	4	4	0.11 U	0.16 J	0.11 UJ	0.11 UJ	0.11 UJ	0.23 J	0.11 U	0.12 J
CADMIUM	18	5	5	0.06 U	0.06 U	0.06 U	0.06 U	0.061 UJ	0.08 J	0.06 U	0.061 U
CALCIUM	NA	NA	NA	5050	5780	3990	4570	3160	5330	7220	3650
CHROMIUM	110	100	100	0.71	3.4	0.91 U	0.92 U	1.7 U	2.7	0.96	3.6
COBALT	730	NA	NA	1.4	3	1.8	1.5	1.2	3.4	2.1	1.7
COPPER	1500	1300	NA	0.42 U	5.9	0.48 J	0.4 U	2.3 U	6.6	1.2 U	7.2 U
IRON	11000	NA	NA	2780	10700	6000	3860	3650	3370	2890	5750
LEAD	NA	15	15	0.08 J	1.9	0.16	0.05 U	0.64	2	0.26	2.9
MAGNESIUM	NA	NA	NA	1770	2600	1850	1920	1350	2300	2480	2020
MANGANESE	880	NA	NA	172	392	241	174	317	70.3	171	243 J
NICKEL	730	NA	100	1.2	3.3	0.68 J	0.88	1.6 J	7.7	3.3	4.5
POTASSIUM	NA	NA	NA	1140	1690	1230	1230	1650	1390	1560	1460
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.31 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.05 U	0.79	0.05 U	0.05 U	0.25	0.05 U	0.05 U	0.15
SODIUM	NA	NA	NA	8730	9580	9130	10100	22300 J	8670	10900	19900
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.066 U
VANADIUM	36	NA	NA	0.4 U	2.7	0.49 J	0.4 U	1.1 U	2.3	0.4 U	3.7
ZINC	11000	NA	NA	7.6	15.7	7.5	4.7 U	6 U	17.5	12	32.7
Dissolved Metals (ug/L)											
ALUMINUM	36000	NA	NA	0.72 U	12.7	0.72 U	0.72 U	5.4	1.9	1.2 J	3.7
ARSENIC	0.045	10	NA	0.89	1.5	1.3	0.83	1.3 J	0.31	0.72	0.7
BARIUM	2600	2000	2000	6.2	7.6	7.5	14.6	4.9	5.2	9.6	6.3
BERYLLIUM	73	4	4	0.12 U	0.12 U	0.12 U	0.12 U	0.12 UJ	0.12 U	0.12 U	0.12 UJ
CALCIUM	NA	NA	NA	5120	5620	3950	4790	3530	5600	7550	3700
CHROMIUM	110	100	100	0.85	0.75	0.95	0.93	0.98 U	0.79	0.82	1.3 U
COBALT	730	NA	NA	1.6	1.7	1.7	1.4	0.81	2.6	2.3	1.4
COPPER	1500	1300	NA	0.16 U	0.22 J	0.16 U	0.16 U	0.23 U	0.94	0.28 J	0.16 U
IRON	11000	NA	NA	2510	7090	5080	3360	2590	905	2710	3270
LEAD	NA	15	15	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.38	0.13 J	0.2
MAGNESIUM	NA	NA	NA	1770	2240	1860	2030	1430	2140	2510	1450
MANGANESE	880	NA	NA	187	364 J	242	182	301	53.1 J	186	203 J
MERCURY	11	2	2	0.05 U	0.021 U	0.021 U	0.021 U	0.054 U	0.07 U	0.021 U	0.021 U

TABLE 4-24
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-16D MW16-16D-NWG-100604-D DUP 10/6/2004	08 MW16-17D MW16-17D-NWG-100404 NORMAL 10/4/2004	08 MW16-18D MW16-18D-NWG-100504 NORMAL 10/5/2004	08 MW16-19D MW16-19D-NWG-100504 NORMAL 10/5/2004	08 MW16-20D MW16-20D-NWG-102804 NORMAL 10/28/2004	08 MW16-21D MW16-21D-NWG-100104 NORMAL 10/1/2004	08 MW16-22D MW16-22D-NWG-100604 NORMAL 10/6/2004	08 MW16-23D MW16-23D-NWG-101404 NORMAL 10/14/2004
NICKEL	730	NA	100	1.1	0.77	0.53	0.87	0.76 J	5.5	3.4	1.3
POTASSIUM	NA	NA	NA	1220	1370	1300	1340	1430	1230	1680	1160
SELENIUM	180	50	50	0.3 U	0.48 J	0.3 U	0.3 U	0.3 UJ	0.31 J	0.3 U	0.3 U
SODIUM	NA	NA	NA	8330	9610	9500 J	11000 J	19300 J	9400	10500	18100
VANADIUM	36	NA	NA	0.19	0.14 J	0.19	0.21	0.21 U	0.19	0.2	0.34 U
ZINC	11000	NA	NA	5.7	4	4.3	4.9	1.9 J	17.8	11.6	4.1 J
Miscellaneous Parameters (ug/L)											
ALKALINITY	NA	NA	NA	12.5	25	13.5	16.7	29	10.2	11	18.5
AMMONIA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1	0.1
CHLORIDE	NA	NA	NA	8.35	10.4	9.6	13.4	10.3	12.1	19.6	13
DISSOLVED INORGANIC CARBON	NA	NA	NA	3	1 U	1 U	1 U	3	1 U	2	2
DISSOLVED ORGANIC CARBON	NA	NA	NA	3	2	2	1	3	2	2	2
NITRATE	10000	10000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.145	0.175	0.488 J
SALINITY (g/kg)	NA	NA	NA	0.056	0.067	0.053	0.059	0.065	0.058	0.075	0.064
SULFATE	NA	NA	NA	17.2	18	15.9	19.2	17.8	18.7	8.91	17.5

SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-24D MW16-24D-NWG-100104 NORMAL 10/1/2004	08 MW16-25D MW16-25D-NWG-100504 ORIG 10/5/2004	08 MW16-25D MW16-25D-NWG-100504-AVG AVG 10/5/2004	08 MW16-25D MW16-25D-NWG-100504-D DUP 10/5/2004	08 MW16-26D MW16-26D-NWG-100704 NORMAL 10/7/2004	08 MW16-27D MW16-27D-NWG-101204 NORMAL 10/12/2004	08 MW16-28D MW16-28D-NWG-101104 NORMAL 10/11/2004	08 MW16-29D MW16-29D-NWG-100704 NORMAL 10/7/2004
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	810	NA	NA	1 U	1 U	0.136 J	0.136 J	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	340	7	7								
ACETONE	5500	NA	NA	5 UR	5 UR	1.53 J	1.53 J	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0.0566	0.0196	0.0193	0.019	0 U	0.0126	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	1 U	1 U	1 U	1 U	1 UJ	1 U	1 UJ	1 UJ
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	0.17	80	NA								
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	11	0.231 J	0.2285 J	0.226 J	1 U	8.95	1.15	35
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	6.9	1.1 J	1.1 J	1.1 J	14	11	3.3 U	3000
TETRACHLOROETHENE	0.1	5	5	1 U	0.388 J	0.3825 J	0.377 J	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	11.4	0.231 J	0.229 J	0.226 J	1 U	9.64	1.15	37
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	710	421	416	411	0.0786	201	201	2939
TRANS-1,2-DICHLOROETHENE	120	100	100	0.367 J	1 U	1 U	1 U	1 U	0.686 J	1 U	2.02
TRICHLOROETHENE	0.028	5	5	690	420	415	410	1 U	190	200	2900
VINYL CHLORIDE	0.02	2	2								
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	0.2	5	5	0.019 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.624	0.025 J	0.0257 J	0.0264 J	0.1 U	0.811	0.18	1.17
1,2-DICHLOROETHANE	0.12	5	5	0.0933 J	0.1 U	0.1 U	0.1 U	0.1 U	0.0753 J	0.1 U	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 UJ	0.1 UJ
BENZENE	0.35	5	5	0.0566 J	0.0196 J	0.0193 J	0.019 J	0.1 U	0.0126 J	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.132	0.148	0.1425	0.137	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	7.87	0.1 U	0.1 U	0.1 U	0.0786 J	0.0506 J	0.1 U	0.515
Total Metals (ug/L)											
ALUMINUM	36000	NA	NA	73.9	7.3	8.65	10	30.4	41.1	23.1	51.3
ANTIMONY	15	6	6	0.31 U	0.19 U	0.195 U	0.2 U	0.17 U	0.31 U	0.17 U	0.2 U
ARSENIC	0.045	10	NA	0.42 U	0.42 U	0.42 U	0.42 U	3.1	0.53 J	1	0.86
BARIUM	2600	2000	2000	8	6.5	6.45	6.4	12.4	17.4	7.1	18.4
BERYLLIUM	73	4	4	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 U	0.11 UJ	0.11 U	0.11 U
CADMIUM	18	5	5	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.1 J
CALCIUM	NA	NA	NA	4780	4920	4910	4900	12000	9410	19900	18800
CHROMIUM	110	100	100	1.5 U	0.86 U	0.865 U	0.87 U	0.79 U	2 U	0.75 U	0.72 U
COBALT	730	NA	NA	2.2	1.3	1.3	1.3	0.44	4.4	1.3	1.1
COPPER	1500	1300	NA	0.81	0.4 U	0.4 U	0.4 U	0.68 J	1.6 U	1.4	3.8
IRON	11000	NA	NA	2170	1330	1355	1380	9910	3630	1490	1030
LEAD	NA	15	15	0.42	0.05 U	0.0425 J	0.06 J	0.06 J	0.3	0.51	0.15
MAGNESIUM	NA	NA	NA	1860	1780	1790	1800	3440	4010	7320	5170
MANGANESE	880	NA	NA	100	114	114.5	115	733	276 J	375	590
NICKEL	730	NA	100	4.2	2.3	2.3	2.3	0.4 J	4.2	1.9	1.3
POTASSIUM	NA	NA	NA	1330	1380	1395	1410	1620	3940	5270	3890
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	1.4	0.29 U
SILVER	180	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
SODIUM	NA	NA	NA	11500	8610	8580	8550	12500 J	70800 J	81000	33400
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 UJ	0.4 U	0.4 U
ZINC	11000	NA	NA	22.2	9.1	9.3	9.5	3.6 J	15.3 J	5.2 J	8.9 J
Dissolved Metals (ug/L)											
ALUMINUM	36000	NA	NA	1.8	0.92 J	0.875 J	0.83 J	0.72 U	2.5	0.72 U	0.76 J
ARSENIC	0.045	10	NA	0.39	0.43	0.43	0.43	2.8	0.85	0.99	0.68
BARIUM	2600	2000	2000	8	6.6	6.6	6.6	11.9	17.1	7.4	18
BERYLLIUM	73	4	4	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
CALCIUM	NA	NA	NA	4850	4990	5060	5130	11500	9470	20800	17900
CHROMIUM	110	100	100	0.79	0.61	0.71	0.81	1.2	1	1.5	3.5
COBALT	730	NA	NA	1.8	1.3	1.3	1.3	0.33	4	1.1	0.84
COPPER	1500	1300	NA	0.24 J	0.16 U	0.16 U	0.16 U	0.16 UJ	1.4 U	0.94 J	1.1 J
IRON	11000	NA	NA	1840	1280	1315	1350	8580	3290	1220	912
LEAD	NA	15	15	0.15 J	0.14 J	0.09 J	0.08 U	0.078 UJ	0.18	0.1 J	0.08 J
MAGNESIUM	NA	NA	NA	2050	1830	1860	1890	3060	3770	7290	4480
MANGANESE	880	NA	NA	98 J	116	119	122	663	257 J	363	517
MERCURY	11	2	2	0.024 U	0.021 U	0.25025	0.49	0.021 U	0.021 U	0.11 U	0.021 U

TABLE 4-24
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-24D MW16-24D-NWG-100104 NORMAL 10/1/2004	08 MW16-25D MW16-25D-NWG-100504 ORIG 10/5/2004	08 MW16-25D MW16-25D-NWG-100504-AVG AVG 10/5/2004	08 MW16-25D MW16-25D-NWG-100504-D DUP 10/5/2004	08 MW16-26D MW16-26D-NWG-100704 NORMAL 10/7/2004	08 MW16-27D MW16-27D-NWG-101204 NORMAL 10/12/2004	08 MW16-28D MW16-28D-NWG-101104 NORMAL 10/11/2004	08 MW16-29D MW16-29D-NWG-100704 NORMAL 10/7/2004
NICKEL	730	NA	100	3.1	2.4	2.35	2.3	0.3	4 J	1.7	0.92
POTASSIUM	NA	NA	NA	1370	1510	1520	1530	1560	3620	5450 J	3770
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1.8	0.3 U
SODIUM	NA	NA	NA	11700	9120	9195	9270	10400 J	64800	85100	32300
VANADIUM	36	NA	NA	0.19	0.12 J	0.14 J	0.16	0.26	0.2	0.33	0.98
ZINC	11000	NA	NA	8.8	8.9	8.55	8.2	1.2 J	23.5 J	3.8 J	1.7 J
Miscellaneous Parameters (ug/L)											
ALKALINITY	NA	NA	NA	11.8	13.5	13.75	14	18.5	40.1	32	85
AMMONIA	NA	NA	NA	0.12	0.1 U	0.1 U	0.1 U	0.1	0.1	0.1 U	1.22
CHLORIDE	NA	NA	NA	12.7	9.16	9.15	9.14	41.7	126	86.2	34.9
DISSOLVED INORGANIC CARBON	NA	NA	NA	1 U	1 U	1 U	1 U	1	4	5	7
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	2	2	2	3	2	2	3
NITRATE	10000	10000	NA	0.938	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.394
SALINITY (g/kg)	NA	NA	NA	0.06	0.054	0.054	0.054	0.099	0.248	0.209	0.167
SULFATE	NA	NA	NA	17.2	17.2	17.2	17.2	18.8	13.3	25.7	13.2

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-30D MW16-30D-NWG-101204 NORMAL 10/12/2004
Volatile Organics (ug/L)				
1,1-DICHLOROETHANE	810	NA	NA	1 U
1,1-DICHLOROETHENE	340	7	7	
ACETONE	5500	NA	NA	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U
BTEX[1]	NA	NA	NA	0 U
CARBON DISULFIDE	1000	NA	NA	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U
CHLOROFORM	0.17	80	NA	
CHLOROMETHANE	160	NA	NA	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U
ETHANE	NA	NA	NA	6.2 U
ETHENE	NA	NA	NA	5.8 U
METHANE	NA	NA	NA	110
TETRACHLOROETHENE	0.1	5	5	1 U
TOLUENE	720	1000	1000	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	0.0717
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U
TRICHLOROETHENE	0.028	5	5	1 U
VINYL CHLORIDE	0.02	2	2	
Low-Level Volatile Organics (ug/L)				
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 UJ
BENZENE	0.35	5	5	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U
VINYL CHLORIDE	0.02	2	2	0.0717 J
Total Metals (ug/L)				
ALUMINUM	36000	NA	NA	13200
ANTIMONY	15	6	6	0.36 U
ARSENIC	0.045	10	NA	2.2
BARIUM	2600	2000	2000	60.7
BERYLLIUM	73	4	4	0.76 J
CADMIUM	18	5	5	0.19 U
CALCIUM	NA	NA	NA	11400
CHROMIUM	110	100	100	17.5 J
COBALT	730	NA	NA	10.1
COPPER	1500	1300	NA	34.8
IRON	11000	NA	NA	25900
LEAD	NA	15	15	10.3
MAGNESIUM	NA	NA	NA	6660
MANGANESE	880	NA	NA	853 J
NICKEL	730	NA	100	19
POTASSIUM	NA	NA	NA	5040
SELENIUM	180	50	50	0.29 U
SILVER	180	NA	NA	9.3
SODIUM	NA	NA	NA	10200 J
THALLIUM	2.4	2	2	0.34
VANADIUM	36	NA	NA	21.2 J
ZINC	11000	NA	NA	59.1 J
Dissolved Metals (ug/L)				
ALUMINUM	36000	NA	NA	3.9
ARSENIC	0.045	10	NA	1.7
BARIUM	2600	2000	2000	6.8
BERYLLIUM	73	4	4	0.12 U
CALCIUM	NA	NA	NA	11900
CHROMIUM	110	100	100	0.79 U
COBALT	730	NA	NA	0.36
COPPER	1500	1300	NA	0.46 U
IRON	11000	NA	NA	3780
LEAD	NA	15	15	0.24
MAGNESIUM	NA	NA	NA	2110
MANGANESE	880	NA	NA	564 J
MERCURY	11	2	2	0.021 U

TABLE 4-24
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-30D MW16-30D-NWG-101204 NORMAL 10/12/2004
NICKEL	730	NA	100	0.63 J
POTASSIUM	NA	NA	NA	1790
SELENIUM	180	50	50	0.3 U
SODIUM	NA	NA	NA	10400
VANADIUM	36	NA	NA	0.17
ZINC	11000	NA	NA	18.4 J
Miscellaneous Parameters (ug/L)				
ALKALINITY	NA	NA	NA	36
AMMONIA	NA	NA	NA	0.18
CHLORIDE	NA	NA	NA	15.3
DISSOLVED INORGANIC CARBON	NA	NA	NA	2
DISSOLVED ORGANIC CARBON	NA	NA	NA	3
NITRATE	10000	10000	NA	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.086
SULFATE	NA	NA	NA	19

SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-31D MW16-31D-NWG-101204 NORMAL 10/12/2004	08 MW16-32D MW16-32D-NWG-110104 NORMAL 11/1/2004	08 MW16-33D MW16-33D-NWG-100404 NORMAL 10/4/2004	08 MW16-34D MW16-34D-NWG-092904 NORMAL 9/29/2004	08 MW16-35D MW16-35D-NWG-092904 NORMAL 9/29/2004
Volatile Organics (ug/L)								
1,1-DICHLOROETHANE	810	NA	NA	1 U	10 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	340	7	7					
ACETONE	5500	NA	NA	5 U	26 U	5 UR	5 UR	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	10 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0.0267	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	1 U	10 U	1 U	1 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	10 U	1 U	1 U	1 U
CHLOROFORM	0.17	80	NA					
CHLOROMETHANE	160	NA	NA	1 U	10 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U	10 U	1 U	1 U	1 U
ETHANE	NA	NA	NA	6.2 U	1.3 J	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	3.3 U	1.7 U	1.6 J	3.3 U	3.3 U
TETRACHLOROETHENE	0.1	5	5	1 U	10 U	1 U	7.91	1 U
TOLUENE	720	1000	1000	1 U	10 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	0.143 J	10 U	1 U	1 U	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	150	291	0.399	9.52	0.665
TRANS-1,2-DICHLOROETHENE	120	100	100	0.143 J	10 U	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	150	290	0.399 J	1.61	0.633 J
VINYL CHLORIDE	0.02	2	2					
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.0295 J	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.197	0.479	0.1 U	0.1 U	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.0317 J
1,4-DICHLOROBENZENE	0.5	75	75	0.1 UJ	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ
BENZENE	0.35	5	5	0.1 U	0.0267 J	0.1 U	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.148 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.111	0.0231 J	0.1 U	0.1 U	0.1 U
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	1340	485	51	12.4 J	35200 J
ANTIMONY	15	6	6	0.29 U	0.68 U	0.33 U	0.28 U	0.35 U
ARSENIC	0.045	10	NA	1.1	0.42 U	2.4	0.53 J	0.96
BARIUM	2600	2000	2000	17.5	1390	9.3	8.6	257
BERYLLIUM	73	4	4	0.12 J	0.11 U	0.11 UJ	0.11 U	3.1 J
CADMIUM	18	5	5	0.06 U	0.27 J	0.06 U	0.06 U	1.4 J
CALCIUM	NA	NA	NA	6530	311000	8480	5840	32300 J
CHROMIUM	110	100	100	3.8 J	6.2 J	1.1 U	1 U	40.3
COBALT	730	NA	NA	3.7	0.48	1.2	3.2	40.1
COPPER	1500	1300	NA	4.6 U	2.5 U	0.93	0.4 U	115
IRON	11000	NA	NA	7120	895	6270	741	73800
LEAD	NA	15	15	1.3	3.3 J	0.3	0.08 J	63.9
MAGNESIUM	NA	NA	NA	2920	58.2 J	2020	1990	14700
MANGANESE	880	NA	NA	633 J	2.5	455	238	1290
NICKEL	730	NA	100	3.6	6.8 J	0.86	2.6	74.7
POTASSIUM	NA	NA	NA	2210	6540 J	1660	1110	5870
SELENIUM	180	50	50	0.29 U	0.36 J	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.23	0.05 U	0.05 U	0.05 U	1.4
SODIUM	NA	NA	NA	12700 J	19800 J	8910	9420 J	7210
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.55
VANADIUM	36	NA	NA	2.8 J	1.1 J	0.4 U	0.4 U	55.9
ZINC	11000	NA	NA	13.9 J	14.3	6.2	8.1	242 J
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	2	446	1.8	0.72 J	5.3
ARSENIC	0.045	10	NA	1	0.12 J	2.6	0.42	0.88 J
BARIUM	2600	2000	2000	9.6	1270	9.6	8.6	8.6
BERYLLIUM	73	4	4	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
CALCIUM	NA	NA	NA	6740	298000	8580	5730	4000 J
CHROMIUM	110	100	100	0.8 U	5.5 J	0.89	0.65	0.78 U
COBALT	730	NA	NA	1.3	0.37 J	1.2	3.1	1
COPPER	1500	1300	NA	0.79 U	1.4 U	0.26 J	0.17 J	0.16 U
IRON	11000	NA	NA	4300	823	6240	724	3950
LEAD	NA	15	15	0.21	1.4 J	0.13 J	0.08 J	0.15 J
MAGNESIUM	NA	NA	NA	2400	50 U	2380	1820	1880 J
MANGANESE	880	NA	NA	604 J	0.5 U	483 J	230	202
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.027 U	0.037 U
NICKEL	730	NA	100	0.83 J	6 J	0.78	2.7	1.3
POTASSIUM	NA	NA	NA	1720	5420 J	1570	1100	1660
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
SODIUM	NA	NA	NA	11700	14500 J	9480	8010	9410

TABLE 4-24
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-31D MW16-31D-NWG-101204 NORMAL 10/12/2004	08 MW16-32D MW16-32D-NWG-110104 NORMAL 11/1/2004	08 MW16-33D MW16-33D-NWG-100404 NORMAL 10/4/2004	08 MW16-34D MW16-34D-NWG-092904 NORMAL 9/29/2004	08 MW16-35D MW16-35D-NWG-092904 NORMAL 9/29/2004
VANADIUM	36	NA	NA	0.15	1.4 J	0.23	0.24	0.21 U
ZINC	11000	NA	NA	10.5 J	9.4	5.6	3 J	5.1 J
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	18.5	812	27	17	147
AMMONIA	NA	NA	NA	0.14	0.17	0.1 U	0.1 U	0.2 U
CHLORIDE	NA	NA	NA	22	18.2	21.2	10.7	7.38
DISSOLVED INORGANIC CARBON	NA	NA	NA	3	2	1	2	9
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	16	1	2	6
NITRATE	10000	10000	NA	0.133	0.1 U	0.402	0.421	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.076	2.1	0.077	0.055	0.048
SULFATE	NA	NA	NA	16.4	10.9	16.9	15.6	15

SUMMARY OF [illegible]ALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-36D MW16-36D-NWG-100504 NORMAL 10/5/2004	08 MW16-37D MW16-37D-NWG-100504 NORMAL 10/5/2004	08 MW16-39D MW16-39D-NWG-100604 NORMAL 10/6/2004	08 MW16-40D MW16-40D-NWG-101204 NORMAL 10/12/2004	08 MW16-41D MW16-41D-NWG-093004 NORMAL 9/30/2004	08 MW16-42D MW16-42D-NWG-093004 ORIG 9/30/2004	08 MW16-42D MW16-42D-NWG-093004-AVG AVG 9/30/2004	08 MW16-42D MW16-42D-NWG-093004-D DUP 9/30/2004
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	810	NA	NA	1 U	1 U	1 U	1 U	20 U	20 U	20 U	20 U
1,1-DICHLOROETHENE	340	7	7								
ACETONE	5500	NA	NA	5 UR	5 U	5 U	5 U	100 UR	100 UR	100 UR	100 UR
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	20 U	20 U	20 U	20 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	1 U	0.188 J	1 U	1 U	20 U	20 U	20 U	20 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	20 U	20 U	20 U	20 U
CHLOROFORM	0.17	80	NA								
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	20 U	20 U	20 U	20 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U	1 U	1 U	4.84	4.4 J	4.92 J	4.82 J	4.72 J
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	1.1 J	3.3 U	1.6 J	3.3 U	1.6 J	3.3 U	3.3 U	3.3 U
TETRACHLOROETHENE	0.1	5	5	1 U	1.58	1 U	0.426 J	20 U	20 U	20 U	20 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	20 U	20 U	20 U	20 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	1 U	1 U	5.17	4.4 J	4.92 J	4.82 J	4.72 J
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	0 U	14.6	1.5	776	615	735	730	725
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	0.329 J	20 U	20 U	20 U	20 U
TRICHLOROETHENE	0.028	5	5	1 U	13	1.44	770	610	730	725	720
VINYL CHLORIDE	0.02	2	2								
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.1 U	0.1 U	0.1 U	0.441	0.429	0.381	0.374	0.367
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.0557 J	0.189	0.106	0.134	0.135	0.136
Total Metals (ug/L)											
ALUMINUM	36000	NA	NA	6.4 J	3.3 U	114000	1130	9.8	1300 J	1320 J	1340 J
ANTIMONY	15	6	6	0.19 U	0.26 U	0.42 U	0.35 U	0.32 U	0.24 U	0.245 U	0.25 U
ARSENIC	0.045	10	NA	0.42 U	0.53 J	23.9	2.7	0.56 J	0.57 J	0.64 J	0.71 J
BARIUM	2600	2000	2000	10	6	500	16.9	17.7	19.5	19.6	19.7
BERYLLIUM	73	4	4	0.11 UJ	0.11 U	4.1	0.14 J	0.11 UJ	0.18 J	0.185 J	0.19 J
CADMIUM	18	5	5	0.06 U	0.06 U	3.5 J	0.1 U	0.06 U	0.07 U	0.07 U	0.07 U
CALCIUM	NA	NA	NA	3720	4890	67400	11700	12600	12100	12150	12200
CHROMIUM	110	100	100	1.2 U	0.89	172	4.4 J	0.72 U	4.5	4.5	4.5
COBALT	730	NA	NA	0.59	1.4	154	4.6	5.7	4.6	4.55	4.5
COPPER	1500	1300	NA	0.4 U	0.4 U	424	6.9 U	1.9	10.9	10.85	10.8
IRON	11000	NA	NA	1660	2140	334000	5750	10200	4510	4540	4570
LEAD	NA	15	15	0.05 J	0.05 U	135	3.2	0.07 J	2.6	2.65	2.7
MAGNESIUM	NA	NA	NA	1130	1720	73900	4530	4700	4950	4930	4910
MANGANESE	880	NA	NA	95.1	184	7190	530 J	1040	375	373.5	372
NICKEL	730	NA	100	0.59 J	1.5	278	14	3.9	11	10.9	10.8
POTASSIUM	NA	NA	NA	1310	1160	29600	2540	2170	2240	2260	2280
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.05 U	0.05 U	0.77	0.14	0.05 U	0.51	0.52	0.53
SODIUM	NA	NA	NA	7050	8660 J	45400 J	19700 J	27500	18200	18350	18500
THALLIUM	2.4	2	2	0.07 U	0.07 U	1.6	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.71 J	0.4 U	222	3.1 J	0.4 U	2.2	2.25	2.3
ZINC	11000	NA	NA	11.5	4.8	901	13.9 J	12.9	16.2	14.65	13.1
Dissolved Metals (ug/L)											
ALUMINUM	36000	NA	NA	1.5	1.7	3.4	5.5	0.77 J	1.7	1.5 J	1.3 J
ARSENIC	0.045	10	NA	0.49	0.65	2.8	0.38	0.81	0.27	0.285	0.3
BARIUM	2600	2000	2000	10.8	5.9	25.5	11.2	17.2	12.6	12.45	12.3
BERYLLIUM	73	4	4	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
CALCIUM	NA	NA	NA	3810	4960	8610	12200	12700	11700	11600	11500
CHROMIUM	110	100	100	0.51	0.84	0.9	0.61 U	0.85	0.62	0.615	0.61
COBALT	730	NA	NA	0.61	1.6	0.28	2.9	5.5	2.8	2.85	2.9
COPPER	1500	1300	NA	0.16 U	0.16 U	0.27 J	0.31 U	0.18 J	1.1	0.67 J	0.24 J
IRON	11000	NA	NA	1660	2210	3630	1570	10100	1480	1495	1510
LEAD	NA	15	15	0.2	0.08 U	0.15 J	0.22	0.08 U	0.18	0.145 J	0.11 J
MAGNESIUM	NA	NA	NA	1180	1760	3250	4090	4960	3850	3850	3850
MANGANESE	880	NA	NA	99.4	204	406	454 J	995 J	330	328.5	327
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.024 U	0.027 U
NICKEL	730	NA	100	0.78	1.6	0.46	11.5 J	3.8	8.3	8.25	8.2
POTASSIUM	NA	NA	NA	1420	1240	1880	2220	2130	1980	1965	1950
SELENIUM	180	50	50	0.3 U	0.3 U	0.65	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
SODIUM	NA	NA	NA	7480	8490 J	42500 J	18400	27100	16900	16750	16600

TABLE 4-24
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-36D MW16-36D-NWG-100504 NORMAL 10/5/2004	08 MW16-37D MW16-37D-NWG-100504 NORMAL 10/5/2004	08 MW16-39D MW16-39D-NWG-100604 NORMAL 10/6/2004	08 MW16-40D MW16-40D-NWG-101204 NORMAL 10/12/2004	08 MW16-41D MW16-41D-NWG-093004 NORMAL 9/30/2004	08 MW16-42D MW16-42D-NWG-093004 ORIG 9/30/2004	08 MW16-42D MW16-42D-NWG-093004-AVG AVG 9/30/2004	08 MW16-42D MW16-42D-NWG-093004-D DUP 9/30/2004
VANADIUM	36	NA	NA	0.21	0.19	0.21	0.13 J	0.16	0.09 J	0.09 J	0.09 J
ZINC	11000	NA	NA	8.5	7.7	5	7.7 J	12.4	7.5 J	8.9 J	10.3 J
Miscellaneous Parameters (ug/L)											
ALKALINITY	NA	NA	NA	14.5	15	35	11.1	14.3	11.5	11.5	11.5
AMMONIA	NA	NA	NA	0.1 U	0.1	0.39	0.11	0.19	0.1 U	0.1 U	0.1 U
CHLORIDE	NA	NA	NA	8.37	8.05	48	59.5	66.1	46	45.05	44.1
DISSOLVED INORGANIC CARBON	NA	NA	NA	4	56	11	3	1 U	1 U	1.25	2
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	140	6	2	2	2	2	2
NITRATE	10000	10000	NA	0.708	0.1 U	0.1 U	0.766	0.1 U	0.356	0.33	0.304
SALINITY (g/kg)	NA	NA	NA	0.042	0.052	0.16	0.128	0.166	0.12	0.12	0.12
SULFATE	NA	NA	NA	10.9	17.5	26.3	15.5	17.1	17.2	17.1	17

SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-43D MW16-43D-NWG-093004 NORMAL 9/30/2004	08 MW16-44D MW16-44D-NWG-100104 NORMAL 10/1/2004	08 MW16-45D MW16-45D-NWG-092804 NORMAL 9/28/2004	08 MW16-46D MW16-46D-NWG-092804 NORMAL 9/28/2004	08 MW16-47D MW16-47D-NWG-092704 NORMAL 9/27/2004	08 MW16-48D MW16-48D-NWG-100404 NORMAL 10/4/2004	08 MW16-49D MW16-49D-NWG-101104 NORMAL 10/11/2004	08 MW16-50D MW16-50D-NWG-101304 NORMAL 10/13/2004
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	810	NA	NA	1 U	1 U	20 U	10 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	340	7	7								
ACETONE	5500	NA	NA	5 UR	5 UR	100 UR	50 UR	5 UR	5 UR	5 U	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	20 U	10 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0.0167	0.0125	0.0163	0 U	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	1 U	1 U	20 U	10 U	1 U	1 U	1 UJ	0.49 J
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	20 U	10 U	1 U	1 U	1 U	1 U
CHLOROFORM	0.17	80	NA								
CHLOROMETHANE	160	NA	NA	1 U	1 U	20 U	10 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	6.91	13	6.94 J	5.36 J	1 U	1 U	1 U	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	3.3 U	1.6 J	3.3 U	3.6 U	3.3 U	1.9 J	3.3 U	54 J
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	20 U	10 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	20 U	10 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	7.53	13.6	6.94 J	5.36 J	1 U	1 U	1 U	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	818	1315	687	386	0 U	0 U	0.498	0.031
TRANS-1,2-DICHLOROETHENE	120	100	100	0.618 J	0.618 J	20 U	10 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	810	1300	680	380	1 U	1 U	1 U	1 U
VINYL CHLORIDE	0.02	2	2								
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.0241 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.83	0.764	0.196	0.576	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.0296 J	0.1 U	0.1 U	0.1 U	0.1 U
1,4-DICHLOROBENZENE	0.5	75	75	0.1 UJ	0.1 UJ	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U
BENZENE	0.35	5	5	0.1 U	0.0167 J	0.0125 J	0.0163 J	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.139	0.322	0.0212 J	0.113	0.1 U	0.1 U	0.498	0.031 J
Total Metals (ug/L)											
ALUMINUM	36000	NA	NA	105 J	65.8	1650	105	214 J	29.2	91.4	4.7 J
ANTIMONY	15	6	6	0.25 U	0.29 U	0.35 U	0.24 U	0.26 U	0.18 U	1.1 U	3.2 J
ARSENIC	0.045	10	NA	0.84	0.42 U	1.4	0.81 J	1.5	0.42 U	5.5	16.3
BARIUM	2600	2000	2000	10.8	9.2	17.6	10.4	13.5	5.7	38.4	41.3
BERYLLIUM	73	4	4	0.11 U	0.11 UJ	0.19 J	0.11 U	0.11 U	0.11 UJ	0.66 J	0.11 R
CADMIUM	18	5	5	0.06 U	0.06 U	0.06 U	0.06 U	0.45	0.06 U	0.06 U	0.061 U
CALCIUM	NA	NA	NA	12500	11300	12800 J	9200	10300	5130	409000	216000
CHROMIUM	110	100	100	1.2 U	1.2 U	2.8 U	0.71 U	0.69 U	1.1 U	1.6 U	1.4 U
COBALT	730	NA	NA	1.9	3	2.5	1.8	1.8	0.33	0.92	1 J
COPPER	1500	1300	NA	2.1	0.89	5.4	1.1	1.8	1.9	39.2 J	160 R
IRON	11000	NA	NA	6590	1230	9700	2660	7730	53.9 J	15500	2220
LEAD	NA	15	15	0.14	0.2	1.5	0.31	0.53	0.48	0.4 J	0.048 U
MAGNESIUM	NA	NA	NA	4660 J	3610	5000	3520	4290	4670	78700 J	435000
MANGANESE	880	NA	NA	457	648	560	437	519	4.9	3070 J	1540 J
NICKEL	730	NA	100	2.2	2.4	4.2	3.3	1.6	0.8	6.4 J	7.6 J
POTASSIUM	NA	NA	NA	2040	2220	2950	1940	1910 J	1700	31000	178000
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	24.1	60.6
SILVER	180	NA	NA	0.52	0.05 U	1.3	0.05 U	0.08 J	0.05 U	0.05 U	0.052 U
SODIUM	NA	NA	NA	25000	22700	29500	45800	23800	27000	1610000 J	5080000
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.11 J	0.066 U
VANADIUM	36	NA	NA	0.4 U	0.4 U	2.4	0.4 U	0.4 U	0.43 U	0.4 UJ	0.4 U
ZINC	11000	NA	NA	6	4.5	22.3 J	11.1 J	7.4 J	24.1	117 J	10.7 J
Dissolved Metals (ug/L)											
ALUMINUM	36000	NA	NA	1 J	0.72 U	0.96 J	0.75 J	1.4 J	3.1	0.83 J	2.2 J
ARSENIC	0.045	10	NA	0.77	0.49	0.92 J	0.83 J	1.5 J	0.23	6.7	16.9
BARIUM	2600	2000	2000	10.5	8.6	11.8	9.4	12.3	5.7	38.6	40.4 J
BERYLLIUM	73	4	4	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.21 J	0.12 U
CALCIUM	NA	NA	NA	12600	11200	12200 J	8650 J	10300	5300	363000	176000
CHROMIUM	110	100	100	0.66	1	1.1 U	1.6	1.1 U	2	1.2	7.4
COBALT	730	NA	NA	1.7	2.8	0.89	1.8	1.7	0.18	0.74 J	0.7
COPPER	1500	1300	NA	0.35	0.24 J	0.32	0.37	0.2 J	0.5	23.9 J	167 J
IRON	11000	NA	NA	5970	984	4010	2220	6770	50 U	4430	1950
LEAD	NA	15	15	0.43	0.44	0.08 U	0.23	0.08 U	0.08 U	0.17 J	0.078 U
MAGNESIUM	NA	NA	NA	4170	3870	4000	3130	4040	4850	79000 J	358000
MANGANESE	880	NA	NA	449	605 J	374	417	535	4.9	3030 J	1200 J
MERCURY	11	2	2	0.021 U	0.021 U	0.087 U	0.056 U	0.021 U	0.021 U	0.021 U	0.021 U
NICKEL	730	NA	100	2.3	2.6	0.93	3.6	1.1	0.74	7 J	6 J
POTASSIUM	NA	NA	NA	2000	2200	12600	1840	1890	1850	27500	156000
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	30	61
SODIUM	NA	NA	NA	23700	22400	33900	49000 J	25500 J	25900	1470000 J	4200000

TABLE 4-24
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-43D MW16-43D-NWG-093004 NORMAL 9/30/2004	08 MW16-44D MW16-44D-NWG-100104 NORMAL 10/1/2004	08 MW16-45D MW16-45D-NWG-092804 NORMAL 9/28/2004	08 MW16-46D MW16-46D-NWG-092804 NORMAL 9/28/2004	08 MW16-47D MW16-47D-NWG-092704 NORMAL 9/27/2004	08 MW16-48D MW16-48D-NWG-100404 NORMAL 10/4/2004	08 MW16-49D MW16-49D-NWG-101104 NORMAL 10/11/2004	08 MW16-50D MW16-50D-NWG-101304 NORMAL 10/13/2004
VANADIUM	36	NA	NA	0.1 J	0.22	0.25 U	0.39 U	0.26 U	0.48	0.08 U	0.81
ZINC	11000	NA	NA	5.5 J	3	3 J	8.9 J	5.1 J	26.3	5.1 J	18.6 J
Miscellaneous Parameters (ug/L)											
ALKALINITY	NA	NA	NA	22.2	15.5	26	28.3	25	34	63	275
AMMONIA	NA	NA	NA	0.1 U	0.1 U	0.11 U	0.18 U	0.12 U	0.1 U	0.19	0.32
CHLORIDE	NA	NA	NA	59.2	54.1	58.6	66.8	46.4	25.8	2880	7160
DISSOLVED INORGANIC CARBON	NA	NA	NA	3	1 U	6	7	7	5	5	17
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	3	1	1	5 J	2	3	2
NITRATE	10000	10000	NA	0.1 U	0.301	0.139	0.172	0.1 U	5.26	0.1 U	1.89 J
SALINITY (g/kg)	NA	NA	NA	0.151	0.123	0.157	0.175	0.123	0.107	5.65	13.9
SULFATE	NA	NA	NA	18.5	15.9	17.6	17.3	20.5	18.8	428	1030

SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-51D MW16-51D-NWG-102904 NORMAL 10/29/2004	08 MW16-52D MW16-52D-NWG-102704 NORMAL 10/27/2004	08 MW16-54D MW16-54D-NWG-101304 NORMAL 10/13/2004	08 MW16-55D MW16-55D-NWG-092904 NORMAL 9/29/2004	08 MW16-56D MW16-56D-NWG-101404 NORMAL 10/14/2004	08 MW16-57D MW16-57D-NWG-102604 NORMAL 10/26/2004	08 MW16-58D MW16-58D-NWG-101304 NORMAL 10/13/2004	08 MW16-59D MW16-59D-NWG-102504 NORMAL 10/25/2004
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	810	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	0.196 J	0.135 J
1,1-DICHLOROETHENE	340	7	7								
ACETONE	5500	NA	NA	5 U	5 U	5 U	5 UR	12 U	5 U	4.31 U	14 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0 U	0.0135	0 U	0.0338	0.0619
CARBON DISULFIDE	1000	NA	NA	0.579 J	1 U	1 U	1 U	0.258 J	0.117 J	1 U	0.197 J
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	0.17	80	NA								
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	0.336 J	1 U	1 U	1 U	0.33 J	1 U	6.24	14
ETHANE	NA	NA	NA	1.3 J	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	0.85 J
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	51	61	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	0.336 J	1 U	1 U	1 U	0.33 J	1 U	7.09	14.4
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	0.884	0.614	0 U	0 U	50.6	0.706	1410	2320
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	1 U	1 U	1 U	0.845 J	0.392 J
TRICHLOROETHENE	0.028	5	5	0.504 J	0.55 J	1 U	1 U	50	0.678 J	1400	2300
VINYL CHLORIDE	0.02	2	2								
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.111	0.1 U	0.897	1.9
1,1-DICHLOROETHENE	340	7	7	0.0237 J	0.1 U	0.1 U	0.1 U	0.0809 J	0.1 U	1.85	2.82
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.0746 J	0.1 U	0.0484 J	0.119
1,4-DICHLOROBENZENE	0.5	75	75	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.0135 J	0.1 U	0.0338 J	0.0619 J
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.0198 J	0.0641 J	0.1 U	0.1 U	0.0301 J	0.028 J	0.116	0.947
Total Metals (ug/L)											
ALUMINUM	36000	NA	NA	3.3 U	81.6	41100	2480 J	417	10000	193	14900
ANTIMONY	15	6	6	0.71 U	0.57 U	0.44 U	0.28 U	0.34 U	0.16 U	0.24 U	0.16 U
ARSENIC	0.045	10	NA	3.4	5.9	15.8	5.9	1.5	3.2	0.49 J	1.9
BARIUM	2600	2000	2000	43.3	29.8	319	25.7	7.9	55.6	6.7	63.7
BERYLLIUM	73	4	4	0.11 UJ	0.11 UJ	2.4	0.26	0.11 U	0.49	0.11 UJ	1.9 R
CADMIUM	18	5	5	0.061 UJ	0.061 UJ	1.2 J	0.88	0.061 U	0.13 U	0.06 U	0.59
CALCIUM	NA	NA	NA	62300 J	50300 J	35300	16700	4820	7680	5160	10500 J
CHROMIUM	110	100	100	0.72 U	0.87 U	67.6	4.5	2 U	11.8	1.6 U	24.7
COBALT	730	NA	NA	1.6 J	4 J	57.3	2.3	1	7.8	1.5	12.1
COPPER	1500	1300	NA	55.2 J	24.5 J	137	8.5	2.9 U	16.3	0.84 U	44.8 J
IRON	11000	NA	NA	2940	7100	114000	5280	1090	19800	1740	26200
LEAD	NA	15	15	0.05 J	0.06 J	51.1	4.2	0.61	8.8	0.22	17
MAGNESIUM	NA	NA	NA	106000	152000	23600	4110	1260	5910	1750	8140
MANGANESE	880	NA	NA	344	325	4170 J	398	406 J	528	161 J	595
NICKEL	730	NA	100	3.1 J	7.1 J	99.7	4.6	1.1	14.8	1.9	24.5 J
POTASSIUM	NA	NA	NA	79400	73600	12200	3010	4970	3370	1340	4280
SELENIUM	180	50	50	14 J	16.8 J	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.05 U	0.05 U	0.36	0.05 U	0.62	0.08 J	0.05 U	8.5
SODIUM	NA	NA	NA	1360000 J	1590000 J	12200	11800 J	33700	65600 J	10400 J	12900 J
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.77	0.09 J	0.066 U	0.07 U	0.07 U	0.15 U
VANADIUM	36	NA	NA	0.4 U	0.4 U	86.9	5.4	0.78 J	14.4	0.74 J	19
ZINC	11000	NA	NA	10.6 J	17.8 J	305	30.1	5.8	50.7	9.1 J	66.5
Dissolved Metals (ug/L)											
ALUMINUM	36000	NA	NA	0.84 J	1.1 J	2.9	2.1	8.7	1.9	3.5	5.3
ARSENIC	0.045	10	NA	3.7 J	6.1 J	1.7	7.5	1.4	3.9	0.5	2.2
BARIUM	2600	2000	2000	41.3	28.8	40.2	6.7	5.1	10.5	7	8.6
BERYLLIUM	73	4	4	0.12 UJ	0.12 UJ	0.12 UJ	0.12 U	0.12 UJ	0.12 UJ	0.12 U	0.12 U
CALCIUM	NA	NA	NA	67600	53800	7460	16000	5000	5140	5760	8220
CHROMIUM	110	100	100	3.2	4	2	1.3	2.5	1.6	0.71 U	0.81 U
COBALT	730	NA	NA	1.3	3.5	1.1	0.01 U	0.68	0.11	1.5	0.22 J
COPPER	1500	1300	NA	24.2 U	15.1 U	0.17 U	0.16 U	0.34 U	0.66	0.49 U	0.14 J
IRON	11000	NA	NA	2590 J	7440	5200	70.9 J	360	1190	1060	3040
LEAD	NA	15	15	0.35 J	0.14 J	0.15 J	0.16	0.32	0.08 J	0.27	0.14 J
MAGNESIUM	NA	NA	NA	102000	147000	1820	2640	1030	1300	1780	2580
MANGANESE	880	NA	NA	324 J	295 J	557 J	232	380 J	232	158 J	367
MERCURY	11	2	2	0.068 U	0.052 U	0.021 U	0.036 U	0.021 U	0.024 J	0.021 U	0.021 U
NICKEL	730	NA	100	3.2 J	6.6 J	0.55	0.45	0.61	0.33	2 J	1.3
POTASSIUM	NA	NA	NA	82200	72400	2580	1910	4920	1430	1390	1870
SELENIUM	180	50	50	13.9 J	16.3 J	0.34 J	0.3 U	0.3 U	0.44 J	0.3 U	0.3 U
SODIUM	NA	NA	NA	1290000	1530000	11100	10600	33000	65500	10400	13500

TABLE 4-24
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-51D MW16-51D-NWG-102904 NORMAL 10/29/2004	08 MW16-52D MW16-52D-NWG-102704 NORMAL 10/27/2004	08 MW16-54D MW16-54D-NWG-101304 NORMAL 10/13/2004	08 MW16-55D MW16-55D-NWG-092904 NORMAL 9/29/2004	08 MW16-56D MW16-56D-NWG-101404 NORMAL 10/14/2004	08 MW16-57D MW16-57D-NWG-102604 NORMAL 10/26/2004	08 MW16-58D MW16-58D-NWG-101304 NORMAL 10/13/2004	08 MW16-59D MW16-59D-NWG-102504 NORMAL 10/25/2004
VANADIUM	36	NA	NA	0.61	0.84	0.49	0.3	0.65	0.33 U	0.13 J	0.15 U
ZINC	11000	NA	NA	7.4 J	12.2 J	1.5 J	2.4 J	28.1 J	0.81 U	13.7 J	11.3
Miscellaneous Parameters (ug/L)											
ALKALINITY	NA	NA	NA	195	180	40.5	69.8	59.5	64.5	15.5	22.5
AMMONIA	NA	NA	NA	0.37	0.45	0.39	0.17	0.14	0.13	0.1 U	0.11
CHLORIDE	NA	NA	NA	2540	2970	10.6	5.54	9.45	47.3	18.2	20.2
DISSOLVED INORGANIC CARBON	NA	NA	NA	12	19	1	11	5	6	3	2
DISSOLVED ORGANIC CARBON	NA	NA	NA	6	3	3	2	2	2	3	3
NITRATE	10000	10000	NA	0.5 U	0.5 U	0.1 UJ	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	4.88	5.16	0.078	0.088	0.818	0.191	0.062	0.078
SULFATE	NA	NA	NA	372	381	19.9	7.69	19.7	32.2	18	19.7

TABLE 4
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-60D MW16-60D-NWG-102704 NORMAL 10/27/2004	08 MW16-61D MW16-61D-NWG-102504 NORMAL 10/25/2004	08 MW16-62D MW16-62D-NWG-102604 NORMAL 10/26/2004	08 MW16-63D MW16-63D-NWG-102604 NORMAL 10/26/2004	08 MW16-64D MW16-64D-NWG-102704 NORMAL 10/27/2004	08 MW16-65D MW16-65D-NWG-102804 NORMAL 10/28/2004	09 MW16-66D MW16-66D-NWG-111604 NORMAL 11/16/2004	09 MW16-67D MW16-67D-NWG-111604 NORMAL 11/16/2004
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	810	NA	NA	1 U	10 U	20 U	20 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	340	7	7							1 U	0.487 J
ACETONE	5500	NA	NA	6.8 U	50 U	46 U	100 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	10 U	20 U	20 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0.0323	0.0182	0.0167	0.0133	0.252	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	0.249 J	10 U	20 U	20 U	0.264 J	0.136 J	1 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	10 U	20 U	20 U	1 U	1 U	1 U	1 U
CHLOROFORM	0.17	80	NA							1 U	1 U
CHLOROMETHANE	160	NA	NA	1 U	10 U	20 U	20 U	1 U	1 U	1 U	0.212 J
CIS-1,2-DICHLOROETHENE	61	70	70	1.67	10 U	20 U	20 U	1.28	1 U	1.33	2.53
ETHANE	NA	NA	NA	0.68 J	6.2 U	1.6 J	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	0.88 J	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	3.3 U	3.3 U	3.3 U	3.3 U	3.5 U	3.3 U	4.5 U	3.3 U
TETRACHLOROETHENE	0.1	5	5	1 U	10 U	20 U	20 U	1 U	1 U		
TOLUENE	720	1000	1000	1 U	10 U	20 U	20 U	0.237 J	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1.93	10 U	20 U	20 U	1.43	1 U	1.33 J	2.53
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	1604	220	550	540	382	0 U	19.3	983
TRANS-1,2-DICHLOROETHENE	120	100	100	0.255 J	10 U	20 U	20 U	0.145 J	1 U	1 U	0.245 J
TRICHLOROETHENE	0.028	5	5	1600	220	550	540	380	1 U	18	980
VINYL CHLORIDE	0.02	2	2							1 U	1 U
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	0.2	5	5	1.28	0.267	0.1 U	0.1 U	0.1 J	0.1 U		
1,1-DICHLOROETHENE	340	7	7	0.527	0.0465 J	0.336	0.356	0.289	0.1 U		
1,2-DICHLOROETHANE	0.12	5	5	0.0229 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		
1,4-DICHLOROBENZENE	0.5	75	75	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		
BENZENE	0.35	5	5	0.0323 J	0.0182 J	0.0167 J	0.0133 J	0.0151 J	0.1 U		
CHLOROFORM	0.17	80	NA	0.159	0.13	0.1 U	0.1 U	0.1 U	0.1 U		
VINYL CHLORIDE	0.02	2	2	0.0236 J	0.1 U	0.0306 J	0.1 U	0.1 U	0.1 U		
Total Metals (ug/L)											
ALUMINUM	36000	NA	NA	12.4	91800	81	443	170	24.3		
ANTIMONY	15	6	6	0.16 U	0.35 U	0.16 U	0.21 U	0.16 U	0.21 U		
ARSENIC	0.045	10	NA	0.42 U	21.2	0.42 U	1.1	0.88 U	1.5		
BARIUM	2600	2000	2000	9.7	305	23.1	12	6.2	16.1		
BERYLLIUM	73	4	4	0.11 UJ	6.6 R	0.11 U	0.11 U	0.11 UR	0.11 UJ		
CADMIUM	18	5	5	0.061 UJ	2.3 J	0.09 U	0.06 U	0.07 U	0.061 UJ		
CALCIUM	NA	NA	NA	8390	35300	17100	8460	5670 J	15300 J		
CHROMIUM	110	100	100	1 U	146	1.3 U	1.7 U	0.95 U	0.95 U		
COBALT	730	NA	NA	3.5	78	5.1	2.3	3.4	2.7 J		
COPPER	1500	1300	NA	0.4 UJ	272	1.2	1.6	1.3 J	0.4 UJ		
IRON	11000	NA	NA	1650	187000	3280	3540	1510	11600		
LEAD	NA	15	15	0.05 U	84	0.22	0.82	0.29	0.1		
MAGNESIUM	NA	NA	NA	2880	39900	7120	3000	2190	4080		
MANGANESE	880	NA	NA	323	2510	1020	315	295	911		
NICKEL	730	NA	100	5.8 J	175	4.1	4.1	3.8 J	1.3 J		
POTASSIUM	NA	NA	NA	2030	16400	3140	1970	1490	2620 J		
SELENIUM	180	50	50	0.29 UJ	0.29 U	0.29 U	0.29 U	0.61	0.37 U		
SILVER	180	NA	NA	0.05 U	0.36	0.05 U	0.05 U	0.05 U	0.05 U		
SODIUM	NA	NA	NA	13200 J	11700 J	39500 J	11000 J	11100 J	17000 J		
THALLIUM	2.4	2	2	0.07 U	0.95	0.07 U	0.07 U	0.07 U	0.07 U		
VANADIUM	36	NA	NA	0.4 U	184	0.4 U	0.82	0.4 U	0.4 U		
ZINC	11000	NA	NA	9.8 J	551	10.4	11.2	12.6	8 J		
Dissolved Metals (ug/L)											
ALUMINUM	36000	NA	NA	1.6	3	2.8	2.6	2.6	1.2 J		
ARSENIC	0.045	10	NA	0.57 J	0.1 J	0.39	0.99	0.83	1.7 J		
BARIUM	2600	2000	2000	10.4	3.9 J	22.6	9.4	5.2	16		
BERYLLIUM	73	4	4	0.12 UJ	0.12 U	0.12 U	0.12 UJ	0.12 UJ	0.12 UJ		
CALCIUM	NA	NA	NA	9950	5270	16100	7620	5510	17000		
CHROMIUM	110	100	100	0.96 U	0.71 U	1 U	1 U	0.95 U	0.85 U		
COBALT	730	NA	NA	3.4	1.2	4.4	1.7	3.1	2.4		
COPPER	1500	1300	NA	0.16 UJ	0.22 J	0.4	0.28 J	0.24 J	0.16 UJ		
IRON	11000	NA	NA	1660	50 U	2020	2110	1040	12300	9460	5160
LEAD	NA	15	15	0.2	0.12 J	0.11 J	0.19	0.14 J	0.17		
MAGNESIUM	NA	NA	NA	3190	2010	6990	2520	2050	4440		
MANGANESE	880	NA	NA	319	110	903	282	323	859	1130	654
MERCURY	11	2	2	0.049 U	0.021 U	0.021 U	0.021 U	0.021 U	0.059 U		
NICKEL	730	NA	100	6.2 J	1.7	3.7	3.2	3.2	1.4 J		
POTASSIUM	NA	NA	NA	1980 J	2930	2800	1710	1380	2440		
SELENIUM	180	50	50	0.3 UJ	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ		
SODIUM	NA	NA	NA	12300 J	10400	38700	10400	11500	14800		

TABLE 4-24
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-60D MW16-60D-NWG-102704 NORMAL 10/27/2004	08 MW16-61D MW16-61D-NWG-102504 NORMAL 10/25/2004	08 MW16-62D MW16-62D-NWG-102604 NORMAL 10/26/2004	08 MW16-63D MW16-63D-NWG-102604 NORMAL 10/26/2004	08 MW16-64D MW16-64D-NWG-102704 NORMAL 10/27/2004	08 MW16-65D MW16-65D-NWG-102804 NORMAL 10/28/2004	09 MW16-66D MW16-66D-NWG-111604 NORMAL 11/16/2004	09 MW16-67D MW16-67D-NWG-111604 NORMAL 11/16/2004
VANADIUM	36	NA	NA	0.19 U	0.3 U	0.19 U	0.21 U	0.2 U	0.16 U		
ZINC	11000	NA	NA	11.1 J	12.5	6.7	8.2	4.2	3.5 J		
Miscellaneous Parameters (ug/L)											
ALKALINITY	NA	NA	NA	12.5	17.5	20	19.5	14.5	14.5	11.3	25
AMMONIA	NA	NA	NA	0.1 U	0.31	0.1 U	0.13	0.1 U	0.1 U	0.27	0.33
CHLORIDE	NA	NA	NA	27.9	11.5	77	16.7	17.6	57.2	92.8	32.8
DISSOLVED INORGANIC CARBON	NA	NA	NA	3	2	2	3	3	3	6	7
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	3	3	2	2	2	1 U	1 U
NITRATE	10000	10000	NA	0.1 U	2.85	0.537	0.144	1.19	0.1 U	1.07	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.083	0.058	0.185	0.071	0.061	0.133		
SULFATE	NA	NA	NA	19.5	12.7	15.1	18.6	12.4	18.7	21.5	19

TABLE 4
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRQ Tap Water	Federal MCL	RIDEM GA GW Objectives	09 MW16-68D MW16-68D-NWG-111604 ORIG 11/16/2004	09 MW16-68D MW16-68D-NWG-111604-AVG AVG 11/16/2004	09 MW16-68D MW16-68D-NWG-111604-D DUP 11/16/2004	09 MW16-69D MW16-69D-NWG-111604 NORMAL 11/16/2004	09 MW16-70D MW16-70D-NWG-111704 NORMAL 11/17/2004	09 MW16-71D MW16-71D-NWG-111704 NORMAL 11/17/2004
Volatile Organics (ug/L)									
1,1-DICHLOROETHANE	810	NA	NA	1 U	1 U	1 U	1 U	25 U	1 U
1,1-DICHLOROETHENE	340	7	7	0.335 J	0.3355 J	0.336 J	0.74 J	25 U	0.295 J
ACETONE	5500	NA	NA	7.29 U	7.97 U	8.65 U	17 U	130 U	9.17 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	25 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	0.309 J	0.3215 J	0.334 J	1.11	25 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	25 U	1 U
CHLOROFORM	0.17	80	NA	1 U	1 U	1 U	1 U	25 U	1 U
CHLOROMETHANE	160	NA	NA	1 U	1 U	1 U	1 U	25 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1.74	1.76	1.78	7.67	25 U	1.57
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	3.5 J	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	3.3 U	5.4 U	7.5 U	6.2 U	5.6 U	3.3 U
TETRACHLOROETHENE	0.1	5	5						
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	25 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1.74 J	1.87 J	2	8.2	50 U	1.57 J
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	792	782	772	979	730	792
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	0.133 J	0.133 J	0.164 J	25 U	1 U
TRICHLOROETHENE	0.028	5	5	790	780	770	970	730	790
VINYL CHLORIDE	0.02	2	2	1 U	1 U	1 U	1 U	25 U	1 U
Low-Level Volatile Organics (ug/L)									
1,1,2-TRICHLOROETHANE	0.2	5	5						
1,1-DICHLOROETHENE	340	7	7						
1,2-DICHLOROETHANE	0.12	5	5						
1,4-DICHLOROBENZENE	0.5	75	75						
BENZENE	0.35	5	5						
CHLOROFORM	0.17	80	NA						
VINYL CHLORIDE	0.02	2	2						
Total Metals (ug/L)									
ALUMINUM	36000	NA	NA						
ANTIMONY	15	6	6						
ARSENIC	0.045	10	NA						
BARIUM	2600	2000	2000						
BERYLLIUM	73	4	4						
CADMIUM	18	5	5						
CALCIUM	NA	NA	NA						
CHROMIUM	110	100	100						
COBALT	730	NA	NA						
COPPER	1500	1300	NA						
IRON	11000	NA	NA						
LEAD	NA	15	15						
MAGNESIUM	NA	NA	NA						
MANGANESE	880	NA	NA						
NICKEL	730	NA	100						
POTASSIUM	NA	NA	NA						
SELENIUM	180	50	50						
SILVER	180	NA	NA						
SODIUM	NA	NA	NA						
THALLIUM	2.4	2	2						
VANADIUM	36	NA	NA						
ZINC	11000	NA	NA						
Dissolved Metals (ug/L)									
ALUMINUM	36000	NA	NA						
ARSENIC	0.045	10	NA						
BARIUM	2600	2000	2000						
BERYLLIUM	73	4	4						
CALCIUM	NA	NA	NA						
CHROMIUM	110	100	100						
COBALT	730	NA	NA						
COPPER	1500	1300	NA						
IRON	11000	NA	NA	5320	5440	5560	3210	2730	1230
LEAD	NA	15	15						
MAGNESIUM	NA	NA	NA						
MANGANESE	880	NA	NA	498	507	516	1470	688	175
MERCURY	11	2	2						
NICKEL	730	NA	100						
POTASSIUM	NA	NA	NA						
SELENIUM	180	50	50						
SODIUM	NA	NA	NA						

TABLE 4-24
SUMMARY OF CHEMICALS DETECTED
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	09 MW16-68D MW16-68D-NWG-111604 ORIG 11/16/2004	09 MW16-68D MW16-68D-NWG-111604-AVG AVG 11/16/2004	09 MW16-68D MW16-68D-NWG-111604-D DUP 11/16/2004	09 MW16-69D MW16-69D-NWG-111604 NORMAL 11/16/2004	09 MW16-70D MW16-70D-NWG-111704 NORMAL 11/17/2004	09 MW16-71D MW16-71D-NWG-111704 NORMAL 11/17/2004
VANADIUM	36	NA	NA						
ZINC	11000	NA	NA						
Miscellaneous Parameters (ug/L)									
ALKALINITY	NA	NA	NA	26	25.3	24.6	39.7	26.7	13
AMMONIA	NA	NA	NA	0.1	0.15	0.2	0.16	0.18	0.12
CHLORIDE	NA	NA	NA	14	15	16	16	16.4	16.6
DISSOLVED INORGANIC CARBON	NA	NA	NA	6	6.5	7	7	7	5
DISSOLVED ORGANIC CARBON	NA	NA	NA	1	1.5	2	2	1	1 U
NITRATE	10000	10000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.904
SALINITY (g/kg)	NA	NA	NA						
SULFATE	NA	NA	NA	18.5	18.45	18.4	19.7	20.6	14

Investigation Description:
01 - EBS Phase II Sampling
02 - EBS Phase II Follow-On Sampling
03 - EBS Phase II Follow-On Addendum Sampling
04 - State I Phase I RI Sampling Event
05 - Stage II Phase I RI Sampling Event
06 - Phase II RI Sampling Event
07 - Supplemental SD RI Investigation
08 - CTO 97 Supplemental Phase II Investigation
09 - CTO 107 HRC Injection Study

Qualifiers:
J - Estimated value.
U - Nondetected result.
UJ - Nondetected result is estimated.
UR - Nondetected result is rejected.
R - Rejected value.

Sample Code Description:
NORMAL - One sample was collected at this location.
ORIG - First of two samples collected at this location.
DUP - Second of two samples collected at this location.
AVG - Average of the two samples collected at this location.

Acronyms:
GA = Drinking water suitability
GW = Groundwater
MCL = Maximum Contaminant Level
NA = Not Applicable/Not Available
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
VOC = Volatile Organic Compound

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

T[illegible]-25

SUMMARY OF DESCRIPTIVE STATISTICS

PRE-2004 DEEP OVERBURDEN GROUNDWATER SAMPLES

SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16

FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE

NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	2/29	0.3	1	1	0.51	0.65	MW16-21D-NWG-032801	NA	**0.2 C**	5	5
1,1-DICHLOROETHANE	7/81	0.16 J	0.6	1 - 20	0.599	0.292	MW16-16D-NWG-032601	NA	810 N	NA	NA
1,1-DICHLOROETHENE	9/32	0.3 J	1	1 - 20	0.93	0.75	4 Samples	NA	340 C	7	7
1,2-DICHLOROETHANE	5/81	0.3	0.4	1 - 20	0.609	0.36	3 Samples	NA	**0.12 C**	5	5
4-METHYL-2-PENTANONE	2/61	0.11 J	0.34 J	3 - 100	2.75	0.225	MW16-47D-NWG-120202	NA	2000 N	NA	NA
ACETONE	14/38	0.8 J	100 J	5 - 17	15	35.5	MW16-23D-NWG-032801	NA	5500 N	NA	NA
BENZENE	1/32	1	1	1 - 20	0.813	1	MW16-20D-NWG-032801	NA	**0.35 C**	5	5
BTEX	15/81	0.04	1.12	---	0.0627	0.339	MW16-14D-NWG-112102	NA	NA	NA	NA
CARBON DISULFIDE	27/81	0.2 J	1.5	1 - 20	0.622	0.516	MW16-26D-NWG-121202	NA	1000 N	NA	NA
CHLORODIBROMOMETHANE	2/81	0.21 J	0.47 J	1 - 20	0.613	0.34	MW16-19D-NWG-112702	NA	**0.13 C**	80	NA
CHLOROETHANE	1/81	0.6	0.6	1 - 20	0.785	0.6	MW16-14D-NWG-032301	NA	4.6 C	NA	NA
CHLOROFORM	1/29	0.5 J	0.5 J	1	0.5	0.5	MW16-29D-NWG-032101	NA	**0.17 C**	80	NA
CIS-1,2-DICHLOROETHENE	36/77	0.23 J	61	1 - 2	4.37	8.58	MW16-29D-NWG-121102	NA	61 N	70	70
ETHYLBENZENE	3/81	0.17 J	0.5	1 - 20	0.61	0.317	MW16-15D-NWG-032701-D	NA	1300 N	700	700
M+P-XYLENES	2/80	0.1 J	0.47 J	1 - 40	1.04	0.285	MW16-14D-NWG-112102	NA	210 N[7]	10000 [7]	10000 [7]
METHANE	12/52	1.5 J	410 J	1	12.5	52.3	MW16-29D-NWG-121102	NA	NA	NA	NA
O-XYLENE	3/80	0.3 J	0.6	1 - 20	0.614	0.38	MW16-15D-NWG-032701-D	NA	210 N[7]	10000 [7]	10000 [7]
TETRACHLOROETHENE	17/81	0.11 J	23	1 - 20	0.885	1.78	MW16-34D-NWG-112602	NA	**0.1 C**	**5**	**5**
TOLUENE	7/81	0.1 J	0.29 J	1 - 20	0.588	0.16	MW16-32D-NWG-121802	NA	720 N	1000	1000
TOTAL 1,2-DICHLOROETHENE	37/81	0.23	63	1 - 40	4.65	8.84	MW16-29D-NWG-121102	NA	**61 N[8]**	NA	70
TOTAL CHLORINATED VOCS	70/81	0.06	6404	---	622	720	MW16-15D-NWG-032701-D	NA	NA	NA	NA
TOTAL XYLENES	4/81	0.1	0.77	1 - 20	0.614	0.428	MW16-14D-NWG-112102	NA	210 N	10000	10000
TRANS-1,2-DICHLOROETHENE	23/77	0.12 J	3 J	1 - 2	0.707	0.715	MW16-29D-NWG-032101	NA	120 N	100	100
TRICHLOROETHENE	60/81	0.12 J	6400	1	617	832	MW16-15D-NWG-032701-D	NA	**0.028 C**	**5**	**5**
VINYL CHLORIDE	1/29	2 J	2 J	1 - 2	1.02	2	MW16-29D-NWG-032101	NA	**0.02 C[9]**	**2**	**2**
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	18/52	0.05 J	4	0.1	0.261	0.659	MW16-21D-NWG-121202	NA	**0.2 C**	5	5
1,1-DICHLOROETHANE	18/52	0.06 J	0.8	0.1	0.0963	0.184	MW16-21D-NWG-121202	NA	810 N	NA	NA
1,1-DICHLOROETHENE	32/52	0.07 J	14	0.1	0.8	1.27	MW16-24D-NWG-121002	NA	340 C	**7**	**7**
1,4-DICHLOROBENZENE	2/52	0.07 J	2	0.1	0.0879	1.04	MW16-08D-NWG-121102	NA	**0.5 C**	75	75
BENZENE	6/52	0.04 J	0.08 J	0.1	0.05	0.05	MW16-12D-NWG-121002	NA	0.35 C	5	5
CHLOROFORM	18/52	0.04 J	0.7	0.1	0.0837	0.147	MW16-21D-NWG-121202	NA	**0.17 C**	80	NA
VINYL CHLORIDE	14/52	0.05 J	22	0.1	0.512	1.77	MW16-24D-NWG-121002	NA	**0.02 C[9]**	**2**	**2**
Semivolatile Organics (ug/L)											
1,4-DICHLOROBENZENE	1/28	2 J	2 J	10 - 11	4.91	2	MW16-08D-NWG-032801	NA	**0.5 C**	75	75
BIS(2-ETHYLHEXYL)PHTHALATE	6/40	1 J	46	2 - 11	5.44	12.3	MW16-31D-NWG-121802	NA	**4.8 C**	**6**	**6**
DI-N-BUTYL PHTHALATE	2/40	0.6	0.9	1 - 10	3.99	0.75	MW16-19D-NWG-032801	NA	3600 N	NA	NA
Polyaromatric Hydrocarbons (ug/L)											
NAPHTHALENE	2/37	0.1	0.2 J	0.2 - 0.5	0.135	0.15	MW16-09D-NWG-032601	NA	6.2 N	NA	20
PHENANTHRENE	1/40	0.04 J	0.04 J	0.05 - 0.2	0.0798	0.04	MW16-52D-NWG-121102	NA	180 N[10]	NA	NA
TOTAL PAHS	3/40	0.04	0.2	---	0.0085	0.113	MW16-09D-NWG-032601	NA	NA	NA	NA
Pesticides (ug/L)											
BETA-BHC	1/41	0.01	0.01	0.002 - 0.05	0.018	0.01	MW16-07D-NWG-032301	NA	0.037 C	NA	NA
Total Metals (ug/L)											
ALUMINUM	19/40	110 J	14000 J	52.6 - 610	1285	2571	MW16-54D-NWG-121702	5315	36000 N	NA	NA
ANTIMONY	1/40	1.1	1.1	0.29 - 3.65	1.61	1.1	MW16-50D-NWG-121902	12	15 N	6	6
ARSENIC	7/40	2.1	21.5	0.55 - 2.53	2.06	6.43	MW16-50D-NWG-121902	6.4	**0.045 C**	**10**	NA
BARIUM	40/40	5.4	260	---	25.9	25.9	MW16-54D-NWG-121702	80.5	2600 N	2000	2000
BERYLLIUM	4/40	0.18 J	2.35	0.18 - 1.3	0.341	0.804	MW16-54D-NWG-121702	1.3	73 N	4	4
CADMIUM	5/40	0.1	0.97	0.08 - 1.3	0.233	0.406	MW16-54D-NWG-121702	3	18 N	5	5
CALCIUM	40/40	1100	270000	---	19094	19094	MW16-50D-NWG-121902	13302	NA	NA	NA
CHROMIUM	18/40	0.65 J	18 J	0.57 - 50	3.94	4.09	MW16-54D-NWG-121702	214	110 N[11]	100 [11]	100
COBALT	20/29	1.1 J	5.4	0.92	1.92	2.58	MW16-14D-NWG-032301	24.9	730 N	NA	NA
COPPER	6/40	1.4 J	62 J	0.84 - 120	8.05	17.8	MW16-54D-NWG-121702	25.8	1500 N	1300 [12]	NA
IRON	40/40	103	41000 J	---	6804	6804	MW16-54D-NWG-121702	25500	**11000 N**	NA	NA
LEAD	17/40	0.28	36.3	0.1 - 2.3	2.32	4.62	MW16-54D-NWG-121702	4.8	NA	**15 [12]**	**15**
MAGNESIUM	40/40	1840	620000	---	22789	22789	MW16-50D-NWG-121902	5126	NA	NA	NA
MANGANESE	40/40	64.6	2100	---	512	512	MW16-50D-NWG-121902	3292	**880 N**	NA	NA
MERCURY	1/40	0.52 J	0.52 J	0.03 - 0.2	0.0533	0.52	MW16-33D-NWG-120202	ND	11 N	2	2
NICKEL	19/40	1.4 J	28	1.3 - 200	12.1	5.86	MW16-54D-NWG-121702	154	730 N	NA	100

TABLE 4-25
SUMMARY OF DESCRIPTIVE STATISTICS
PRE-2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
POTASSIUM	40/40	1350	230000	---	11457	11457	MW16-50D-NWG-121902	3843	NA	NA	NA
SELENIUM	4/40	3.5 J	87.1	3.04 - 6.3	4.78	30.5	MW16-50D-NWG-121902	2.2	180 N	50	50
SILVER	5/40	0.13 J	9.2	1.03 - 1.3	0.758	2.27	MW16-45D-NWG-120302	1	180 N	NA	NA
SODIUM	38/40	9300	137000	5000	24641	25807	MW16-28D-NWG-032701	12346	NA	NA	NA
THALLIUM	1/40	0.53	0.53	0.09 - 4.74	1.86	0.53	MW16-54D-NWG-121702	4.1	2.4 N	2	2
VANADIUM	17/40	0.53 J	29.9 J	0.52 - 8	2.18	4.39	MW16-54D-NWG-121702	24.4	36 N	NA	NA
ZINC	30/40	1.8	120	4.2 - 130	16.2	16.4	MW16-37D-NWG-120402	89.9	11000 N	NA	NA
Dissolved Metals (ug/L)											
ALUMINUM	6/12	84 J	2200 J	75 - 200	292	494	MW16-54D-NWG-121702	NA	36000 N	NA	NA
ANTIMONY	2/12	0.53	1.7	0.41 - 2.5	1.14	1.12	MW16-50D-NWG-121902	NA	15 N	6	6
ARSENIC	9/12	0.38 J	8.3	0.32 - 1.8	1.74	2.13	MW16-52D-NWG-121102	NA	0.045 C	10	NA
BARIUM	11/12	4.7 J	87	7.4	22.1	23.8	MW16-54D-NWG-121702	NA	2600 N	2000	2000
BERYLLIUM	1/12	0.58	0.58	0.2 - 1.3	0.598	0.58	MW16-54D-NWG-121702	NA	73 N	4	4
CALCIUM	11/12	730	240000	11900	31223	33521	MW16-50D-NWG-121902	NA	NA	NA	NA
CHROMIUM	1/12	330 J	330 J	3.3 - 10	31.8	330	MW16-54D-NWG-121702	NA	110 N[11]	100 [11]	100
COBALT	1/1	9.1 J	9.1 J	---	9.1	9.1	28-GW03-NGW-101298-40	NA	730 N	NA	NA
COPPER	1/12	65 J	65 J	4.1 - 25	16	65	MW16-54D-NWG-121702	NA	1500 N	1300 [12]	NA
IRON	48/53	73 J	14000 J	100 - 935	3427	3770	MW16-01D-NWG-121002	NA	11000 N	NA	NA
LEAD	3/12	0.12 J	9.9	1 - 1.3	1.33	3.44	MW16-54D-NWG-121702	NA	NA	15 [12]	15
MAGNESIUM	12/12	510	560000	---	60546	60546	MW16-50D-NWG-121902	NA	NA	NA	NA
MANGANESE	52/53	18	2000	15	423	431	MW16-50D-NWG-121902	NA	880 N	NA	NA
NICKEL	1/12	420	420	9.6 - 40	52.1	420	MW16-54D-NWG-121702	NA	730 N	NA	100
POTASSIUM	11/12	1400	190000	3410	24509	26582	MW16-50D-NWG-121902	NA	NA	NA	NA
SELENIUM	3/12	1.6	25.9	2.2 - 6.3	4.94	11	MW16-52D-NWG-121102	NA	180 N	50	50
SILVER	1/12	0.22	0.22	1 - 1.3	0.602	0.22	MW16-34D-NWG-112602	NA	180 N	NA	NA
SODIUM	9/12	9200	53000 J	5000 - 30100	16129	19278	MW16-49D-NWG-121902	NA	NA	NA	NA
THALLIUM	1/12	0.14	0.14	0.06 - 1.3	0.427	0.14	MW16-54D-NWG-121702	NA	2.4 N	2	2
VANADIUM	1/12	8.9	8.9	1.3 - 3.2	1.42	8.9	MW16-54D-NWG-121702	NA	36 N	NA	NA
ZINC	4/12	9.6 J	92	12 - 56	20.4	35.9	MW16-36D-NWG-120402	NA	11000 N	NA	NA
Miscellaneous Parameters (ug/L)											
ALKALINITY	51/51	7	1480 J	---	68.3	68.3	MW16-32D-NWG-121802	NA	NA	NA	NA
AMMONIA	29/52	0.1	1.25	0.1	0.153	0.234	MW16-29D-NWG-121102	NA	NA	NA	NA
CHLORIDE	52/52	2.73	11913	---	360	360	MW16-50D-NWG-121902	NA	NA	NA	NA
DISSOLVED ORGANIC CARBON	25/39	1	61	5	9.4	13.3	MW16-51D-NWG-120902	NA	NA	NA	NA
NITRATE	14/51	0.1	8.29 J	0.1 - 10	0.717	2.13	MW16-08D-NWG-121102	NA	10000 N	10000	NA
SALINITY (g/kg)	20/66	0.0021 J	6.06	0.1 - 1	0.574	0.811	MW16-52D-NWG-121102	NA	NA	NA	NA
SULFATE	52/52	2.27	1660	---	64.3	64.3	MW16-50D-NWG-121902	NA	NA	NA	NA
SULFIDE	13/50	0.05 J	0.29 J	0.05	0.0499	0.121	MW16-19D-NWG-112702	NA	NA	NA	NA
TOTAL INORGANIC CARBON	12/52	1 J	17	1 - 5	2.6	4.92	MW16-49D-NWG-121902	NA	NA	NA	NA
TOTAL ORGANIC CARBON	13/13	4	67	---	17.7	17.7	MW16-52D-NWG-121102	NA	NA	NA	NA
Field Parameters (ug/L)											
CARBON DIOXIDE	47/47	23.6	778	---	82.6	82.6	MW16-31D-NWG-121802	NA	NA	NA	NA
DISSOLVED OXYGEN	52/52	-0.09	12.13	---	1.77	1.77	MW16-34D-NWG-112602	NA	NA	NA	NA
FERRIC IRON	47/47	0.07	15.5	---	2.85	2.85	MW16-01D-NWG-121002	NA	NA	NA	NA
OXIDATION REDUCTION POTENTIAL (MV)	52/52	-127.4	227.9	---	4.55	4.55	MW16-08D-NWG-121102	NA	NA	NA	NA
PH (S.U.)	52/52	5.56	12.53	---	6.86	6.86	MW16-32D-NWG-121802	NA	NA	NA	NA
TEMPERATURE (C)	52/52	4.6	15.25	---	11	11	MW16-23D-NWG-121802	NA	NA	NA	NA

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - Background values from Table 7-4 from Stone & Websters Final Background Inorganics Groundwater Study Report, December 1996.
The groundwater background values are based on the more conservative value of the 95% UCL and the maximum detected concentration.
4 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
5 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Winter 2004).
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
7 - Value is for total xylenes.
8 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
9 - PRG is based on CSF for lifetime exposures by a child/adult.
10 - The value for pyrene is used as a surrogate for phenanthrene.
11 - The value for hexavalent chromium is presented.
12 - The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.

SUMMARY OF DESCRIPTIVE STATISTICS
PRE-2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]

Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers
C - Carcinogen.
N - Noncarcinogen.
J - Estimated value.

Acronyms:
BKG = Background
CSF = Cancer Slope Factor
GA = Drinking water suitability
GW = Groundwater
HI = Hazard Index
MCL = Maximum Contaminant Level
NA = No Criteria Available
PAH = Polyaromatic Hydrocarbon
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SDWA = Safe Drinking Water Act
U.S. EPA = United States Environmental Protection Agency

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SUMMARY OF DESCRIPTIVE STATISTICS
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	6/81	0.135 J	0.254 J	1 - 50	3.77	0.176	MW16-16D-NWG-100604-D	NA	810 N	NA	NA
1,1-DICHLOROETHENE	5/18	0.295 J	0.74 J	1 - 50	9.2	0.432	MW16-69D-NWG-111604	NA	340 C	7	7
ACETONE	3/62	1.53 J	2.57 J	4.31 - 250	19.4	1.98	MW16-13D-NWG-100704	NA	5500 N	NA	NA
BROMODICHLOROMETHANE	1/81	0.294 J	0.294 J	1 - 50	3.79	0.294	MW16-15D-NWG-101404	NA	**0.18 C**	80	NA
BTEX	21/81	0.0125	0.252	---	0.00918	0.0354	MW16-64D-NWG-102704	NA	NA	NA	NA
CARBON DISULFIDE	11/81	0.117 J	1.11	1 - 50	3.78	0.355	MW16-69D-NWG-111604	NA	1000 N	NA	NA
CHLORODIBROMOMETHANE	1/81	0.579 J	0.579 J	1 - 50	3.8	0.579	MW16-15D-NWG-101404	NA	**0.13 C**	80	NA
CHLOROFORM	1/18	0.134 J	0.134 J	1 - 50	9.2	0.134	INJ16-07D-NWG-120904	NA	0.17 C	80	NA
CHLOROMETHANE	1/81	0.212 J	0.212 J	1 - 50	3.79	0.212	MW16-67D-NWG-111604	NA	160 N	NA	NA
CIS-1,2-DICHLOROETHENE	33/81	0.226 J	35	1 - 50	5.58	5.87	MW16-29D-NWG-100704	NA	61 N	70	70
ETHANE	6/81	0.68 J	3.5 J	6.2	2.98	1.54	MW16-69D-NWG-111604	NA	NA	NA	NA
ETHENE	1/81	0.88 J	0.88 J	5.8	2.88	0.88	MW16-60D-NWG-102704	NA	NA	NA	NA
METHANE	26/81	1 J	3000	1.7 - 7.5	45.5	138	MW16-29D-NWG-100704	NA	NA	NA	NA
TETRACHLOROETHENE	5/63	0.371 J	7.91	1 - 50	2.38	2.13	MW16-34D-NWG-092904	NA	**0.1 C**	**5**	**5**
TOLUENE	1/81	0.237 J	0.237 J	1 - 50	3.79	0.237	MW16-64D-NWG-102704	NA	720 N	1000	1000
TOTAL 1,2-DICHLOROETHENE	34/81	0.143 J	37	1 - 100	7.7	5.98	MW16-29D-NWG-100704	NA	61 N[7]	NA	70
TOTAL CHLORINATED VOCS	73/81	0.031	2939	---	527	584	MW16-29D-NWG-100704	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	22/81	0.111 J	2.02	1 - 50	3.78	0.428	MW16-29D-NWG-100704	NA	120 N	100	100
TRICHLOROETHENE	69/81	0.142 J	2900	1	524	615	MW16-29D-NWG-100704	NA	**0.028 C**	**5**	**5**
VINYL CHLORIDE	1/18	0.366 J	0.366 J	1 - 50	9.21	0.366	INJ16-02D-NWG-120904	NA	**0.02 C**	2	2
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	15/63	0.018 J	1.9	0.1	0.144	0.445	MW16-59D-NWG-102504	NA	**0.2 C**	5	5
1,1-DICHLOROETHENE	37/63	0.0197 J	2.82	0.1	0.305	0.484	MW16-59D-NWG-102504	NA	340 C	7	7
1,2-DICHLOROETHANE	9/63	0.0229 J	0.119	0.023 - 0.1	0.0509	0.0609	MW16-59D-NWG-102504	NA	0.12 C	5	5
1,4-DICHLOROBENZENE	1/63	1.45 J	1.45 J	0.1	0.0722	1.45	MW16-08D-NWG-100804	NA	**0.5 C**	75	75
BENZENE	21/63	0.0125 J	0.0619 J	0.1	0.0414	0.0241	MW16-59D-NWG-102504	NA	0.35 C	5	5
CHLOROFORM	5/63	0.13	0.286	0.1 - 0.152	0.0603	0.17	MW16-21D-NWG-100104	NA	**0.17 C**	80	NA
VINYL CHLORIDE	36/63	0.0132 J	7.87	0.1	0.221	0.349	MW16-24D-NWG-100104	NA	**0.02 C[8]**	**2**	**2**
Total Metals (ug/L)											
ALUMINUM	59/63	4.7 J	114000	3.3	5361	5725	MW16-39D-NWG-100604	5315	**36000 N**	NA	NA
ANTIMONY	1/63	3.2 J	3.2 J	0.16 - 1.1	0.189	3.2	MW16-50D-NWG-101304	12	15 N	6	6
ARSENIC	51/63	0.48 J	23.9	0.42 - 0.88	2.59	3.14	MW16-39D-NWG-100604	6.4	**0.045 C**	**10**	NA
BARIUM	63/63	5.7	1390	---	59	59	MW16-32D-NWG-110104	80.5	2600 N	2000	2000
BERYLLIUM	15/59	0.12 J	4.1	0.11	0.27	0.901	MW16-39D-NWG-100604	1.3	73 N	**4**	**4**
CADMIUM	11/63	0.08 J	3.5 J	0.06 - 0.19	0.2	0.987	MW16-39D-NWG-100604	3	18 N	5	5
CALCIUM	63/63	3160	409000	---	26858	26858	MW16-49D-NWG-101104	13302	NA	NA	NA
CHROMIUM	19/63	0.71	172	0.34 - 2.8	8.62	27.2	MW16-39D-NWG-100604	214	**110 N[9]**	**100 [9]**	**100**
COBALT	63/63	0.33	154	---	7.79	7.79	MW16-39D-NWG-100604	24.9	730 N	NA	NA
COPPER	41/62	0.48 J	424	0.4 - 7.2	20.3	30.3	MW16-39D-NWG-100604	25.8	1500 N	1300 [10]	NA
IRON	63/63	53.9 J	334000	---	16856	16856	MW16-39D-NWG-100604	25500	**11000 N**	NA	NA
LEAD	59/63	0.05 J	135	0.048 - 0.05	6.44	6.88	MW16-39D-NWG-100604	4.8	NA	**15 [10]**	**15**
MAGNESIUM	63/63	58.2 J	435000	---	17650	17650	MW16-50D-NWG-101304	5126	NA	NA	NA
MANGANESE	63/63	2.5	7190	---	658	658	MW16-39D-NWG-100604	3292	**880 N**	NA	NA
NICKEL	63/63	0.4 J	278	---	14	14	MW16-39D-NWG-100604	154	730 N	NA	**100**
POTASSIUM	63/63	1110	178000	---	8721	8721	MW16-50D-NWG-101304	3843	NA	NA	NA
SELENIUM	7/63	0.36 J	60.6	0.29 - 0.37	2	16.8	MW16-50D-NWG-101304	2.2	180 N	**50**	**50**
SILVER	22/63	0.08 J	9.3	0.05 - 0.052	0.434	1.2	MW16-30D-NWG-101204	1	180 N	NA	NA
SODIUM	63/63	7050	5080000	---	172665	172665	MW16-50D-NWG-101304	12346	NA	NA	NA
THALLIUM	8/63	0.07 J	1.6	0.066 - 0.15	0.102	0.56	MW16-39D-NWG-100604	4.1	2.4 N	2	2
VANADIUM	27/63	0.41 J	222	0.4 - 1.1	10.2	23.6	MW16-39D-NWG-100604	24.4	**36 N**	NA	NA
ZINC	61/63	3.1 J	901	4.7 - 6	46.2	47.6	MW16-39D-NWG-100604	89.9	11000 N	NA	NA
Dissolved Metals (ug/L)											

TABLE 4-26
SUMMARY OF DESCRIPTIVE STATISTICS
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
ALUMINUM	51/63	0.72 J	446	0.72	9.09	11.1	MW16-32D-NWG-110104	NA	36000 N	NA	NA
ARSENIC	63/63	0.1 J	16.9	---	1.6	1.6	MW16-50D-NWG-101304	NA	0.045 C	10	NA
BARIUM	63/63	3.9 J	1270	---	32.5	32.5	MW16-32D-NWG-110104	NA	2600 N	2000	2000
BERYLLIUM	1/63	0.21 J	0.21 J	0.12	0.0624	0.21	MW16-49D-NWG-101104	NA	73 N	4	4
CALCIUM	63/63	3530	363000	---	23082	23082	MW16-49D-NWG-101104	NA	NA	NA	NA
CHROMIUM	45/63	0.49	7.4	0.61 - 1.3	1.2	1.5	MW16-50D-NWG-101304	NA	110 N[9]	100 [9]	100
COBALT	62/63	0.11	6.1	0.01	1.83	1.86	MW16-12D-NWG-101204	NA	730 N	NA	NA
COPPER	33/63	0.17 J	167 J	0.16 - 24.2	3.59	6.14	MW16-50D-NWG-101304	NA	1500 N	1300 [10]	NA
IRON	78/81	50.2 J	15600	50	3741	3884	MW16-11D-NWG-100604	NA	11000 N	NA	NA
LEAD	47/63	0.08 J	1.4 J	0.078 - 0.08	0.171	0.215	MW16-32D-NWG-110104	NA	NA	15 [10]	15
MAGNESIUM	62/63	1030	358000	50	13629	13848	MW16-50D-NWG-101304	NA	NA	NA	NA
MANGANESE	80/81	4.9	3030 J	0.5	448	453	MW16-49D-NWG-101104	NA	880 N	NA	NA
MERCURY	3/63	0.024 J	0.49	0.021 - 0.12	0.02	0.112	MW16-25D-NWG-100504-D	NA	11 N	2	2
NICKEL	63/63	0.3	11.5 J	---	2.66	2.66	MW16-40D-NWG-101204	NA	730 N	NA	100
POTASSIUM	63/63	1100	156000	---	7423	7423	MW16-50D-NWG-101304	NA	NA	NA	NA
SELENIUM	10/63	0.31 J	61	0.3	2.11	12.5	MW16-50D-NWG-101304	NA	180 N	50	50
SODIUM	63/63	7480	4200000	---	153889	153889	MW16-50D-NWG-101304	NA	NA	NA	NA
VANADIUM	46/63	0.08 J	1.4 J	0.08 - 0.39	0.251	0.299	MW16-32D-NWG-110104	NA	36 N	NA	NA
ZINC	62/63	0.53 J	28.1 J	0.81	8.06	8.19	MW16-56D-NWG-101404	NA	11000 N	NA	NA
Miscellaneous Parameters (mg/L)											
ALKALINITY	81/81	9	812	---	42.4	42.4	MW16-32D-NWG-110104	NA	NA	NA	NA
AMMONIA	47/81	0.1	1.22	0.1 - 0.2	0.14	0.204	MW16-29D-NWG-100704	NA	NA	NA	NA
CHLORIDE	81/81	5.54	7160	---	223	223	MW16-50D-NWG-101304	NA	NA	NA	NA
DISSOLVED INORGANIC CARBON	71/81	1	56	1	4.92	5.54	MW16-37D-NWG-100504	NA	NA	NA	NA
DISSOLVED ORGANIC CARBON	78/81	1	140	1	4.04	4.18	MW16-37D-NWG-100504	NA	NA	NA	NA
NITRATE	32/81	0.133	6.3	0.1 - 0.5	0.487	1.14	MW16-03D-NWG-100804	NA	10 N	10	NA
SALINITY (g/kg)	63/63	0.042	13.9	---	0.61	0.61	MW16-50D-NWG-101304	NA	NA	NA	NA
SULFATE	81/81	7.69	1030	---	44.5	44.5	MW16-50D-NWG-101304	NA	NA	NA	NA

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - Background values from Table 7-4 from Stone & Websters Final Background Inorganics Groundwater Study Report, December 1996.
The groundwater background values are based on the more conservative value of the 95% UCL and the maximum detected concentration.
4 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
5 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Winter 2004).
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
7 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
8 - PRG is based on CSF for lifetime exposures by a child/adult.
9 - The value for hexavalent chromium is presented.
10 - The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers:
C - Carcinogen.
N - Noncarcinogen.
J - Estimated value.

T[illegible]-26
SUMMARY OF DESCRIPTIVE STATISTICS
2004 DEEP OVERBURDEN GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]

Acronyms:
BKG = Background
CSF = Cancer Slope Factor
GA = Drinking water suitability
GW = Groundwater
HI = Hazard Index
MCL = Maximum Contaminant Level
NA = No Criteria Available
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SDWA = Safe Drinking Water Act
U.S. EPA = United States Environmental Protection Agency

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SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-01R MW16-01R-NWG-101204 NORMAL 10/12/2004	08 MW16-02R MW16-02R-NWG-093004 ORIG 9/30/2004	08 MW16-02R MW16-02R-NWG-093004-AVG AVG 9/30/2004	08 MW16-02R MW16-02R-NWG-093004-D DUP 9/30/2004
Volatile Organics (ug/L)							
1,1-DICHLOROETHANE	810	NA	NA	1 U	25 U	37.5 U	50 U
1,1-DICHLOROETHENE	340	7	7				
2-BUTANONE	7000	NA	NA	5 U	130 U	190 U	250 U
2-HEXANONE	NA	NA	NA	5 U	130 U	190 U	250 U
ACETONE	5500	NA	NA	23 U	130 UR	190 UR	250 UR
BROMODICHLOROMETHANE	0.18	80	NA	1 U	25 U	37.5 U	50 U
BTEX[1]	NA	NA	NA	0.211	0.03	0.0321	0.0341
CARBON DISULFIDE	1000	NA	NA	1 U	25 U	37.5 U	50 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	25 U	37.5 U	50 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U	19 J	19.5 J	20 J
ETHANE	NA	NA	NA	6.2 U	4.5 J	4.75 J	5 J
ETHENE	NA	NA	NA	5.8 U	1.9 J	2.05 J	2.2 J
METHANE	NA	NA	NA	3.3 U	8.4	8.4	8.4
TETRACHLOROETHENE	0.1	5	5	1 U	25 U	37.5 U	50 U
TOLUENE	720	1000	1000	0.211 J	25 U	37.5 U	50 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	19 J	19.5 J	20 J
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	4.92	1221	1171	1122
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	25 U	37.5 U	50 U
TRICHLOROETHENE	0.028	5	5	4.92	1200	1150	1100
Low-Level Volatile Organics (ug/L)							
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.0117 J	0.0117 J
1,1-DICHLOROETHENE	340	7	7	0.1 U	1.59	1.46	1.33
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U
BENZENE	0.35	5	5	0.1 U	0.03 J	0.03205 J	0.0341 J
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.393	0.3705	0.348
Total Metals (ug/L)							
ALUMINUM	36000	NA	NA	10.5	468 J	306 J	144 J
ARSENIC	0.045	10	NA	0.42 U	0.53 J	0.475 J	0.42 J
BARIUM	2600	2000	2000	37.4	9.5	8.6	7.7
BERYLLIUM	73	4	4	0.11 UJ	0.11 UJ	0.11 UJ	0.11 U
CADMIUM	18	5	5	0.06 U	0.06 U	0.06 U	0.06 U
CALCIUM	NA	NA	NA	15200	8050	7970 J	7890 J
CHROMIUM	110	100	100	1.7 U	1.8 U	1.205 U	0.61 U
COBALT	730	NA	NA	3.6	2.1	1.85	1.6
COPPER	1500	1300	NA	0.4 U	1.8	1.45	1.1
IRON	11000	NA	NA	15800	7180	6315	5450
LEAD	NA	15	15	0.05 U	0.63	0.58	0.53
MAGNESIUM	NA	NA	NA	5160	2440	2545 J	2650 J
MANGANESE	880	NA	NA	919 J	606	587.5	569
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U
NICKEL	730	NA	100	2.1	1.9	1.55	1.2
POTASSIUM	NA	NA	NA	2970	2040	2000	1960
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U

TABLE 4-27
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-01R MW16-01R-NWG-101204 NORMAL 10/12/2004	08 MW16-02R MW16-02R-NWG-093004 ORIG 9/30/2004	08 MW16-02R MW16-02R-NWG-093004-AVG AVG 9/30/2004	08 MW16-02R MW16-02R-NWG-093004-D DUP 9/30/2004
SODIUM	NA	NA	NA	19700 J	10200	10850 J	11500 J
THALLIUM	2.4	2	2	0.07 U	0.12 J	0.0775 J	0.07 U
VANADIUM	36	NA	NA	0.4 UJ	0.93	0.565	0.4 U
ZINC	11000	NA	NA	12.8 J	22.4 J	17.7 J	13 J
Dissolved Metals (ug/L)							
ALUMINUM	36000	NA	NA	0.72 U	0.87 J	0.615 J	0.72 U
ARSENIC	0.045	10	NA	0.52	0.49	0.435	0.38
BARIUM	2600	2000	2000	37	7	7	7
CALCIUM	NA	NA	NA	15800	7960	7800	7640
CHROMIUM	110	100	100	0.6 U	0.96	0.73	0.5
COBALT	730	NA	NA	3.5	1.4	1.3	1.2
COPPER	1500	1300	NA	0.21 U	0.16 U	0.16 U	0.16 U
IRON	11000	NA	NA	14700	3830	3865	3900
LEAD	NA	15	15	0.14 J	0.08 U	0.08 U	0.08 U
MAGNESIUM	NA	NA	NA	5010	2350	2320	2290
MANGANESE	880	NA	NA	866 J	570 J	549.5 J	529
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U
NICKEL	730	NA	100	2.1 J	0.56	0.54	0.52
POTASSIUM	NA	NA	NA	2860	1890	1870	1850
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 U	0.3 U
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	17100	9800	9720	9640
VANADIUM	36	NA	NA	0.12 J	0.23	0.155 J	0.08 J
ZINC	11000	NA	NA	3.4 J	2.2 J	2.05 J	1.9 J
Miscellaneous Parameters (ug/L)							
ALKALINITY	NA	NA	NA	23.7	25.5	26.75	28
AMMONIA	NA	NA	NA	0.1	0.1	0.075	0.1 U
CHLORIDE	NA	NA	NA	76.3	14.2	14.6	15
CYANIDE	730	200	200	10 UJ	10 U	10 U	10 U
DISSOLVED INORGANIC CARBON	NA	NA	NA	3	1 U	1 U	1 U
DISSOLVED ORGANIC CARBON	NA	NA	NA	1	3	3	3
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	0.1 U	0.1 U	0.1 U	0.1 U
NITRITE	1000	1000	NA	0.1 U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.175	0.068	0.071	0.074
SULFATE	NA	NA	NA	19.1	13.7	13.45	13.2

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SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-03R MW16-03R-NWG-101204 NORMAL 10/12/2004	08 MW16-05R MW16-05R-NWG-092904 NORMAL 9/29/2004	08 MW16-06R MW16-06R-NWG-092804 NORMAL 9/28/2004	08 MW16-10R MW16-10R-NWG-100704 NORMAL 10/7/2004	08 MW16-14R MW16-14R-NWG-102704 NORMAL 10/27/2004
Volatile Organics (ug/L)								
1,1-DICHLOROETHANE	810	NA	NA	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	340	7	7					
2-BUTANONE	7000	NA	NA	5 U	5 U	5 U	1.33 J	5 U
2-HEXANONE	NA	NA	NA	5 U	5 U	5 U	5 U	5 U
ACETONE	5500	NA	NA	18 U	5 U	5 U	7.45	14 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0.0271	0.165	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	1 U	0.15 J	0.724 J	1 UJ	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	3.32 U	8.08	1 U	1 U	1 U
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	3.3 U	5.3 U	78	540	3.3 U
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	0.15 J	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	8.46	1 U	1 U	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	31.1	869	0 U	0.0919	0.85
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	0.376 J	1 U	1 U	1 U
TRICHLOROETHENE	0.028	5	5	31	860	1 U	1 U	0.85 J
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.0433 J	0.549	0.1 U	0.0274 J	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BENZENE	0.35	5	5	0.1 U	0.0271 J	0.0152 J	0.1 U	0.1 U
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.0373 J	0.141	0.1 U	0.0645 J	0.1 U
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	1140	416 J	279	74.4	28.3
ARSENIC	0.045	10	NA	0.53 J	0.92	0.59 J	0.52 J	0.5 U
BARIUM	2600	2000	2000	13.3	7.1	25.5	1.2	6.7
BERYLLIUM	73	4	4	0.14 J	0.12 J	0.11 UJ	0.11 U	0.11 UJ
CADMIUM	18	5	5	0.06 U	0.06 U	0.06 U	0.06 U	0.061 UJ
CALCIUM	NA	NA	NA	15200	3120	10600 J	4740	18400
CHROMIUM	110	100	100	4.1 J	1.6 U	0.34 U	0.89 U	0.73 U
COBALT	730	NA	NA	1.1	0.51	0.14	1.9	0.05 U
COPPER	1500	1300	NA	2.8 U	2.9	0.57 J	7.8	0.8 U
IRON	11000	NA	NA	7460	8360	15900	25400	409
LEAD	NA	15	15	1.5	0.76	0.24	1.1	0.23
MAGNESIUM	NA	NA	NA	2850	1110	454	638	2270
MANGANESE	880	NA	NA	534 J	186	247	397	158
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.12 U
NICKEL	730	NA	100	2.9	1.4	1.7	2.6	0.65 J
POTASSIUM	NA	NA	NA	3230	2280	19800	3340	2760
SELENIUM	180	50	50	0.29 U	0.59	0.29 U	0.29 U	0.29 UJ
SILVER	180	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

TABLE 4-27
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-03R MW16-03R-NWG-101204 NORMAL 10/12/2004	08 MW16-05R MW16-05R-NWG-092904 NORMAL 9/29/2004	08 MW16-06R MW16-06R-NWG-092804 NORMAL 9/28/2004	08 MW16-10R MW16-10R-NWG-100704 NORMAL 10/7/2004	08 MW16-14R MW16-14R-NWG-102704 NORMAL 10/27/2004
SODIUM	NA	NA	NA	30100 J	93400	27500	7800 J	8720 J
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	2.3 J	0.9	0.4 U	0.6 J	0.4 U
ZINC	11000	NA	NA	28.5 J	34.1	110 J	46.7 J	2.2 U
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	1.8	1.4 J	50.6	1.6	3.1
ARSENIC	0.045	10	NA	0.36	0.66	0.53 J	0.09 U	0.7 J
BARIUM	2600	2000	2000	6.5	3.7 J	23.3	2.1 U	6.3
CALCIUM	NA	NA	NA	15800	2980	12000 J	4590	21200
CHROMIUM	110	100	100	0.91	0.89	0.62 U	0.88	0.96 U
COBALT	730	NA	NA	0.05	0.01 U	0.01 U	0.01 U	0.02 J
COPPER	1500	1300	NA	0.78 U	0.51	0.26 J	0.25 J	0.17 U
IRON	11000	NA	NA	2160	50 U	50 U	76.4 J	50 U
LEAD	NA	15	15	0.09 J	0.12 J	0.45	0.17 J	0.15 J
MAGNESIUM	NA	NA	NA	2420	800	403 J	424	2610
MANGANESE	880	NA	NA	455 J	42	5	96.5	145
MERCURY	11	2	2	0.021 U	0.031 U	0.043 U	0.021 U	0.056 U
NICKEL	730	NA	100	0.52 J	0.3	1.1	0.57	0.45 J
POTASSIUM	NA	NA	NA	2880	2200	22000	2060	2670 J
SELENIUM	180	50	50	0.3 U	0.8	0.3 U	0.3 U	0.36 J
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	27500	87400	30900	6140 J	8260 J
VANADIUM	36	NA	NA	0.17	0.18	0.11 U	0.17	0.32 U
ZINC	11000	NA	NA	5.3 J	0.76 J	2.3 J	3.3 J	0.78 U
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	47	48	51.2	21	55.5
AMMONIA	NA	NA	NA	0.1	0.11	0.1 U	0.18	0.12
CHLORIDE	NA	NA	NA	49.5	100	41.1	7.81	14.4
CYANIDE	730	200	200	10 UJ	10 U	10 U	10 U	10 U
DISSOLVED INORGANIC CARBON	NA	NA	NA	4	4	1 U	1	4
DISSOLVED ORGANIC CARBON	NA	NA	NA	1	2	2	3	1
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	0.1 U	0.1 U	0.233	0.1 U	0.1 U
NITRITE	1000	1000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.146	0.267	0.162	0.36	0.09
SULFATE	NA	NA	NA	18.7	32.1	15.6	0.133	15.4

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SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-15R MW16-15R-NWG-101404 ORIG 10/14/2004	08 MW16-15R MW16-15R-NWG-101404-AVG AVG 10/14/2004	08 MW16-15R MW16-15R-NWG-101404-D DUP 10/14/2004	08 MW16-17R MW16-17R-NWG-100504 NORMAL 10/5/2004	08 MW16-25R MW16-25R-NWG-100504 NORMAL 10/5/2004
Volatile Organics (ug/L)								
1,1-DICHLOROETHANE	810	NA	NA	1 U	1 U	1 U	1 U	0.285 J
1,1-DICHLOROETHENE	340	7	7					
2-BUTANONE	7000	NA	NA	5 U	5 U	5 U	5 U	5 U
2-HEXANONE	NA	NA	NA	5 U	5 U	5 U	5 U	5 U
ACETONE	5500	NA	NA	5 U	5 U	5 U	5 UR	5 UR
BROMODICHLOROMETHANE	0.18	80	NA	0.235 J	0.235 J	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0.0307	0.0313	0.0318	0 U	0.0236
CARBON DISULFIDE	1000	NA	NA	0.759 J	0.826 J	0.893 J	0.228 J	0.704 J
CHLORODIBROMOMETHANE	0.13	80	NA	0.322 J	0.322 J	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	49	54.5	60	1 U	1 U
ETHANE	NA	NA	NA	5.4 J	5.05 J	4.7 J	6.2 U	6.2 U
ETHENE	NA	NA	NA	4.2 J	3.9 J	3.6 J	5.8 U	5.8 U
METHANE	NA	NA	NA	1100 J	835 J	570 J	44	26
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	49.2	54.7	60.2	1 U	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	520	761	1002	0 U	0.73
TRANS-1,2-DICHLOROETHENE	120	100	100	0.184 J	0.213 J	0.242 J	1 U	1 U
TRICHLOROETHENE	0.028	5	5	470 J	705 J	940 J	1 U	0.445 J
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.131 J	0.186 J	0.241 J	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.567 J	0.8185 J	1.07 J	0.1 U	0.1 U
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.0263 J	0.0263 J	0.1 U	0.1 U
BENZENE	0.35	5	5	0.0307 J	0.03125 J	0.0318 J	0.1 U	0.0236 J
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.235	0.2705	0.306	0.1 U	0.1 U
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	10.7	9.5	8.3	38.1	24.5
ARSENIC	0.045	10	NA	1	1	1	0.42 U	0.57 J
BARIUM	2600	2000	2000	3.5	4	4.5	3.4	2.4
BERYLLIUM	73	4	4	0.11 U	0.11 U	0.11 U	0.11 U	0.11 UJ
CADMIUM	18	5	5	0.061 U	0.061 U	0.061 U	0.06 U	0.06 U
CALCIUM	NA	NA	NA	5950	6050	6150	10100	6560
CHROMIUM	110	100	100	1.1 U	1.15 U	1.2 U	0.94	0.9 U
COBALT	730	NA	NA	0.16	0.27	0.38	0.49	0.72
COPPER	1500	1300	NA	0.43 U	0.435 U	0.44 U	0.93 U	0.47 J
IRON	11000	NA	NA	4470	4990	5510	3630	5810
LEAD	NA	15	15	0.06 J	0.08 J	0.1	0.08 J	0.1
MAGNESIUM	NA	NA	NA	1520	1630	1740	1690	1990
MANGANESE	880	NA	NA	164 J	217.5 J	271 J	437	275
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.13 U
NICKEL	730	NA	100	0.47 J	1.185 J	1.9	0.43 J	1.7
POTASSIUM	NA	NA	NA	3270	2865	2460	1660	3350
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.052 U	0.052 U	0.052 U	0.05 U	0.05 U

TABLE 4-27
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-15R MW16-15R-NWG-101404 ORIG 10/14/2004	08 MW16-15R MW16-15R-NWG-101404-AVG AVG 10/14/2004	08 MW16-15R MW16-15R-NWG-101404-D DUP 10/14/2004	08 MW16-17R MW16-17R-NWG-100504 NORMAL 10/5/2004	08 MW16-25R MW16-25R-NWG-100504 NORMAL 10/5/2004
SODIUM	NA	NA	NA	18700	18450	18200	10600 J	11700
THALLIUM	2.4	2	2	0.066 U	0.066 U	0.066 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
ZINC	11000	NA	NA	16.7	14.95	13.2	7.8	24.2
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	0.72 U	0.72 U	0.72 U	0.85 J	0.88 J
ARSENIC	0.045	10	NA	0.58	0.585	0.59	0.47	0.72
BARIUM	2600	2000	2000	3.4 J	3.65 J	3.9 J	3.5 J	2.5 J
CALCIUM	NA	NA	NA	6540	6585	6630	10300	6840
CHROMIUM	110	100	100	1.5	1.45	1.4	0.91	0.75
COBALT	730	NA	NA	0.1	0.095	0.09	0.51	0.11
COPPER	1500	1300	NA	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
IRON	11000	NA	NA	937	922	907	1760	791
LEAD	NA	15	15	0.078 U	0.1045	0.17	0.14 J	0.08 U
MAGNESIUM	NA	NA	NA	1440	1450	1460	1700	2060
MANGANESE	880	NA	NA	135 J	135.5 J	136 J	455	243
MERCURY	11	2	2	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U
NICKEL	730	NA	100	0.21	0.33	0.45	0.62	0.35
POTASSIUM	NA	NA	NA	3490	3565	3640	1780	3660
SELENIUM	180	50	50	0.3 U	0.3 U	0.3 U	0.38 J	0.33 J
SILVER	180	NA	NA	0.021 U	0.021 U	0.021 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	18400	18300	18200	10600 J	12300
VANADIUM	36	NA	NA	0.35 U	0.335 U	0.32 U	0.23	0.16
ZINC	11000	NA	NA	7.4 J	6.35 J	5.3 J	3.2	1.9 J
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	33	33.25	33.5	31.7	32.7
AMMONIA	NA	NA	NA	0.12	0.11	0.1	0.11	0.1 U
CHLORIDE	NA	NA	NA	20.9	21	21.1	9.95	9.24
CYANIDE	730	200	200	10 U	10 U	10 U	10 U	10 U
DISSOLVED INORGANIC CARBON	NA	NA	NA	3	3	3	7	1 U
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	2	2	8	2
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	0.1 UJ	0.184 J	0.318 J	0.1 U	0.1 U
NITRITE	1000	1000	NA	0.1 U	0.1 U	0.1 U	0.11	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.078	0.0775	0.077	0.072	0.066
SULFATE	NA	NA	NA	3.97	3.85	3.73	15.4	13

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SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-27R MW16-27R-NWG-101204 NORMAL 10/12/2004	08 MW16-28R MW16-28R-NWG-101104 NORMAL 10/11/2004	08 MW16-32R MW16-32R-NWG-102904 NORMAL 10/29/2004	08 MW16-36R MW16-36R-NWG-100504 NORMAL 10/5/2004	08 MW16-44R MW16-44R-NWG-100104 NORMAL 10/1/2004
Volatile Organics (ug/L)								
1,1-DICHLOROETHANE	810	NA	NA	1 U	1 U	5 U	1 U	1 U
1,1-DICHLOROETHENE	340	7	7					
2-BUTANONE	7000	NA	NA	5 U	5 U	25 U	5 U	5 U
2-HEXANONE	NA	NA	NA	5 U	5 U	25 U	5 U	5 U
ACETONE	5500	NA	NA	5 U	5 U	29 U	11 J	5 UR
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	5 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0.0201	0.0132	1.19
CARBON DISULFIDE	1000	NA	NA	1 U	1 UJ	5 U	0.264 J	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	5 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1.64 U	1 U	5 U	1 U	22
ETHANE	NA	NA	NA	6.2 U	6.2 U	1 J	6.2 U	6.6
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	7.8
METHANE	NA	NA	NA	3.3 U	28	3.3 U	1.6 J	11
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	5 U	1 U	1 U
TOLUENE	720	1000	1000	1 U	1 U	5 U	1 U	1.17
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	1 U	5 U	1 U	22.4
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	0.66	0.0157	110	0 U	1423
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	5 U	1 U	0.405 J
TRICHLOROETHENE	0.028	5	5	2.01 U	1 U	110	1 U	1400
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	340	7	7	0.1 U	0.1 U	0.12	0.1 U	0.51
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.0157 J	0.1 U	0.1 U	0.1 U
BENZENE	0.35	5	5	0.1 U	0.1 U	0.0201 J	0.0132 J	0.0205 J
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.66 J	0.1 U	0.1 U	0.1 U	0.461
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	71.2	6680	227	65.2	204
ARSENIC	0.045	10	NA	3.6	3	0.89	0.42 U	0.42 U
BARIUM	2600	2000	2000	37.1	76.5	12.6	21.9	9.4
BERYLLIUM	73	4	4	0.11 UJ	0.6	0.11 UJ	0.11 UJ	0.11 UJ
CADMIUM	18	5	5	0.06 U	0.06 U	0.061 UJ	0.06 U	0.06 U
CALCIUM	NA	NA	NA	200000	3510	16700 J	7500	12600
CHROMIUM	110	100	100	1.3 U	24.6 J	1.2 U	0.54 U	1.5 U
COBALT	730	NA	NA	1.1	5.4	0.24 J	0.18	0.43
COPPER	1500	1300	NA	7.8 U	19.6	1.5 U	0.4 U	0.87
IRON	11000	NA	NA	52400	14800	548	14900	12800
LEAD	NA	15	15	1.3 J	7.7	0.32	0.14 J	0.27
MAGNESIUM	NA	NA	NA	41000 J	4530	1120	934	3490
MANGANESE	880	NA	NA	2060 J	361 J	41.2	194	754
MERCURY	11	2	2	0.021 U	0.021 U	0.075 U	0.68	0.021 U
NICKEL	730	NA	100	4.7 J	11.7	2.4 J	0.74	0.82
POTASSIUM	NA	NA	NA	11100	7160 J	6240 J	5490	2450
SELENIUM	180	50	50	11	0.37 J	0.32 U	0.29 U	0.29 U
SILVER	180	NA	NA	0.05 U	0.11	0.05 U	0.05 U	0.05 U

TABLE 4-27
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-27R MW16-27R-NWG-101204 NORMAL 10/12/2004	08 MW16-28R MW16-28R-NWG-101104 NORMAL 10/11/2004	08 MW16-32R MW16-32R-NWG-102904 NORMAL 10/29/2004	08 MW16-36R MW16-36R-NWG-100504 NORMAL 10/5/2004	08 MW16-44R MW16-44R-NWG-100104 NORMAL 10/1/2004
SODIUM	NA	NA	NA	749000 J	96800 J	11000 J	9190	11800
THALLIUM	2.4	2	2	0.07 UJ	0.26	0.07 U	0.07 U	0.07 U
VANADIUM	36	NA	NA	0.5 U	14.2 J	0.66 U	0.4 U	0.63 J
ZINC	11000	NA	NA	24 J	40.1 J	5 U	5.8 U	43
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	1.1 J	6.8	43.8	5.4	0.72 U
ARSENIC	0.045	10	NA	2.9	2.2	1 J	0.18 J	0.36
BARIUM	2600	2000	2000	36	15.3	10.8	18.9	7.8
CALCIUM	NA	NA	NA	189000	3800	18900	8210	12500
CHROMIUM	110	100	100	0.82 U	1.5	0.7 U	0.52	0.97
COBALT	730	NA	NA	0.2 J	0.68	0.05	0.01 U	0.24
COPPER	1500	1300	NA	5 J	1.7 U	0.53 U	0.16 U	0.16 U
IRON	11000	NA	NA	1720	3780	56.7 J	161	6050
LEAD	NA	15	15	0.08 U	0.21	0.09 J	0.08 U	0.16
MAGNESIUM	NA	NA	NA	41800 J	3280	1090	1020	3730
MANGANESE	880	NA	NA	1830 J	292 J	26.3	20.3	694 J
MERCURY	11	2	2	0.021 U	0.021 U	0.073 U	0.021 U	0.058 U
NICKEL	730	NA	100	2.8 J	1.7 J	1.9 J	0.15	0.8
POTASSIUM	NA	NA	NA	10900	5590	5950	6120	2340
SELENIUM	180	50	50	12.5	1	0.3 UJ	0.3 U	0.3 U
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SODIUM	NA	NA	NA	699000	98200	10500	10500	11800
VANADIUM	36	NA	NA	0.08 U	0.48	0.24 U	0.11 J	0.21
ZINC	11000	NA	NA	4 J	9.2 J	2.2 J	9.3	1.9 J
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	60.7	75.8	32.7	33.3	27
AMMONIA	NA	NA	NA	0.18	0.16	0.14	0.1 U	0.41
CHLORIDE	NA	NA	NA	1440	81.9	13.2	8.47	35.5
CYANIDE	730	200	200	10 UJ	10 UJ	10 U	10 U	10 U
DISSOLVED INORGANIC CARBON	NA	NA	NA	5	6	2	14	1
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	2	3	22	2
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.066	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.212
NITRITE	1000	1000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	2.76	0.251	0.082	0.065	0.104
SULFATE	NA	NA	NA	201	21.9	21.1	12.1	9.64

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SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-51R MW16-51R-NWG-102904 NORMAL 10/29/2004	08 MW16-52R MW16-52R-NWG-110104 NORMAL 11/1/2004	08 MW16-55R MW16-55R-NWG-100704 NORMAL 10/7/2004	08 MW16-56R MW16-56R-NWG-101404 NORMAL 10/14/2004	08 MW16-58R MW16-58R-NWG-101304 NORMAL 10/13/2004
Volatile Organics (ug/L)								
1,1-DICHLOROETHANE	810	NA	NA	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	340	7	7					
2-BUTANONE	7000	NA	NA	5 U	5 U	5 U	5 U	5 U
2-HEXANONE	NA	NA	NA	5 U	5 U	5 U	5 U	5 U
ACETONE	5500	NA	NA	16 U	6.57 U	8.4	8.63 U	7.87 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0.199	0.0126	0 U	0 U	0.0171
CARBON DISULFIDE	1000	NA	NA	0.262 J	0.504 J	0.254 J	1 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	1 U	1 U	1 U	1.5	6.65
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	11	160	3.3 U	3.3 U	5
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	1 U	1 U	1 U
TOLUENE	720	1000	1000	0.186 J	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1 U	1 U	1 U	1.5	7.31
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	0 U	0.0738	0 U	18.8	328
TRANS-1,2-DICHLOROETHENE	120	100	100	1 U	1 U	1 U	1 U	0.663 J
TRICHLOROETHENE	0.028	5	5	1 U	1 U	1 U	17	320
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.1 U	0.0738 J	0.1 U	0.1 U	0.295
1,1-DICHLOROETHENE	340	7	7	0.1 U	0.1 U	0.1 U	0.279	0.715
1,2-DICHLOROETHANE	0.12	5	5	0.1 U	0.1 U	0.1 U	0.0124 J	0.1 U
BENZENE	0.35	5	5	0.0134 J	0.0126 J	0.1 U	0.1 U	0.0171 J
CHLOROFORM	0.17	80	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.1 U	0.1 U	0.1 U	0.0498 J	0.112
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	7.5	46.9	94.7	135	230
ARSENIC	0.045	10	NA	11.4	13.2	0.44 J	1.3	0.42 U
BARIUM	2600	2000	2000	126	50.5	12.7	19.5	2.3
BERYLLIUM	73	4	4	0.11 UJ	0.11 U	0.11 U	0.11 U	0.12 J
CADMIUM	18	5	5	0.061 UJ	0.06 U	0.2	0.061 U	0.08 U
CALCIUM	NA	NA	NA	2460000	1340000	11300	22500	10900
CHROMIUM	110	100	100	0.67 U	0.81 U	1.2 U	1.8 U	2.5 U
COBALT	730	NA	NA	3.4 J	3.1	0.12	0.054 U	0.42
COPPER	1500	1300	NA	163 J	744	2.4	0.94 U	1.5 U
IRON	11000	NA	NA	36700	124000	3570	420	2440
LEAD	NA	15	15	0.37 J	1 J	0.95	0.37	1.5
MAGNESIUM	NA	NA	NA	502000	946000	2320	961	2350
MANGANESE	880	NA	NA	15400	32100	60.1	22 J	240 J
MERCURY	11	2	2	0.059 U	0.076 U	0.021 U	0.021 U	0.021 U
NICKEL	730	NA	100	25.4 J	15.7 J	0.76	0.7	0.88
POTASSIUM	NA	NA	NA	80800	139000 J	5100	11900	3530
SELENIUM	180	50	50	62.8 J	77.1	0.29 U	0.51 J	0.29 U
SILVER	180	NA	NA	0.05 U	0.06 J	0.05 U	0.052 U	0.05 U

TABLE 4-27
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-51R MW16-51R-NWG-102904 NORMAL 10/29/2004	08 MW16-52R MW16-52R-NWG-110104 NORMAL 11/1/2004	08 MW16-55R MW16-55R-NWG-100704 NORMAL 10/7/2004	08 MW16-56R MW16-56R-NWG-101404 NORMAL 10/14/2004	08 MW16-58R MW16-58R-NWG-101304 NORMAL 10/13/2004
SODIUM	NA	NA	NA	3690000 J	6870000 J	12100	13200	13300 J
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U	0.066 U	0.07 U
VANADIUM	36	NA	NA	0.4 U	0.4 U	0.4 U	2.4	0.52 U
ZINC	11000	NA	NA	24.6 J	14.1	11.8 J	5	24.2 J
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	0.72 UJ	2	1.8	39.8	1.3 J
ARSENIC	0.045	10	NA	7.4 J	14.4	0.16 J	1.3	0.26
BARIUM	2600	2000	2000	86	46.1	10.5	19.5	2.1 U
CALCIUM	NA	NA	NA	2400000	1270000	11100	23800	12000
CHROMIUM	110	100	100	2	2.6 J	1.2	1.5	0.88
COBALT	730	NA	NA	3.4 J	3.5 J	0.01 U	0.014 U	0.16
COPPER	1500	1300	NA	168 J	1270	0.16 UJ	0.22 U	0.41 U
IRON	11000	NA	NA	23600 J	120000	50 U	69.3 J	412
LEAD	NA	15	15	0.08 UJ	0.08 U	0.078 UJ	0.22	0.23
MAGNESIUM	NA	NA	NA	456000	905000	2230	917	2370
MANGANESE	880	NA	NA	15600	30400	19.3	14.1 J	218 J
MERCURY	11	2	2	0.072 U	0.021 U	0.021 U	0.021 U	0.021 U
NICKEL	730	NA	100	25.8 J	15 J	0.27	0.88	0.53 J
POTASSIUM	NA	NA	NA	75900	132000 J	5200	12100	3570
SELENIUM	180	50	50	62.6 J	91.1	0.3 U	0.74	0.3 U
SILVER	180	NA	NA	0.03 U	0.06	0.02 U	0.021 U	0.02 U
SODIUM	NA	NA	NA	3160000 J	6340000	11700	13300	12600
VANADIUM	36	NA	NA	0.08 U	0.08 U	0.27	2.6	0.17
ZINC	11000	NA	NA	16.5 J	10.9	0.09 J	5.5 J	7.8 J
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	38.7	82.5	54.2	38	42.7
AMMONIA	NA	NA	NA	0.37	0.1 U	0.11	0.13	0.11
CHLORIDE	NA	NA	NA	9970	15100	7.04	24.9	17.7
CYANIDE	730	200	200	10 U	10 U	10 U	10 U	10 UJ
DISSOLVED INORGANIC CARBON	NA	NA	NA	10	6	8	2	2
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	5	2	5	2
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	1 U	0.5 U	0.1 U	0.203 J	0.1 U
NITRITE	1000	1000	NA	1 U	0.5 U	0.1 U	0.519	0.1 U
SALINITY (g/kg)	NA	NA	NA	18.1	24.8	0.079	0.105	0.092
SULFATE	NA	NA	NA	1190	1810	8.62	19.9	14.5

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SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-59R MW16-59R-NWG-102504 NORMAL 10/25/2004	08 MW16-60R MW16-60R-NWG-102704 NORMAL 10/27/2004	08 MW16-65R MW16-65R-NWG-102804 NORMAL 10/28/2004	09 MW16-66R MW16-66R-NWG-111604 NORMAL 11/16/2004	09 MW16-67R MW16-67R-NWG-111604 NORMAL 11/16/2004
Volatile Organics (ug/L)								
1,1-DICHLOROETHANE	810	NA	NA	0.233 J	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	340	7	7				1 U	0.533 J
2-BUTANONE	7000	NA	NA	5 U	5 U	8.17	5 U	5 U
2-HEXANONE	NA	NA	NA	5 U	5 U	11	5 U	5 U
ACETONE	5500	NA	NA	25 U	21 U	64	20 U	13 U
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	1 U	1 U
BTEX[1]	NA	NA	NA	0.0511	0.467	0.768	0.12	0.149
CARBON DISULFIDE	1000	NA	NA	1 U	0.679 J	1 U	1 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	23	16	1 U	0.292 J	2.95
ETHANE	NA	NA	NA	3.2 J	3.1 J	1 J	6.2 U	0.8 J
ETHENE	NA	NA	NA	5.8 U	1.7 J	0.9 J	5.8 U	5.8 U
METHANE	NA	NA	NA	3.3 U	3.3 U	5.4 U	4.4 U	3.9 U
TETRACHLOROETHENE	0.1	5	5	1 U	1 U	0.824 J		
TOLUENE	720	1000	1000	1 U	0.41 J	0.688 J	0.12 J	0.149 J
TOTAL 1,2-DICHLOROETHENE	61	NA	70	23.6	16.7	1 U	0.292 J	3.16
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	1530	1824	1.24	3.74	604
TRANS-1,2-DICHLOROETHENE	120	100	100	0.559 J	0.668 J	1 U	1 U	0.212 J
TRICHLOROETHENE	0.028	5	5	1500	1800	0.415 J	3.45	600
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5	0.734	1.54	0.1 U		
1,1-DICHLOROETHENE	340	7	7	4.2	5.05	0.1 U		
1,2-DICHLOROETHANE	0.12	5	5	0.0801 J	0.0652 J	0.1 U		
BENZENE	0.35	5	5	0.0511 J	0.0567 J	0.08 J		
CHLOROFORM	0.17	80	NA	0.1 U	0.104	0.1 U		
VINYL CHLORIDE	0.02	2	2	0.916	0.413	0.1 U		
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA	106	1280	341		
ARSENIC	0.045	10	NA	1.8	3	0.42 U		
BARIUM	2600	2000	2000	10.8	13.1	2350		
BERYLLIUM	73	4	4	0.11 U	0.26 J	0.11 UJ		
CADMIUM	18	5	5	0.06 U	0.061 UJ	0.09 U		
CALCIUM	NA	NA	NA	14400	9250	510000		
CHROMIUM	110	100	100	3.1	3.8	0.95 U		
COBALT	730	NA	NA	0.6	2.8	1.9 J		
COPPER	1500	1300	NA	1.1	5.7 U	2.1 U		
IRON	11000	NA	NA	2870	5730	1300		
LEAD	NA	15	15	0.86	2.8	0.37 J		
MAGNESIUM	NA	NA	NA	1710	2990	50 U		
MANGANESE	880	NA	NA	375	650	0.79 U		
MERCURY	11	2	2	0.021 U	0.095 U	0.081 U		
NICKEL	730	NA	100	2	4.7 J	18.1 J		
POTASSIUM	NA	NA	NA	6550	2810	130000		
SELENIUM	180	50	50	0.29 U	0.29 UJ	0.67 U		
SILVER	180	NA	NA	0.05 U	0.05 U	0.05 U		

TABLE 4-27
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-59R MW16-59R-NWG-102504 NORMAL 10/25/2004	08 MW16-60R MW16-60R-NWG-102704 NORMAL 10/27/2004	08 MW16-65R MW16-65R-NWG-102804 NORMAL 10/28/2004	09 MW16-66R MW16-66R-NWG-111604 NORMAL 11/16/2004	09 MW16-67R MW16-67R-NWG-111604 NORMAL 11/16/2004
SODIUM	NA	NA	NA	12200 J	13000 J	76700 J		
THALLIUM	2.4	2	2	0.07 U	0.07 U	0.07 U		
VANADIUM	36	NA	NA	1.6	3	0.56 U		
ZINC	11000	NA	NA	10.9	19.3 J	7 U		
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA	9.4	0.77 J	384		
ARSENIC	0.045	10	NA	1.9	3.2 J	0.34 J		
BARIUM	2600	2000	2000	8.2	6.9	2480		
CALCIUM	NA	NA	NA	13600	10500	500000		
CHROMIUM	110	100	100	0.94 U	0.98 U	0.66 U		
COBALT	730	NA	NA	0.28	1.5	1.7 J		
COPPER	1500	1300	NA	0.16 U	0.16 UJ	1.5 U		
IRON	11000	NA	NA	111	2550	1220	89.4 U	32.2 U
LEAD	NA	15	15	0.15 J	0.2	0.44 J		
MAGNESIUM	NA	NA	NA	1560	2760	50 U		
MANGANESE	880	NA	NA	291	618	0.63 U	117	2 U
MERCURY	11	2	2	0.024 J	0.057 U	0.07 U		
NICKEL	730	NA	100	0.73	1.7 J	17.3 J		
POTASSIUM	NA	NA	NA	6370	2370 J	133000		
SELENIUM	180	50	50	0.3 U	0.3 UJ	0.54 J		
SILVER	180	NA	NA	0.02 U	0.02 U	0.02 U		
SODIUM	NA	NA	NA	11900	11500 J	67100 J		
VANADIUM	36	NA	NA	1.1	0.17 U	0.53		
ZINC	11000	NA	NA	2.7	5.4 J	9.3 J		
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	43.5	19.5	1640	33	59
AMMONIA	NA	NA	NA	0.16	0.1 U	0.32	0.39	0.19
CHLORIDE	NA	NA	NA	15.4	21.1	42.7	35	22
CYANIDE	730	200	200	1.8 U	10 U	2.3 J		
DISSOLVED INORGANIC CARBON	NA	NA	NA	2	2	2	3	1
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	3	11	1	1
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	0.1 U	0.1 U	0.7	0.1 U	0.1 U
NITRITE	1000	1000	NA	0.114	0.1 U	4.74	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA	0.095	0.081	3.82		
SULFATE	NA	NA	NA	18.1	19.5	6.21	19.4	15.5

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SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	09 MW16-68R MW16-68R-NWG-111604 ORIG 11/16/2004	09 MW16-68R MW16-68R-NWG-111604-AVG AVG 11/16/2004	09 MW16-68R MW16-68R-NWG-111604-D DUP 11/16/2004	09 MW16-69R MW16-69R-NWG-111704 ORIG 11/17/2004	09 MW16-(MW16-69R-NWG- AVG 11/17/2(
Volatile Organics (ug/L)								
1,1-DICHLOROETHANE	810	NA	NA	1 U	1 U	1 U	10 U	10
1,1-DICHLOROETHENE	340	7	7	0.317 J	0.327 J	0.337 J	10 U	10
2-BUTANONE	7000	NA	NA	0.63 J	0.63 J	5 U	50 U	50
2-HEXANONE	NA	NA	NA	5 U	5 U	5 U	50 U	50
ACETONE	5500	NA	NA	27 U	25 J	25 J	15 U	24
BROMODICHLOROMETHANE	0.18	80	NA	1 U	1 U	1 U	10 U	10
BTEX[1]	NA	NA	NA	0.173	0.173	0 U	0 U	0
CARBON DISULFIDE	1000	NA	NA	1 U	1 U	1 U	10 U	10
CHLORODIBROMOMETHANE	0.13	80	NA	1 U	1 U	1 U	10 U	10
CIS-1,2-DICHLOROETHENE	61	70	70	1.32	1.335	1.35	8.15 J	8.155
ETHANE	NA	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2
ETHENE	NA	NA	NA	5.8 U	5.8 U	5.8 U	5.8 U	5.8
METHANE	NA	NA	NA	3.3 U	5.2 U	7.1 U	3.3 U	3.3
TETRACHLOROETHENE	0.1	5	5					
TOLUENE	720	1000	1000	0.173 J	0.173 J	1 U	10 U	10
TOTAL 1,2-DICHLOROETHENE	61	NA	70	1.45 J	1.5 J	1.54 J	8.15 J	8.16
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	622	612	602	248	248
TRANS-1,2-DICHLOROETHENE	120	100	100	0.129 J	0.13 J	0.131 J	10 U	10
TRICHLOROETHENE	0.028	5	5	620	610	600	240	240
Low-Level Volatile Organics (ug/L)								
1,1,2-TRICHLOROETHANE	0.2	5	5					
1,1-DICHLOROETHENE	340	7	7					
1,2-DICHLOROETHANE	0.12	5	5					
BENZENE	0.35	5	5					
CHLOROFORM	0.17	80	NA					
VINYL CHLORIDE	0.02	2	2					
Total Metals (ug/L)								
ALUMINUM	36000	NA	NA					
ARSENIC	0.045	10	NA					
BARIUM	2600	2000	2000					
BERYLLIUM	73	4	4					
CADMIUM	18	5	5					
CALCIUM	NA	NA	NA					
CHROMIUM	110	100	100					
COBALT	730	NA	NA					
COPPER	1500	1300	NA					
IRON	11000	NA	NA					
LEAD	NA	15	15					
MAGNESIUM	NA	NA	NA					
MANGANESE	880	NA	NA					
MERCURY	11	2	2					
NICKEL	730	NA	100					
POTASSIUM	NA	NA	NA					
SELENIUM	180	50	50					
SILVER	180	NA	NA					

TABLE 4-27
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	09 MW16-68R MW16-68R-NWG-111604 ORIG 11/16/2004	09 MW16-68R MW16-68R-NWG-111604-AVG AVG 11/16/2004	09 MW16-68R MW16-68R-NWG-111604-D DUP 11/16/2004	09 MW16-69R MW16-69R-NWG-111704 ORIG 11/17/2004	09 MW16-(MW16-69R-NWG AVG 11/17/2
SODIUM	NA	NA	NA					
THALLIUM	2.4	2	2					
VANADIUM	36	NA	NA					
ZINC	11000	NA	NA					
Dissolved Metals (ug/L)								
ALUMINUM	36000	NA	NA					
ARSENIC	0.045	10	NA					
BARIUM	2600	2000	2000					
CALCIUM	NA	NA	NA					
CHROMIUM	110	100	100					
COBALT	730	NA	NA					
COPPER	1500	1300	NA					
IRON	11000	NA	NA	56.5 U	44.35 UJ	32.2 UJ	47.3 U	40.5
LEAD	NA	15	15					
MAGNESIUM	NA	NA	NA					
MANGANESE	880	NA	NA	5.2	4.35 J	3.5 J	98.2	105.1
MERCURY	11	2	2					
NICKEL	730	NA	100					
POTASSIUM	NA	NA	NA					
SELENIUM	180	50	50					
SILVER	180	NA	NA					
SODIUM	NA	NA	NA					
VANADIUM	36	NA	NA					
ZINC	11000	NA	NA					
Miscellaneous Parameters (ug/L)								
ALKALINITY	NA	NA	NA	60	55.25	50.5	48.5	48.75
AMMONIA	NA	NA	NA	0.23	0.235	0.24	0.14	0.13
CHLORIDE	NA	NA	NA	17.9	18.15	18.4	13	15.1
CYANIDE	730	200	200					
DISSOLVED INORGANIC CARBON	NA	NA	NA	2	2.5	3	7	6.5
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	2	2	3	2
HYDROGEN SULFIDE	110	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05
NITRATE	10000	10000	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1
NITRITE	1000	1000	NA	0.13	0.1285	0.127	0.1 U	0.1
SALINITY (g/kg)	NA	NA	NA					
SULFATE	NA	NA	NA	18.7	17.9	17.1	18.4	18.95

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SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	9R -111704-AVG 004	09 MW16-69R MW16-69R-NWG-111704-D DUP 11/17/2004	09 MW16-70R MW16-70R-NWG-111704 NORMAL 11/17/2004	09 MW16-71R MW16-71R-NWG-111704 NORMAL 11/17/2004
Volatile Organics (ug/L)							
1,1-DICHLOROETHANE	810	NA	NA	U	10 U	1 U	0.172 J
1,1-DICHLOROETHENE	340	7	7	U	10 U	0.403 J	2.56
2-BUTANONE	7000	NA	NA	U	50 U	5 U	5 U
2-HEXANONE	NA	NA	NA	U	50 U	5 U	5 U
ACETONE	5500	NA	NA	U	33 U	67 J	20 U
BROMODICHLOROMETHANE	0.18	80	NA	U	10 U	1 U	1 U
BTEX[1]	NA	NA	NA	U	0 U	0 U	0.141
CARBON DISULFIDE	1000	NA	NA	U	10 U	0.166 J	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	U	10 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	J	8.16 J	3.93	23
ETHANE	NA	NA	NA	U	6.2 U	6.2 U	1.3 J
ETHENE	NA	NA	NA	U	5.8 U	5.8 U	5.8 U
METHANE	NA	NA	NA	U	3.3 U	3.7 U	3.3 U
TETRACHLOROETHENE	0.1	5	5				
TOLUENE	720	1000	1000	U	10 U	1 U	0.141 J
TOTAL 1,2-DICHLOROETHENE	61	NA	70	J	8.16 J	4.12	24
TOTAL CHLORINATED VOCS[1]	NA	NA	NA		248	63.5	1127
TRANS-1,2-DICHLOROETHENE	120	100	100	U	10 U	1 U	1.04
TRICHLOROETHENE	0.028	5	5		240	59	1100
Low-Level Volatile Organics (ug/L)							
1,1,2-TRICHLOROETHANE	0.2	5	5				
1,1-DICHLOROETHENE	340	7	7				
1,2-DICHLOROETHANE	0.12	5	5				
BENZENE	0.35	5	5				
CHLOROFORM	0.17	80	NA				
VINYL CHLORIDE	0.02	2	2				
Total Metals (ug/L)							
ALUMINUM	36000	NA	NA				
ARSENIC	0.045	10	NA				
BARIUM	2600	2000	2000				
BERYLLIUM	73	4	4				
CADMIUM	18	5	5				
CALCIUM	NA	NA	NA				
CHROMIUM	110	100	100				
COBALT	730	NA	NA				
COPPER	1500	1300	NA				
IRON	11000	NA	NA				
LEAD	NA	15	15				
MAGNESIUM	NA	NA	NA				
MANGANESE	880	NA	NA				
MERCURY	11	2	2				
NICKEL	730	NA	100				
POTASSIUM	NA	NA	NA				
SELENIUM	180	50	50				
SILVER	180	NA	NA				

TABLE 4-27
SUMMARY OF CHEMICALS DETECTED
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	69R -111704-AVG 004	09 MW16-69R MW16-69R-NWG-111704-D DUP 11/17/2004	09 MW16-70R MW16-70R-NWG-111704 NORMAL 11/17/2004	09 MW16-71R MW16-71R-NWG-111704 NORMAL 11/17/2004
SODIUM	NA	NA	NA				
THALLIUM	2.4	2	2				
VANADIUM	36	NA	NA				
ZINC	11000	NA	NA				
Dissolved Metals (ug/L)							
ALUMINUM	36000	NA	NA				
ARSENIC	0.045	10	NA				
BARIUM	2600	2000	2000				
CALCIUM	NA	NA	NA				
CHROMIUM	110	100	100				
COBALT	730	NA	NA				
COPPER	1500	1300	NA				
IRON	11000	NA	NA	U	33.7 U	32.2 UJ	47.6 U
LEAD	NA	15	15				
MAGNESIUM	NA	NA	NA				
MANGANESE	880	NA	NA		112	20.2	13.1
MERCURY	11	2	2				
NICKEL	730	NA	100				
POTASSIUM	NA	NA	NA				
SELENIUM	180	50	50				
SILVER	180	NA	NA				
SODIUM	NA	NA	NA				
VANADIUM	36	NA	NA				
ZINC	11000	NA	NA				
Miscellaneous Parameters (ug/L)							
ALKALINITY	NA	NA	NA		49	29	64.5
AMMONIA	NA	NA	NA		0.12	0.15	0.11
CHLORIDE	NA	NA	NA		17.2	11.6	13.1
CYANIDE	730	200	200				
DISSOLVED INORGANIC CARBON	NA	NA	NA		6	3	2
DISSOLVED ORGANIC CARBON	NA	NA	NA		1	2	1
HYDROGEN SULFIDE	110	NA	NA	U	0.05 U	0.05 U	0.05 U
NITRATE	10000	10000	NA	U	0.1 U	0.1 U	0.1 U
NITRITE	1000	1000	NA	U	0.1 U	0.1 U	0.1 U
SALINITY (g/kg)	NA	NA	NA				
SULFATE	NA	NA	NA		19.5	17.1	26.1

Investigation Description:
01 - EBS Phase II Sampling
02 - EBS Phase II Follow-On Sampling
03 - EBS Phase II Follow-On Addendum Sampling
04 - State I Phase I RI Sampling Event
05 - Stage II Phase I RI Sampling Event
06 - Phase II RI Sampling Event
07 - Supplemental SD RI Investigation
08 - CTO 97 Supplemental Phase II Investigation
09 - CTO 107 HRC Injection Study

Qualifiers:
J - Estimated value.
U - Nondetected result.
UJ - Nondetected result is estimated.
UR - Nondetected result is rejected.
R - Rejected value.

Sample Code Description:
NORMAL - One sample was collected at this location.
ORIG - First of two samples collected at this location.
DUP - Second of two samples collected at this location.
AVG - Average of the two samples collected at this location.

Acronyms:
GA = Drinking water suitability
GW = Groundwater
MCL = Maximum Contaminant Level
NA = Not Applicable/Not Available
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
VOC = Volatile Organic Compound

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

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SUMMARY OF DESCRIPTIVE STATISTICS
PRE-2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	1/6	0.3	0.3	1 - 50	4.55	0.3	MW16-02R-NWG-032901	NA	**0.2 C**	5	5
1,1-DICHLOROETHANE	2/20	0.1 J	0.12 J	1 - 50	1.69	0.11	MW16-02R-NWG-121002	NA	810 N	NA	NA
1,1-DICHLOROETHENE	1/6	2	2	1 - 50	4.83	2	MW16-02R-NWG-032901	NA	340 C	7	7
ACETONE	9/14	13 J	750 J	5	80.6	124	MW16-06R-NWG-112502	NA	5500 N	NA	NA
BTEX	9/20	0.05	12	---	0.753	1.67	MW16-44R-NWG-121202	NA	NA	NA	NA
CARBON DISULFIDE	7/20	0.19 J	4	1 - 50	2.04	1.4	MW16-10R-NWG-032701	NA	1000 N	NA	NA
CHLOROFORM	1/6	0.4	0.4	1 - 50	4.57	0.4	MW16-25R-NWG-032701	NA	**0.17 C**	80	NA
CHLOROMETHANE	2/20	0.13 J	0.16 J	1 - 100	3.06	0.145	MW16-28R-NWG-121202	NA	160 N	NA	NA
CIS-1,2-DICHLOROETHENE	8/20	1	110	1 - 2	11.1	26.7	MW16-15R-NWG-032701	NA	**61 N**	**70**	**70**
ETHANE	1/14	9.1	9.1	2	1.58	9.1	MW16-15R-NWG-112502	NA	NA	NA	NA
ETHENE	1/14	6.8	6.8	3	1.88	6.8	MW16-15R-NWG-112502	NA	NA	NA	NA
ETHYLBENZENE	1/20	0.13 J	0.13 J	1 - 50	1.71	0.13	MW16-15R-NWG-112502	NA	1300 N	700	700
METHANE	4/14	2	40	1	3.9	12.4	MW16-10R-NWG-112602	NA	NA	NA	NA
TOLUENE	7/20	0.11 J	12	1 - 50	2.29	2.1	MW16-44R-NWG-121202	NA	720 N	1000	1000
TOTAL 1,2-DICHLOROETHENE	8/20	1	110	1 - 2	11.2	27	MW16-15R-NWG-032701	NA	**61 N[7]**	NA	**70**
TOTAL CHLORINATED VOCS	14/20	0.1	4710	---	588	840	MW16-15R-NWG-032701	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	5/20	0.13 J	0.95 J	1 - 100	3.08	0.514	MW16-02R-NWG-121002	NA	120 N	100	100
TRICHLOROETHENE	12/20	0.1 J	4600	1 - 1.9	577	961	MW16-15R-NWG-032701	NA	**0.028 C**	**5**	**5**
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	4/14	0.06 J	0.9	0.1	0.169	0.465	MW16-02R-NWG-121002	NA	**0.2 C**	5	5
1,1-DICHLOROETHANE	4/14	0.1	0.4	0.1	0.1	0.225	MW16-25R-NWG-112202	NA	810 N	NA	NA
1,1-DICHLOROETHENE	4/14	0.9	5	0.1	0.671	2.23	MW16-02R-NWG-121002	NA	340 C	7	7
1,4-DICHLOROBENZENE	1/14	0.05 J	0.05 J	0.1	0.05	0.05	MW16-05R-NWG-120602	NA	0.5 C	75	75
BENZENE	3/14	0.05 J	0.1	0.1	0.0557	0.0767	MW16-15R-NWG-112502	NA	0.35 C	5	5
CHLOROFORM	4/14	0.05 J	0.2	0.1	0.0643	0.1	MW16-55R-NWG-121602	NA	**0.17 C**	80	NA
VINYL CHLORIDE	4/14	0.2 J	0.4	0.1	0.129	0.325	MW16-02R-NWG-121002, MW16-15R-NWG-112502	NA	**0.02 C[8]**	2	2
Polyaromatric Hydrocarbons (ug/L)											
PHENANTHRENE	1/7	0.06	0.06	0.05 - 0.2	0.0836	0.06	MW16-10R-NWG-032701	NA	180 N[9]	NA	NA
TOTAL PAHS	1/7	0.06	0.06	---	0.00857	0.06	MW16-10R-NWG-032701	NA	NA	NA	NA
Pesticides (ug/L)											
GAMMA-CHLORDANE	1/7	0.004 J	0.004 J	0.005 - 0.05	0.0188	0.004	MW16-02R-NWG-032901	NA	0.19 C[10]	2 [10]	NA
Total Metals (ug/L)											
ALUMINUM	4/7	673	3100 J	49.2 - 298	1053	1790	MW16-17R-NWG-120502	5315	36000 N	NA	NA
ANTIMONY	1/7	0.53	0.53	3.65	1.64	0.53	MW16-17R-NWG-120502	12	15 N	6	6
BARIUM	7/7	3.2	53.3	---	24.3	24.3	MW16-28R-NWG-032701	80.5	2600 N	2000	2000
BERYLLIUM	1/7	0.23 J	0.23 J	0.18 - 0.89	0.166	0.23	MW16-17R-NWG-120502	1.3	73 N	4	4
CALCIUM	7/7	8940	534000	---	130924	130924	MW16-28R-NWG-032701	13302	NA	NA	NA
CHROMIUM	5/7	0.86 J	7.5	0.89 - 50	6.1	3.45	MW16-28R-NWG-032701	214	110 N[11]	100 [11]	100
COBALT	2/6	1.9	3.8	0.92	1.26	2.85	MW16-02R-NWG-032901	24.9	730 N	NA	NA
COPPER	1/7	0.87 J	0.87 J	0.84 - 120	9.38	0.645	MW16-25R-NWG-032701-D	25.8	1500 N	1300 [12]	NA
IRON	7/7	897	16600	---	8163	8163	MW16-28R-NWG-032701	25500	**11000 N**	NA	NA
LEAD	4/7	1.2	99.5 J	1.48	8.34	14	MW16-25R-NWG-032701-D	4.8	NA	**15 [12]**	**15**
MAGNESIUM	7/7	2490	146000	---	33337	33337	MW16-28R-NWG-032701	5126	NA	NA	NA
MANGANESE	7/7	278	5270	---	1730	1730	MW16-28R-NWG-032701	3292	**880 N**	NA	NA
NICKEL	6/7	1.2 J	7	200	17	3.19	MW16-02R-NWG-032901	154	730 N	NA	100
POTASSIUM	7/7	2560	33100	---	12434	12434	MW16-28R-NWG-032701	3843	NA	NA	NA
SILVER	1/7	1.2 J	1.2 J	1.03 - 1.3	0.632	1.2	MW16-28R-NWG-032701	1	180 N	NA	NA
SODIUM	7/7	9990	1880000	---	418184	418184	MW16-28R-NWG-032701	12346	NA	NA	NA
VANADIUM	2/7	1.3	4.9	0.52 - 1.4	1.2	3.1	MW16-02R-NWG-032901	24.4	36 N	NA	NA
ZINC	7/7	3.9	200	---	65.1	65.1	MW16-17R-NWG-120502	89.9	11000 N	NA	NA
Dissolved Metals (ug/L)											
ALUMINUM	1/1	110 J	110 J	---	110	110	MW16-17R-NWG-120502	NA	36000 N	NA	NA
CALCIUM	1/1	12000	12000	---	12000	12000	MW16-17R-NWG-120502	NA	NA	NA	NA
IRON	12/14	68 J	130000 J	100	12880	15019	MW16-52R-NWG-121102	NA	**11000 N**	NA	NA
MAGNESIUM	1/1	1900	1900	---	1900	1900	MW16-17R-NWG-120502	NA	NA	NA	NA
MANGANESE	13/14	7	28000	15	3562	3835	MW16-52R-NWG-121102	NA	**880 N**	NA	NA
POTASSIUM	1/1	4000	4000	---	4000	4000	MW16-17R-NWG-120502	NA	NA	NA	NA
SODIUM	1/1	11000	11000	---	11000	11000	MW16-17R-NWG-120502	NA	NA	NA	NA
ZINC	1/1	9.2 J	9.2 J	---	9.2	9.2	MW16-17R-NWG-120502	NA	11000 N	NA	NA

TABLE 4-28
SUMMARY OF DESCRIPTIVE STATISTICS
PRE-2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
Miscellaneous Parameters (ug/L)											
ALKALINITY	14/14	26	272 J	---	51.7	51.7	MW16-27R-NWG-121902-D	NA	NA	NA	NA
AMMONIA	9/14	0.12	0.53	0.1	0.174	0.242	MW16-52R-NWG-121102	NA	NA	NA	NA
CHLORIDE	14/14	8.71	13900	---	2118	2118	MW16-52R-NWG-121102	NA	NA	NA	NA
DISSOLVED ORGANIC CARBON	6/10	6	16	5	7.8	11.3	MW16-05R-NWG-120602	NA	NA	NA	NA
NITRATE	2/14	0.22	4.94	0.1 - 5	0.619	2.58	MW16-28R-NWG-121202	NA	10000 N	10000	NA
NITRITE	1/14	0.56	0.56	0.1 - 5	0.294	0.56	MW16-55R-NWG-121602	NA	1000 N	1000	NA
SALINITY (g/kg)	7/16	1.45	21.6	0.1 - 1	3.29	6.94	MW16-15R-NWG-112502	NA	NA	NA	NA
SULFATE	14/14	7.73	1830	---	281	281	MW16-52R-NWG-121102	NA	NA	NA	NA
SULFIDE	4/14	0.06 J	0.31 J	0.05	0.0579	0.14	MW16-15R-NWG-112502	NA	NA	NA	NA
TOTAL INORGANIC CARBON	2/14	1	2	1 - 5	1.89	1.25	MW16-27R-NWG-121902	NA	NA	NA	NA
TOTAL ORGANIC CARBON	4/4	6	49	---	23	23	MW16-52R-NWG-121102	NA	NA	NA	NA
Field Parameters (ug/L)											
CARBON DIOXIDE	13/13	2.5	242	---	62.5	62.5	MW16-51R-NWG-120902	NA	NA	NA	NA
DISSOLVED OXYGEN	14/14	0.49	6.07	---	2.03	2.03	MW16-10R-NWG-112602	NA	NA	NA	NA
FERRIC IRON	13/13	0.03	50	---	7.46	7.46	MW16-52R-NWG-121102	NA	NA	NA	NA
OXIDATION REDUCTION POTENTIAL (MV)	14/14	-230.4	158.8	---	-56.8	-56.8	MW16-55R-NWG-121602	NA	NA	NA	NA
PH (S.U.)	14/14	6.29	11.12	---	7.95	7.95	MW16-55R-NWG-121602	NA	NA	NA	NA
TEMPERATURE (C)	14/14	6.95	13.63	---	10.4	10.4	MW16-15R-NWG-112502	NA	NA	NA	NA

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - Background values from Table 7-4 from Stone & Websters Final Background Inorganics Groundwater Study Report, December 1996.
The groundwater background values are based on the more conservative value of the 95% UCL and the maximum detected concentration.
4 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
5 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Winter 2004).
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
7 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
8 - PRG is based on CSF for lifetime exposures by a child/adult.
9 - The value for pyrene is used as a surrogate for phenanthrene.
10 - The value for chlordane is used as a surrogate for gamma-chlordane.
11 - The value for hexavalent chromium is presented.
12 - The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers:
C - Carcinogen.
N - Noncarcinogen.
J - Estimated value.

Acronyms:
BKG = Background
CSF = Cancer Slope Factor
GA = Drinking water suitability
GW = Groundwater
HI = Hazard Index
MCL = Maximum Contaminant Level
NA = No Criteria Available
PAH = Polyaromatic Hydrocarbon
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SDWA = Safe Drinking Water Act
U.S. EPA = United States Environmental Protection Agency

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SUMMARY OF DESCRIPTIVE STATISTICS
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	3/29	0.172 J	0.285 J	1 - 50	1.33	0.23	MW16-25R-NWG-100504	NA	810 N	NA	NA
1,1-DICHLOROETHENE	4/6	0.317 J	2.56	1 - 10	1.55	0.956	MW16-71R-NWG-111704	NA	340 C	7	7
2-BUTANONE	3/29	0.63 J	8.17	5 - 250	6.9	3.38	MW16-65R-NWG-102804	NA	7000 N	NA	NA
2-HEXANONE	1/29	11	11	5 - 250	7.1	11	MW16-65R-NWG-102804	NA	NA	NA	NA
ACETONE	6/25	7.45	67 J	5 - 33	12.7	30.5	MW16-70R-NWG-111704	NA	5500 N	NA	NA
BROMODICHLOROMETHANE	1/29	0.235 J	0.235 J	1 - 50	1.34	0.235	MW16-15R-NWG-101404	NA	**0.18 C**	80	NA
BTEX	19/29	0.0126	1.19	---	0.131	0.201	MW16-44R-NWG-100104	NA	NA	NA	NA
CARBON DISULFIDE	11/29	0.15 J	0.893 J	1 - 50	1.33	0.433	MW16-15R-NWG-101404-D	NA	1000 N	NA	NA
CHLORODIBROMOMETHANE	1/29	0.322 J	0.322 J	1 - 50	1.35	0.322	MW16-15R-NWG-101404	NA	**0.13 C**	80	NA
CIS-1,2-DICHLOROETHENE	14/29	0.292 J	60	1 - 5	6.96	13.6	MW16-15R-NWG-101404-D	NA	61 N	70	70
ETHANE	9/29	0.8 J	6.6	6.2	3.06	2.98	MW16-44R-NWG-100104	NA	NA	NA	NA
ETHENE	5/29	0.9 J	7.8	5.8	2.96	3.27	MW16-44R-NWG-100104	NA	NA	NA	NA
METHANE	12/29	1.6 J	1100 J	3.3 - 7.1	61.4	146	MW16-15R-NWG-101404	NA	NA	NA	NA
TETRACHLOROETHENE	1/23	0.824 J	0.824 J	1 - 50	1.39	0.824	MW16-65R-NWG-102804	NA	**0.1 C**	5	5
TOLUENE	10/29	0.12 J	1.17	1 - 50	1.3	0.34	MW16-44R-NWG-100104	NA	720 N	1000	1000
TOTAL 1,2-DICHLOROETHENE	14/29	0.292 J	60.2	1 - 5	7.07	14	MW16-15R-NWG-101404-D	NA	61 N[7]	NA	70
TOTAL CHLORINATED VOCS	24/29	0.0157	1824	---	370	447	MW16-60R-NWG-102704	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	9/29	0.129 J	1.04	1 - 50	1.35	0.474	MW16-71R-NWG-111704	NA	120 N	100	100
TRICHLOROETHENE	20/29	0.415 J	1800	1 - 2.01	363	526	MW16-60R-NWG-102704	NA	**0.028 C**	**5**	**5**
Low-Level Volatile Organics (ug/L)											
1,1,2-TRICHLOROETHANE	6/23	0.0117 J	1.54	0.1	0.16	0.473	MW16-60R-NWG-102704	NA	**0.2 C**	5	5
1,1-DICHLOROETHENE	11/23	0.0274 J	5.05	0.1	0.625	1.25	MW16-60R-NWG-102704	NA	340 C	7	7
1,2-DICHLOROETHANE	5/23	0.0124 J	0.0801 J	0.1	0.0478	0.0399	MW16-59R-NWG-102504	NA	0.12 C	5	5
BENZENE	14/23	0.0126 J	0.08 J	0.1	0.0376	0.0296	MW16-65R-NWG-102804	NA	0.35 C	5	5
CHLOROFORM	1/23	0.104	0.104	0.1	0.0523	0.104	MW16-60R-NWG-102704	NA	0.17 C	80	NA
VINYL CHLORIDE	11/23	0.0373 J	0.916	0.1	0.178	0.318	MW16-59R-NWG-102504	NA	**0.02 C[8]**	2	2
Total Metals (ug/L)											
ALUMINUM	23/23	7.5	6680	---	514	514	MW16-28R-NWG-101104	5315	36000 N	NA	NA
ARSENIC	16/23	0.42 J	13.2	0.42 - 0.5	1.95	2.7	MW16-52R-NWG-110104	6.4	**0.045 C**	**10**	NA
BARIUM	23/23	1.2	2350	---	124	124	MW16-65R-NWG-102804	80.5	2600 N	**2000**	**2000**
BERYLLIUM	5/23	0.12 J	0.6	0.11	0.097	0.248	MW16-28R-NWG-101104	1.3	73 N	4	4
CADMIUM	1/23	0.2	0.2	0.06 - 0.09	0.0386	0.2	MW16-55R-NWG-100704	3	18 N	5	5
CALCIUM	23/23	3120	2460000	---	205070	205070	MW16-51R-NWG-102904	13302	NA	NA	NA
CHROMIUM	5/23	0.94	24.6 J	0.34 - 2.5	2.04	7.31	MW16-28R-NWG-101104	214	110 N[9]	100 [9]	100
COBALT	21/23	0.12	5.4	0.05 - 0.054	1.32	1.44	MW16-28R-NWG-101104	24.9	730 N	NA	NA
COPPER	11/23	0.47 J	744	0.4 - 7.8	41.6	85.8	MW16-52R-NWG-110104	25.8	1500 N	1300 [10]	NA
IRON	23/23	409	124000	---	15937	15937	MW16-52R-NWG-110104	25500	**11000 N**	NA	NA
LEAD	22/23	0.06 J	7.7	0.05	0.985	1.03	MW16-28R-NWG-101104	4.8	NA	15 [10]	15
MAGNESIUM	22/23	454	946000	50	66512	69534	MW16-52R-NWG-110104	5126	NA	NA	NA
MANGANESE	22/23	22 J	32100	0.79	2444	2555	MW16-52R-NWG-110104	3292	**880 N**	NA	NA
MERCURY	1/23	0.68	0.68	0.021 - 0.13	0.0502	0.68	MW16-36R-NWG-100504	ND	11 N	2	2
NICKEL	23/23	0.43 J	25.4 J	---	4.56	4.56	MW16-51R-NWG-102904	154	730 N	NA	100
POTASSIUM	23/23	1660	139000 J	---	19843	19843	MW16-52R-NWG-110104	3843	NA	NA	NA
SELENIUM	6/23	0.37 J	77.1	0.29 - 0.67	6.74	25.4	MW16-52R-NWG-110104	2.2	180 N	**50**	**50**
SILVER	2/23	0.06 J	0.11	0.05 - 0.052	0.0303	0.085	MW16-28R-NWG-101104	1	180 N	NA	NA
SODIUM	23/23	7800 J	6870000 J	---	513787	513787	MW16-52R-NWG-110104	12346	NA	NA	NA
THALLIUM	2/23	0.12 J	0.26	0.066 - 0.07	0.0465	0.169	MW16-28R-NWG-101104	4.1	2.4 N	2	2
VANADIUM	9/23	0.6 J	14.2 J	0.4 - 0.66	1.27	2.91	MW16-28R-NWG-101104	24.4	36 N	NA	NA
ZINC	19/23	5	110 J	2.2 - 7	22.8	27	MW16-06R-NWG-092804	89.9	11000 N	NA	NA
Dissolved Metals (ug/L)											
ALUMINUM	19/23	0.77 J	384	0.72	24.3	29.3	MW16-65R-NWG-102804	NA	36000 N	NA	NA
ARSENIC	22/23	0.16 J	14.4	0.09	1.77	1.84	MW16-52R-NWG-110104	NA	**0.045 C**	**10**	NA

TABLE 4-29
SUMMARY OF DESCRIPTIVE STATISTICS
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
BARIUM	21/23	2.5 J	2480	2.1	124	135	MW16-65R-NWG-102804	NA	2600 N	2000	2000
CALCIUM	23/23	2980	2400000	---	199013	199013	MW16-51R-NWG-102904	NA	NA	NA	NA
CHROMIUM	15/23	0.5	2.6 J	0.6 - 0.98	0.906	1.18	MW16-52R-NWG-110104	NA	110 N[9]	100 [9]	100
COBALT	17/23	0.02 J	3.5	0.01 - 0.014	0.753	1.02	MW16-01R-NWG-101204, MW16-52R-NWG-110104	NA	730 N	NA	NA
COPPER	6/23	0.25 J	1270	0.16 - 1.7	62.9	241	MW16-52R-NWG-110104	NA	1500 N	1300 [10]	NA
IRON	19/29	56.7 J	120000	32.2 - 89.4	6353	9684	MW16-52R-NWG-110104	NA	11000 N	NA	NA
LEAD	16/23	0.09 J	0.45	0.078 - 0.08	0.145	0.192	MW16-06R-NWG-092804	NA	NA	15 [10]	15
MAGNESIUM	22/23	403 J	905000	50	62651	65498	MW16-52R-NWG-110104	NA	NA	NA	NA
MANGANESE	27/29	3.5 J	30400	0.63 - 2	1837	1973	MW16-52R-NWG-110104	NA	880 N	NA	NA
MERCURY	1/23	0.024 J	0.024 J	0.021 - 0.073	0.0174	0.024	MW16-59R-NWG-102504	NA	11 N	2	2
NICKEL	23/23	0.15	25.8 J	---	3.32	3.32	MW16-51R-NWG-102904	NA	730 N	NA	100
POTASSIUM	23/23	1780	133000	---	19433	19433	MW16-65R-NWG-102804	NA	NA	NA	NA
SELENIUM	10/23	0.33 J	91.1	0.3	7.49	17	MW16-52R-NWG-110104	NA	180 N	50	50
SILVER	1/23	0.06	0.06	0.02 - 0.03	0.0124	0.06	MW16-52R-NWG-110104	NA	180 N	NA	NA
SODIUM	23/23	6140 J	6340000	---	464623	464623	MW16-52R-NWG-110104	NA	NA	NA	NA
VANADIUM	15/23	0.08 J	2.6	0.08 - 0.35	0.32	0.444	MW16-56R-NWG-101404	NA	36 N	NA	NA
ZINC	22/23	0.09 J	16.5 J	0.78	4.95	5.15	MW16-51R-NWG-102904	NA	11000 N	NA	NA
Miscellaneous Parameters (mg/L)											
ALKALINITY	29/29	19.5	1640	---	98.2	98.2	MW16-65R-NWG-102804	NA	NA	NA	NA
AMMONIA	24/29	0.1	0.41	0.1	0.153	0.175	MW16-44R-NWG-100104	NA	NA	NA	NA
CHLORIDE	29/29	7.04	15100	---	939	939	MW16-52R-NWG-110104	NA	NA	NA	NA
CYANIDE (ug/L)	1/23	2.3 J	2.3 J	1.8 - 10	4.7	2.3	MW16-65R-NWG-102804	NA	730 N[11]	200	200
DISSOLVED INORGANIC CARBON	26/29	1	14	1	3.71	4.08	MW16-36R-NWG-100504	NA	NA	NA	NA
DISSOLVED ORGANIC CARBON	29/29	1	22	---	3.34	3.34	MW16-36R-NWG-100504	NA	NA	NA	NA
HYDROGEN SULFIDE	1/29	0.066	0.066	0.05	0.0264	0.066	MW16-28R-NWG-101104	NA	0.11 N	NA	NA
NITRATE	5/29	0.203 J	0.7	0.1 - 1	0.117	0.306	MW16-65R-NWG-102804	NA	10 N	10	NA
NITRITE	5/29	0.11	4.74	0.1 - 1	0.257	1.12	MW16-65R-NWG-102804	NA	1 N	1	NA
SALINITY (g/kg)	23/23	0.065	24.8	---	2.26	2.26	MW16-52R-NWG-110104	NA	NA	NA	NA
SULFATE	29/29	0.133	1810	---	125	125	MW16-52R-NWG-110104	NA	NA	NA	NA

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - Background values from Table 7-4 from Stone & Websters Final Background Inorganics Groundwater Study Report, December 1996.
The groundwater background values are based on the more conservative value of the 95% UCL and the maximum detected concentration.
4 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
5 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Winter 2004).
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
7 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
8 - PRG is based on CSF for lifetime exposures by a child/adult.
9 - The value for hexavalent chromium is presented.
10 - The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.
11 - The value for free cyanide is presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers:
C - Carcinogen.
N - Noncarcinogen.
J - Estimated value.

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SUMMARY OF DESCRIPTIVE STATISTICS
2004 SHALLOW BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]

Acronyms:
BKG = Background
CSF = Cancer Slope Factor
GA = Drinking water suitability
GW = Groundwater
HI = Hazard Index
MCL = Maximum Contaminant Level
NA = No Criteria Available
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SDWA = Safe Drinking Water Act
U.S. EPA = United States Environmental Protection Agency

TA[illegible]-30
SUMMARY OF CHEMICALS DETECTED
2004 DEEP BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-02R2 MW16-02R2-NWG-100604 ORIG 10/6/2004	08 MW16-02R2 MW16-02R2-NWG-100604-AVG AVG. 10/6/2004	08 MW16-02R2 MW16-02R2-NWG-100604-D DUP 10/6/2004	08 MW16-05R2 MW16-05R2-NWG-102604 NORMAL 10/26/2004
Volatile Organics (ug/L)							
1,1-DICHLOROETHANE	810	NA	NA	10 U	0.184 J	0.184 J	1 U
BROMODICHLOROMETHANE	0.18	80	NA	10 U	5.5 U	1 U	1 U
BTEX[1]	NA	NA	NA	0 U	0 U	0 U	0 U
CARBON DISULFIDE	1000	NA	NA	10 U	5.5 U	1 U	1 U
CHLORODIBROMOMETHANE	0.13	80	NA	10 U	5.5 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	5.54 J	5.74 J	5.94	0.597 J
METHANE	NA	NA	NA	1.1 J	1.05 J	1 J	4.3 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	5.54 J	5.96 J	6.39	0.597 J
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	476	472	468	10.1
TRANS-1,2-DICHLOROETHENE	120	100	100	10 U	0.448 J	0.448 J	1 U
TRICHLOROETHENE	0.028	5	5	470	465	460	9.37
Low-Level Volatile Organics (ug/L)							
1,1-DICHLOROETHENE	340	7	7	0.587	0.5885	0.59	0.0927 J
BENZENE	0.35	5	5	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	0.02	2	2	0.342	0.3445	0.347	0.1 U
Total Metals (ug/L)							
ALUMINUM	36000	NA	NA	153	154.5	156	46
ARSENIC	0.045	10	NA	0.42 U	0.42 U	0.42 U	8.6
BARIUM	2600	2000	2000	37.9	37.8	37.7	106
CALCIUM	NA	NA	NA	31300	31400	31500	723000
CHROMIUM	110	100	100	0.51 J	0.53 J	0.55 J	1.3 U
COBALT	730	NA	NA	0.27	0.265	0.26	1.2
COPPER	1500	1300	NA	0.59 U	0.545 U	0.5 U	36.2 J
IRON	11000	NA	NA	159	155.5	152	2370
LEAD	NA	15	15	0.05 U	0.0375 J	0.05 J	0.2 J
MAGNESIUM	NA	NA	NA	1320	1315	1310	193000
MANGANESE	880	NA	NA	224	221.5	219	3050
NICKEL	730	NA	100	0.88	0.845	0.81	14.3 J
POTASSIUM	NA	NA	NA	2740	2740	2740	41000
SELENIUM	180	50	50	0.29 U	0.29 U	0.29 U	41.5
SODIUM	NA	NA	NA	9950	10025	10100	3000000 J
VANADIUM	36	NA	NA	1.1	1.15	1.2	0.4 U
ZINC	11000	NA	NA	1.3 J	1.25 J	1.2 J	7.3 U
Dissolved Metals (ug/L)							
ALUMINUM	36000	NA	NA	129	128	127	1.8
ARSENIC	0.045	10	NA	0.51	0.51	0.51	10.9
BARIUM	2600	2000	2000	34.6	34.8	35	97.2
CALCIUM	NA	NA	NA	30900	30750	30600	774000
CHROMIUM	110	100	100	0.82	0.73	0.64	0.98 U
COBALT	730	NA	NA	0.13	0.13	0.13	1.3
COPPER	1500	1300	NA	0.2 J	0.27 J	0.34	29.5 J
IRON	11000	NA	NA	125	124	123	2590
LEAD	NA	15	15	0.08 U	0.08 U	0.08 U	0.11 J
MAGNESIUM	NA	NA	NA	1360	1340	1320	214000
MANGANESE	880	NA	NA	134	133	132	3620

TABLE 4-30
SUMMARY OF CHEMICALS DETECTED
2004 DEEP BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-02R2 MW16-02R2-NWG-100604 ORIG 10/6/2004	08 MW16-02R2 MW16-02R2-NWG-100604-AVG AVG 10/6/2004	08 MW16-02R2 MW16-02R2-NWG-100604-D DUP 10/6/2004	08 MW16-05R2 MW16-05R2-NWG-102604 NORMAL 10/26/2004
NICKEL	730	NA	100	0.86	0.845	0.83	16.8 J
POTASSIUM	NA	NA	NA	2800	2770	2740	44900
SELENIUM	180	50	50	0.43 J	0.4 J	0.37 J	49.9
SODIUM	NA	NA	NA	9840 J	9670 J	9500 J	3050000
VANADIUM	36	NA	NA	1.3	1.25	1.2	0.08 U
ZINC	11000	NA	NA	3.3	3.3	3.3	4.8
Miscellaneous Parameters (ug/L)							
ALKALINITY	NA	NA	NA	96.5	97	97.5	42.5
AMMONIA	NA	NA	NA	0.15	0.1	0.1 U	0.15
CHLORIDE	NA	NA	NA	10.5	9.985	9.47	5850
DISSOLVED INORGANIC CARBON	NA	NA	NA	5	4.5	4	5
DISSOLVED ORGANIC CARBON	NA	NA	NA	3	2	1	2
SALINITY (g/kg)	NA	NA	NA	0.133	0.137	0.141	10.4
SULFATE	NA	NA	NA	15.3	14.9	14.5	706

TA[illegible]4-30
SUMMARY OF CHEMICALS DETECTED
2004 DEEP BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-15R2 MW16-15R2-NWG-101404 NORMAL 10/14/2004	08 MW16-55R2 MW16-55R2-NWG-092904 NORMAL 9/29/2004
Volatile Organics (ug/L)					
1,1-DICHLOROETHANE	810	NA	NA	1 U	1 U
BROMODICHLOROMETHANE	0.18	80	NA	0.303 J	1 U
BTEX[1]	NA	NA	NA	0.0235	0.0281
CARBON DISULFIDE	1000	NA	NA	1 U	1.02
CHLORODIBROMOMETHANE	0.13	80	NA	0.491 J	1 U
CIS-1,2-DICHLOROETHENE	61	70	70	27	1 U
METHANE	NA	NA	NA	3.3 U	3.3 U
TOTAL 1,2-DICHLOROETHENE	61	NA	70	27.3	1 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	239	0 U
TRANS-1,2-DICHLOROETHENE	120	100	100	0.306 J	1 U
TRICHLOROETHENE	0.028	5	5	210	1 U
Low-Level Volatile Organics (ug/L)					
1,1-DICHLOROETHENE	340	7	7	1.31	0.1 U
BENZENE	0.35	5	5	0.0235 J	0.0281 J
VINYL CHLORIDE	0.02	2	2	0.19	0.1 U
Total Metals (ug/L)					
ALUMINUM	36000	NA	NA	272	831
ARSENIC	0.045	10	NA	3.2	0.42 U
BARIUM	2600	2000	2000	17.9	343
CALCIUM	NA	NA	NA	18600	153000
CHROMIUM	110	100	100	1.9 U	1.7 U
COBALT	730	NA	NA	0.28	0.16 J
COPPER	1500	1300	NA	2.1 U	12.8 J
IRON	11000	NA	NA	3490	760
LEAD	NA	15	15	0.82	0.66 J
MAGNESIUM	NA	NA	NA	1180	369
MANGANESE	880	NA	NA	155 J	14.5
NICKEL	730	NA	100	1.6	3.5 J
POTASSIUM	NA	NA	NA	4880	11600
SELENIUM	180	50	50	0.29 U	0.29 U
SODIUM	NA	NA	NA	10300 J	14200
VANADIUM	36	NA	NA	3.8	0.4 U
ZINC	11000	NA	NA	18.5	9.1 J
Dissolved Metals (ug/L)					
ALUMINUM	36000	NA	NA	67.4	610
ARSENIC	0.045	10	NA	3.2	0.092 U
BARIUM	2600	2000	2000	12.4	313
CALCIUM	NA	NA	NA	18900	154000 J
CHROMIUM	110	100	100	1.1 U	0.55 U
COBALT	730	NA	NA	0.014 U	0.1 J
COPPER	1500	1300	NA	0.16 U	0.23 J
IRON	11000	NA	NA	58.2 J	363
LEAD	NA	15	15	0.2	0.26 J
MAGNESIUM	NA	NA	NA	945	196
MANGANESE	880	NA	NA	90.7 J	0.03 J

TABLE 4-30
SUMMARY OF CHEMICALS DETECTED
2004 DEEP BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	08 MW16-15R2 MW16-15R2-NWG-101404 NORMAL 10/14/2004	08 MW16-55R2 MW16-55R2-NWG-092904 NORMAL 9/29/2004
NICKEL	730	NA	100	0.82	3.3 J
POTASSIUM	NA	NA	NA	4880	11300
SELENIUM	180	50	50	0.3 U	0.3 U
SODIUM	NA	NA	NA	10300	12600
VANADIUM	36	NA	NA	2.4	0.27 U
ZINC	11000	NA	NA	4.4 J	1.3 J
Miscellaneous Parameters (ug/L)					
ALKALINITY	NA	NA	NA	38.5	392
AMMONIA	NA	NA	NA	0.13	0.31 U
CHLORIDE	NA	NA	NA	10.4	13.2
DISSOLVED INORGANIC CARBON	NA	NA	NA	2	1 U
DISSOLVED ORGANIC CARBON	NA	NA	NA	2	2
SALINITY (g/kg)	NA	NA	NA	0.078	0.983
SULFATE	NA	NA	NA	16.9	3.08

TABLE 4-30
SUMMARY OF CHEMICALS DETECTED
2004 DEEP BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Description:
08 - CTO 97 Supplemental Phase II Investigation

Qualifiers:
J - Estimated value.
U - Nondetected result.

Sample Code Description:
NORMAL - One sample was collected at this location.
ORIG - First of two samples collected at this location.
DUP - Second of two samples collected at this location.
AVG - Average of the two samples collected at this location.

Acronyms:
GA = Drinking water suitability
GW = Groundwater
MCL = Maximum Contaminant Level
NA = Not Applicable/Not Available
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
VOC = Volatile Organic Compound

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

TABLE 4-31
SUMMARY OF DESCRIPTIVE STATISTICS
PRE-2004 DEEP BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	1/3	0.13 J	0.13 J	1	0.377	0.13	MW16-02R2-NWG-121002	NA	810 N	NA	NA
ACETONE	3/3	6.85 J	77 J	---	36.3	36.3	MW16-15R2-NWG-112502	NA	5500 N	NA	NA
BTEX	3/3	0.12	0.24	---	0.197	0.197	MW16-02R2-NWG-121002	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	2/3	3.24	21	1	8.25	12.1	MW16-15R2-NWG-112502	NA	61 N	70	70
TOLUENE	3/3	0.12 J	0.24 J	---	0.177	0.177	MW16-02R2-NWG-121002	NA	720 N	1000	1000
TOTAL 1,2-DICHLOROETHENE	2/3	3.42	21.4	1	8.44	12.4	MW16-15R2-NWG-112502	NA	61 N[7]	NA	70
TOTAL CHLORINATED VOCS	2/3	126	182	---	103	154	MW16-15R2-NWG-112502	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	2/3	0.18 J	0.35 J	1	0.343	0.265	MW16-15R2-NWG-112502	NA	120 N	100	100
TRICHLOROETHENE	2/3	120	160 J	1	93.5	140	MW16-15R2-NWG-112502	NA	**0.028 C**	**5**	**5**
Low-Level Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	2/3	0.06 J	0.2	0.1	0.103	0.13	MW16-02R2-NWG-121002	NA	810 N	NA	NA
1,1-DICHLOROETHENE	2/3	0.8	2	0.1	0.95	1.4	MW16-02R2-NWG-121002	NA	340 C	7	7
BENZENE	1/3	0.06 J	0.06 J	0.1	0.0533	0.06	MW16-15R2-NWG-112502	NA	0.35 C	5	5
CHLOROFORM	3/3	0.2	0.2	---	0.2	0.2	3 Samples	NA	**0.17 C**	80	NA
VINYL CHLORIDE	1/3	0.2	0.2	0.1	0.1	0.2	MW16-02R2-NWG-121002	NA	**0.02 C[8]**	2	2
Dissolved Metals (ug/L)											
MANGANESE	2/3	3.2 J	3.5 J	15	4.73	3.35	MW16-55R2-NWG-121602	NA	880 N	NA	NA
Miscellaneous Parameters (ug/L)											
ALKALINITY	3/3	291 J	731 J	---	527	527	MW16-55R2-NWG-121602	NA	NA	NA	NA
AMMONIA	3/3	0.15	0.35	---	0.237	0.237	MW16-55R2-NWG-121602	NA	NA	NA	NA
CHLORIDE	3/3	13.6	14.8	---	14.1	14.1	MW16-02R2-NWG-121002	NA	NA	NA	NA
NITRITE	3/3	0.29	0.94	---	0.59	0.59	MW16-02R2-NWG-121002	NA	1000 N	1000	NA
SALINITY (g/kg)	1/3	1.2	1.2	1	0.733	1.2	MW16-02R2-NWG-121002	NA	NA	NA	NA
SULFATE	3/3	0.9	8.29	---	4.82	4.82	MW16-15R2-NWG-112502	NA	NA	NA	NA
SULFIDE	1/3	0.08 J	0.08 J	0.05	0.0433	0.08	MW16-15R2-NWG-112502	NA	NA	NA	NA
TOTAL INORGANIC CARBON	1/3	1	1	5	2	1	MW16-55R2-NWG-121602	NA	NA	NA	NA
TOTAL ORGANIC CARBON	1/1	16	16	---	16	16	MW16-02R2-NWG-121002	NA	NA	NA	NA
Field Parameters (ug/L)											
DISSOLVED OXYGEN	3/3	0.31	0.63	---	0.437	0.437	MW16-55R2-NWG-121602	NA	NA	NA	NA
FERRIC IRON	2/2	0.44	3.17	---	1.81	1.81	MW16-02R2-NWG-121002	NA	NA	NA	NA
OXIDATION REDUCTION POTENTIAL (MV)	3/3	-125.8	100.1	---	-1.83	-1.83	MW16-02R2-NWG-121002	NA	NA	NA	NA
PH (S.U.)	3/3	12.04	12.45	---	12.3	12.3	MW16-02R2-NWG-121002	NA	NA	NA	NA
TEMPERATURE (C)	3/3	8.93	13.96	---	11.4	11.4	MW16-15R2-NWG-112502	NA	NA	NA	NA

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - Background values from Table 7-4 from Stone & Websters Final Background Inorganics Groundwater Study Report, December 1996.
The groundwater background values are based on the more conservative value of the 95% UCL and the maximum detected concentration.
4 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
5 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Winter 2004).
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
7 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
8 - PRG is based on CSF for lifetime exposures by a child/adult.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers:
C - Carcinogen.
N - Noncarcinogen.
J - Estimated value.

TABLE 4-31
SUMMARY OF DESCRIPTIVE STATISTICS
PRE-2004 DEEP BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	U.S. EPA Region 9 PRG - Tap Water[4]	U.S. EPA MCL[5]	RIDEM GA Groundwater Objective[6]

Acronyms:
BKG = Background
CSF = Cancer Slope Factor
GA = Drinking water suitability
GW = Groundwater
HI = Hazard Index
MCL = Maximum Contaminant Level
NA = No Criteria Available
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
U.S. EPA = United States Environmental Protection Agency

TA[illegible]32
SUMMARY OF DESCRIPTIVE STATISTICS
2004 DEEP BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	USEPA Region 9 PRG - Tap Water[4]	USEPA MCL[5]	RIDEM GA Groundwater Objective[6]
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	1/4	0.184 J	0.184 J	1 - 10	0.421	0.184	MW16-02R2-NWG-100604-D	NA	810 N	NA	NA
BROMODICHLOROMETHANE	1/4	0.303 J	0.303 J	1 - 10	1.01	0.303	MW16-15R2-NWG-101404	NA	**0.18 C**	80	NA
BTEX	2/4	0.0235	0.0281	---	0.0129	0.0258	MW16-55R2-NWG-092904	NA	NA	NA	NA
CARBON DISULFIDE	1/4	1.02	1.02	1 - 10	1.19	1.02	MW16-55R2-NWG-092904	NA	1000 N	NA	NA
CHLORODIBROMOMETHANE	1/4	0.491 J	0.491 J	1 - 10	1.06	0.491	MW16-15R2-NWG-101404	NA	**0.13 C**	80	NA
CIS-1,2-DICHLOROETHENE	3/4	0.597 J	27	1	8.46	11.1	MW16-15R2-NWG-101404	NA	61 N	70	70
METHANE	1/4	1 J	1.1 J	3.3 - 4.3	1.63	1.05	MW16-02R2-NWG-100604	NA	NA	NA	NA
TOTAL 1,2-DICHLOROETHENE	3/4	0.597 J	27.3	1	8.59	11.3	MW16-15R2-NWG-101404	NA	61 N[7]	NA	70
TOTAL CHLORINATED VOCS	3/4	10.1	476	---	180	240	MW16-02R2-NWG-100604	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	2/4	0.306 J	0.448 J	1 - 10	0.439	0.377	MW16-02R2-NWG-100604-D	NA	120 N	100	100
TRICHLOROETHENE	3/4	9.37	470	1	171	228	MW16-02R2-NWG-100604	NA	**0.028 C**	**5**	**5**
Low-Level Volatile Organics (ug/L)											
1,1-DICHLOROETHENE	3/4	0.0927 J	1.31	0.1	0.51	0.664	MW16-15R2-NWG-101404	NA	340 C	7	7
BENZENE	2/4	0.0235 J	0.0281 J	0.1	0.0379	0.0258	MW16-55R2-NWG-092904	NA	0.35 C	5	5
VINYL CHLORIDE	2/4	0.19	0.347	0.1	0.159	0.267	MW16-02R2-NWG-100604-D	NA	**0.02 C[8]**	2	2
Total Metals (ug/L)											
ALUMINUM	4/4	46	831	---	326	326	MW16-55R2-NWG-092904	5315	36000 N	NA	NA
ARSENIC	2/4	3.2	8.6	0.42	3.06	5.9	MW16-05R2-NWG-102604	6.4	**0.045 C**	10	NA
BARIUM	4/4	17.9	343	---	126	126	MW16-55R2-NWG-092904	80.5	2600 N	2000	2000
CALCIUM	4/4	18600	723000	---	231500	231500	MW16-05R2-NWG-102604	13302	NA	NA	NA
CHROMIUM	1/4	0.51 J	0.55 J	1.3 - 1.9	0.745	0.53	MW16-02R2-NWG-100604-D	214	110 N[9]	100 [9]	100
COBALT	4/4	0.16 J	1.2	---	0.476	0.476	MW16-05R2-NWG-102604	24.9	730 N	NA	NA
COPPER	2/4	12.8 J	36.2 J	0.5 - 2.1	12.6	24.5	MW16-05R2-NWG-102604	25.8	1500 N	1300 [10]	NA
IRON	4/4	152	3490	---	1694	1694	MW16-15R2-NWG-101404	25500	11000 N	NA	NA
LEAD	4/4	0.05 J	0.82	0.05	0.429	0.429	MW16-15R2-NWG-101404	4.8	NA	15 [10]	15
MAGNESIUM	4/4	369	193000	---	48966	48966	MW16-05R2-NWG-102604	5126	NA	NA	NA
MANGANESE	4/4	14.5	3050	---	860	860	MW16-05R2-NWG-102604	3292	**880 N**	NA	NA
NICKEL	4/4	0.81	14.3 J	---	5.06	5.06	MW16-05R2-NWG-102604	154	730 N	NA	100
POTASSIUM	4/4	2740	41000	---	15055	15055	MW16-05R2-NWG-102604	3843	NA	NA	NA
SELENIUM	1/4	41.5	41.5	0.29	10.5	41.5	MW16-05R2-NWG-102604	2.2	180 N	50	50
SODIUM	4/4	9950	3000000 J	---	758631	758631	MW16-05R2-NWG-102604	12346	NA	NA	NA
VANADIUM	2/4	1.1	3.8	0.4	1.34	2.48	MW16-15R2-NWG-101404	24.4	36 N	NA	NA
ZINC	3/4	1.2 J	18.5	7.3	8.13	9.62	MW16-15R2-NWG-101404	89.9	11000 N	NA	NA
Dissolved Metals (ug/L)											
ALUMINUM	4/4	1.8	610	---	202	202	MW16-55R2-NWG-092904	NA	36000 N	NA	NA
ARSENIC	3/4	0.51	10.9	0.092	3.66	4.87	MW16-05R2-NWG-102604	NA	**0.045 C**	**10**	NA
BARIUM	4/4	12.4	313	---	114	114	MW16-55R2-NWG-092904	NA	2600 N	2000	2000
CALCIUM	4/4	18900	774000	---	244413	244413	MW16-05R2-NWG-102604	NA	NA	NA	NA
CHROMIUM	1/4	0.64	0.82	0.55 - 1.1	0.511	0.73	MW16-02R2-NWG-100604	NA	110 N[9]	100 [9]	100
COBALT	3/4	0.1 J	1.3	0.014	0.384	0.51	MW16-05R2-NWG-102604	NA	730 N	NA	NA
COPPER	3/4	0.2 J	29.5 J	0.16	7.52	10	MW16-05R2-NWG-102604	NA	1500 N	1300 [10]	NA
IRON	4/4	58.2 J	2590	---	784	784	MW16-05R2-NWG-102604	NA	11000 N	NA	NA
LEAD	3/4	0.11 J	0.26 J	0.08	0.153	0.19	MW16-55R2-NWG-092904	NA	NA	15 [10]	15
MAGNESIUM	4/4	196	214000	---	54120	54120	MW16-05R2-NWG-102604	NA	NA	NA	NA
MANGANESE	4/4	0.03 J	3620	---	961	961	MW16-05R2-NWG-102604	NA	**880 N**	NA	NA
NICKEL	4/4	0.82	16.8 J	---	5.44	5.44	MW16-05R2-NWG-102604	NA	730 N	NA	100
POTASSIUM	4/4	2740	44900	---	15963	15963	MW16-05R2-NWG-102604	NA	NA	NA	NA
SELENIUM	2/4	0.37 J	49.9	0.3	12.7	25.2	MW16-05R2-NWG-102604	NA	180 N	50	50
SODIUM	4/4	9500 J	3050000	---	770643	770643	MW16-05R2-NWG-102604	NA	NA	NA	NA
VANADIUM	2/4	1.2	2.4	0.08 - 0.27	0.956	1.83	MW16-15R2-NWG-101404	NA	36 N	NA	NA
ZINC	4/4	1.3 J	4.8	---	3.45	3.45	MW16-05R2-NWG-102604	NA	11000 N	NA	NA
Miscellaneous Parameters (mg/L)											
ALKALINITY	4/4	38.5	392	---	143	143	MW16-55R2-NWG-092904	NA	NA	NA	NA
AMMONIA	3/4	0.13	0.15	0.1 - 0.31	0.134	0.127	MW16-02R2-NWG-100604	NA	NA	NA	NA
CHLORIDE	4/4	9.47	5850	---	1471	1471	MW16-05R2-NWG-102604	NA	NA	NA	NA
DISSOLVED INORGANIC CARBON	3/4	2	5	1	3	3.83	MW16-02R2-NWG-100604	NA	NA	NA	NA
DISSOLVED ORGANIC CARBON	4/4	1	3	---	2	2	MW16-02R2-NWG-100604	NA	NA	NA	NA

TABLE 4-32
SUMMARY OF DESCRIPTIVE STATISTICS
2004 DEEP BEDROCK GROUNDWATER SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	BKG GW Concentration[3]	USEPA Region 9 PRG - Tap Water[4]	USEPA MCL[5]	RIDEM GA Groundwater Objective[6]
SALINITY (g/kg)	4/4	0.078	10.4	---	2.9	2.9	MW16-05R2-NWG-102604	NA	NA	NA	NA
SULFATE	4/4	3.08	706	---	185	185	MW16-05R2-NWG-102604	NA	NA	NA	NA

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - Background values from Table 7-4 from Stone & Websters Final Background Inorganics Groundwater Study Report, December 1996.
The groundwater background values are based on the more conservative value of the 95% UCL and the maximum detected concentration.
4 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
5 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Winter 2004).
6 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
7 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
8 - PRG is based on CSF for lifetime exposures by a child/adult.
9 - The value for hexavalent chromium is presented.
10 - The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Qualifiers:
C - Carcinogen.
N - Noncarcinogen.
J - Estimated value.

Acronyms:
BKG = Background
CSF = Cancer Slope Factor
GA = Drinking water suitability
GW = Groundwater
HI = Hazard Index
MCL = Maximum Contaminant Level
NA = No Criteria Available
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SDWA = Safe Drinking Water Act
U.S. EPA = United States Environmental Protection Agency

TAB[illegible]4-33
TCE CONCENTRATIONS BY GROUNDWATER ZONE FOR SELECT WELLS
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Groundwater Zone	MW16-02	MW16-05	MW16-15	MW16-41	MW16-44	MW16-45	MW16-59	MW16-68	MW16-69	MW16-70
Shallow Overburden	1.19	1U	6.15	0.701 J	3.69	1U	21	12	10	20
Intermediate Overburden	63	470	--	89	3.14	520	670	11	550	11
Deep Overburden	360	1100	1400	610	1300	680	2300	770	970	730
Shallow Bedrock	1200	860	470 J	--	1400	--	1500	620/600	240	59
Deep Bedrock	470/460	9.37	210	--	--	--	--	--	--	--

Notes:
"--" Indicates that a sample was not collected in that particular groundwater zone.
Units are ug/L.

Acronyms:
RI = Remedial Investigation

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SUMMARY OF CHEMICALS DETECTED IN SEEP SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	Ecological Criteria	03 28-SP-01 28-SP01-NGW-101598 NORMAL 10/15/1998	05 OPW16-01 OPW16-01-NWG-032201 NORMAL 3/22/2001	05 SEEP16-01 SEEP16-01-NWG-032101 ORIG 3/21/2001	05 SEEP16-01 SEEP16-01-NWG-032101-D DUP 3/21/2001	05 SEEP16-02 SEEP16-02-NWG-032601 NORMAL 3/26/2001
Volatile Organics (ug/L)									
ACETONE	5500	NA	NA	1500	5 U	0.9 J	5 UJ	5 UJ	5 UJ
CIS-1,2-DICHLOROETHENE	61	70	70	2240		2 U	2 U	2 U	0.7
TOTAL 1,2-DICHLOROETHENE	61	NA	70	2240	1 U	2 U	2 U	2 U	0.7
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	NA	0 U	0 U	0.5	0.4	1.4
TRICHLOROETHENE	0.028	5	5	20	1 U	1 U	1 U	1 U	0.7
VINYL CHLORIDE	0.02	2	2	NA	1 U	2 U	0.5 J	0.4	2 U
Semivolatile Organics (ug/L)									
2-METHYLNAPHTHALENE	6.2	NA	NA	3	1 U	10 U	1	0.8	
ACENAPHTHENE	370	NA	NA	71	17	10 U	31	31	
ANTHRACENE	1800	NA	NA	3	1 U	10 U	1	2	
BIS(2-ETHYLHEXYL)PHTHALATE	4.8	6	6	360	2 U	39	10 U	10 U	
DI-N-OCTYL PHTHALATE	1500	NA	NA	0.34	1 U	1	10 U	10 U	
DIBENZOFURAN	12	NA	NA	3.7	8	10 U	11	12	
FLUORANTHENE	1500	NA	NA	1.6	4	10 U	2	5	
FLUORENE	240	NA	NA	3	12	10 U	17	18	
NAPHTHALENE	6.2	NA	20	23.5	3	10 U	9	5	
PHENANTHRENE	180	NA	NA	4.6	7	10 U	10	8	
PYRENE	180	NA	NA	3	2	10 U	1	2	
TOTAL PAHS[1]	NA	NA	NA	3	45	0 U	72	71.8	
Polyaromatic Hydrocarbons (ug/L)									
2-METHYLNAPHTHALENE	6.2	NA	NA	3		0.2 U	1	0.9	0.2 U
ACENAPHTHENE	370	NA	NA	71		0.2 U	34	37	0.2 U
ACENAPHTHYLENE	370	NA	NA	3		0.2 U	0.2 J	0.2	0.2 U
ANTHRACENE	1800	NA	NA	3		0.2 U	2 J	1 J	0.2 U
FLUORANTHENE	1500	NA	NA	1.6		0.1	2 J	3 J	0.2 U
FLUORENE	240	NA	NA	3		0.2 U	14	15	0.2 U
NAPHTHALENE	6.2	NA	20	23.5		0.2 U	6 J	2	0.2 U
PHENANTHRENE	180	NA	NA	4.6		0.1	9	5 J	0.2 U
PYRENE	180	NA	NA	3		0.1	1	1	0.2 U
TOTAL PAHS[1]	NA	NA	NA	3		0.3	69.2	65.1	0 U
Pesticides (ug/L)									
ALPHA-BHC	0.011	NA	NA	0.16	0.001 U	0.05 U	0.03 J	0.03	0.05 U
DIELDRIN	0.0042	NA	NA	0.0019	0.02	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN	11	2	NA	0.0023	0.0039 J	0.1 U	0.1 U	0.1 U	0.1 U
HEPTACHLOR EPOXIDE	0.0074	0.2	NA	0.0036	0.02 J	0.05 U	0.05 U	0.05 U	0.05 U
Total Metals (ug/L)									
BARIUM	2600	2000	2000	4		9.9	300	291	2.3
CALCIUM	NA	NA	NA	NA		1450	46200	48300	26700
CHROMIUM	110	100	100	50		4	0.57 U	0.57 U	0.76 U
COBALT	730	NA	NA	23		0.92 U	0.92 U	0.92 U	10.2
COPPER	1500	1300	NA	3.1		4	8.9	0.84 U	0.84 U
IRON	11000	NA	NA	1000		438	32000	27200	6480
LEAD	NA	15	15	8.1		18.8	12.4	1.48 U	3 U
MAGNESIUM	NA	NA	NA	NA		280	4820	4840	27000

TABLE 4-34
SUMMARY OF CHEMICALS DETECTED IN SEEP SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG Tap Water	Federal MCL	RIDEM GA GW Objectives	Ecological Criteria	03 28-SP-01 28-SP01-NGW-101598 NORMAL 10/15/1998	05 OPW16-01 OPW16-01-NWG-032201 NORMAL 3/22/2001	05 SEEP16-01 SEEP16-01-NWG-032101 ORIG 3/21/2001	05 SEEP16-01 SEEP16-01-NWG-032101-D DUP 3/21/2001	05 SEEP16-02 SEEP16-02-NWG-032601 NORMAL 3/26/2001
MANGANESE	880	NA	NA	120		8.9	**441**	**450**	**2170**
MERCURY	11	2	2	0.94		0.08 U	0.11 U	0.03 U	0.1
NICKEL	730	NA	100	8.2		1.3 U	3.5 U	1.5 U	1.1 J
POTASSIUM	NA	NA	NA	NA		173	3610	3590	10800
SODIUM	NA	NA	NA	NA		3130	13700	13200	182000
VANADIUM	36	NA	NA	20		1.8 U	3.2	0.52 U	0.52 U
ZINC	11000	NA	NA	81		32.6	23.6	1.2 U	43.8
Dissolved Metals (ug/L)									
ALUMINUM	36000	NA	NA	87	**2630**	120 U	100 U	108 U	53.7 U
ARSENIC	0.045	10	NA	36	**1.9 J**	2.53 U	2.53 U	2.53 U	2.53 U
BARIUM	2600	2000	2000	4	**370**	**4.5**	**280**	**263**	1.8
BERYLLIUM	73	4	4	0.53	0.21 J	0.18 U	0.18 U	0.18 U	0.18 U
CALCIUM	NA	NA	NA	NA	48700 U	1320	49100	46800	25700
COBALT	730	NA	NA	23	6.3 U	0.92 U	0.92 U	0.92 U	9
IRON	11000	NA	NA	1000	34600 U	35	**21600**	**19800**	**5100**
LEAD	NA	15	15	8.1	**29.3**	1.9 J	1.48 U	1.48 U	2.9 U
MAGNESIUM	NA	NA	NA	NA	8900	203	4930	4710	26200
MANGANESE	880	NA	NA	120	431 U	4	**456**	**434**	**2040**
MERCURY	11	2	2	0.94	0.2 U	0.04 U	0.11 U	0.05 U	0.07
NICKEL	730	NA	100	8.2	9.6 U	1 U	0.72 U	0.72 U	2.1
POTASSIUM	NA	NA	NA	NA	6030 U	107	3670	3480	10500
SODIUM	NA	NA	NA	NA	51900	3080	13600	13000	176000
VANADIUM	36	NA	NA	20	8.1 J	0.52 U	0.52 U	0.52 U	0.52 U
ZINC	11000	NA	NA	81	54.8 U	20.1	0.85 U	1.5 U	10.5 U
Miscellaneous Parameters (g/kg)									
SALINITY	NA	NA	NA	NA			0.08 J		0.62 J

Investigation Description:
03 - EBS Phase II Follow-On Addendum Sampling
05 - Stage II Phase I RI Sampling Event

Qualifiers:
J - Estimated value.
U - Nondetected result.
UJ - Nondetected result is estimated.

Sample Code Description:
NORMAL - One sample was collected at this location.
ORIG - First of two samples collected at this location.
DUP - Second of two samples collected at this location.

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SUMMARY OF CHEMICALS DETECTED IN SEEP SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation					03	05	05	05	05
Location	Region 9	Federal	RIDEM	Ecological	28-SP-01	OPW16-01	SEEP16-01	SEEP16-01	SEEP16-02
Sample Number	PRG	MCL	GA GW	Criteria	28-SP01-NGW-101598	OPW16-01-NWG-032201	SEEP16-01-NWG-032101	SEEP16-01-NWG-032101-D	SEEP16-02-NWG-032601
Sample Code	Tap Water		Objectives		NORMAL	NORMAL	ORIG	DUP	NORMAL
Sample Date					10/15/1998	3/22/2001	3/21/2001	3/21/2001	3/26/2001

Acronyms:
GA = Drinking water suitability
GW = Groundwater
MCL = Maximum Contaminant Level
NA = Not Applicable/Not Available
PAH = Polyaromatic Hydrocarbon
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
VOC = Volatile Organic Compound

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

TABLE 4-35
SUMMARY OF DESCRIPTIVE STATISTICS - SEEP SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	U.S. EPA Region 9 PRG - Tap Water[3]	U.S. EPA MCL[4]	RIDEM GA Groundwater Objective[5]	Ecological Criteria	Source
Volatile Organics (ug/L)												
ACETONE	1/4	0.9 J	0.9 J	5	2.10	0.900	OPW16-01-NWG-032201	5500 N	NA	NA	1500	3
CIS-1,2-DICHLOROETHENE	1/3	0.7	0.7	2	0.900	0.700	SEEP16-02-NWG-032601	61 N	70	70	2240 [7]	2
TOTAL 1,2-DICHLOROETHENE	1/4	0.7	0.7	1 - 2	0.800	0.700	SEEP16-02-NWG-032601	61 N[6]	NA	70	2240 [6,7]	2
TOTAL CHLORINATED VOCS	2/4	0.4	1.4	---	0.463	0.925	SEEP16-02-NWG-032601	NA	NA	NA	NA	
TRICHLOROETHENE	1/4	0.7	0.7	1	0.550	0.700	SEEP16-02-NWG-032601	0.028 C	5	5	20 [7]	2
VINYL CHLORIDE	1/4	0.4	0.5 J	1 - 2	0.738	0.450	SEEP16-01-NWG-032101	0.02 C[8]	2	2	NA	
Semivolatile Organics (ug/L)												
2-METHYLNAPHTHALENE	1/3	0.8	1	1 - 10	2.13	0.900	SEEP16-01-NWG-032101	6.2 N[9]	NA	NA	3 [7]	2
ACENAPHTHENE	2/3	17	31	10	17.7	24.0	SEEP16-01-NWG-032101, SEEP16-01-NWG-032101-D	370 N	NA	NA	71 [10]	2
ANTHRACENE	1/3	1	2	1 - 10	2.33	1.50	SEEP16-01-NWG-032101-D	1800 N	NA	NA	3 [7]	2
BIS(2-ETHYLHEXYL)PHTHALATE	1/3	39	39	2 - 10	15.0	39.0	OPW16-01-NWG-032201	4.8 C	6	6	360	2
DI-N-OCTYL PHTHALATE	1/3	1	1	1 - 10	2.17	1.00	OPW16-01-NWG-032201	1500 N	NA	NA	0.34 [10]	2
DIBENZOFURAN	2/3	8	12	10	8.17	9.75	SEEP16-01-NWG-032101-D	12 N	NA	NA	3.7	3
FLUORANTHENE	2/3	2	5	10	4.17	3.75	SEEP16-01-NWG-032101-D	1500 N	NA	NA	1.6 [10]	2
FLUORENE	2/3	12	18	10	11.5	14.8	SEEP16-01-NWG-032101-D	240 N	NA	NA	3 [7]	2
NAPHTHALENE	2/3	3	9	10	5.00	5.00	SEEP16-01-NWG-032101	6.2 N	NA	20	23.5 [7]	2
PHENANTHRENE	2/3	7	10	10	7.00	8.00	SEEP16-01-NWG-032101	180 N	NA	NA	4.6	2
PYRENE	2/3	1	2	10	2.83	1.75	28-SP01-NGW-101598, SEEP16-01-NWG-032101-D	180 N	NA	NA	3 [7]	2
TOTAL PAHS	2/3	45	72	---	39.0	58.5	SEEP16-01-NWG-032101	NA	NA	NA	3 [7]	2
Polyaromatic Hydrocarbons (ug/L)												
2-METHYLNAPHTHALENE	1/3	0.9	1	0.2	0.383	0.950	SEEP16-01-NWG-032101	6.2 N[9]	NA	NA	3 [7]	2
ACENAPHTHENE	1/3	34	37	0.2	11.9	35.5	SEEP16-01-NWG-032101-D	370 N	NA	NA	71 [10]	2
ACENAPHTHYLENE	1/3	0.2	0.2	0.2	0.133	0.200	SEEP16-01-NWG-032101, SEEP16-01-NWG-032101-D	370 N[11]	NA	NA	3 [7]	2
ANTHRACENE	1/3	1 J	2 J	0.2	0.567	1.50	SEEP16-01-NWG-032101	1800 N	NA	NA	3 [7]	2
FLUORANTHENE	2/3	0.1	3 J	0.2	0.900	1.30	SEEP16-01-NWG-032101-D	1500 N	NA	NA	1.6 [10]	2
FLUORENE	1/3	14	15	0.2	4.90	14.5	SEEP16-01-NWG-032101-D	240 N	NA	NA	3 [7]	2
NAPHTHALENE	1/3	2	6 J	0.2	1.40	4.00	SEEP16-01-NWG-032101	6.2 N	NA	20	23.5 [7]	2
PHENANTHRENE	2/3	0.1	9	0.2	2.40	3.55	SEEP16-01-NWG-032101	180 N[12]	NA	NA	4.6	2
PYRENE	2/3	0.1	1	0.2	0.400	0.550	SEEP16-01-NWG-032101, SEEP16-01-NWG-032101-D	180 N	NA	NA	3 [7]	2
TOTAL PAHS	2/3	0.3	69.2	---	22.5	33.8	SEEP16-01-NWG-032101	NA	NA	NA	3 [7]	2
Pesticides (ug/L)												
ALPHA-BHC	1/4	0.03	0.03	0.001 - 0.05	0.0201	0.0300	SEEP16-01-NWG-032101, SEEP16-01-NWG-032101-D	0.011 C	NA	NA	0.16	1
DIELDRIN	1/4	0.02	0.02	0.1	0.0425	0.0200	28-SP01-NGW-101598	0.0042 C	NA	NA	0.0019	1
ENDRIN	1/4	0.0039 J	0.0039 J	0.1	0.0385	0.00390	28-SP01-NGW-101598	11 N	2	NA	0.0023	1
HEPTACHLOR EPOXIDE	1/4	0.02 J	0.02 J	0.05	0.0238	0.0200	28-SP01-NGW-101598	0.0074 C	0.2	NA	0.0036	1
Total Metals (ug/L)												
BARIUM	3/3	2.3	300	---	103	103	SEEP16-01-NWG-032101	2600 N	2000	2000	4	3
CALCIUM	3/3	1450	48300	---	25133	25133	SEEP16-01-NWG-032101-D	NA	NA	NA	NA	
CHROMIUM	1/3	4	4	0.57 - 0.76	1.56	4.00	OPW16-01-NWG-032201	110 N[13]	100 [13]	100	50	1

TABLE 4-35
SUMMARY OF DESCRIPTIVE STATISTICS - SEEP SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	U.S. EPA Region 9 PRG - Tap Water[3]	U.S. EPA MCL[4]	RIDEM GA Groundwater Objective[5]	Ecological Criteria	Source
COBALT	1/3	10.2	10.2	0.92	3.71	10.2	SEEP16-02-NWG-032601	730 N	NA	NA	23	3
COPPER	2/3	4	8.9	0.84	3.03	4.33	SEEP16-01-NWG-032101	1500 N	1300	NA	3.1	1
IRON	3/3	438	32000	---	12173	12173	SEEP16-01-NWG-032101	11000 N	NA	NA	1000 [14]	1
LEAD	2/3	12.4	18.8	1.48 - 3	8.96	12.7	OPW16-01-NWG-032201	NA	15 [15]	15	8.1	1
MAGNESIUM	3/3	280	27000	---	10703	10703	SEEP16-02-NWG-032601	NA	NA	NA	NA	
MANGANESE	3/3	8.9	2170	---	875	875	SEEP16-02-NWG-032601	880 N	NA	NA	120	3
MERCURY	1/3	0.1	0.1	0.03 - 0.11	0.0583	0.100	SEEP16-02-NWG-032601	11 N	2	2	0.94	1
NICKEL	1/3	1.1 J	1.1 J	1.3 - 3.5	1.00	1.10	SEEP16-02-NWG-032601	730 N	NA	100	8.2	1
POTASSIUM	3/3	173	10800	---	4858	4858	SEEP16-02-NWG-032601	NA	NA	NA	NA	
SODIUM	3/3	3130	182000	---	66193	66193	SEEP16-02-NWG-032601	NA	NA	NA	NA	
VANADIUM	1/3	3.2	3.2	0.52 - 1.8	0.963	1.73	SEEP16-01-NWG-032101	36 N	NA	NA	20	3
ZINC	3/3	23.6	43.8	1.2	29.5	29.5	SEEP16-02-NWG-032601	11000 N	NA	NA	81	1
Dissolved Metals (ug/L)												
ALUMINUM	1/4	2630	2630	53.7 - 120	692	2630	28-SP01-NGW-101598	36000 N	NA	NA	87 [14]	1
ARSENIC	1/4	1.9 J	1.9 J	2.53	1.42	1.90	28-SP01-NGW-101598	0.045 C	10	NA	36	1
BARIUM	4/4	1.8	370	---	162	162	28-SP01-NGW-101598	2600 N	2000	2000	4	3
BERYLLIUM	1/4	0.21 J	0.21 J	0.18	0.120	0.210	28-SP01-NGW-101598	73 N	4	4	0.53 [10]	2
CALCIUM	3/4	1320	49100	48700	24830	24990	SEEP16-01-NWG-032101	NA	NA	NA	NA	
COBALT	1/4	9	9	0.92 - 6.3	3.27	9.00	SEEP16-02-NWG-032601	730 N	NA	NA	23	3
IRON	3/4	35	21600	34600	10784	8612	SEEP16-01-NWG-032101	11000 N	NA	NA	1000 [14]	1
LEAD	2/4	1.9 J	29.3	1.48 - 2.9	8.35	15.6	28-SP01-NGW-101598	NA	15 [15]	15	8.1	1
MAGNESIUM	4/4	203	26200	---	10031	10031	SEEP16-02-NWG-032601	NA	NA	NA	NA	
MANGANESE	3/4	4	2040	431	676	830	SEEP16-02-NWG-032601	880 N	NA	NA	120	3
MERCURY	1/4	0.07	0.07	0.04 - 0.2	0.0575	0.0700	SEEP16-02-NWG-032601	11 N	2	2	0.94	1
NICKEL	1/4	2.1	2.1	0.72 - 9.6	1.94	2.10	SEEP16-02-NWG-032601	730 N	NA	100	8.2	1
POTASSIUM	3/4	107	10500	6030	4299	4727	SEEP16-02-NWG-032601	NA	NA	NA	NA	
SODIUM	4/4	3080	176000	---	61070	61070	SEEP16-02-NWG-032601	NA	NA	NA	NA	
VANADIUM	1/4	8.1 J	8.1 J	0.52	2.22	8.10	28-SP01-NGW-101598	36 N	NA	NA	20	3
ZINC	1/4	20.1	20.1	0.85 - 54.8	13.3	20.1	OPW16-01-NWG-032201	11000 N	NA	NA	81	1
Miscellaneous Parameters (g/kg)												
SALINITY	2/2	0.08 J	0.62 J	---	0.350	0.350	SEEP16-02-NWG-032601	NA	NA	NA	NA	

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
4 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Winter 2004).
5 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
6 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
7 - Calculated by multplying the acute LOEL by 0.01 to estimate a chronic NOEL.
8 - PRG is based on CSF for lifetime exposures by a child/adult.
9 - The value for napthalene is used as a surrogate for 2-methylnaphthalene.
10 - Calculated by multplying the chronic LOEL by 0.1 to estimate a chronic NOEL.
11 - The value for acenaphthene is used as a surrogate for acenaphthylene.
12 - The value for pyrene is used as a surrogate for phenanthrene.
13 - The value for chromium VI is presented.

TABLE 4-35
SUMMARY OF DESCRIPTIVE STATISTICS - SEEP SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	U.S. EPA Region 9 PRG - Tap Water[3]	U.S. EPA MCL[4]	RIDEM GA Groundwater Objective[5]	Ecological Criteria	Source

14 - Freshwater value.
15 - The MCL for this parameter is actually a treatment technique. The SDWA action level (at the tap) has been presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Sources for Ecological Screening Criteria:
1 - Water Quality Criteria (USEPA, 2004)
2 - Saltwater values (Buchman, 1999)
3 - Freshwater values (Suter and Tsao, 1996)

Qualifiers:
C - Carcinogen.
N - Noncarcinogen.
J - Estimated value.

Acronyms:
CSF = Cancer Slope Factor
HI = Hazard Index
LOEL = Lowest Observed Effect Level
MCL = Maximum Contaminant Level
NA = No Criteria Available
NOEL = No Observed Effect Level
PAH = Polyaromatic Hydrocarbon
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SDWA = Safe Drinking Water Act
U.S. EPA = United States Environmental Protection Agency
VOC = Volatile Organic Carbon

TABLE 4-36
COMPARISION OF SEEP AND GROUNDWATER ANALYTICAL RESULTS
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation	05	05	05	05	05
Location	SEEP16-01	SEEP16-01	SEEP16-02	MW16-03S	MW16-05S
Sample Number	SEEP16-01-NWG-032101	SEEP16-01-NWG-032101-D	SEEP16-02-NWG-032601	MW16-03S-NWG-032101	MW16-05S-NWG-032101
Sample Code	ORIG	DUP	NORMAL	NORMAL	NORMAL
Sample Date	3/21/2001	3/21/2001	3/26/2001	3/21/2001	3/21/2001
Volatile Organics (ug/L)					
ACETONE	5 UJ	5 UJ	5 UJ	1 UJ	1
CIS-1,2-DICHLOROETHENE	2 U	2 U	0.7	2 U	2 U
TOTAL 1,2-DICHLOROETHENE	2 U	2 U	0.7	2 U	2 U
TOTAL CHLORINATED VOCS[1]	0.5	0.4	1.4	0 U	0 U
TRICHLOROETHENE	1 U	1 U	0.7	1 U	1 U
VINYL CHLORIDE	0.5 J	0.4	2 U	2 U	2 U
Semivolatile Organics (ug/L)					
2-METHYLNAPHTHALENE	1	0.8		10 U	10 U
ACENAPHTHENE	31	31		10 U	10 U
ANTHRACENE	1	2		10 U	10 U
DIBENZOFURAN	11	12		10 U	10 U
FLUORANTHENE	2	5		10 U	10 U
FLUORENE	17	18		10 U	10 U
NAPHTHALENE	9	5		10 U	10 U
PHENANTHRENE	10	8		10 U	10 U
PYRENE	1	2		10 U	10 U
TOTAL PAHS[1]	72	71.8		0 U	0 U
Polyaromatic Hydrocarbons (ug/L)					
2-METHYLNAPHTHALENE	1	0.9	0.2 U	0.2 U	0.2 U
ACENAPHTHENE	34	37	0.2 U	0.2 U	0.2 U
ACENAPHTHYLENE	0.2 J	0.2	0.2 U	0.2 U	0.2 U
ANTHRACENE	2 J	1 J	0.2 U	0.2 U	0.2 U
FLUORANTHENE	2 J	3 J	0.2 U	0.2 U	0.2 U
FLUORENE	14	15	0.2 U	0.2 U	0.2 U
NAPHTHALENE	6 J	2	0.2 U	0.2 U	0.2 U
PHENANTHRENE	9	5 J	0.2 U	0.2 U	0.2 U
PYRENE	1	1	0.2 U	0.2 U	0.2 U
TOTAL PAHS[1]	69.2	65.1	0 U	0 U	0 U
Pesticides (ug/L)					
ALPHA-BHC	0.03 J	0.03	0.05 U	0.05 U	0.05 U
DIELDRIN	0.1 U	0.1 U	0.1 U	0.05 U	0.05 U
ENDRIN	0.1 U	0.1 U	0.1 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Metals (ug/L)					
BARIUM	300	291	2.3	8.8	7.9
CALCIUM	46200	48300	26700	24700 J	25400 J
CHROMIUM	0.57 U	0.57 U	0.76 U	0.57 U	0.57 U
COBALT	0.92 U	0.92 U	10.2	0.92 U	3.6
COPPER	8.9	0.84 U	0.84 U	0.84 U	0.84 U
IRON	32000	27200	6480	3220 J	27800 J
LEAD	12.4	1.48 U	3 U	1.48 U	1.48 U
MAGNESIUM	4820	4840	27000	3230	2360
MANGANESE	441	450	2170	180 J	1350 J
MERCURY	0.11 U	0.03 U	0.1	0.03 U	0.1 U
NICKEL	3.5 U	1.5 U	1.1 J	1.1 J	2.7
POTASSIUM	3610	3590	10800	2420	2380
SODIUM	13700	13200	182000	9860 J	4840 J
VANADIUM	3.2	0.52 U	0.52 U	0.52 U	0.52 U
ZINC	23.6	1.2 U	43.8	0.47 U	5.1
Miscellaneous Parameters (g/kg)					
SALINITY	0.08 J		0.62 J	0.0004 J	0.0051 J

Investigation Description:
05 - Stage II Phase I RI Sampling Event

Qualifiers:
J - Estimated value.
U - Nondetected result.
UJ - Nondetected result is estimated.

Sample Code Description:
NORMAL - One sample was collected at this location.
ORIG - First of two samples collected at this location.
DUP - Second of two samples collected at this location.

Acronyms:
NA = Not Applicable/Not Available
PAH = Polyaromatic Hydrocarbon
RI = Remedial Investigation
VOC = Volatile Organic Compound

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

SUMMARY OF CHEMICALS DETECTED IN SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	07 AH-03 AH-03-NSD-032304 NORMAL 3/23/2004	07 AH-06 AH-06-NSD-032304 ORIG 3/23/2004	07 AH-06 AH-06-NSD-032304-D DUP 3/23/2004	07 AH-08 AH-08-NSD-032204 NORMAL 3/22/2004	07 AH-11 AH-11-NSD-032204 ORIG 3/22/2004	07 AH-11 AH-11-NSD-032204-D DUP 3/22/2004	07 AH-17 AH-17-NSD-032304 NORMAL 3/23/2004	07 AH-23 AH-23-NSD-032404 NORMAL 3/24/2004
Volatile Organics (ug/kg)											
1,1-DICHLOROETHENE	120000	200	NA	7 U	12 U	10 U	17 R	11 UJ	12 U	15 U	10 U
2-BUTANONE	22000000	10000000	NA	7 J	10 J	14 J	33 R	21 U	23 U	20 J	21 U
ACETONE	14000000	7800000	NA	220	390 J	83 J	210 R	110 U	150 U	200	210 U
CARBON DISULFIDE	360000	NA	NA	11 U	12 U	11 U	24 R	11 U	12 U	24 U	10 U
CIS-1,2-DICHLOROETHENE	43000	630000	NA	7 U	12 U	10 U	17 R	11 UJ	12 U	15 U	10 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	NA	7 U	12 U	10 U	17 U	11 U	12 U	15 U	10 U
TOTAL CHLORINATED VOCS	NA	NA	NA	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U
TRANS-1,2-DICHLOROETHENE	69000	1100000	---	7 U	12 U	10 U	17 R	11 UJ	12 U	15 U	10 U
TRICHLOROETHENE	53	13000	41	7 U	12 U	10 U	17 R	11 UJ	12 U	15 U	10 U
Semivolatile Organics (ug/kg)											
2-METHYLNAPHTHALENE	56000	123000	70	6.97 J	9.24 J	8.24 J	16.12 J	13.37	16.31	21.51 J	23.13
ACENAPHTHENE	3700000	43000	16	10.69	8.62	7.73	13.69 J	20.33	22.77	22.87 J	56.52
ACENAPHTHYLENE	3700000	23000	44	90.09 J	58.74 J	52.99 J	115.95 J	121.5	148.52	171.97 J	259.86
ANTHRACENE	22000000	35000	85.3	275.05	93.37	78.59	180.96 J	166.67	188.33	208.38 J	390.41
BAP EQUIVALENT[1]	62	400	NA	1240	325	295	593	635	694	753	1253
BENZO(A)ANTHRACENE	620	900	261	715.48	167.23	154.97	333.13 J	324.68	326.25	380.61 J	665.32
BENZO(A)PYRENE	62	400	430	792.32	213.6	194.69	386.33 J	425.84	465.48	497.2 J	829.48
BENZO(B)FLUORANTHENE	620	900	1800	1408.11	280.68	254.02	572.41 J	525.88 J	584.48	641.86 J	1137
BENZO(G,H,I)PERYLENE	2300000	800	670	516.3	173.03	152.79	309.96 J	326.92	359.99	411.55 J	605.79
BENZO(K)FLUORANTHENE	6200	900	1800	1100.54	270.95	244.66	518.85 J	500.3 J	551.87	617.11 J	999.91
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	182								
CHRYSENE	62000	400	384	1644.13	292.35	252.47	615.92 J	549.07 J	571.49	626.91 J	1110.94
DI-N-BUTYL PHTHALATE	2400000	NA	61								
DIBENZO(A,H)ANTHRACENE	62	400	63.4	156.39	43.37	39.27	74.94 J	82.28	90.56	100.55 J	160
DIBENZOFURAN	150000	NA	110								
FLUORANTHENE	2300000	20000	600	1869.8	376.06	335.13	660.03 J	694.9 J	746.19	1083.67 J	1914.77
FLUORENE	2700000	28000	19	30.35	16.83	14.45	25.07 J	30.13	33.55	39.43 J	73.35
HIGH MOLECULAR WEIGHT PAHS[1]	---	---	1700	7155	1499	1345	3196	2868	3094	3738	6638
INDENO(1,2,3-CD)PYRENE	620	900	600	662.89	204.58	179.39	356.55 J	367.47 J	411.62	462.31 J	722.15
LOW MOLECULAR WEIGHT PAHS[1]	---	---	552	776	382	336	685	775	917	1007	1774
NAPHTHALENE	56000	54000	160	13.64 J	18.32 J	16.91 J	29.74 J	26.77	32.9	45.09 J	46.1
PHENANTHRENE	2300000	40000	240	348.94	177.09	157.03	303.89 J	396.25	474.38	497.5 J	924.53
PYRENE	2300000	13000	665	1977.37	406.32	368.78	1125.23 J	790.88	894.36	1049.11 J	1957.11
TOTAL PAHS[1]	NA	NA	NA	11619	2810	2512	5639	5363	5919	6878	11876
TOTAL PAHS ECOSD[1]	---	---	4022	7931	1881	1681	3881	3643	4011	4745	8412
Polyaromatic Hydrocarbons (ug/kg)											
ACENAPHTHENE	3700000	43000	16								
ACENAPHTHYLENE	3700000	23000	44								
ANTHRACENE	22000000	35000	85.3								
BAP EQUIVALENT[1]	62	400	NA								
BENZO(A)ANTHRACENE	620	900	261								
BENZO(A)PYRENE	62	400	430								
BENZO(B)FLUORANTHENE	620	900	1800								
BENZO(G,H,I)PERYLENE	2300000	800	670								
BENZO(K)FLUORANTHENE	6200	900	1800								
CHRYSENE	62000	400	384								
FLUORANTHENE	2300000	20000	600								
FLUORENE	2700000	28000	19								
HIGH MOLECULAR WEIGHT PAHS[1]	---	---	1700								
INDENO(1,2,3-CD)PYRENE	620	900	600								
LOW MOLECULAR WEIGHT PAHS[1]	---	---	552								
PHENANTHRENE	2300000	40000	240								
PYRENE	2300000	13000	665								
TOTAL PAHS ECOSD[1]	---	---	4022								
TOTAL PAHS[1]	NA	NA	NA								
Pesticides PCBs (ug/kg)											
4,4'-DDD	2400	NA	1.22	1.3 U	1.7 U		1.3 R	1.8 U	1.8 U	1.5 U	1.8 U
4,4'-DDE	1700	NA	2.2	1.6	1.7 U		1.6 J	1.8 UJ	2.7 J	1.5 U	3.4 J
4,4'-DDT	1700	NA	1.58	1.3 U	1.7 U		1.3 R	1.8 U	1.8 U	1.5 U	1.8 U
ALPHA-CHLORDANE	1600	NA	2.26	0.65 U	0.86 U		0.68 R	0.94 U	0.92 U	0.76 U	0.94 U
AROCLOR-1260	220	NA	22.7	13 U	19 J	21	21 J	30 J	34	17 J	70
DELTA-BHC	90	NA	0.32	0.65 U	0.86 U		0.68 R	0.94 U	0.92 U	0.76 U	0.94 U
DIELDRIN	30	40	280	1.3 U	1.7 U		1.3 R	1.8 U	1.8 U	1.5 U	9.6 R
ENDOSULFAN SULFATE	370000	NA	5.4	1.3 U	1.7 U		1.3 R	1.8 U	1.8 U	1.5 U	1.8 U
ENDRIN KETONE	18000	NA	9.9	1.3 U	1.7 U		1.3 R	1.8 UJ	1.8 U	1.5 U	1.8 U
GAMMA-CHLORDANE	1600	NA	2.26	0.68 R	0.86 U		0.68 R	1.7 J	3.4 J	5.3 J	10
HEPTACHLOR	110	NA	0.3	1.2 R	0.86 U		1.4 R	3 R	0.92 U	0.76 U	0.94 U
HEPTACHLOR EPOXIDE	53	NA	0.3	0.65 U	0.86 U		2.1 R	0.94 U	0.92 U	6.4 R	0.94 U
TOTAL AROCLOR[1]	220	10000	22.7	13 U	19	21	21	30	34	17	70
TOTAL DDT[1]	NA	NA	1.58	1.6			1.6		2.7		3.4
TOTAL PCB CONGENERS[1]	NA	NA	22.7		19	21	21	30	34	17	70
Inorganics (mg/kg)											
ALUMINUM	76000	NA	18000	6540	10900	10600	12000	11200	12000	15400	13700
ANTIMONY	31	10	2	1.1 R	1.3 R	1.4 R	1.9 R	1.6 R	1.5 R	1.8 R	1.5 R
ARSENIC	0.39	7	8.2	7.4	7.8	7.7	10.7	9.5	10.3	17	15.4

TABLE 4-37
SUMMARY OF CHEMICALS DETECTED IN SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	07 AH-03 AH-03-NSD-032304 NORMAL 3/23/2004	07 AH-06 AH-06-NSD-032304 ORIG 3/23/2004	07 AH-06 AH-06-NSD-032304-D DUP 3/23/2004	07 AH-08 AH-08-NSD-032204 NORMAL 3/22/2004	07 AH-11 AH-11-NSD-032204 ORIG 3/22/2004	07 AH-11 AH-11-NSD-032204-D DUP 3/22/2004	07 AH-17 AH-17-NSD-032304 NORMAL 3/23/2004	07 AH-23 AH-23-NSD-032404 NORMAL 3/24/2004
BARIUM	5400	5500	48	35.5	62.7	64.7	60.8	52.8	102	85.1	60.5
BERYLLIUM	150	0.4	NA	0.85	1.3	1.3	1.5	1.3	1.4	1.9	1.6
CADMIUM	37	39	1.2	0.22	0.53	0.58	0.81	0.38	0.57	2.4	0.95
CALCIUM	NA	NA	NA	22600	2670 U	2490 U	3860 U	2170 U	2450 U	4510 U	2050 U
CHROMIUM	30	1400	81	26.7	46.2	45.8	50.3	41.8	52.6	65.7	58.4
COBALT	900	NA	10	5.3	7.4	7.2	8.5	7.5	7.8	10.1	8.8
COPPER	3100	3100	34	79.6	87	90.8	148	83.5	126	212	164
IRON	23000	NA	220000	18400	25200	25700	31100	27100	28000	38800	35700
LEAD	400	150	46.7	60.6 J	48.9 J	50.1 J	70.1 J	59.9 J	64.4 J	96.9 J	92.9 J
MAGNESIUM	NA	NA	NA	4230	6680	6800	7190	6260	7170	7890	6050
MANGANESE	1800	390	260	134	197	198	210	200	217	260	215
MERCURY	23	23	0.15	0.15	0.23	0.25	0.29	0.23	0.29	0.38	0.34
NICKEL	1600	1000	20.9	16.6	20.2	20.3	23.6	19.4	23.8	30.1	27.8
POTASSIUM	NA	NA	NA	1760 J	2980 J	3040 J	3400 J	3040 J	3400 J	4310 J	3270 J
SELENIUM	390	390	1	1.2 U	1.4 U	1.6 U	2.1 U	1.7 U	1.6 U	2 U	1.7 U
SILVER	390	200	1	0.23 U	0.27 U	0.41	0.62	0.43	0.41	0.38 U	0.32 U
SODIUM	NA	NA	NA	11500 U	16200 U	18100 U	19800 U	15600 U	18800 U	18200 U	6960 U
VANADIUM	78	550	57	24.2	34.3	33.7	49.7	37.4	46.7	71	57
ZINC	23000	6000	150	217	154	159	256	149	193	449	246
AVS/SEM Parameters (UMO/g)											
CADMIUM	NA	NA	1.2	0.00372	0.00549	0.00595	0.00793	0.00629	0.00517	0.00795	0.00871
COPPER	NA	NA	34	0.14	0.13	0.09	0.04	0.03 J	0.18 J	0.19	0.56
LEAD	NA	NA	46.7	0.17	0.13	0.14	0.25	0.2	0.18	0.28	0.35
MERCURY	NA	NA	0.15	0.00004 U	0.00006 U	0.00006 U	0.00008 U	0.00006 U	0.00007 U	0.00008 U	0.00006 U
NICKEL	NA	NA	20.9	0.12	0.03 U	0.04 U	0.08	0.04 U	0.04 U	0.07	0.05
SEM/AVS	NA	NA	NA	71.54	51.59	69.23	144.49	40.14	36.74	156.59	18.3
SUM OF SEM	NA	NA	NA	2.59	1.65	1.71	3.02	2.07	2.15	3.45	3.54
ZINC	NA	NA	150	2.14	1.34	1.42	2.63	1.78	1.74	2.89	2.55
Miscellaneous Parameters (%)											
PERCENT GRAVEL	NA	NA	NA	14.1			4.8	9.7		0.4	
PERCENT SAND	NA	NA	NA	58	1.8	1.5	22.4	79.4	2.1	3.8	20.8
PERCENT SILT/CLAY	NA	NA	NA	27.9	98.2	98.5	72.8	10.9	97.9	95.8	79.2
PH (S.U.)	NA	NA	NA								
TOTAL INORGANIC CARBON	NA	NA	NA	2.77	3.17	3.22	4.68	3.99	3.8	5.25	3.73

SUMMARY OF CHEMICALS [illegible]TED IN SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	07 AH-26 AH-26-NSD-032704 NORMAL 3/27/2004	07 AH-28 AH-28-NSD-032504 NORMAL 3/25/2004	07 AH-29 AH-29-NSD-032604 NORMAL 3/26/2004	07 AH-32 AH-32-NSD-032604 NORMAL 3/26/2004	07 AH-33 AH-33-NSD-032604 ORIG 3/26/2004	07 AH-33 AH-33-NSD-032604-D DUP 3/26/2004	07 AH-35 AH-35-NSD-032604 NORMAL 3/26/2004	07 AH-40 AH-40-NSD-032704 NORMAL 3/27/2004
Volatile Organics (ug/kg)											
1,1-DICHLOROETHENE	120000	200	NA	8 U	5 U	13 U	11 U	10 U	10 U	12 U	5 U
2-BUTANONE	22000000	10000000	NA	17 U	10 U	27 U	17 J	17 J	23	20 J	8
ACETONE	14000000	7800000	NA	67 UJ	84 UJ	93 UJ	130 U	120 U	85 U	91 U	45 U
CARBON DISULFIDE	360000	NA	NA	9 U	5 U	13 U	11 U	10 U	10 U	12 U	10 U
CIS-1,2-DICHLOROETHENE	43000	630000	NA	8 U	5 U	13 U	5 J	6 J	10 U	12 U	5 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	NA	8 U	5 U	13 U	5	6	10 U	12 U	5 U
TOTAL CHLORINATED VOCS	NA	NA	NA	0 U	0 U	0 U	5	6	0 U	0 U	0 U
TRANS-1,2-DICHLOROETHENE	69000	1100000	----	8 U	5 U	13 U	11 U	10 U	10 U	12 U	5 U
TRICHLOROETHENE	53	13000	41	8 U	5 U	13 U	11 U	10 U	10 U	12 U	5 U
Semivolatile Organics (ug/kg)											
2-METHYLNAPHTHALENE	56000	123000	70	21.2 J	39.74	213.46 J	23.61	25.49	17.83	44.83	22.22 J
ACENAPHTHENE	3700000	43000	16	37.73	56.46	97.39	39.09	70.7 J	34.08 J	294.89	115.8
ACENAPHTHYLENE	3700000	23000	44	285.68 J	785.17	534.97 J	272.86	275.93	196.76	231.15	27.95 J
ANTHRACENE	22000000	35000	85.3	314.15	792.27	758.28	308.66	373.96	254.17	693.13	203.32
BAP EQUIVALENT[1]	62	400	NA	999	2405	2282	1054	1235	828	2331	587
BENZO(A)ANTHRACENE	620	900	261	535.47	1339.47	1187.49	504.9	684.19	452.28	1596.69	441.24
BENZO(A)PYRENE	62	400	430	664.35	1623.42	1503.46	702.88	819.88	543.51	1560.65	389.82
BENZO(B)FLUORANTHENE	620	900	1800	789.32	1745.9	2195.47	850.15	981.63	723.68	1765.93	420.58
BENZO(G,H,I)PERYLENE	2300000	800	670	498.24	1243.88	1067.85	569.33	634.64	426.88	1000.56	244.5
BENZO(K)FLUORANTHENE	6200	900	1800	709.63	1725.11	2033.61	826.73	983.43	657.52	1643.93	433.61
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	182								
CHRYSENE	62000	400	384	871.45	2227.35	1974.39	892.57	1095.87	745.64	2034.63	501.01
DI-N-BUTYL PHTHALATE	2400000	NA	61								
DIBENZO(A,H)ANTHRACENE	62	400	63.4	137.19	317.72	288.39	142.26	163.99	109.07	292.59	75.76
DIBENZOFURAN	150000	NA	110								
FLUORANTHENE	2300000	20000	600	1519.36	4081.99	4751.11	1441.22	2003.94	1548.52	3720.28	1100.26
FLUORENE	2700000	28000	19	74.23	145.02	136.72	60.21	87.36 J	50.89 J	248.78	89.67
HIGH MOLECULAR WEIGHT PAHS[1]	---	---	1700	5261	13733	14027	5263	6672	4790	12528	3413
INDENO(1,2,3-CD)PYRENE	620	900	600	572.98	1361.12	1294.8	643.03	733.91	500.69	1233.47	306.66
LOW MOLECULAR WEIGHT PAHS[1]	---	---	552	1963	5203	3355	1734	2054	1346	4149	1269
NAPHTHALENE	56000	54000	160	36.52 J	67.83	128.42 J	47.25	51.39	33.56	91.66	45.59 J
PHENANTHRENE	2300000	40000	240	1193.18	3316.29	1486.2	981.88	1169.38	758.7	2544.73	763.05
PYRENE	2300000	13000	665	1533.21	4143.47	4322.01	1579.4	1904.58	1390.76	3322.77	904.73
TOTAL PAHS[1]	NA	NA	NA	9794	25012	23974	9886	12060	8445	22321	6086
TOTAL PAHS ECOSD[1]	---	---	4022	7224	18936	17362	6997	8727	6136	16677	4680
Polyaromatic Hydrocarbons (ug/kg)											
ACENAPHTHENE	3700000	43000	16								
ACENAPHTHYLENE	3700000	23000	44								
ANTHRACENE	22000000	35000	85.3								
BAP EQUIVALENT[1]	62	400	NA								
BENZO(A)ANTHRACENE	620	900	261								
BENZO(A)PYRENE	62	400	430								
BENZO(B)FLUORANTHENE	620	900	1800								
BENZO(G,H,I)PERYLENE	2300000	800	670								
BENZO(K)FLUORANTHENE	6200	900	1800								
CHRYSENE	62000	400	384								
FLUORANTHENE	2300000	20000	600								
FLUORENE	2700000	28000	19								
HIGH MOLECULAR WEIGHT PAHS[1]	---	---	1700								
INDENO(1,2,3-CD)PYRENE	620	900	600								
LOW MOLECULAR WEIGHT PAHS[1]	---	---	552								
PHENANTHRENE	2300000	40000	240								
PYRENE	2300000	13000	665								
TOTAL PAHS ECOSD[1]	---	---	4022								
TOTAL PAHS[1]	NA	NA	NA								
Pesticides PCBs (ug/kg)											
4,4'-DDD	2400	NA	1.22	1.6 R	1.6	3.3	1.9 R	1.8 U	1.7 U	1.3 U	1.7
4,4'-DDE	1700	NA	2.2	1.6 R	1.4 R	1.3 U	1.9 R	2.2 R	2 J	1.3 U	0.87 U
4,4'-DDT	1700	NA	1.58	1.6 R	0.94 U	1.3 U	1.9 R	1.8 U	1.7 U	1.3 U	0.87 U
ALPHA-CHLORDANE	1600	NA	2.26	0.84 R	2.4 R	0.68 U	0.99 R	0.91 U	0.89 U	0.68 U	0.45 U
AROCLOR-1260	220	NA	22.7	41	23	22	55	37 J	49	22	32 J
DELTA-BHC	90	NA	0.32	0.84 R	0.48 U	0.68 U	0.99 R	0.91 U	0.89 U	0.68 U	0.92 J
DIELDRIN	30	40	280	1.6 R	8.1	4.2 R	1.9 R	1.8 U	3 R	1.3 U	3.7
ENDOSULFAN SULFATE	370000	NA	5.4	1.6 R	0.94 U	1.3 U	1.9 R	1.8 U	1.7 U	1.3 U	0.87 U
ENDRIN KETONE	18000	NA	9.9	1.6 R	2 R	1.3 U	1.9 R	1.8 U	1.7 U	1.3 U	0.87 U
GAMMA-CHLORDANE	1600	NA	2.26	5.4 J	2.3 R	5.4 R	6.1 J	7.1	6.5 J	5.1 J	0.45 U
HEPTACHLOR	110	NA	0.3	0.97 R	0.48 U	0.68 U	2.1 R	1.4 R	2.5 R	9 R	0.45 U
HEPTACHLOR EPOXIDE	53	NA	0.3	0.84 R	0.48 U	8.8 R	0.99 R	0.91 U	0.89 U	0.68 U	0.45 U
TOTAL AROCLOR[1]	220	10000	22.7	41	23	22	55	37	49	22	32
TOTAL DDT[1]	NA	NA	1.58		1.6	3.3			2		1.7
TOTAL PCB CONGENERS[1]	NA	NA	22.7	41	23	22	55	37	49	22	32
Inorganics (mg/kg)											
ALUMINUM	76000	NA	18000	7790	3760	15900	14600	12800	10900	12900	3330
ANTIMONY	31	10	2	1.4 U	0.87 R	2.1 U	1.7 U	1.8 U	1.7 U	2.1 U	0.8 U
ARSENIC	0.39	7	8.2	8.8	3.9	18	13.4	13.7	13.6	14.1	3

TABLE 4-37
SUMMARY OF CHEMICALS DETECTED IN SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	07 AH-26 AH-26-NSD-032704 NORMAL 3/27/2004	07 AH-28 AH-28-NSD-032504 NORMAL 3/25/2004	07 AH-29 AH-29-NSD-032604 NORMAL 3/26/2004	07 AH-32 AH-32-NSD-032604 NORMAL 3/26/2004	07 AH-33 AH-33-NSD-032604 ORIG 3/26/2004	07 AH-33 AH-33-NSD-032604-D DUP 3/26/2004	07 AH-35 AH-35-NSD-032604 NORMAL 3/26/2004	07 AH-40 AH-40-NSD-032704 NORMAL 3/27/2004
BARIUM	5400	5500	48	89.9	48.3	66.1	133	40.1	78.3	75	16.4
BERYLLIUM	150	0.4	NA	1	1	1.8	1.7	1.5	1.3	1.5	0.41
CADMIUM	37	39	1.2	0.64	0.32	1.1	0.78	0.74	0.73	0.83	0.08 U
CALCIUM	NA	NA	NA	2300 U	1930 U	2590 U	2630 U	2460 U	1930 U	6840 U	710 U
CHROMIUM	30	1400	81	32.4	32.1	66.8	59.7	54.5	48.9	51.8	7.7
COBALT	900	NA	10	5.8	5.6	10.2	9.3	8.3	7.5	8.2	2.3
COPPER	3100	3100	34	85.5	118	204	146	142	132	168	32.7
IRON	23000	NA	220000	21700	11300	38400	33600	35900	29500	34600	12500
LEAD	400	150	46.7	54.8	96.4	101	86.6	84.9	75.9	78.1	22
MAGNESIUM	NA	NA	NA	4430	2100	7290	6570	5420	5370	6620	1430 U
MANGANESE	1800	390	260	156	97.4	312	261	248	215	229	61.1
MERCURY	23	23	0.15	0.21	0.06	0.3	0.31	0.28	0.33	0.3	0.03 J
NICKEL	1600	1000	20.9	19.7	33.1	31.6	28.2	25.8	22.4	23.1	6.6
POTASSIUM	NA	NA	NA	2330	924 U	4380	3920	3220	2800	3900	546 U
SELENIUM	390	390	1	1.5 U	0.96 U	2.3 U	1.9 U	2 U	1.9 U	2.3 U	0.88 U
SILVER	390	200	1	0.84 U	0.33 U	1.5 U	1.3 U	0.87 U	0.62 U	0.64 U	0.17 U
SODIUM	NA	NA	NA	11900 U	4670 U	11800 U	9030 U	2660 U	6010 U	15000 U	1240 U
VANADIUM	78	550	57	33	14.8	80.9	60.1	54.5	47.3	57.6	13.3
ZINC	23000	6000	150	176	427	317	236	224	212	262	72.2
AVS/SEM Parameters (UMO/g)											
CADMIUM	NA	NA	1.2	0.00606	0.00188	0.00885	0.00785	0.00674	0.00772	0.00681	0.00126 U
COPPER	NA	NA	34	0.05	0.06	0.07	0.35	0.48	0.6	0.03	0.16
LEAD	NA	NA	46.7	0.16	0.31	0.38	0.34	0.32	0.36	0.27	0.19
MERCURY	NA	NA	0.15	0.00005 U	0.00003 U	0.00007 U	0.00006 U	0.00006 U	0.00006 U	0.00007 U	0.00003 U
NICKEL	NA	NA	20.9	0.09	0.21	0.05	0.05	0.04 U	0.05	0.09	0.03
SEM/AVS	NA	NA	NA	85.88	18.72	64.29	46.84	26.11 J	45.87 J	176.88	10.16
SUM OF SEM	NA	NA	NA	2.44	5.38	3.37	3.22	3.04	3.56	3.03	1.1
ZINC	NA	NA	150	2.12	4.78	2.84	2.46	2.18	2.54	2.62	0.71
Miscellaneous Parameters (%)											
PERCENT GRAVEL	NA	NA	NA	0.7	5.2					1.3	1.4
PERCENT SAND	NA	NA	NA	23.2	78.7	2.6	4.4	7.3	7.4	10.3	92
PERCENT SILT/CLAY	NA	NA	NA	76.1	16.1	97.4	95.5	92.7	92.6	88.4	6.6
PH (S.U.)	NA	NA	NA								
TOTAL INORGANIC CARBON	NA	NA	NA	3.1	2.1	5.01	4.29	4.05	3.73	4.55	0.78

SUMMARY OF CHEMICALS DETECTED IN SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	07 AH-42 AH-42-NSD-032704 NORMAL 3/27/2004	07 AH-45 AH-45-NSD-032604 NORMAL 3/26/2004	07 AH-47 AH-47-NSD-032604 NORMAL 3/26/2004	07 AH-49 AH-49-NSD-032504 NORMAL 3/25/2004	07 AH-51 AH-51-NSD-032704 NORMAL 3/27/2004	07 CORE1-BOT CORE1-BOTNSD-032704 NORMAL 3/27/2004	07 CORE1-TOP CORE1-TOPNSD-032704 NORMAL 3/27/2004	05 OPSED16-01 OPSED16-01-NSD-03220 NORMAL 3/22/2001
Volatile Organics (ug/kg)											
1,1-DICHLOROETHENE	120000	200	NA	5 U	12 U	0.9 J	5 U	11 U	5 U	5 U	6 UJ
2-BUTANONE	22000000	10000000	NA	8 J	15 J	8 J	10 U	16 J	5 J	5 J	13 UJ
ACETONE	14000000	7800000	NA	52 UJ	190 U	72 UJ	79 U	210 UJ	65 UJ	20 U	89 J
CARBON DISULFIDE	360000	NA	NA	5 U	12 U	5 U	5 U	11 U	5 U	5 U	6 UJ
CIS-1,2-DICHLOROETHENE	43000	630000	NA	5 U	12 U	880	5 U	11 U	5 U	5 U	6 UJ
TOTAL 1,2-DICHLOROETHENE	43000	630000	NA	5 U	12 U	883	5 U	11 U	5 U	5 U	6 U
TOTAL CHLORINATED VOCS	NA	NA	NA	0 U	0 U	886	0 U	0 U	0 U	0 U	0 U
TRANS-1,2-DICHLOROETHENE	69000	1100000	---	5 U	12 U	3 J	5 U	11 U	5 U	5 U	6 UJ
TRICHLOROETHENE	53	13000	41	5 U	12 U	2 J	5 U	11 U	5 U	5 U	6 UJ
Semivolatile Organics (ug/kg)											
2-METHYLNAPHTHALENE	56000	123000	70	16.52	15.76 J	16.05	51.56 J	22.8 J	6.28	32.75	1600 U
ACENAPHTHENE	3700000	43000	16	30.65	36.64 J	32.71	70.16	33.37 J	18.98	213.9	1600 U
ACENAPHTHYLENE	3700000	23000	44	314.45	143.74 J	238.43	791.31 J	354.73 J	33.33	54.24	100
ANTHRACENE	22000000	35000	85.3	324.7	197.53 J	244.43	814.22	358.53 J	79.68	302.24	68
BAP EQUIVALENT[1]	62	400	NA	1252	691	806	2463	1119	179	997	275
BENZO(A)ANTHRACENE	620	900	261	700.42	362.69 J	502.65	1502.3	530.25 J	145.37	737.41	180
BENZO(A)PYRENE	62	400	430	847.16	452.96 J	549.11	1654.23	739.58 J	110.1	668.48	200
BENZO(B)FLUORANTHENE	620	900	1800	952.29	592.35 J	554.41	1724.54	906.18 J	196.12	718.8	400
BENZO(G,H,I)PERYLENE	2300000	800	670	575.27	359.63 J	386.32	1241.54	633.68 J	84.54	401.58	270
BENZO(K)FLUORANTHENE	6200	900	1800	931.27	532.37 J	568.44	1799.07	876.16 J	188.42	717.41	130
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	182								3600
CHRYSENE	62000	400	384	1078.97	583.33 J	738.64	2416.21	981.43 J	274.36	855.55	350
DI-N-BUTYL PHTHALATE	2400000	NA	61								1600 U
DIBENZO(A,H)ANTHRACENE	62	400	63.4	163.45	94.77 J	100.96	331.17	157.21 J	22.72	124.04	1600 U
DIBENZOFURAN	150000	NA	110								1600 U
FLUORANTHENE	2300000	20000	600	1742.77	1018.6 J	1455.37	4872.56	1947.41 J	776.86	1783.54	810
FLUORENE	2700000	28000	19	82.3	43.69 J	63.44	230.36	52.88 J	16.33	155.1	1600 U
HIGH MOLECULAR WEIGHT PAHS[1]	---	---	1700	6238	3446	4700	15497	6137	1934	5730	2090
INDENO(1,2,3-CD)PYRENE	620	900	600	658.06	422.35 J	433.05	1349.72	689.38 J	101.67	506.2	150
LOW MOLECULAR WEIGHT PAHS[1]	---	---	552	2231	994	1655	6530	1976	298	2293	728
NAPHTHALENE	56000	54000	160	32.19	30.46 J	31.4	78.46 J	39.27 J	9.45	92.86	1600 U
PHENANTHRENE	2300000	40000	240	1430.2	526.04 J	1028.61	4493.7	1114.52 J	134.43	1441.84	560
PYRENE	2300000	13000	665	1705	933.27 J	1353.15	4721	1780.72 J	604.18	1560.92	550
TOTAL PAHS[1]	NA	NA	NA	11586	6346	8297	28142	11218	2803	10367	3768
TOTAL PAHS ECOSO[1]	---	---	4022	8469	4439	6355	22027	8113	2232	8023	2818
Polyaromatic Hydrocarbons (ug/kg)											
ACENAPHTHENE	3700000	43000	16								720 U
ACENAPHTHYLENE	3700000	23000	44								110 J
ANTHRACENE	22000000	35000	85.3								480 UJ
BAP EQUIVALENT[1]	62	400	NA								397
BENZO(A)ANTHRACENE	620	900	261								200
BENZO(A)PYRENE	62	400	430								300
BENZO(B)FLUORANTHENE	620	900	1800								480 J
BENZO(G,H,I)PERYLENE	2300000	800	670								380
BENZO(K)FLUORANTHENE	6200	900	1800								340
CHRYSENE	62000	400	384								450
FLUORANTHENE	2300000	20000	600								1700 J
FLUORENE	2700000	28000	19								720 UJ
HIGH MOLECULAR WEIGHT PAHS[1]	---	---	1700								2990
INDENO(1,2,3-CD)PYRENE	620	900	600								250
LOW MOLECULAR WEIGHT PAHS[1]	---	---	552								900
PHENANTHRENE	2300000	40000	240								790 J
PYRENE	2300000	13000	665								340
TOTAL PAHS ECOSO[1]	---	---	4022								3890
TOTAL PAHS[1]	NA	NA	NA								5340
Pesticides PCBs (ug/kg)											
4,4'-DDD	2400	NA	1.22	1.2 U	1.3 U	0.94 U	0.88 U	2.2 J	1.7 J	1.7 J	4 U
4,4'-DDE	1700	NA	2.2	1.2 U	1.3 U	0.94 U	1.4 R	2.3 J	0.79 U	0.84 UJ	1.7
4,4'-DDT	1700	NA	1.58	1.2 U	1.3 U	0.94 U	0.88 U	2 U	0.79 U	0.84 UJ	1.4 J
ALPHA-CHLORDANE	1600	NA	2.26	0.62 U	0.68 U	2	0.45 U	1 U	0.41 U	0.43 UJ	2 U
AROCLOR-1260	220	NA	22.7	37	16	21	8.8 U	59 J	38 J	25 J	20 U
DELTA-BHC	90	NA	0.32	0.62 U	2.2 R	0.49 U	0.45 U	1 U	0.53 J	2 J	1.5
DIELDRIN	30	40	280	1.2 U	3.2 R	0.94 U	0.88 U	2.4 R	0.79 U	0.84 UJ	4 U
ENDOSULFAN SULFATE	370000	NA	5.4	1.2 U	1.3 U	0.94 U	0.88 U	2 U	0.79 U	0.84 UJ	4 U
ENDRIN KETONE	18000	NA	9.9	1.2 U	1.3 U	0.94 U	0.88 U	2 U	0.79 U	0.84 UJ	1.6
GAMMA-CHLORDANE	1600	NA	2.26	1.8 R	2.2 R	2.8 R	0.63 R	8.7	0.41 U	0.68 J	1.7
HEPTACHLOR	110	NA	0.3	0.62 U	0.83 R	1.1 R	0.45 U	1.4 R	0.41 U	0.43 UJ	2 U
HEPTACHLOR EPOXIDE	53	NA	0.3	0.62 U	20 R	0.49 U	0.45 U	4.5 R	0.41 U	0.43 UJ	1.2 J
TOTAL AROCLOR[1]	220	10000	22.7	37	16	21	8.8 U	59	38	25	20 U
TOTAL DDT[1]	NA	NA	1.58					4.5	1.7	1.7	
TOTAL PCB CONGENERS[1]	NA	NA	22.7	37	16	21		59	38	25	
Inorganics (mg/kg)											
ALUMINUM	76000	NA	18000	3830	11800	3670	2410	6670	3600	5430	2370
ANTIMONY	31	10	2	0.9 U	2.4 U	0.77 U	0.6 R	1.5 U	0.78 U	1 U	0.5 J
ARSENIC	0.39	7	8.2	3.7	15	3.1	2.2 U	6.9	2.8	4.9	0.97

TABLE 4-37
SUMMARY OF CHEMICALS DETECTED IN SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	07 AH-42 AH-42-NSD-032704 NORMAL 3/27/2004	07 AH-45 AH-45-NSD-032604 NORMAL 3/26/2004	07 AH-47 AH-47-NSD-032604 NORMAL 3/26/2004	07 AH-49 AH-49-NSD-032504 NORMAL 3/25/2004	07 AH-51 AH-51-NSD-032704 NORMAL 3/27/2004	07 CORE1-BOT CORE1-BOTNSD-032704 NORMAL 3/27/2004	07 CORE1-TOP CORE1-TOPNSD-032704 NORMAL 3/27/2004	05 OPSED16-01 OPSED16-01-NSD-03220 NORMAL 3/22/2001
BARIUM	5400	5500	48	18.1	64.2	13.8	19.3	126	21	37.1	23.5
BERYLLIUM	150	0.4	NA	0.49	1.4	0.51	0.29	0.99	0.44	0.68	0.33
CADMIUM	37	39	1.2	0.23	0.7	0.1 U	0.03 U	0.54	0.19	0.39	0.06 U
CALCIUM	NA	NA	NA	5110	9610 U	3760 U	453 U	2340 U	6000	9680	1380
CHROMIUM	30	1400	81	14.2	49.0	14.4	11	29.3	9.4	18.6	33.5
COBALT	900	NA	10	2.9	7.7	3.7	2.1	5.3	2.6	3.6	2.4
COPPER	3100	3100	34	37.2	164	32.7	23	104	22.8	56.9	35.2 J
IRON	23000	NA	220000	10000	34500	11900	5820	18000	10100	14700	6400
LEAD	400	150	46.7	31	77.5	36.6	53.1 J	88.9	35.2	35.3	154 J
MAGNESIUM	NA	NA	NA	2270	5980	1690	1240 U	3120	1470 U	2700	994 J
MANGANESE	1800	390	260	74.2	301	79.9	46.2	172	72.8	99.4	89 J
MERCURY	23	23	0.15	0.06	0.29	0.03 J	0.02 U	0.21	0.03 J	0.11	0.01 U
NICKEL	1600	1000	20.9	7.9	21.2	8.2	6.3	30.3	7	10.3	11.5
POTASSIUM	NA	NA	NA	935 U	3430	637 U	416 U	1620 U	685 U	1400 U	599
SELENIUM	390	390	1	0.99 U	2.6 U	0.85 U	0.67 U	1.6 U	0.86 U	1.1 U	0.29 U
SILVER	390	200	1	0.29 U	0.49 U	0.23 U	0.13 U	0.46 U	0.25 U	0.54 U	0.1 U
SODIUM	NA	NA	NA	4970 U	7970 U	573 U	1780 U	6360 U	406 U	3750 U	73.4 U
VANADIUM	78	550	57	14.3	50.7	15.6	8.6	32.1	12.1	23.7	15.8
ZINC	23000	6000	150	93.5	254	88.2	66.9	218	52.7	101	163
AVS/SEM Parameters (UMO/g)											
CADMIUM	NA	NA	1.2	0.00167	0.00576	0.00126 U	0.00124 U	0.00337	0.0016	0.00287	0.000623 U
COPPER	NA	NA	34	0.31	0.22	0.13	0.08	0.04	0.1	0.01 U	0.305 J
LEAD	NA	NA	46.7	0.09	0.3	0.09	0.09	0.39	0.11	0.12	0.283
MERCURY	NA	NA	0.15	0.00003 U	0.00008 U	0.00003 U	0.00003 U	0.00005 U	0.00003 U	0.00004 U	0.000049 U
NICKEL	NA	NA	20.9	0.22	0.05 U	0.02	0.03	0.04	0.03	0.22	0.0664
SEM/AVS	NA	NA	NA	6.17	220.22	10.87	2.27	19.25	50.56	70.47	0.1 UJ
SUM OF SEM	NA	NA	NA	1.51	3.26	0.96	0.92	2.04	0.86	1.48	
ZINC	NA	NA	150	0.88	2.67	0.7	0.71	1.54	0.61	1.12	1.17 J
Miscellaneous Parameters (%)											
PERCENT GRAVEL	NA	NA	NA	11.3	9.1	11.9	0.8	1.8	21.2	5.7	
PERCENT SAND	NA	NA	NA	80.5	15.9	78	97.8	54.2	59.2	79.7	
PERCENT SILT/CLAY	NA	NA	NA	8.1	75	10.1	1.4	44	19.6	14.6	
PH (S.U.)	NA	NA	NA								7.3
TOTAL INORGANIC CARBON	NA	NA	NA	1.13	4.97	1.6	1.36	5.05	1.18	1.27	

SUMMARY OF CHEMICALS DETECTED IN SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	05 SED16-01 SED16-01-NSD-032101 ORIG 3/21/2001	05 SED16-01 SED16-01-NSD-032101-D DUP 3/21/2001	05 SED16-02 SED16-02-NSD-032601 NORMAL 3/26/2001
Volatile Organics (ug/kg)						
1,1-DICHLOROETHENE	120000	200	NA	12 U	5 U	20 U
2-BUTANONE	22000000	10000000	NA	24 UJ	10 UJ	41 UJ
ACETONE	14000000	7800000	NA	84 J	30 J	120 J
CARBON DISULFIDE	360000	NA	NA	5 J	50 J	12
CIS-1,2-DICHLOROETHENE	43000	630000	NA	12 U	5 U	20 U
TOTAL 1,2-DICHLOROETHENE	43000	630000	NA	12 U	5 U	20 U
TOTAL CHLORINATED VOCS	NA	NA	NA	0 U	0 U	0 U
TRANS-1,2-DICHLOROETHENE	69000	1100000	---	12 U	5 U	20 U
TRICHLOROETHENE	53	13000	41	12 U	5 U	20 U
Semivolatile Organics (ug/kg)						
2-METHYLNAPHTHALENE	56000	123000	70	1600 U	400 U	1300 UJ
ACENAPHTHENE	3700000	43000	16	1100	780	1300 UJ
ACENAPHTHYLENE	3700000	23000	44	1600 U	400 U	1300 UJ
ANTHRACENE	22000000	35000	85.3	450	190	1300 UJ
BAP EQUIVALENT[1]	62	400	NA	608	95.7	8.3
BENZO(A)ANTHRACENE	620	900	261	960	110	1300 UJ
BENZO(A)PYRENE	62	400	430	370	66	1300 UJ
BENZO(B)FLUORANTHENE	620	900	1800	1100	130	83 J
BENZO(G,H,I)PERYLENE	2300000	800	670	230	56	1300 UJ
BENZO(K)FLUORANTHENE	6200	900	1800	310	42	1300 UJ
BIS(2-ETHYLHEXYL)PHTHALATE	35000	46000	182	430	210	600 J
CHRYSENE	62000	400	384	2000 J	170 J	1300 UJ
DI-N-BUTYL PHTHALATE	2400000	NA	61	1600 U	400 U	1300 UJ
DIBENZO(A,H)ANTHRACENE	62	400	63.4	1600 U	400 U	1300 UJ
DIBENZOFURAN	150000	NA	110	270	240	1300 UJ
FLUORANTHENE	2300000	20000	600	9800 J	1900 J	99 J
FLUORENE	2700000	28000	19	600	500	1300 UJ
HIGH MOLECULAR WEIGHT PAHS[1]	---	---	1700	18530	2926	199
INDENO(1,2,3-CD)PYRENE	620	900	600	270	51	1300 UJ
LOW MOLECULAR WEIGHT PAHS[1]	---	---	552	4550	1860	100
NAPHTHALENE	56000	54000	160	1600 U	400 U	1300 UJ
PHENANTHRENE	2300000	40000	240	2400 J	390 J	100 J
PYRENE	2300000	13000	665	5400 J	680 J	100 J
TOTAL PAHS[1]	NA	NA	NA	24990	5065	382
TOTAL PAHS ECOSD[1]	---	---	4022	23080	4786	299
Polyaromatic Hydrocarbons (ug/kg)						
ACENAPHTHENE	3700000	43000	16	1200 J	610	78 U
ACENAPHTHYLENE	3700000	23000	44	620 UJ	620 U	78 U
ANTHRACENE	22000000	35000	85.3	620 UJ	210	78 U
BAP EQUIVALENT[1]	62	400	NA	33.2	12.1	6.13
BENZO(A)ANTHRACENE	620	900	261	140	120 J	20
BENZO(A)PYRENE	62	400	430	620 U	620 U	78 U
BENZO(B)FLUORANTHENE	620	900	1800	190 J	620 U	41
BENZO(G,H,I)PERYLENE	2300000	800	670	620 U	620 U	23
BENZO(K)FLUORANTHENE	6200	900	1800	620 U	620 U	78 U
CHRYSENE	62000	400	384	190	130 J	34
FLUORANTHENE	2300000	20000	600	2000 J	1600	64
FLUORENE	2700000	28000	19	800 J	360 J	78 U
HIGH MOLECULAR WEIGHT PAHS[1]	---	---	1700	3040	2850	186
INDENO(1,2,3-CD)PYRENE	620	900	600	620 U	620 U	78 UJ
LOW MOLECULAR WEIGHT PAHS[1]	---	---	552	2260	1660	44
PHENANTHRENE	2300000	40000	240	260 J	480	44
PYRENE	2300000	13000	665	710	1000 J	68
TOTAL PAHS ECOSD[1]	---	---	4022	5300	4510	230
TOTAL PAHS[1]	NA	NA	NA	5490	4510	294
Pesticides PCBs (ug/kg)						
4,4'-DDD	2400	NA	1.22	4.4 J	2.5 J	2 J
4,4'-DDE	1700	NA	2.2	4.1 U	4 U	1.5 J
4,4'-DDT	1700	NA	1.58	4.1 U	4 U	1.8 J
ALPHA-CHLORDANE	1600	NA	2.26	2.1 U	2.1 U	3.3 U
AROCLOR-1260	220	NA	22.7	36	36	33 U
DELTA-BHC	90	NA	0.32	2.1 U	2.1 U	3.3 U
DIELDRIN	30	40	280	4.1 U	4 U	1.7 J
ENDOSULFAN SULFATE	370000	NA	5.4	2.2 J	4 U	6.5 U
ENDRIN KETONE	18000	NA	9.9	0.76 J	4 U	0.64 J
GAMMA-CHLORDANE	1600	NA	2.26	2.1 U	2.1 U	3.3 U
HEPTACHLOR	110	NA	0.3	0.8	0.45 J	0.71
HEPTACHLOR EPOXIDE	53	NA	0.3	2.1 U	2.1 U	3.3 U
TOTAL AROCLOR[1]	220	10000	22.7	36	36	33 U
TOTAL DDT[1]	NA	NA	1.58			
TOTAL PCB CONGENERS[1]	NA	NA	22.7			
Inorganics (mg/kg)						
ALUMINUM	76000	NA	18000	5710	5350	5670
ANTIMONY	31	10	2	1.5 J	1.1 UJ	1.2 J
ARSENIC	0.39	7	8.2	4.5	6	36.6

TABLE 4-37
SUMMARY OF CHEMICALS DETECTED IN SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	05 SED16-01 SED16-01-NSD-032101 ORIG 3/21/2001	05 SED16-01 SED16-01-NSD-032101-D DUP 3/21/2001	05 SED16-02 SED16-02-NSD-032601 NORMAL 3/26/2001
BARIUM	5400	5500	48	99.2	121	29.9
BERYLLIUM	150	0.4	NA	0.97	0.84	0.32
CADMIUM	37	39	1.2	0.05 U	0.07 U	0.19
CALCIUM	NA	NA	NA	1970	1660	1660 J
CHROMIUM	30	1400	81	19.5	26	11.7
COBALT	900	NA	10	6	6.1	37.9
COPPER	3100	3100	34	132 J	122 J	13.4 J
IRON	23000	NA	220000	53800	72900	40900
LEAD	400	150	46.7	128 J	85.6 J	11.4
MAGNESIUM	NA	NA	NA	1360 J	1790 J	2020 J
MANGANESE	1800	390	260	176 J	233 J	788
MERCURY	23	23	0.15	0.07	0.04	0.03 UJ
NICKEL	1600	1000	20.9	53.1	54.5	19.3
POTASSIUM	NA	NA	NA	690	615	816
SELENIUM	390	390	1	1.1	0.92 U	0.57 U
SILVER	390	200	1	0.12 U	0.1 U	0.19 U
SODIUM	NA	NA	NA	299	180	197 U
VANADIUM	78	550	57	17.1	13.8	22.9
ZINC	23000	6000	150	374	318	50.5
AVS/SEM Parameters (UMO/g)						
CADMIUM	NA	NA	1.2	0.0169	0.00107	0.00507
COPPER	NA	NA	34	3.63 J	146.18 J	0.161 J
LEAD	NA	NA	46.7	0.273	0.385	0.0521
MERCURY	NA	NA	0.15	0.000049 U	0.000049	0.000049 U
NICKEL	NA	NA	20.9	0.463	0.632	0.133
SEM/AVS	NA	NA	NA	0.1 UJ	0.3 J	0.1 UJ
SUM OF SEM	NA	NA	NA			
ZINC	NA	NA	150	3.38 J	9.62 J	0.356 J
Miscellaneous Parameters (%)						
PERCENT GRAVEL	NA	NA	NA			
PERCENT SAND	NA	NA	NA			
PERCENT SILT/CLAY	NA	NA	NA			
PH (S.U.)	NA	NA	NA	7.3	7.1	7.2
TOTAL INORGANIC CARBON	NA	NA	NA			

Investigation Description:
05 - Stage II Phase I RI Sampling Event
07 - Supplemental SD RI Investigation

Qualifiers:
J - Estimated value.
U - Nondetected result.
UJ - Nondetected result is estimated.
R - Rejected value.

Sample Code Description:
NORMAL - One sample was collected at this location.
ORIG - First of two samples collected at this location.
DUP - Second of two samples collected at this location.

Acronyms:
AVS = Acid Volatile Sulfide
ECOSD = Ecological Sediment
NA = Not Applicable/Not Available
PAH = Polyaromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SEM = Simultaneously Extracted Metals
VOC = Volatile Organic Compound

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

TABLE 4-38
SUMMARY OF CHEMICALS DETECTED
REFERENCE LOCATION 01 SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	07 REF1-1 REF1-1-NSD-032404 NORMAL 3/24/2004	07 REF1-2 REF1-2-NSD-032404 NORMAL 3/24/2004	07 REF1-4 REF1-4-NSD-032404 NORMAL 3/24/2004
Volatile Organics (ug/kg)						
2-BUTANONE	22000000	10000000	NA	10 U	10 U	38
CARBON DISULFIDE	360000	NA	NA	46	12	16 U
TOTAL CHLORINATED VOCS[1]	NA	NA	NA	1	0 U	0 U
TRICHLOROETHENE	53	13000	41	1 J	5 U	7 U
Semivolatile Organics (ug/kg)						
2-METHYLNAPHTHALENE	56000	123000	70	0.25 U	0.43	5.07 J
ACENAPHTHENE	3700000	43000	16	0.1 J	0.15 J	2.15
ACENAPHTHYLENE	3700000	23000	44	0.56	0.92	13.02 J
ANTHRACENE	22000000	35000	85.3	0.86	1.24	18.21
BAP EQUIVALENT[1]	62	400	NA	3.57	6.08	83.8
BENZO(A)ANTHRACENE	620	900	261	2.01	2.51	36.82
BENZO(A)PYRENE	62	400	430	2.41	3.9	54.75
BENZO(B)FLUORANTHENE	620	900	1800	2.52	4.76	68.74
BENZO(G,H,I)PERYLENE	2300000	800	670	2.16	4.36	52.46
BENZO(K)FLUORANTHENE	6200	900	1800	2.42	4.58	58.71
CHRYSENE	62000	400	384	2.35	3.67	48.48
DIBENZO(A,H)ANTHRACENE	62	400	63.4	0.44	0.92	11.73
FLUORANTHENE	2300000	20000	600	4.73	6.22	90.43
FLUORENE	2700000	28000	19	0.28	0.43	5.97
HIGH MOLECULAR WEIGHT PAHS[1]	---	---	1700	16.1	23	321
INDENO(1,2,3-CD)PYRENE	620	900	600	2.45	4.86	61.45
LOW MOLECULAR WEIGHT PAHS[1]	---	---	552	4.92	6	89.6
NAPHTHALENE	56000	54000	160	0.86 U	1 U	10.82 J
PHENANTHRENE	2300000	40000	240	3.12	2.83	34.4
PYRENE	2300000	13000	665	4.15	5.76	78.35
TOTAL PAHS[1]	NA	NA	NA	30.6	47.5	652
TOTAL PAHS ECOSD[1]	---	---	4022	21	29	410
Inorganics (mg/kg)						
ALUMINUM	76000	NA	18000	1920	3200	4060
ARSENIC	0.39	7	8.2	1.3 U	1.5 U	2.8
BARIUM	5400	5500	48	2.8 U	4.3 U	7.2
BERYLLIUM	150	0.4	NA	0.14	0.23	0.23
CADMIUM	37	39	1.2	0.04 J	0.03 U	0.04 U
CALCIUM	NA	NA	NA	290 U	1220 U	66800
CHROMIUM	30	1400	81	4.4	9	13.7
COBALT	900	NA	10	1.3	1.9	2.4
IRON	23000	NA	220000	3650	5430	8150
LEAD	400	150	46.7	3.9 J	7.9 J	13.5 J
MAGNESIUM	NA	NA	NA	1120 U	1690 U	3420
MANGANESE	1800	390	260	45.6	71	112
MERCURY	23	23	0.15	0.02 U	0.03	0.07
NICKEL	1600	1000	20.9	3.3	4.7	6.5
SILVER	390	200	1	0.15 U	0.14 U	0.26 J
VANADIUM	78	550	57	3.6	6.1	9.6
ZINC	23000	6000	150	13.7 U	20.7 U	36.1
AVS/SEM Parameters (UMO/g)						
COPPER	NA	NA	34	0.01	0.07	0.07
LEAD	NA	NA	46.7	0.01	0.03	0.08
NICKEL	NA	NA	20.9	0.01 U	0.01 U	0.05
SEM/AVS	NA	NA	NA	2.19	12.47	28.32
SUM OF SEM	NA	NA	NA	0.14	0.3	0.66
ZINC	NA	NA	150	0.1	0.17	0.45
Miscellaneous Parameters (%)						
CYANIDE (mg/kg)	NA	NA	NA	0.2 R	0.19 R	0.21 R
PERCENT GRAVEL	NA	NA	NA			14.3
PERCENT SAND	NA	NA	NA	98.4	95.5	57.3
PERCENT SILT/CLAY	NA	NA	NA	1.6	4.5	28.4

Investigation Description:
07 - Supplemental SD RI Investigation

Qualifiers:
J - Estimated value.
U - Nondetected result.
R - Rejected value.

TABLE 4-38
SUMMARY OF CHEMICALS DETECTED
REFERENCE LOCATION 01 SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	07 REF1-1 REF1-1-NSD-032404 NORMAL 3/24/2004	07 REF1-2 REF1-2-NSD-032404 NORMAL 3/24/2004	07 REF1-4 REF1-4-NSD-032404 NORMAL 3/24/2004

Sample Code Description:
NORMAL - One sample was collected at this location.

Acronyms:
AVS = Acid Volatile Sulfide
ECOSD = Ecological Sediment
NA = Not Applicable/Not Available
PAH = Polyaromatic Hydrocarbon
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SEM = Simultaneously Extracted Metals
VOC = Volatile Organic Compound

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

TABLE 4-39
SUMMARY OF CHEMICALS DETECTED
REFERENCE LOCATION 02 SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	07 REF2-1 REF2-1-NSD-032404 NORMAL 3/24/2004	07 REF2-3 REF2-3-NSD-032404 NORMAL 3/24/2004	07 REF2-5 REF2-5-NSD-032404 NORMAL 3/24/2004
Semivolatile Organics (ug/kg)						
2-METHYLNAPHTHALENE	56000	123000	70	8.16 J	5.02	0.91
ACENAPHTHENE	3700000	43000	16	3.46	2.11	0.46
ACENAPHTHYLENE	3700000	23000	44	18.3 J	11.84	2.32
ANTHRACENE	22000000	35000	85.3	24.55	15.87	2.95
BAP EQUIVALENT[1]	62	400	NA	112	73.7	14.2
BENZO(A)ANTHRACENE	620	900	261	48.84	31.22	6.96
BENZO(A)PYRENE	62	400	430	74.11	48.35	9.49
BENZO(B)FLUORANTHENE	620	900	1800	92.88	57.66	10.15
BENZO(G,H,I)PERYLENE	2300000	800	670	67.1	46.21	8.7
BENZO(K)FLUORANTHENE	6200	900	1800	80.25	50.46	10
CHRYSENE	62000	400	384	64.66	43.4	8.54
DIBENZO(A,H)ANTHRACENE	62	400	63.4	15.1	10.59	1.89
FLUORANTHENE	2300000	20000	600	115.97	68.33	14.47
FLUORENE	2700000	28000	19	8.62	5.25	1.01
HIGH MOLECULAR WEIGHT PAHS[1]	---	---	1700	423	266	55.1
INDENO(1,2,3-CD)PYRENE	620	900	600	79.62	53.12	9.98
LOW MOLECULAR WEIGHT PAHS[1]	---	---	552	123	81.4	17.84
NAPHTHALENE	56000	54000	160	16.73 J	10.33	2.78
PHENANTHRENE	2300000	40000	240	43.53	31	7.41
PYRENE	2300000	13000	665	104.41	64.5	13.73
TOTAL PAHS[1]	NA	NA	NA	866	555	112
TOTAL PAHS ECOSD[1]	---	---	4022	546	348	72.9
Pesticides PCBs (ug/kg)						
AROCLOR-1260	220	NA	22.7	11 J	12 U	8.1 U
TOTAL AROCLOR[1]	220	10000	22.7	11	12 U	8.1 U
TOTAL PCB CONGENERS[1]	NA	NA	22.7	11		
Inorganics (mg/kg)						
ALUMINUM	76000	NA	18000	10900	9800	6790
ARSENIC	0.39	7	8.2	5.4	4.4	3.9
BARIUM	5400	5500	48	26.4	16.9	8.1
BERYLLIUM	150	0.4	NA	1	0.7	0.47
CALCIUM	NA	NA	NA	8170	7900	5700
CHROMIUM	30	1400	81	40	29.7	15.1
COBALT	900	NA	10	7.2	6.4	4.8
COPPER	3100	3100	34	33.2	21.8	8.2 U
IRON	23000	NA	220000	22400	19700	13100
LEAD	400	150	46.7	45.5 J	30.7 J	11.7 J
MAGNESIUM	NA	NA	NA	6820	5570	3380
MANGANESE	1800	390	260	204	170	105
MERCURY	23	23	0.15	0.18	0.12	0.06
NICKEL	1600	1000	20.9	17.9	15.3	9.6
POTASSIUM	NA	NA	NA	3190 J	2160 J	876 U
VANADIUM	78	550	57	36.4	25.9	12.9
ZINC	23000	6000	150	108	81.1	41.6
AVS/SEM Parameters (UMO/g)						
CADMIUM	NA	NA	1.2	0.00233 U	0.00197	0.00124 U
COPPER	NA	NA	34	0.25	0.15	0.05
LEAD	NA	NA	46.7	0.21	0.14	0.04
NICKEL	NA	NA	20.9	0.08	0.05	0.02
SEM/AVS	NA	NA	NA	84.21	40.54	1.85
SUM OF SEM	NA	NA	NA	1.79	1.11	0.44
ZINC	NA	NA	150	1.23	0.76	0.32
Miscellaneous Parameters (%)						
PERCENT GRAVEL	NA	NA	NA		10.6	3.1
PERCENT SAND	NA	NA	NA	1.2	62.1	87.7
PERCENT SILT/CLAY	NA	NA	NA	98.8	27.4	9.2
TOTAL INORGANIC CARBON	NA	NA	NA	2.85	2.51	1.03

Investigation Description:
07 - Supplemental SD RI Investigation

Qualifiers:
J - Estimated value.
U - Nondetected result.

TABLE 4-39
SUMMARY OF CHEMICALS DETECTED
REFERENCE LOCATION 02 SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	07 REF2-1 REF2-1-NSD-032404 NORMAL 3/24/2004	07 REF2-3 REF2-3-NSD-032404 NORMAL 3/24/2004	07 REF2-5 REF2-5-NSD-032404 NORMAL 3/24/2004

Sample Code Description:
NORMAL - One sample was collected at this location.

Acronyms:
AVS = Acid Volatile Sulfide
ECOSD = Ecological Sediment
NA = Not Applicable/Not Available
PAH = Polyaromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SEM = Simultaneously Extracted Metals

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

TABLE 4-40
SUMMARY OF CHEMICALS DETECTED
REFERENCE LOCATION 03 SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	07 REF3-1 REF3-1-NSD-032504 NORMAL 3/25/2004	07 REF3-2 REF3-2-NSD-032504 NORMAL 3/25/2004	07 REF3-4 REF3-4-NSD-032504 NORMAL 3/25/2004
Volatile Organics (ug/kg)						
2-BUTANONE	22000000	10000000	NA	13 J	13 J	13
Semivolatile Organics (ug/kg)						
2-METHYLNAPHTHALENE	56000	123000	70	4.77	5.42 J	3.18
ACENAPHTHENE	3700000	43000	16	4.08	5.82	3.27
ACENAPHTHYLENE	3700000	23000	44	18.54	27.11 J	12.51
ANTHRACENE	22000000	35000	85.3	28.79	52.05	24.61
BAP EQUIVALENT[1]	62	400	NA	170	302	131
BENZO(A)ANTHRACENE	620	900	261	86.82	175.29	74.24
BENZO(A)PYRENE	62	400	430	115.78	206.95	90.04
BENZO(B)FLUORANTHENE	620	900	1800	120.11	203.99	89.22
BENZO(G,H,I)PERYLENE	2300000	800	670	91.76	148.83	65.5
BENZO(K)FLUORANTHENE	6200	900	1800	119.13	202.15	83.62
CHRYSENE	62000	400	384	103.7	188.13	78.42
DIBENZO(A,H)ANTHRACENE	62	400	63.4	21.04	36.27	15.99
FLUORANTHENE	2300000	20000	600	199.6	406.54	168.96
FLUORENE	2700000	28000	19	9.77	16.22	7.01
HIGH MOLECULAR WEIGHT PAHS[1]	---	---	1700	699	1358	571
INDENO(1,2,3-CD)PYRENE	620	900	600	112.25	186.49	79.31
LOW MOLECULAR WEIGHT PAHS[1]	---	---	552	155	285	123
NAPHTHALENE	56000	54000	160	10.41	13.96 J	7.23
PHENANTHRENE	2300000	40000	240	78.59	164.01	64.8
PYRENE	2300000	13000	665	172.48	345.26	143.79
TOTAL PAHS[1]	NA	NA	NA	1298	2384	1012
TOTAL PAHS ECOSD[1]	---	---	4022	854	1643	694
Inorganics (mg/kg)						
ALUMINUM	76000	NA	18000	9280	9850	6480
ARSENIC	0.39	7	8.2	6.1	6.6	4.9
BARIUM	5400	5500	48	20.4	23.3	14.8
BERYLLIUM	150	0.4	NA	1.1	1.1	0.74
CADMIUM	37	39	1.2	0.38	0.34	0.12 U
CALCIUM	NA	NA	NA	7530	2150 U	1620 U
CHROMIUM	30	1400	81	39.5	43.3	26.8
COBALT	900	NA	10	5.4	6.1	4.2
COPPER	3100	3100	34	72.6	66	52.6
IRON	23000	NA	220000	19800	21700	13500
LEAD	400	150	46.7	39.4	45	25.7
MAGNESIUM	NA	NA	NA	5630	6200	4020
MANGANESE	1800	390	260	162	175	116
MERCURY	23	23	0.15	0.47	0.48	0.21
NICKEL	1600	1000	20.9	14.8	15.8	9.9
POTASSIUM	NA	NA	NA	2740	2870	1860
VANADIUM	78	550	57	29.3	31.5	19.7
ZINC	23000	6000	150	106	119	73.2
AVS/SEM Parameters (UMO/g)						
CADMIUM	NA	NA	1.2	0.00363	0.00252	0.00177 U
COPPER	NA	NA	34	0.22	0.16	0.17
LEAD	NA	NA	46.7	0.17	0.16	0.09
NICKEL	NA	NA	20.9	0.03 U	0.03 U	0.09
SEM/AVS	NA	NA	NA	13.01	16.55	3.19
SUM OF SEM	NA	NA	NA	1.65	1.33	0.92
ZINC	NA	NA	150	1.22	0.97	0.55
Miscellaneous Parameters (%)						
PERCENT GRAVEL	NA	NA	NA	1.5		
PERCENT SAND	NA	NA	NA	12.7	13.3	32.7
PERCENT SILT/CLAY	NA	NA	NA	85.8	86.7	67.3
TOTAL INORGANIC CARBON	NA	NA	NA	2.86		1.89

Investigation Description:
07 - Supplemental SD RI Investigation

Qualifiers:
J - Estimated value.
U - Nondetected result.

TABLE 4-40
SUMMARY OF CHEMICALS DETECTED
REFERENCE LOCATION 03 SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation				07	07	07
Location	Region 9	RIDEM		REF3-1	REF3-2	REF3-4
Sample Number	PRG for	Soil Direct	Ecological	REF3-1-NSD-032504	REF3-2-NSD-032504	REF3-4-NSD-032504
Sample Code	Soil	Exposure	Criteria	NORMAL	NORMAL	NORMAL
Sample Date	Residential	Residential		3/25/2004	3/25/2004	3/25/2004

Sample Code Description:
NORMAL - One sample was collected at this location.

Acronyms:
AVS = Acid Volatile Sulfide
ECOSD = Ecological Sediment
NA = Not Applicable/Not Available
PAH = Polyaromatic Hydrocarbon
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SEM = Simultaneously Extracted Metals

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

TABLE 4-41
SUMMARY OF CHEMICALS DETECTED
STORM CATCH BASIN SEDIMENT SAMPLE
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Investigation Location Sample Number Sample Code Sample Date	Region 9 PRG for Soil Residential	RIDEM Soil Direct Exposure Residential	Ecological Criteria	SOURCE4-1 SOURCE4-1-NSD-032404 NORMAL 3/24/2004
Semivolatile Organics (ug/kg)				
2-METHYLNAPHTHALENE	56000	123000	70	15.3 J
ACENAPHTHENE	3700000	43000	16	**24.44**
ACENAPHTHYLENE	3700000	23000	44	**172.28 J**
ANTHRACENE	22000000	35000	85.3	**211.64**
BAP EQUIVALENT(1)	62	400	NA	**576.94211**
BENZO(A)ANTHRACENE	620	900	261	**321.7**
BENZO(A)PYRENE	62	400	430	**369.75**
BENZO(B)FLUORANTHENE	620	900	1800	494.83
BENZO(G,H,I)PERYLENE	2300000	800	670	357.35
BENZO(K)FLUORANTHENE	6200	900	1800	464.01
CHRYSENE	62000	400	384	**636.01**
DIBENZO(A,H)ANTHRACENE	62	400	63.4	**83.98**
FLUORANTHENE	2300000	20000	600	**1202.09**
FLUORENE	2700000	28000	19	**44.35**
HIGH MOLECULAR WEIGHT PAHS(1)	---	---	1700	**3703.07**
INDENO(1,2,3-CD)PYRENE	620	900	600	362.83
LOW MOLECULAR WEIGHT PAHS(1)	---	---	552	**1414.03**
NAPHTHALENE	56000	54000	160	29.74 J
PHENANTHRENE	2300000	40000	240	**916.28**
PYRENE	2300000	13000	665	**1089.54**
TOTAL PAHS(1)	NA	NA	NA	6796.12
TOTAL PAHS ECOSD(1)	---	---	4022	**5117.1**

Qualifiers:
J - Estimated value.

Sample Code Description:
NORMAL - One sample was collected at this location.

Acronyms:
NA = Not Applicable/Not Available
PAH = Polyaromatic Hydrocarbon
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management

Footnotes:
1 - Explanation of how this was calculated is included in Section 4.

TABLE 4-42
SUMMARY OF DESCRIPTIVE STATISTICS
ALLEN HARBOR SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil -Residential[3]	Region 9 PRG for Soil -Industrial[3]	RIDEM Soil Direct Exposure Residential[4]	RIDEM Soil Direct Exposure Industrial[4]	Ecological Criteria	
Volatile Organics (ug/kg)													
1,1-DICHLOROETHENE	1/22	0.9 J	0.9 J	5 - 20	4.50	0.900	AH-47-NSD-032604	120000 N	410000 N	200	9500	NA	
2-BUTANONE	13/22	5 J	23	10 - 41	11.4	12.4	AH-33-NSD-032604-D	22000000 N	110000000 N	10000000	10000000	NA	
ACETONE	6/22	30 J	390 J	20 - 210	79.2	154	AH-06-NSD-032304	14000000 N	54000000 N	7800000	10000000	NA	
CARBON DISULFIDE	2/22	5 J	50 J	5 - 24	6.16	19.8	SED16-01-NSD-032101-D	360000 N	720000 SAT	NA	NA	NA	
CIS-1,2-DICHLOROETHENE	3/22	5 J	880	5 - 20	44.5	297	AH-47-NSD-032604	43000 N	150000 N	630000	10000000	NA	
TOTAL 1,2-DICHLOROETHENE	3/23	5	883	5 - 20	43.0	298	AH-47-NSD-032604	43000 N[5]	150000 N[5]	630000	10000000	NA	
TOTAL CHLORINATED VOCS	3/23	5	886	---	39.0	299	AH-47-NSD-032604	NA	NA	NA	NA	NA	
TRANS-1,2-DICHLOROETHENE	1/22	3 J	3 J	5 - 20	4.59	3.00	AH-47-NSD-032604	69000 N	230000 N	1100000	10000000	---	
TRICHLOROETHENE	1/22	2 J	2 J	5 - 20	4.55	2.00	AH-47-NSD-032604	53 C	110 C	13000	520000	41	5
Semivolatil Organics (ug/kg)													
2-METHYLNAPHTHALENE	20/23	6.28	213.46 J	400 - 1600	113	32.0	AH-29-NSD-032604	56000 N[6]	190000 N[6]	123000	10000000	70	2
ACENAPHTHENE	21/23	7.73	1100	1300 - 1600	159	105	SED16-01-NSD-032101	3700000 N	29000000 N	43000	10000000	16	2
ACENAPHTHYLENE	21/23	27.95 J	791.31 J	400 - 1600	278	249	AH-49-NSD-032504	3700000 N[7]	29000000 N[7]	23000	10000000	44	2
ANTHRACENE	22/23	68	814.22	1300	350	337	AH-49-NSD-032504	22000000 N	100000000 MAX	35000	10000000	85.3	2
BAP EQUIVALENT	23/23	8.3	2463	---	1028	1028	AH-49-NSD-032504	62 C	210 C	400	800	NA	
BENZO(A)ANTHRACENE	22/23	110	1596.69	1300	635	634	AH-35-NSD-032604	620 C	2100 C	900	7800	261	2
BENZO(A)PYRENE	22/23	66	1654.23	1300	712	715	AH-49-NSD-032504	62 C	210 C	400	800	430	2
BENZO(B)FLUORANTHENE	23/23	83 J	2195.47	---	867	867	AH-29-NSD-032604	620 C	2100 C	900	7800	1800	5
BENZO(G,H,I)PERYLENE	22/23	56	1243.88	1300	533	527	AH-28-NSD-032504	2300000 N[8]	29000000 N[8]	800	10000000	670	5
BENZO(K)FLUORANTHENE	22/23	42	2033.61	1300	817	824	AH-29-NSD-032604	6200 C	21000 C	900	78000	1800	5
BIS(2-ETHYLHEXYL)PHTHALATE	3/3	210	3600	---	1507	1507	OPSED16-01-NSD-032201	35000 C	120000 C	46000	410000	182	3
CHRYSENE	22/23	170 J	2416.21	1300	1012	1028	AH-49-NSD-032504	62000 C	210000 C	400	780000	384	2
DI-N-OCTYL PHTHALATE	1/3	550	550	400 - 1600	567	550	OPSED16-01-NSD-032201	2400000 N	25000000 N	NA	NA	61	5
DIBENZO(A,H)ANTHRACENE	20/23	22.72	331.17	400 - 1600	215	150	AH-49-NSD-032504	62 C	210 C	400	800	63.4	2
DIBENZOFURAN	1/3	240	270	1300 - 1600	568	255	SED16-01-NSD-032101	150000 N	1600000 N	NA	NA	110	5
FLUORANTHENE	23/23	99 J	9800 J	---	1972	1972	SED16-01-NSD-032101	2300000 N	22000000 N	20000	10000000	600	2
FLUORENE	21/23	14.45	600	1300 - 1600	160	106	SED16-01-NSD-032101	2700000 N	26000000 N	28000	10000000	19	2
HIGH MOLECULAR WEIGHT PAHS	23/23	199	18530	---	6165	6165	SED16-01-NSD-032101	NA	NA	NA	NA	1700	2
INDENO(1,2,3-CD)PYRENE	22/23	51	1361.12	1300	606	604	AH-28-NSD-032504	620 C	2100 C	900	7800	600	5
LOW MOLECULAR WEIGHT PAHS	23/23	100	6530	---	1949	1949	AH-49-NSD-032504	NA	NA	NA	NA	552	2
NAPHTHALENE	20/23	9.45	128.42 J	400 - 1600	126	47.8	AH-29-NSD-032604	56000 N	190000 N	54000	10000000	160	2
PHENANTHRENE	23/23	100 J	4493.7	---	1137	1137	AH-49-NSD-032504	2300000 N[8]	29000000 N[8]	40000	10000000	240	2
PYRENE	23/23	100 J	5400 J	---	1789	1789	SED16-01-NSD-032101	2300000 N	29000000 N	13000	10000000	665	2
TOTAL PAHS	23/23	382	28142	---	10851	10851	AH-49-NSD-032504	NA	NA	NA	NA	NA	
TOTAL PAHS ECOSD	23/23	299	23080	---	8114	8114	SED16-01-NSD-032101	NA	NA	NA	NA	4022	2
Polyaromatic Hydrocarbons (ug/kg)													
ACENAPHTHENE	1/3	610	1200 J	78 - 720	435	905	SED16-01-NSD-032101	3700000 N	29000000 N	43000	10000000	16	2
ACENAPHTHYLENE	1/3	110 J	110 J	78 - 620	153	110	OPSED16-01-NSD-032201	3700000 N[7]	29000000 N[7]	23000	10000000	44	2
ANTHRACENE	1/3	210	210	78 - 620	163	210	SED16-01-NSD-032101-D	22000000 N	100000000 MAX	35000	10000000	85.3	2
BAP EQUIVALENT	3/3	6.13	397	---	145	145	OPSED16-01-NSD-032201	62 C	210 C	400	800	NA	
BENZO(A)ANTHRACENE	3/3	20	200	---	117	117	OPSED16-01-NSD-032201	620 C	2100 C	900	7800	261	2
BENZO(A)PYRENE	1/3	300	300	78 - 620	216	300	OPSED16-01-NSD-032201	62 C	210 C	400	800	430	2
BENZO(B)FLUORANTHENE	3/3	41	480 J	620	237	237	OPSED16-01-NSD-032201	620 C	2100 C	900	7800	1800	5
BENZO(G,H,I)PERYLENE	2/3	23	380	620	238	202	OPSED16-01-NSD-032201	2300000 N[8]	29000000 N[8]	800	10000000	670	5
BENZO(K)FLUORANTHENE	1/3	340	340	78 - 620	230	340	OPSED16-01-NSD-032201	6200 C	21000 C	900	78000	1800	5
CHRYSENE	3/3	34	450	---	215	215	OPSED16-01-NSD-032201	62000 C	210000 C	400	780000	384	2
FLUORANTHENE	3/3	64	2000 J	---	1188	1188	SED16-01-NSD-032101	2300000 N	22000000 N	20000	10000000	600	2
FLUORENE	1/3	360 J	800 J	78 - 720	326	580	SED16-01-NSD-032101	2700000 N	26000000 N	28000	10000000	19	2
HIGH MOLECULAR WEIGHT PAHS	3/3	186	3040	---	2040	2040	SED16-01-NSD-032101	NA	NA	NA	NA	1700	2
INDENO(1,2,3-CD)PYRENE	1/3	250	250	78 - 620	200	250	OPSED16-01-NSD-032201	620 C	2100 C	900	7800	600	5
LOW MOLECULAR WEIGHT PAHS	3/3	44	2260	---	1003	1003	SED16-01-NSD-032101	NA	NA	NA	NA	552	2

TABLE 4-42
SUMMARY OF DESCRIPTIVE STATISTICS
ALLEN HARBOR SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil -Residential[3]	Region 9 PRG for Soil -Industrial[3]	RIDEM Soil Direct Exposure Residential[4]	RIDEM Soil Direct Exposure Industrial[4]	Ecological Criteria	
PHENANTHRENE	3/3	44	790 J	---	401	401	OPSED16-01-NSD-032201	2300000 N[8]	29000000 N[8]	40000	10000000	240	2
PYRENE	3/3	68	1000 J	---	421	421	SED16-01-NSD-032101-D	2300000 N	29000000 N	13000	10000000	665	2
TOTAL PAHS ECOSD	3/3	230	5300	---	3043	3043	SED16-01-NSD-032101	NA	NA	NA	NA	4022	2
TOTAL PAHS	3/3	294	5490	---	3611	3611	SED16-01-NSD-032101	NA	NA	NA	NA	NA	
Pesticides PCBs (ug/kg)													
4,4'-DDD	8/20	1.6	4.4 J	0.88 - 4	1.37	2.21	SED16-01-NSD-032101	2400 C	10000 C	NA	NA	1.22	3
4,4'-DDE	8/19	1.5 J	3.4 J	0.79 - 4.1	1.25	1.99	AH-23-NSD-032404	1700 C	7000 C	NA	NA	2.2	2
4,4'-DDT	2/20	1.4 J	1.8 J	0.79 - 4.1	0.817	1.60	SED16-02-NSD-032601	1700 C	7000 C	NA	NA	1.58	2
ALPHA-CHLORDANE	1/19	2	2	0.41 - 3.3	0.575	2.00	AH-47-NSD-032604	1600 C[9]	6500 C[9]	NA	NA	2.26	3
AROCLOR-1260	19/23	16	70	8.8 - 33	29.0	33.2	AH-23-NSD-032404	220 C[10]	740 C[10]	NA	NA	22.7	2
DELTA-BHC	4/19	0.53 J	2 J	0.45 - 3.3	0.651	1.24	CORE1-TOPNSD-032704	90 C[11]	360 C[11]	NA	NA	0.32 [12]	3
DIELDRIN	3/16	1.7 J	8.1	0.79 - 4.1	1.53	4.50	AH-28-NSD-032504	30 C	110 C	40	400	280	1
ENDOSULFAN SULFATE	1/20	2.2 J	2.2 J	0.79 - 6.5	0.928	2.20	SED16-01-NSD-032101	370000 N[13]	3700000 N[13]	NA	NA	5.4 [13]	6
ENDRIN KETONE	3/19	0.64 J	1.6	0.79 - 4	0.718	1.00	OPSED16-01-NSD-032201	18000 N[14]	180000 N[14]	NA	NA	9.9	1
GAMMA-CHLORDANE	10/15	0.88 J	10	0.41 - 3.3	3.74	5.25	AH-23-NSD-032404	1600 C[9]	6500 C[9]	NA	NA	2.26	3
HEPTACHLOR	2/14	0.45 J	0.8	0.41 - 2	0.417	0.668	SED16-01-NSD-032101	110 C	380 C	NA	NA	0.3	5
HEPTACHLOR EPOXIDE	1/16	1.2 J	1.2 J	0.41 - 3.3	0.503	1.20	OPSED16-01-NSD-032201	53 C	190 C	NA	NA	0.3 [15]	5
TOTAL AROCLOR	19/23	16	70	8.8 - 33	29.0	33.2	AH-23-NSD-032404	220 C[10]	740 C[10]	10000	10000	22.7	2
TOTAL DDT	11/11	1.6	4.5	---	2.35	2.35	AH-51-NSD-032704	NA	NA	NA	NA	1.58	2
TOTAL PCB CONGENERS	18/18	16	70	---	33.0	33.0	AH-23-NSD-032404	220 C[10]	740 C[10]	10000 [10]	10000 [10]	22.7 [10]	2
Inorganics (mg/kg)													
ALUMINUM	23/23	2370	15900	---	8309	8309	AH-29-NSD-032604	76000 N	100000 MAX	NA	NA	18000	5
ANTIMONY	3/15	0.5 J	1.5 J	0.77 - 2.4	0.755	0.908	SED16-01-NSD-032101	31 N	410 N	10	820	2	4
ARSENIC	22/23	0.97	36.6	2.2	9.71	10.1	SED16-02-NSD-032601	0.39 C	1.6 C	7	7	8.2	2
BARIUM	23/23	13.8	133	---	58.1	58.1	AH-32-NSD-032604	5400 N	67000 N	5500	10000	48	5
BERYLLIUM	23/23	0.29	1.9	---	1.03	1.03	AH-17-NSD-032304	150 N	1900 N	0.4	1.3	NA	
CADMIUM	18/23	0.19	2.4	0.03 - 0.1	0.531	0.670	AH-17-NSD-032304	37 N	450 N	39	1000	1.2	2
CALCIUM	7/23	1380	22600	453 - 9610	3199	6892	AH-03-NSD-032304	NA	NA	NA	NA	NA	
CHROMIUM	23/23	7.7	66.8	---	35.3	35.3	AH-29-NSD-032604	30 C[16]	64 C	1400	10000	81	2
COBALT	23/23	2.1	37.9	---	7.44	7.44	SED16-02-NSD-032601	900 C	1900 C	NA	NA	10	5
COPPER	23/23	13.4 J	212	---	100	100	AH-17-NSD-032304	3100 N	41000 N	3100	10000	34	2
IRON	23/23	5820	72900	---	25107	25107	SED16-01-NSD-032101-D	23000 N	100000 MAX	NA	NA	220000	5
LEAD	23/23	11.4	154 J	---	68.8	68.8	OPSED16-01-NSD-032201	400	800	150	500	46.7	2
MAGNESIUM	20/23	994 J	7890	1240 - 1470	4071	4578	AH-17-NSD-032304	NA	NA	NA	NA	NA	
MANGANESE	23/23	46.2	788	---	196	196	SED16-02-NSD-032601	1800 N	19000 N	390	10000	260	5
MERCURY	20/23	0.03 J	0.38	0.01 - 0.03	0.173	0.198	AH-17-NSD-032304	23 N	310 N	23	610	0.15	2
NICKEL	23/23	6.3	54.5	---	21.0	21.0	SED16-01-NSD-032101-D	1600 N	20000 N	1000	10000	20.9	2
POTASSIUM	15/23	599	4380	416 - 1620	1986	2807	AH-29-NSD-032604	NA	NA	NA	NA	NA	
SELENIUM	1/23	1.1	1.1	0.29 - 2.6	0.718	0.780	SED16-01-NSD-032101	390 N	5100 N	390	10000	1	5
SILVER	3/23	0.41	0.62	0.1 - 1.5	0.258	0.438	AH-08-NSD-032204	390 N	5100 N	200	10000	1	2
SODIUM	1/23	180	299	73.4 - 19800	3812	240	SED16-01-NSD-032101	NA	NA	NA	NA	NA	
VANADIUM	23/23	8.6	80.9	---	34.8	34.8	AH-29-NSD-032604	78 N	1000 N	550	10000	57	5
ZINC	23/23	50.5	449	---	202	202	AH-17-NSD-032304	23000 N	100000 MAX	6000	10000	150	2
AVS/SEM Param t rs (UMO/g)													
CADMIUM	19/23	0.00107	0.0169	0.000623 - 0.00126	0.00478	0.00567	SED16-01-NSD-032101	NA	NA	NA	NA	1.2	2
COPPER	22/23	0.03 J	146.18 J	0.01	3.42	3.58	SED16-01-NSD-032101-D	NA	NA	NA	NA	34	2
LEAD	23/23	0.0521	0.39	---	0.227	0.227	AH-51-NSD-032704	NA	NA	NA	NA	46.7	2
MERCURY	1/23	0.000049	0.000049	0.00003 - 0.00008	0.0000270	0.0000370	SED16-01-NSD-032101-D	NA	NA	NA	NA	0.15	2
NICKEL	20/23	0.02	0.632	0.03 - 0.05	0.0976	0.109	SED16-01-NSD-032101-D	NA	NA	NA	NA	20.9	2
SEM/AVS	21/23	0.3 J	220.22	0.1	56.8	62.2	AH-45-NSD-032604	NA	NA	NA	NA	NA	
SUM OF SEM	20/20	0.86	5.38	---	2.46	2.46	AH-28-NSD-032504	NA	NA	NA	NA	NA	
ZINC	23/23	0.356 J	9.62 J	---	2.07	2.07	SED16-01-NSD-032101-D	NA	NA	NA	NA	150	2

TABLE 4-42
SUMMARY OF DESCRIPTIVE STATISTICS
ALLEN HARBOR SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil -Residential[3]	Region 9 PRG for Soil -Industrial[3]	RIDEM Soil Direct Exposure Residential[4]	RIDEM Soil Direct Exposure Industrial[4]	Ecological Criteria	
Miscellaneous Parameters (%)													
PERCENT GRAVEL	15/15	0.4	21.2	---	6.63	6.63	CORE1-BOTNSD-032704	NA	NA	NA	NA	NA	
PERCENT SAND	20/20	1.5	97.8	---	41.6	41.6	AH-49-NSD-032504	NA	NA	NA	NA	NA	
PERCENT SILT/CLAY	20/20	1.4	98.5	---	53.7	53.7	AH-06-NSD-032304-D	NA	NA	NA	NA	NA	
PH (S.U.)	3/3	7.1	7.3	---	7.23	7.23	SED16-01-NSD-032101, OPSED16-01-NSD-032201	NA	NA	NA	NA	NA	
TOTAL INORGANIC CARBON	20/20	0.78	5.25	---	3.19	3.19	AH-17-NSD-032304	NA	NA	NA	NA	NA	

Notes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - U.S. EPA Region 9 Preliminary Remediation Goal Table, October, 2004, Updated December 28, 2004. [Cancer benchmark value = 1E-06, Hazard Index (HI) = 1.0].
4 - Rhode Island Department of Environmental Management, DEM-DSR-01-93, February 2004.
5 - The value for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
6 - The value for naphthalene was used as a surrogate for 2-methylnaphthalene.
7 - The value for acenaphthene was used as a surrogate for acenaphthylene.
8 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
9 - The value for chlordane is used as a surrogate for alpha- and gamma-chlordane.
10 - The value for Total PCB congeners (Aroclors) is presented.
11 - The value for alpha-BHC has been used as a surrogate for delta BHC.
12 - The value for gamma-BHC (Lindane) is used as a surrogate.
13 - The value for endosulfan has been used as a surrogate for Endosulfan Sulfate.
14 - The value for endrin has been used as a surrogate for endrin ketone.
15 - The value for heptachlor has been used as a surrogate for heptachlor epoxide.
16 - The value for chromium VI is presented.
Shading indicates that the maximum detected concentration exceeds the screening criteria.

Sources for Ecological Screening Criteria:
1 - Sediment Quality Benchmark for Dieldrin and Endrin (assume 1% total organic carbon) (USEPA, 1996)
2 - ER-L (Long et al., 1995)
3 - TEL (MacDonald, 1994)
4 - ER-L (Long and Morgan, 1991)
5 - AET (Buchman, 1999)
6 - SQB from Ecotox Thresholds (USEPA, 1996)

Qualifiers
C - Carcinogen.
N - Noncarcinogen.
MAX - Ceiling limit.
SAT - Saturation limit.
J - Estimated value.

TABLE 4-42
SUMMARY OF DESCRIPTIVE STATISTICS
ALLEN HARBOR SEDIMENT SAMPLES
SUPPLEMENTAL PHASE II RI DATA PACKAGE - SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTON, RHODE ISLAND

Parameter	Frequency of Detection	Minimum Concentration[1]	Maximum Concentration[1]	Range of Nondetects[2]	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect	Region 9 PRG for Soil -Residential[3]	Region 9 PRG for Soil -Industrial[3]	RIDEM Soil Direct Exposure Residential[4]	RIDEM Soil Direct Exposure Industrial[4]	Ecological Criteria

Acronyms:
AET = Apparent Effects Threshold
AVS = Acid Volatile Sulfide
ECOSD = Ecological Sediment
ER-L = Effects Range-Low
HI = Hazard Index
NA = No Criteria Available
PAH = Polyaromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
PRG = Preliminary Remediation Goal
RI = Remedial Investigation
RIDEM = Rhode Island Department of Environmental Management
SEM = Simultaneously Extractable Metals
SQB = Sediment Quality Benchmark
TEL = Threshold Effects Level
U.S. EPA = United States Environmental Protection Agency

5.0 CHEMICAL FATE AND TRANSPORT ANALYSIS

Knowledge of a contaminants' potential to migrate, attenuate, and persist in environmental media is important when evaluating the overall impacts to a medium, the long-term potential for chemical exposure, and the potential remedial alternatives for clean-up and/or containment. This section contains information on transport processes, attenuation processes, and degradation potential of the primary contaminants detected at Site 16, VOCs (especially TCE; 1,2-DCE; 1,1-DCE; and vinyl chloride), SVOCs (especially PAHs), and, and to a lesser extent, dioxins and furans.

5.1 CONTAMINANT TRANSPORT PATHWAYS

LNAPL compounds such as benzene or petroleum hydrocarbons that were evidently released in the north central area of Site 16 would not migrate very deep vertically beyond the water table as LNAPL. They can, however, dissolve into the groundwater and migrate as a dissolved phase in the direction of groundwater movement. No free phase LNAPL has been observed and very little in the way of LNAPL compounds has been detected in groundwater. This indicates that the groundwater transport pathway is either minor for these compounds, that the bulk of the LNAPL mass has already migrated as far as it will go, or that the LNAPLs have degraded sufficiently as to not be present in significant quantities in soil or groundwater except, perhaps, in isolated locations. Some CVOCs may have also been released in the north central area of Site 16 but, similar to LNAPL, the mass of CVOCs that remain is evidently limited in terms of mass and extent. The complete vertical and lateral extent of CVOC contamination in soils has not been determined. VOCs released to soils would volatilize from shallow soils over time. DNAPLs would descend deeper into the soil column as long as free phase exists. During this vertical migration, the DNAPL VOCs would become sorbed to soils and, when in contact with groundwater, would partition between the soils and groundwater. No free phase DNAPL has been observed to date.

The SVOCs, evidently originating from releases of the creosote dip formulation and fuels or oils in the north central area of Site 16, were observed primarily in soils of the north central area of Site 16 and to a much lesser extent in groundwater. Of the SVOCs, the PAHs are the most prevalent in groundwater. Of the SVOCs investigated, only bis(2-ethylhexyl)phthalate, and naphthalene, were detected at concentrations greater then RIDEM GW groundwater screening levels or EPA MCLs. The exceedances were minor in magnitude and frequency. The PAHs were presumably released as surface spills in the north central area of Site 16 (particularly the FFTA and creosote Dip Tank Area) and migrated vertically into the soils. This vertical downward migration would have occurred under the influence of gravity and infiltration of precipitation. The initial transport would have occurred as the native spilled liquid percolated into the soil. The PAHs would have rapidly bound to the soils, slowing their migration dramatically. The PAHs have not been migrating very rapidly since that time, as is evidenced by the low groundwater

concentrations and limited vertical extent of PAH contamination in soils described in Section 4. The complete vertical and lateral extent of contamination is unknown in some areas (see Section 4).

Contaminants in surface soil can also migrate via overland runoff into sewers and other downgradient areas. The contaminants may migrate as sorbed phases to particulates if they have a tendency to bind to particulates. Alternatively, they may migrate in a dissolved phase. In virtually all cases contaminants will migrate in both phases, the predominant phase being dependent on the contaminant as well as other factors such as the time available for distribution between solid and liquid phases, temperature, etc. Contaminant transport via overland runoff has evidently not occurred to any great degree except in association with the storm sewer system that discharges at the southeastern corner of Allen Harbor. Harbor sediments contaminated by this overland runoff can be redistributed over time under the influence of surface water currents. Leaching of contaminants into the surface water with subsequent accumulation elsewhere in sediments can also occur. Sediment contaminants, however, have been shown to have origins that are largely not associated with Site 16 and are therefore not discussed further. Surface water, being in contact with sediments, can exchange contaminants with the sediments. It can also receive influx of contamination from point discharges such as storm sewers and overland runoff from Site 16 and adjacent areas. However, no evidence has been found for any significant impact from these sources to surface water so surface water is not discussed further. Furthermore, the overland transport pathway is evidently not significant for Site 16.

Dioxins and furans were analyzed in select soil samples. These chemicals may have been formed during combustion of chlorinated solvents mixed with fuels used to ignite the wooden burned structure near the former FFTA. Combustion plumes tend to rise rapidly at the point of combustion because of the density difference between the hot plume and surrounding air. The plumes then migrate hundreds of feet away before the plume cools and contaminants begin to fall out of the plume to earth. The observed concentrations in soil, however, were less than the 1 µg/kg limit commonly used as a cleanup goal. Dioxins and furans are extremely insoluble in water and bind tightly to soils. Therefore, the concentrations observed in soils are not expected to result in unacceptable levels of dioxins or furans in groundwater. Based on this understanding of plume behavior, and the low dioxin and furan concentrations in soil, these chemicals are not significant site-related contaminants and their fate and transport are not discussed further.

Metals are found naturally in soils. The observed soil metal concentrations appear to be consistent with natural background levels, however, a Site 16-specific background soil data set does not exist for Site 16. Therefore, while metals are not discussed further in this section, the absence of a Site 16-specific background soil data set is acknowledged as a data gap.

The primary Site 16 contaminants in terms of concentrations magnitude, number of environmental media affected by them, and spatial extent of contamination, are VOCs in soil and groundwater. VOCs released to soils would volatilize from shallow soils over time. DNAPLs would descend vertically into the soil column because they are denser than water and because of downward impetus from infiltration precipitation. LNAPLs will descend in the unsaturated zone under the influence of gravity and precipitation infiltration but they float on the groundwater table, moving up and down with natural fluctuations in the groundwater table. The primary mechanisms of natural VOC attenuation in groundwater include advection, dispersion, dilution, and, when conditions are suitable, biochemical degradation. The first three mechanisms are certain to be occurring at Site 16. Groundwater movement via the tortuous migration pathways present in the relatively complex geology of Site 16 overburden and bedrock facilitates these attenuation mechanisms. Natural attenuation of a chlorinated solvent plume is typically evaluated by assessing several lines of evidence (Wiedemeier et al., 1998). The first lines of evidence for establishing natural attenuation as a viable means for groundwater cleanup include the following:

- Significant quantities of degradation products (in this case, 1,2-DCE and vinyl chloride) are present in the plume.
- The plume outline is stable or shrinking over time.
- The concentrations of contaminants in most wells are decreasing over time.

Secondary evidence to support natural attenuation is whether or not geochemical conditions within the plume are conducive to microbial biodegradation. For reductive dechlorination reactions to be carried out, reducing conditions should exist [e.g., oxidation-reduction potential (ORP) <50 millivolts (mV)], dissolved oxygen should be less than 0.5 mg/L, and the concentrations of other electron acceptors (e.g., nitrate, ferric iron, and sulfate) should be relatively low (Wiedemeier et al. 1998). This potential is reported relative to a standard hydrogen reference electrode.

Reductive dechlorination is enhanced if organic hydrocarbons, such as benzene, toluene, ethylbenzene, and xylene (BTEX) or fuel oils are present in groundwater and provide a carbon food source for microorganisms (Type 1 behavior, Wiedemeier et al., 1998). If reducing conditions are prevalent in the interior of the plume, but aerobic conditions exist near the perimeter of the plume, then aerobic degradation of 1,2-DCE and vinyl chloride can occur near the leading edge of the plume.

Section 5.1 contains a general discussion of the various chemical, physical, and degradation properties of these primary contaminants. Sections 5.2 through 5.4 evaluate the spatial and temporal distributions of these contaminants and how the distributions may be interpreted. Section 5.5 presents the geochemical conditions within Site 16 and how these conditions may affect and/or explain the distribution of daughter products recently observed in the groundwater system.

5.2 CHEMICAL AND PHYSICAL PROPERTIES AND DEGRADATION PROCESSES AFFECTING CONTAMINANT MOBILITY AND PERSISTENCE

Six chlorinated VOCs detected in Site 16 soil and groundwater samples are chlorinated ethene compounds: tetrachloroethene (PCE), TCE, dichloroethene (DCE) isomers (1,1-DCE, cis-1,2-DCE, and trans-1,2-DCE), and vinyl chloride. Generally, PCE and TCE are sold and used as cleaning solvents, and the DCE compounds and vinyl chloride are biodegradation products of PCE and TCE. TCE can also be a biodegradation product of PCE. In general, soil microbes strip off chlorine atoms from the ethene chain via reductive dechlorination, one chlorine atom at a time (Aziz et al., 2000):

PCE ▶ TCE ▶ DCE ▶ vinyl chloride ▶ ethene

The dechlorination of TCE typically produces much more cis-1,2-DCE than either 1,1-DCE or trans-1,2-DCE (Aziz et al., 2000). Data collected from Site 16 suggest that TCE was the primary chlorinated solvent utilized at the former Building 41. PCE was detected at 23 µg/L in MW16-33I (intermediate zone) and at 23 µg/L in MW16-34D (deep overburden zone) in 2002. Both of these monitoring wells are located on the south side of the former Building 41. Other than these two wells, however, PCE concentrations are very low (less than 5 µg/L) or not detected in all other wells at Site 16. Therefore, it is believed that PCE was not used as a solvent at Building 41.

As discussed in Section 5.3, cis-1,2-DCE is the primary daughter product of TCE degradation detected at Site 16. 1,1-DCE and trans-1,2-DCE may also have been produced via biodegradation of TCE, but at relatively low rates compared to the production of cis-1,2-DCE.

The reductive dechlorination of TCE to 1,2-DCE occurs under mildly reducing to strongly reducing conditions in subsurface soils and groundwater. The degradation of cis-1,2-DCE to vinyl chloride and vinyl chloride to ethene occur under more vigorous reducing conditions. However, the aerobic degradation of these compounds to carbon dioxide is considered to be more efficient and more commonly observed at contaminated sites. Thus, redox reactions and geochemical conditions at Site 16 may play an important role as to where and how fast microbial degradation of the individual contaminants occurs.

The fact that TCE migrated to the bedrock surface and into the bedrock beneath the former Building 41 and in very close vicinity to the building strongly suggests that some TCE DNAPL migrated vertically downward from the former Building 41 area. Whether or not residual DNAPL is still present at the site is unknown. However, recent TCE groundwater concentrations and lack of DNAPL detection indicate that the DNAPL is either wholly in an adsorbed phase or that residual, free-phase ganglia are finely and sparsely distributed throughout the intermediate to deep soils and/or bedrock.

As CVOCs move through the groundwater system, their mobilities are controlled in large part by their propensity to sorb to soil and bedrock matrix. The sorption of organic compounds to soil is generally related to the soil-water partition coefficient (K_d), which in turn is affected by the fraction of organic carbon in soil (f_{oc}) and the organic matter-water partition coefficients (K_{oc}). The f_{oc} is a property of the site's soils. The K_{oc} is specific for each individual chemical compound. The K_d for each chemical is calculated as:

$$K_d = f_{oc} * K_{oc}$$

The f_{oc} for soils at Site 16 generally ranged from less than 0.1 up to 1.1 percent in 31 soil samples. Total organic carbon concentrations in three "outlier" samples ranged from 1.8 to 3.4 percent (EA, June 2003). The level of organic carbon in the soils appears to be relatively high compared to typical values cited for other sites. Boring logs and geologic cross sections in the Phase II RI indicate that many soil layers are black (presumably from organic carbon) and peat layers were occasionally encountered in the shallow zone in the northern half of Site 16 in the vicinity of Allen Harbor. The K_{oc} value for TCE is higher than DCE, and both are higher than the vinyl chloride K_{oc} value cited in scientific literature. As a result, vinyl chloride should migrate faster than any of the DCE isomers, which in turn should migrate faster than TCE.

The ranges of biodegradation rates cited in scientific literature for TCE, 1,2-DCE, and vinyl chloride are a very wide. In general, the degradation rate for vinyl chloride is considered to be the greatest, DCE is also thought to degrade relatively quickly, and TCE is considered to degrade less quickly (Wiedemeier et al., 1998; Aziz et al., 2000, 2001). However, if certain geochemical conditions exist at a site or the proper microbiota are not present in the plume, then the degradation of 1,2-DCE or vinyl chloride can be very slow and a buildup of degradation products can occur as the parent compound (TCE) continues to degrade.

5.3 MIGRATION OF TCE

The spatial distributions of TCE in groundwater samples collected in 2004 are presented in Figures 5-1 through 5-4 (shallow overburden, intermediate overburden, deep overburden, and bedrock, respectively). No shallow groundwater data are available at wells MW16-39I and MW16-57I. In the shallow zone, the highest TCE concentration (93 µg/L) was observed in well MW16-37S. This well is located about 125 feet southeast of the former Building 41, a known potential source of TCE (Figure 5-1). TCE was detected at 840 µg/L in this same well in 2002. A change of this magnitude appears to be a real change rather than evidence of random uncertainty. It is not clear why TCE concentrations found in MW16-12S next to the former Building 41 and in five other shallow monitoring wells located beneath or within the vicinity of the former Building 41 were much less. One other monitoring well in the shallow zone (MW16-23S) had a moderate TCE concentration (31 µg/L). This well is located north-northeast and downgradient of

MW16-37S. Based on these concentrations, TCE appears to have migrated no farther north than well MW16-44S. This suggests that TCE has migrated no more than 700 feet laterally in the shallow zone since the TCE was released. By contrast, the groundwater flow rate is on the order of 1,000 feet per year. This disparity is not accounted for by the retardation factor of TCE. The retardation factor of about 2 indicates that TCE should be migrating at about one-half the rate of groundwater. Therefore, another mechanism must be at work to yield this spatial pattern. The mechanism could be a sub-duction of TCE from shallow into deeper zones or it could be that the TCE in shallow groundwater has largely degraded toward the outer edges of the shallow plume. Variations in groundwater geology and hence hydraulic conductivity from one area to another may also account for the apparent absence of TCE in this far downgradient region.

The 2004 distribution of TCE in the intermediate zone (Figure 5-2) shows that TCE is much more extensive and the concentrations are much higher compared to the shallow zone. The highest TCE concentration in 2004 (1,700 µg/L) was detected in well MW16-37I, which is east of the former Building 41 and lies directly beneath MW16-37S, which is where the highest TCE concentration was detected in the shallow zone. Hence, it is logical to conclude that a release of TCE may have occurred on the eastern side of Building 41 and the TCE moved vertically downward. Other elevated concentrations of TCE occurred around the former Building 41 at wells MW16-69I (550 µg/L), MW16-38I (820 µg/L), and MW16-59I (670 µg/L). These "hot spots" around three sides of former Building 41 suggest that there may have been several release locations within or adjacent to the building. The hot spots may also represent a relatively large contaminated area that appears as "hot spots" because of the well spacing. Other TCE "hot spots" in the intermediate zone occurred at MW16-45I in the north central area of Site 16, MW16-05I far northeast and downgradient of Building 41, and MW16-57I, located about 1200 feet east of the former Building 41. These latter hot spots (wells MW16-45I, MW16-05I and MW16-57I) do not appear to be laterally connected to the primary contaminated area around former Building 41. It is suspected that these hot spots are the result of additional localized CVOC releases. Except for well MW16-57I, these locations of high concentration lead to a merging of TCE in groundwater to form the predominant contaminant plume.

The 2004 distribution of TCE in the deep overburden zone (Figure 5-3) shows that TCE appears in a plume that starts at the former Building 41 and extends northeastward toward Allen Harbor. This alignment of the higher TCE concentrations into a single northeast-trending plume strongly suggests that the former Building 41 area was a primary release point and groundwater is flowing in a northeast direction (see Section 3.0). A relatively high TCE concentration (2,000 µg/L) was reported for MW16-14D near Building 41 in 2004. However, higher TCE concentrations were detected in deep overburden wells MW16-59D (2,300 µg/L) and MW16-29D (2,900 µg/L), which are located approximately 300 and 900 feet, respectively, downgradient (i.e., northeast) of Building 41. In the shallow and intermediate zones, the

bulk of the TCE mass appears to be close to the former Building 41. However, in the deep zone it appears that the mass has shifted downgradient toward Allen Harbor. Figure 5-3 also shows that TCE was not detected in numerous deep wells on the southeast, south, and eastern sides of the plume.

Figure 5-4 shows a TCE distribution in bedrock that is similar to the distribution in deep overburden. The plume starts near the former Building 41 and extends northeastward toward Allen Harbor. The highest TCE concentrations detected in the bedrock zone in 2004 (wells MW16-60R and MW16-59R; 1800 and 1500 µg/L, respectively) directly underlie a TCE "hot spot" detected in the deep overburden zone (MW16-59D). The second "hot spot" in the bedrock zone (MW16-44R, 1400 µg/L) is offset laterally from but deeper than the location of highest TCE concentration (MW16-29D) detected in the deep overburden. This alignment of the higher TCE concentrations into a single northeast-trending plume in the bedrock strongly suggests that the former Building 41 area was the primary release point and groundwater is flowing in a northeast direction in the bedrock (see Section 3.0). It further suggests that the predominant CVOC plume may split into two paths leading toward the southern boundary of Allen Harbor or that there is a CVOC contribution associated with the north central Site 16 area, near the former FFTA. Two differences are apparent though between the deep overburden TCE map (Figure 5-3) and the bedrock TCE map (Figure 5-4). First, the TCE concentrations in the bedrock nearest to Building 41 are low, suggesting that the TCE moved downward and laterally northeastward at the same time. Thus, the free phase TCE did not reach the bedrock surface directly beneath Building 41. The second difference is that the concentrations of TCE detected in the bedrock zone are in general lower everywhere when compared to concentrations directly above in the deep overburden. Therefore, TCE must be migrating from the deep overburden to the bedrock and not the reverse.

Overall, the TCE has definitely not migrated to Allen Harbor in the shallow zone. Conversely, the plume has reached the southern boundary of Allen Harbor in the intermediate, deep overburden, and bedrock zones, which is confirmed by TCE concentrations detected in MW15-05I, -05D, and 05R. It may be discharging into harbor sediments underneath the harbor or it may pass underneath the harbor into deeper water. In either of these latter cases, any remedial action associated with reduction of CVOCs in groundwater is not likely to be focused on groundwater under the harbor.

5.4 DEGRADATION OF TCE

The spatial distributions of two TCE daughter products (1,2-DCE and vinyl chloride) measured in 2004 are presented in Figures 5-5 through 5-12. The presence of these TCE degradation products is indisputable evidence that TCE has degraded. Total 1,2-DCE concentrations are presented on the figures. However, 95 to 100 percent of the total 1,2-DCE is in the form of cis-1,2-DCE, so the maps also represent the spatial distribution of cis-1,2-DCE.

Figure 5-5 shows the distribution of 1,2-DCE in the shallow zone. The highest 1,2-DCE concentration detected in this zone in 2004 (92.2 µg/L) occurred in well MW16-40S. This well lies about 400 feet northeast of former Building 41 and also lies on the far northeastern side of the TCE plume in this zone. Based on this information, TCE degrades relatively rapidly in the shallow zone when it passes to the northeast of MW16-23S and nearly all of it is degraded by the time groundwater reaches MW16-40S. The 1,2-DCE continues in a northeastern direction without any TCE present in the plume. The spatial distribution of TCE in the shallow zone suggests that TCE does not degrade close to Building 41, but does degrade relatively rapidly northeast of MW16-23S.

Vinyl chloride in the shallow zone (Figure 5-6) shows a pattern very similar to 1,2-DCE. No vinyl chloride was detected in the upgradient half of the plume near former Building 41. The highest concentration (55 µg/L) was detected in MW16-40S, approximately 400 feet northeast of Building 41. Vinyl chloride was detected to the north and northeast of this well, but at much lower concentrations.

In the intermediate zone (Figure 5-7), 1,2-DCE is somewhat more widespread and detected at about the same concentrations as it was in the shallow zone. The highest concentrations of 1,2-DCE in this zone were found in MW16-42I, MW16-58I2, and MW16-05I (41, 30, and 24.1 µg/L, respectively), all of which occur in the distal portion of the plume. Like the shallow zone, the intermediate zone data suggest that TCE is not degrading near the source area (the former Building 41 area).

Figure 5-8 shows the distribution of vinyl chloride in the intermediate zone. The highest concentration of vinyl chloride in 2004 in this zone (33 µg/L) was detected in MW16-42I. Concentrations decreased rapidly in all directions radiating away from this well. Vinyl chloride was below 2 µg/L everywhere else in the intermediate zone.

The 2004 distribution of 1,2-DCE in the deep overburden is presented in Figure 5-9. The highest concentration of 1,2-DCE was detected in MW16-29D (37 µg/L), followed by MW16-23D (25.5 µg/L). Like the intermediate zone, 1,2-DCE was found primarily in the downgradient (i.e., central and northeastern portions of the plume). Elevated detection limits for some chemicals may have masked their presence at select locations, but this suggests that the TCE is not degrading significantly around the source area (the former Building 41 area).

Like the intermediate zone, vinyl chloride was detected in only a very small area at concentrations greater than 1 µg/L in the deep zone. The only well that had a positive detection greater than 1 µg/L in 2004 was MW16-24D (7.87 µg/L). This suggests that very little 1,2-DCE is being transformed to vinyl chloride in the deep overburden zone.

Figure 5-11 shows the distribution of 1,2-DCE in the bedrock zone (shallow and deep bedrock combined). The highest concentration of 1,2-DCE detected in 2004 was found in MW16-15R (54.7 µg/L), MW16-15R2 (27.3 µg/L), and MW16-71R (24 µg/L), all of which are located close to the northeast end of the former Building 41. This suggests that TCE has migrated vertically downward to the bedrock beneath former Building 41 and has degraded to 1,2-DCE at this location. Moderate concentrations of 1,2-DCE were also detected to the northeast of the former Building 41 in wells MW16-59R and MW16-44R.

Vinyl chloride was detected in 13 different wells in the bedrock in 2004, but the concentration was never above 1.0 µg/L. Therefore, the biodegradation of 1,2-DCE to vinyl chloride in the deep zone appears to progress very slowly if at all.

Overall, the presence of 1,2-DCE throughout much of the intermediate, deep overburden, and bedrock zones indicates that TCE is degrading to 1,2-DCE. The lack of significant 1,2-DCE in the vicinity of former Building 41 in the shallow, intermediate, and deep zones indicates that little or no TCE degradation has occurred near the source. Vinyl chloride is present to some extent in the central portion of the plume in the shallow, intermediate and deep overburden zones. However, the limited extent of vinyl chloride and the lower concentrations encountered suggest the degradation of TCE to 1,2-DCE is occurring faster than the degradation of 1,2-DCE to vinyl chloride.

5.5 TEMPORAL TRENDS IN CONTAMINANT CONCENTRATIONS

The use of TCE and the TCE degreasers in the former Building 41 were discontinued in 1953 and moved into Building 319. Therefore, release of TCE should have ceased in 1953 or shortly thereafter near the former Building 41 but may have occurred near Building 319. Building 41 was removed in 2002. Presumably, any residual surface and near-surface sources of TCE were eliminated at that time. Hence, contaminant concentrations should have started to decline near Building 41 at that time since:

- Major sources of TCE were no longer present,
- TCE and its daughters are degrading over time, and
- TCE and its daughters are undergoing dilution, dispersion, adsorption/desorption, and other attenuation processes over time.

If this conceptual model of sources and attenuation mechanisms are correct and the plume has reached steady state, then contaminant concentrations in the plume should be holding steady or declining over time.

One to three groundwater samples have been collected from each monitoring well at Site 16. Most of these samples were collected in 2002 and 2004. This temporal spacing provides limited information on

which to assess temporal concentrations trends. However, an attempt is made in this section to evaluate whether contaminant concentrations in groundwater appear to be increasing, decreasing, or remaining steady over time. If a well had at least two samples collected and a contaminant was detected in at least one of those samples, then a subjective determination was made as to whether the concentration increased, decreased, or remained unchanged over time. The results are summarized in Table 5-1. If a contaminant exhibited a change of 100 µg/L or more, the information on Table 5-1 was bolded. Twenty-eight wells displayed major changes (i.e., greater than 100 µg/L) in TCE concentrations over time. Of these, 21 wells displayed a decrease in TCE and 7 wells displayed a increase. The wells closest to the former Building 41 and south of Davisville Road include 14 of the 28 wells that underwent a major change in TCE concentration between 2002 and 2004. Of these 14 wells, 13 wells showed significant decreases in TCE. Only well MW16-37I showed a significant increase (1100 to 1700 µg/L). Since such a large majority of the wells close to the source decreased, it must be surmised that the mass of TCE in and around the source has declined significantly. If this is the case, it is unlikely that a large source still exists in this area. This does not preclude the possibility that some contamination may still reside in the soils around the former Building 41.

In the central portion of the predominant VOC plume, 11 wells showed a significant change in TCE concentrations between the late 2002 and 2004 (change of 100 µg/L or more). Of these 11 wells, six displayed a major increase in TCE and five displayed a major decrease. Thus, the total mass in the central portion of the plume remained relatively stable.

In the northeastern (downgradient) end of the plume, five wells displayed major changes in TCE concentrations. Four of these wells exhibited decreasing TCE concentrations and only one well (MW16-05R) showed an increase in TCE concentration (750 to 860 µg/L). Thus, the overall TCE mass near the distal end of the plume appears to be decreasing.

Besides the wells that showed major changes in TCE concentrations, there were 43 other wells where a judgement was made concerning temporal trend in TCE. Of the 43 wells with minor changes, 14 wells showed an increase in TCE, 10 wells showed no significant change, and 19 wells showed a decrease in TCE. Thus, an overwhelming number of Site 16 wells have displayed a decrease in TCE over time.

There were a total of 48 wells that were evaluated for changes in total 1,2-DCE concentrations. None of these wells showed a significant change in concentration (a change of 100 µg/L or more). However, 16 of the wells showed a minor increase, 19 wells showed a minor decrease, and 10 wells showed no significant change. Overall, there did not appear to be a significant change in 1,2-DCE mass within the plume.

There were a total of 29 wells that were evaluated for changes in vinyl chloride concentrations. None of these wells showed a change of 100 µg/L or more. However, 9 of the wells showed a minor increase, 11 wells showed a minor decrease, and 9 wells showed no significant change. Overall, there did not appear to be a significant change in vinyl chloride mass within the plume over time.

The evaluation of plume dynamics and whether a plume is expanding, stable, or shrinking is considered to be an important aspect of natural attenuation. Since the plume has already reached the southern boundary of Allen Harbor, it is unlikely that the plume is expanding long distances under the harbor. Based on the evidence presented above, it is more likely that the plume is stable or shrinking. If additional rounds of samples were collected from select existing monitoring wells, a more conclusive assessment could be made regarding the nature of the plume size and contaminant concentrations within the plume over time.

5.6 GEOCHEMICAL CONDITIONS

Geochemical conditions were evaluated in detail in the draft Phase II RI report (EA, June 2003). [Several relevant figures from the Phase II RI report have been included in this report (Figures 5-13 to 5-16)]. ORP, dissolved oxygen, ferrous and ferric iron, sulfate, sulfide, nitrate, methane and other data were used to subdivide each hydrogeologic layer (shallow, intermediate, deep overburden, and bedrock) into redox zones. The shallow overburden zone was found to be oxidizing throughout the southern half off the plume area and was also oxidizing through much of the northern half. Methanogenesis activity (highly reducing) was found to exist around the southern end of Allen Harbor (wells MW16-48S and MW16-04S) and around two wells (MW16-45S and MW16-43S) near the FFTA. Several wells exhibiting sulfate-reducing conditions (highly reducing) were found to exist in the vicinity of the two small areas exhibiting methanogenesis. Overall, more than 80 percent of the shallow overburden appeared to be oxidizing and not conducive to reductive dechlorination.

The overwhelming majority of the intermediate zone was also found to be aerobic. A small area around MW16-38I was found to have nitrate-reducing conditions. In the FFTA, iron-reducing conditions were found to exist around wells MW16-45I, MW16-43I, and MW16-42I. The most reducing conditions in the intermediate zone (sulfate reduction) occurred around a single well (MW16-46I) in the FFTA.

In the deep overburden zone, aerobic conditions were found over about 50 percent of the area. Iron-reducing conditions existed in about 30 percent of the plume area, particularly on the western and in the central portion of the plume area. Sulfate-reducing conditions and methanogenesis conditions existed over significant areas in the western, central, and northeastern portions of the plume area. Overall, the deep overburden zone was much more reducing than either the shallow or intermediate overburden zones.

TABLE 5-1

SUMMARY OF CONTAMINANT CONCENTRATIONS OVER TIME
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Monitoring Well		Trichloroethene (µg/L)		1,2-Dichloroethene (µg/L)		Vinyl Chloride (µg/L)	
MW16-01							
	Shallow						
	Intermediate	I	3.0 to 6.04				
	Deep						
	Shallow Bedrock						
	Deep Bedrock						
MW16-02							
	Shallow						
	Intermediate	NC	61 to 63	I	0.53 to 1.12		
	Deep	D	2100 to 1200	NC	5.8 to 50 U	NC	2 U to 0.04
	Shallow Bedrock	D	3100 to 1150	I	7.9 to 19.5	NC	2 U to 0.371
	Deep Bedrock	I	120 to 465	I	3.42 to 5.96	I	0.2 to 0.345
MW16-04							
	Shallow					NC	0.9 to 0.521
	Intermediate	NC	0.63 to 0.527				
	Deep	D	560 to 340	NC	6.0 to 5.05	NC	2 U to 0.134
	Shallow Bedrock						
	Deep Bedrock						
MW16-05							
	Shallow						
	Intermediate	D	750 to 470	I	19.7 to 24.1	I	0.3 to 0.413
	Deep	D	2250 to 1100	D	7.35 to 5.36	D	0.075 to 0.049
	Shallow Bedrock	I	750 to 860	NC	8.49 to 8.46	D	0.2 to 0.141
	Deep Bedrock						
MW16-06							
	Shallow	D	1.0 to 0.25				
	Intermediate	NC	1.72 to 1.33				
	Deep						
	Shallow Bedrock						
	Deep Bedrock						
MW16-07							
	Shallow	NC	0.8 to 0.546				
	Intermediate						
	Deep	I	1.0 to 2.82				
	Shallow Bedrock						
	Deep Bedrock						
MW16-08							
	Shallow						
	Intermediate						
	Deep	I	190 to 320	I	2.0 to 3.92	NC	0.3 to 0.386
	Shallow Bedrock						
	Deep Bedrock						
MW16-09							
	Shallow	D	7.66 to 0.216				
	Intermediate						
	Deep						
	Shallow Bedrock						
	Deep Bedrock						

TABLE 5-1

SUMMARY OF CONTAMINANT CONCENTRATIONS OVER TIME
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Monitoring Well		Trichloroethene (µg/L)		1,2-Dichloroethene (µg/L)		Vinyl Chloride (µg/L)	
MW16-11							
	Shallow	D	0.9 to 0.266				
	Intermediate						
	Deep	D	4.94 to 1 U				
	Shallow Bedrock						
	Deep Bedrock						
MW16-12							
	Shallow						
	Intermediate						
	Deep	I	21 to 32				
	Shallow Bedrock						
	Deep Bedrock						
MW16-13							
	Shallow						
	Intermediate	I	5.28 to 9.15				
	Deep	NC	0.32 to 0.326				
	Shallow Bedrock						
	Deep Bedrock						
MW16-14							
	Shallow						
	Intermediate	D	26 to 10	NC	0.34 to 1 U		
	Deep	D	4900 to 2000	D	5.0 to 2.14		
	Shallow Bedrock						
	Deep Bedrock						
MW16-15							
	Shallow						
	Intermediate						
	Deep	D	6300 to 1400	D	3.35 to 2.47		
	Shallow Bedrock	D	4600 to 705	D	110 to 54.7		
	Deep Bedrock	I	160 to 210	I	21.4 to 27.3		
MW16-16							
	Shallow						
	Intermediate	D	200 to 49	NC	0.47 to 0.441		
	Deep	D	89 to 44				
	Shallow Bedrock						
	Deep Bedrock						
MW16-18							
	Shallow						
	Intermediate	I	23 to 72.5				
	Deep	D	0.7 to 0.165				
	Shallow Bedrock						
	Deep Bedrock						
MW16-19							
	Shallow						
	Intermediate	D	32 to 15				
	Deep	D	390 to 260	D	0.62 to 0.492		
	Shallow Bedrock						
	Deep Bedrock						

TABLE 5-1

SUMMARY OF CONTAMINANT CONCENTRATIONS OVER TIME
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Monitoring Well		Trichloroethene (µg/L)		1,2-Dichloroethene (µg/L)		Vinyl Chloride (µg/L)	
MW16-20							
	Shallow						
	Intermediate	D	12 to 7.34	D	0.28 to 0.158		
	Deep	I	1.0 to 9.96				
	Shallow Bedrock						
	Deep Bedrock						
MW16-21							
	Shallow						
	Intermediate	I	14 to 43	I	0.18 to 0.304		
	Deep	D	1900 to 860	I	1.0 to 1.57		
	Shallow Bedrock						
	Deep Bedrock						
MW16-22							
	Shallow						
	Intermediate	D	190 to 110	NC	2 U to 0.681		
	Deep	D	2600 to 1500				
	Shallow Bedrock						
	Deep Bedrock						
MW16-23							
	Shallow						
	Intermediate						
	Deep	D	3500 to 1900	I	4.0 tp 25.5	I	0.05 to 0.092
	Shallow Bedrock						
	Deep Bedrock						
MW16-24							
	Shallow						
	Intermediate	D	41 to 35	I	0.63 to 1.54		
	Deep	I	520 to 690	D	48.7 to 11.4	D	22 to 7.87
	Shallow Bedrock						
	Deep Bedrock						
MW16-25							
	Shallow						
	Intermediate	D	220 to 120				
	Deep	D	890 to 415	D	2.0 to 0.229		
	Shallow Bedrock	D	1.08 to 0.445				
	Deep Bedrock						
MW16-27							
	Shallow						
	Intermediate						
	Deep	D	310 to 190	NC	9.7 to 9.64	NC	0.06 to 0.0506
	Shallow Bedrock						
	Deep Bedrock						
MW16-28							
	Shallow						
	Intermediate						
	Deep	I	120 to 200	I	0.8 to 1.15		
	Shallow Bedrock						
	Deep Bedrock						

TABLE 5-1

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SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Monitoring Well		Trichloroethene (µg/L)		1,2-Dichloroethene (µg/L)		Vinyl Chloride (µg/L)	
MW16-29							
	Shallow						
	Intermediate						
	Deep	NC	2700 to 2900	D	55 to 37	D	1.0 to 0.515
	Shallow Bedrock						
	Deep Bedrock						
MW16-31							
	Shallow						
	Intermediate						
	Deep	D	210 to 150	D	0.95 to 0.143		
	Shallow Bedrock						
	Deep Bedrock						
MW16-32							
	Shallow						
	Intermediate						
	Deep	D	2700 to 290	NC	8.84 to 10 U		
	Shallow Bedrock						
	Deep Bedrock						
MW16-33							
	Shallow	D	0.75 to 0.17				
	Intermediate						
	Deep						
	Shallow Bedrock						
	Deep Bedrock						
MW16-34							
	Shallow						
	Intermediate	D	2.74 to 1.0 U				
	Deep	D	5.03 to 1.61				
	Shallow Bedrock						
	Deep Bedrock						
MW16-37							
	Shallow	D	840 to 93				
	Intermediate	I	1100 to 1700				
	Deep	D	21 to 13				
	Shallow Bedrock						
	Deep Bedrock						
MW16-38							
	Shallow						
	Intermediate	D	1200 to 820				
	Deep						
	Shallow Bedrock						
	Deep Bedrock						
MW16-39							
	Shallow						
	Intermediate	D	86 to 77				
	Deep	I	1.0 U to 1.44				
	Shallow Bedrock						
	Deep Bedrock						

TABLE 5-1

SUMMARY OF CONTAMINANT CONCENTRATIONS OVER TIME
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Monitoring Well		Trichloroethene (µg/L)		1,2-Dichloroethene (µg/L)		Vinyl Chloride (µg/L)	
MW16-40							
	Shallow	NC	14.5 to 14	NC	98.9 to 92.2	I	10 to 55
	Intermediate						
	Deep						
	Shallow Bedrock						
	Deep Bedrock						
MW16-41							
	Shallow	NC	1.0 U to 0.418	D	8.5 to 4.96	D	36 to 24
	Intermediate	D	96 to 89				
	Deep	I	410 to 610	NC	4.35 to 4.4	NC	0.1 to 0.106
	Shallow Bedrock						
	Deep Bedrock						
MW16-42							
	Shallow			I	2.77 to 5.77	I	5.0 to 9.28
	Intermediate			D	54.8 to 41	I	25 to 33
	Deep	D	990 to 725	D	7.19 to 4.82	D	0.2 to 0.135
	Shallow Bedrock						
	Deep Bedrock						
MW16-43							
	Shallow			D	7.55 to 4.31	D	2.0 to 0.415
	Intermediate	I	3.09 to 4.47	D	1.52 to 0.486		
	Deep	I	780 to 810	D	9.21 to 7.53		
	Shallow Bedrock						
	Deep Bedrock						
MW16-44							
	Shallow	I	2.48 to 3.63	I	16.2 to 21.3	D	44 to 12
	Intermediate	I	2.75 to 3.14	I	3.56 to 4.46	I	0.55 to 0.926
	Deep	I	660 to 1300	D	16.3 to 13.6	NC	0.3 to 0.322
	Shallow Bedrock	I	940 to 1400	I	15.1 to 22.4	I	0.3 to 0.461
	Deep Bedrock						
MW16-45							
	Shallow			NC	4.96 to 4.13	I	0.1 to 0.18
	Intermediate	D	820 to 520	D	7.73 to 6.7	D	0.3 to 0.117
	Deep	D	780 to 680	D	9.58 to 6.94	NC	0.2 to 0.0212
	Shallow Bedrock						
	Deep Bedrock						
MW16-46							
	Shallow			I	0.82 to 0.976	D	2.0 to 1.86
	Intermediate	NC	0.445 to 0.454	NC	0.86 to 0.843		
	Deep	NC	360 to 380	NC	5.92 to 5.36	D	0.2 to 0.113
	Shallow Bedrock						
	Deep Bedrock						

TABLE 5-1

SUMMARY OF CONTAMINANT CONCENTRATIONS OVER TIME
SUPPLEMENTAL PHASE II RI DATA PACKAGE FOR INSTALLATION RESTORATION PROGRAM SITE 16
FORMER NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Monitoring Well	Trichloroethene (µg/L)	1,2-Dichloroethene (µg/L)	Vinyl Chloride (µg/L)

I = Contaminant concentration appears to be increasing over time

D = Contaminant concentration appears to be decreasing over time

NC = The contaminant concentration does not appear to be changing over time

U = Contaminant was not detected at the detection limit specified

Note: Determination of whether concentrations are increasing, decreasing, or not changing over time were based on 2 or 3 data points over time. Therefore, determination of trends are qualitative. The wells and contaminants showing a change of 100 µg/L or more between first and last measurement are boldened and highlighted.

Note: For wells where less than two samples were collected or the analyses showed nondetectable concentrations of the contaminants, the approriate cells were left blank.

6.0 CONCEPTUAL SITE MODEL

This section augments and updates the conceptual site model information presented in the Phase I and II RI reports.

6.1 CONTAMINANT RELEASE MECHANISMS AND SOURCE AREAS

Based on available data, the activities that took place at Site 16 resulted in one major contaminant release mechanism, a less important second mechanism, and possibly a third and but significant mechanism.

The most important release mechanism was spillage of organic liquids to surface soils. This is known to have happened in the Creosote Dip Tank area, which was active in the late 1960s. This type of release may also have occurred in other places within Site 16. For example, use of accelerants such as kerosene or diesel fuel to ignite a structure in the former FFTA could have resulted in spills to the ground surface. Inclusion of relatively small amounts of chlorinated solvents in the accelerants is likely but can not be demonstrated. A surface release mechanism is plausible throughout Site 16. Data, however, suggest that such releases would have occurred in three primary areas: the north central area of Site 16, the Building 41 area, and the area east of Building 41 (e.g., near locations MW16-57 and MW16-39).

A minor contaminant release mechanism in terms of the expected magnitude of residual contamination at Site 16 is the combustion of organic liquids in the former FFTA. Presumably, most of the liquid volume burned was non-chlorinated liquids. Chlorinated solvents do not burn very well and use of non-chlorinated petroleum hydrocarbons such as kerosene and diesel fuel was and still is common for that type of operations. The burning would have resulted in combustion products being distributed throughout the air in all directions. The relatively diffuse nature of this deposition mechanism, however, causes the Navy to believe that it is of lesser importance than the releases of organic liquids to ground surface. Furthermore, combustion plumes generally rise high at the point of combustion and aerial fallout does not occur for hundreds of feet in the downwind direction. The presence of dioxins and furans, which are formed during combustion of chlorinate materials, is an indication that there is probably a slight impact to Site 16 soils from combustion. However, dioxins are ubiquitous and it is likely that the observed dioxin and furan concentrations in soil reflect a mixture of Site 16 and non-Site 16 sources. Furthermore, dioxins can only be generated if a source of chlorine is present. Therefore, unless polyvinyl chloride plastics, chlorinated solvents, or other chlorine sources were burned, the dioxins would not have formed in measurable quantities from the combustion at Site 16. The presence of dioxins at concentrations less than 1 µg/kg renders them interesting but insignificant from a risk perspective and they are not discussed further.

The third potentially significant mechanism related to Site 16 operations is releases of organic solvents, especially chlorinated solvents, from Building 41 drains or other subsurface structures (e.g., tanks). Such releases would have contaminated subsurface soils directly without having to first migrate through surface soils. This may also have occurred further south and southeast of Building 41 in the Building 319 area. The Building 319 area has not been explored as thoroughly as the Building 41 area with respect to groundwater flow directions or groundwater contaminant levels.

In addition to operationally-related contaminant release mechanisms there are a few non-operationally-related release mechanisms that are known to have occurred, or could have occurred to contaminate the Site 16 environment One mechanism is precipitation runoff from parking lots into storm sewers that discharge to Allen Harbor. This is particularly important for the southeast corner of Allen Harbor where a storm sewer of large flow volume is present. This sewer system drains acres of asphalt paved areas. Asphalt is a rich source of PAHs. A similar mechanism is overland flow of runoff from roads and land surfaces to downgradient areas, including the Allen Harbor sediments. Contaminants likely to be included in these transport pathways include metals as well as the organic compounds, especially for runoff from paved areas where vehicles travel. The vehicles are known sources of lead and other metals as well as semi-volatile organic compounds, especially PAHs. The metals and PAHs originate from car bodies, combustion of leaded and unleaded fuels, and tire wear. Furthermore, oils have been known to be used to suppress dust on dirt road, and in the early years of Site 16, this is another very plausible mechanism for the release of oils and waste oils, including PCB oils, metals, and SVOCs especially PAHs). Contaminants in north central area surface soils have likely migrated in overland flow toward lower lying area, including the harbor. The Site 16 contaminants, consequently, would mix with contaminants from non-Site 16-related sources. Because the Site 16 contaminants are generally present at low levels in the Site 16 surface soils, this does not appear to be a significant mechanism for contamination of harbor shoreline sediments.

Other major non-Site16-releated release pathways are boat traffic on Allen Harbor, leaching of contaminants from dock pilings, and spills of boat fuels. The contaminants from these releases would first enter the Allen Harbor water body but would eventually accumulate in sediments. Boat traffic is a fairly rich source of PAHs and BTEX compounds from combustion, lubricating oils, and fuels. It is also a source of metals from the boat hulls, combustion of leaded gasoline, and similar sources. Chemical compounds of copper, in particular, have been widely used in boat hull anti-foulant formulations, causing them to be a source of copper contamination. Copper, similar to other metals, tends to accumulate in surface water body sediments such as those of Allen Harbor.

Based on site history and available data, the following associations can be made between various areas of Site 16 and significant contaminant groups:

The North C ntral Area, Former FFTA Soils:

SVOCs and dioxins/furans from spillage to surface soils and combustion of organic fuels and possibly chlorinated organic solvents or other chlorinated materials Dioxins/furans are concluded to be of minor significance and do not warrant further investigation because their concentrations are less than the commonly used cleanup level of 1 µg/kg. SVOCs are the contaminants of primary interest in soils; CVOCs are the contaminants of primary interest in groundwater. SVOC concentrations in groundwater are not a concern and are likely not to be a concern in the future because the PAHs are isolated from the groundwater by tens of feet of overburden soils. The overburden soils pose a large volume of adsorptive material to which the PAHs preferentially bind.

The North Central Area, Creosote Dip Tank Area Soils:

SVOCs and possibly VOCs. Creosote, a source of SVOCs was released to surface soils in this area and evidence of the release is present by the detection of creosote-related SVOCs. Solvents used to wash away the creosote may also have been used in this area. SVOCs are the only contaminants of continuing concern in soils, although continued exploration for VOCs may yield information that is helpful to delineate where SVOC contamination is and to explain migration of SVOC contaminants.

The North Central Area Soils near SB16-28:

Primarily SVOCs but possibly chlorinated VOCs. Available data indicate that a surface release occurred in this area to soils that involved SVOCs and possible VOCs. The SVOCs have migrated to relatively deep soils, although they evidently do not pose a threat to groundwater for reasons described for the former FFTA soils.

Th North Central Area Soils near SB16-41:

Primarily CVOCs. Available data indicate that a surface release may have occurred in this area to soils that involved CVOCs. The chlorinated solvent groundwater plume also indicates a potential contribution of CVOCs from the North Central Area, possibly near SB16-41.

Allen Harbor Sediments and Surface Water:

No significant contamination, based on the SLERAs conducted to date and comparisons of contaminant levels to human health screening levels. It is likely that Site 16 has contributed a small amount of contamination to the harbor sediments, but the contribution is concluded to be insignificant relative to other contaminant sources. Elevated PAH and metal concentrations were shown through forensic

fingerprinting and other forensic techniques not to be related to Site 16. Furthermore, the contaminant levels are generally not much greater than human health and ecological screening levels and further investigation is not warranted.

Contamination of Allen Harbor surface water is not a significant concern, based on past investigations. It is quite likely that Site 16 has contributed a small amount of contamination to the harbor surface water, but the contribution is concluded to be insignificant relative to other contaminant sources.

It is possible that CVOC-contaminated groundwater is infiltrating Allen harbor sediments at the bottom of the harbor. However, as stated in Section 5, remedial actions to reduce CVOC concentrations in groundwater are not likely to focus on the harbor.

Se ps:

Individual seeps exhibited elevated concentrations of SVOCs and VOCs. Seeps are acknowledged as a groundwater migration pathway, however, there is no evidence that migration of groundwater through seeps is a significant contaminant transport pathway. Therefore, seeps are not discussed further.

Th Building 41 Area:

CVOCs, primarily TCE, is evident from the major VOC groundwater plume emanating from this area. Limited exploration has occurred for non-VOC contaminants but the limited past explorations and the site history indicate that VOCs are the only contaminants of interest for this area. Available data indicate that multiple sources contribute to the CVOC plume but the precise locations of the sources are unknown. There is some indication that PCE was also released in this area because it was detected in a couple of wells, although the magnitude of the release was probably small, given the small amount of residual PCE contamination (less than 30 µg/L in all sampling years). The PCE may have been a contaminant of TCE or released as a solvent. Degradation products of TCE are evident throughout the plume. This indicates that TCE is degrading naturally in the groundwater.

The Building 319 Area:

CVOCs, primarily TCE. There are some indications, because of uncertainty in groundwater flow directions, that Building 319 or 318 could be contributing to the predominant groundwater plume emanating from the Building 41 area. (However, it is more likely that groundwater is flowing to the east/southeast in this area.) Limited past explorations and the site history indicate that CVOCs are the only contaminants of interest for this area.

East of Site 16 Building 41 Ar a:

CVOCs, primarily, TCE. One or more releases of CVOCs in this area has resulted in contaminated groundwater in wells at locations such as MW16-39 and MW16-57. The release(s) is (are) presumed to have been a release to surface soils, although this can not be demonstrated with the available data.

The extent of contamination in these areas is described in Section 4. In this regard two important observations are made for soils: For areas exhibiting CVOC contamination, the deep soils exhibit the most significant concentrations. For areas that exhibit LNAPL-related contamination (e.g., BTEX and SVOCs), shallow soils exhibit the greater concentrations.

The geology and hydrogeology of the site largely govern the movement of contaminants from one environmental compartment (e.g., soils, sediment, and groundwater) to another. Therefore, these topics are summarized in the following sections in terms of relating known and possible contaminant releases to the potential transport pathways and effects of time on contaminant concentrations.

6.2 GEOLOGY AND HYDROGEOLOGY

Glacial deposits range in thickness from approximately 10 feet deep over bedrock highs to more than 100 feet deep in bedrock valleys. The glacial deposits consist of numerous lithologic units that are thin, laterally discontinuous, and interbedded, so that correlating one lithology across the site with confidence is very difficult.

Nevertheless, the glacial overburden can be subdivided into three units. The uppermost unit (shallow overburden) consisting of fill materials, reworked soils, and recent harbor sediments has a wide variety of textures ranging from silty clay up to gravel and ranges in thickness from 4 feet to 26 feet deep. This unit is quite permeable to DNAPL and NAPL transport, although the more tightly binding chemicals such as PAHs will resist migration considerably. The intermediate unit consists of 30 to 40 feet of deposits, with very fine to fine sand at the top of the unit; silt, sandy silt, and clayey silt lenses in the middle of the unit; and fine to very fine silty sand near the bottom of the intermediate unit. The lowermost glacial deposit (the deep overburden) is dominated by variable sized sands and gravel, with lesser amounts of sandy, silty gravel and gravelly silt. This unit ranges in thickness from 0 to approximately 21.5 feet. It is thinnest or missing around the southwest portion of the site near former Building 41 and generally thickens toward Allen Harbor on the northeast side of the site. The relative permeabilities are, from shallow to deep: highest, lowest, intermediate, although there is much variation in permeability within and across these strata. Because the hydraulic conductivity in each unit is highly variable, it is quite likely that groundwater moves vertically between units as sand and gravel lenses pinch out in order to find the easiest path for lateral migration

The glacial and recent unconsolidated deposits rest on Pennsylvanian age metamorphic rock. The uppermost bedrock is weathered and fractured. The weathered bedrock ranges from 0 to 20 feet thick or more. However, more than 50 percent of the boring sites showed the weathered bedrock to be less than 5 feet thick. Of the rock sections cored, 41 percent displayed comparatively high permeability (RQD values less than 50 percent), and 59 percent had comparatively low permeability (RQD values greater than 50 percent). All else being equal, greater permeability translates to faster groundwater movement and faster dissolved contaminant transport. However, the relative gradients must also be considered. Higher head pressures also translate to faster groundwater movement if permeabilities are uniform. Therefore, the combination of permeabilities and pressure gradients dictate the direction and rate of groundwater flow.

6.3 CONTAMINANT BEHAVIOR IN THE ENVIRONMENT

The migration potential for soil contaminants is limited and has been described elsewhere in this report (Sections 5 and 6.2) therefore it is not described further here. Instead, because VOCs are the contaminants of greatest significance and are affecting groundwater over an extensive area, this discussion focuses on groundwater VOCs and the relationship of those contaminants to potential sources.

Release of LNAPLs has contaminated shallow and intermediate soils of the north central portion of Site 16. The primary soil contaminants are PAHs (refer to Section 4). It is believed that the primary contaminant source areas are known but they have not been sufficiently delineated to support a detailed risk assessment or Feasibility Study (FS). A potential exists for as yet unidentified contaminants sources to exist in the north central portion of Site 16 but these sources are likely to be small and difficult or impossible to find without Herculean efforts.

The LNAPL-related contaminants such as BTEX would not sink beyond the water table as a separate organic phase. They can, however, dissolve into the groundwater and be transported along with the groundwater to downgradient directions. Some evidence exists for this but the groundwater concentrations of BTEX and other LNAPL-related solvent chemicals is limited to values less than RIDEM GA Groundwater criteria. This indicates that the concentrations are not significant. PAHs, which are present in LNAPL fuels, have evidently migrated deeper than surface soils. Based on available data, however, the majority of PAH contamination is expected to lie within about 10 feet of ground surface. Relatively minor PAH contamination has been observed in groundwater, indicating that the PAHs have bound tightly to soils and are moving slowly to groundwater. Furthermore, the PAHs must travel a relatively long way from the 0 to 10-feet bgs interval before encountering groundwater. This tends to mitigate any impact the PAHs have on the groundwater. A similar case can be made across Site 16,

therefore, based on the analytical available to date SVOCs are not viewed as a significant threat to groundwater quality.

Evidently, past releases of DNAPL that sank deeper and deeper into soils under gravity potential have contaminated the deeper groundwater. The releases are old enough that the shallow groundwater is now relatively uncontaminated. Whereas no current evidence exists for the continued presence of DNAPL, the potential for this can not be ruled out. Presumably, however, the residual DNAPL is stored in the intermediate to deep overburden soils as an adsorbed phase that slowly leaches into the groundwater at similar elevations. A potential also exists for DNAPL to be present as an adsorbed phase in bedrock, especially the shallow bedrock that is weathered and severely fractured.

In general, the predominant plume of TCE emanates from former Building 41 or nearby the building and has migrated northeastward toward Allen Harbor. The plume has reached Allen Harbor in the intermediate overburden, deep overburden, and bedrock zones sometime before 2002. The TCE plume apparently has not migrated all the way to Allen Harbor in the shallow zone (i.e., TCE, DCE, or vinyl chloride have not been detected in the shallow wells near Allen Harbor [2004 data]).

A minor to moderate contributor to the groundwater VOC contamination appears to be associated with the north central portion of Site 16. The evidence for this is a lobe of groundwater TCE concentrations oriented in an east-west direction between wells MW16-29D and MW16-43D/-44D/-45D (Figure 5-3). The TCE concentrations in the western portion of this zone (hundreds to low thousands of µg/L), are less than in the highest concentrations (more than 1,000 µg/L) in and downgradient of the apparent Building 41 source area. The groundwater contamination from the MW16-43D/-44D/-45 wells area has merged with the primary plume emanating from the Building 41 area.

There is an area of TCE contamination detected in the intermediate zone east of former Building 41 at wells MW16-39I and MW16-57I that appears to be separate from the primary TCE plume. The source of TCE in this plume and the areal extent of this plume is unknown and should be investigated further.

Overall, it appears that TCE was released at one or more points around the former Building 41 and has migrated quickly downward and laterally through the overburden soils and into the bedrock. In 2004, the largest extent of TCE contamination was detected in the intermediate overburden, deep overburden, and the bedrock. High concentrations of TCE were not detected in the shallow overburden, and a moderate concentration of TCE (93 µg/L) was detected in only one shallow well (MW16-37S). A release may also have occurred near well MW16-44D. Its behavior would be similar to that described below for Building 41 contamination.

Few soil samples have been collected from the vadose zone around and under former Building 41. Hence, it is not known whether TCE is still leaching from these soils and the soils are acting as a long-term source for TCE in the plume. Therefore, a soil sampling program should be performed around former Building 41 to assess whether TCE is still present in the soils and the potential for long-term leaching of TCE into groundwater.

The area to the east of former Building 41 had TCE detected in intermediate zone wells, but it is difficult to ascertain whether former Building 41 was the original source of the TCE or whether another smaller localized release(s) have occurred in the area (e.g., in the vicinity of MW16-39 or MW16-57I). Additional MIP investigations, soil sampling, and well installations in this area may be warranted to further delineate the extent of the TCE contamination in this area and to identify the probable release point(s).

The use of TCE and TCE degreaser operations was halted in Building 41 in 1953 and the operations were moved to Building 319. It is possible that spills, leaks, or other releases of TCE from this building also occurred and should be investigated. Soil sampling, MIP investigations, and monitoring well installations may help to adequately investigate this potential source of TCE.

The subsurface geochemical conditions at Site 16 were extensively discussed in the draft Phase II RI report (EA, June 2003), and were summarized in Section 5 of this report. In general, the groundwater is aerobic to slightly reducing in all layers over most of the Site 16 area. These conditions are not conducive to the reductive dechlorination of TCE, 1,2-DCE, or vinyl chloride. However, there are areas of the groundwater system in the central and northeastern portions of the plume that are reducing and some 1,2-DCE and vinyl chloride production has resulted. These reducing conditions were found primarily in the FFTA and to the east and northeast of the FFTA. In some localized areas, the geochemical conditions have reached sulfate-reducing and methanogenic conditions. Presumably, this is where most of the production of 1,2-DCE and vinyl chloride is occurring.

The occurrences of 1,2-DCE and vinyl chloride coincide closely with locations where BTEX contamination is also present (the FFTA). When aerobic microbiological degradation is fueled by BTEX oxygen is consumed and the oxidation-reduction potential decreases. The reducing conditions, as well as the organic carbon source the BTEX provides, enhance the rate of TCE dechlorination reactions.

Microbial degradation of TCE, 1,2-DCE, and vinyl chloride is occurring in Site 16 groundwaters, as evidenced by the daughter products detected in groundwater samples. As stated above, the natural redox conditions over most of the site do not appear to be conducive to reductive dechlorination. However, the presence of BTEX in the FFTA and natural organic matter in sediments near Allen Harbor have provided a carbon substrate, thereby enhancing microbial degradation of the chlorinated ethene

compounds. The evaluation of concentration-time trends for each well and the primary chlorinated ethane compounds in Section 5 strongly suggests that TCE and 1,2-DCE mass in the plume is declining quickly over time. Part of the reason for the apparent rapid decrease could be the relatively rapid groundwater flows that are flushing the soil/bedrock system of CVOCs. The vinyl chloride mass is relatively low and is generally stable over time. Additional rounds of groundwater sampling should be performed in order to confirm whether or not these temporal trends are real.

Biodegradation is not the only process that causes natural attenuation of contaminants in a plume. Certainly, rainfall and infiltration of surface water is causing dilution and dispersion of contaminants in the shallow zone. As groundwater from Site 16 reaches Allen Harbor, it should theoretically converge with groundwaters from the east and the west and mix with these groundwaters as it discharges to the harbor. In addition, there will be a tremendous amount of mixing and dilution in the Harbor itself after contaminated groundwater discharges to the Harbor.

7.0 DATA GAPS AND RECOMMENDATIONS

This section describes the RI data gaps identified during the data evaluations presented in Sections 1 through 6. Preliminary recommendations for the resolution of those data gaps are also provided. As noted in Section 1, the upcoming RI report for Site 16 will include both human health and ecological risk assessments of the contaminant concentrations in Site 16 environmental media. Consequently, a major objective of the preceding data evaluations was the identification of data gaps in the information necessary for the completion of the RI risk assessments. For example, the nature and extent of contamination in the environmental media and the hydrogeological conditions at Site 16 must be characterized to the extent necessary to evaluate site-related current and potential future on-site and off-site human and ecological receptor risks. A second objective of the preceding evaluations was the preliminary identification of data gaps in contaminant source areas and information that may significantly impact a Site 16 feasibility study. The following lists of data gaps and preliminary recommendations for resolution of those data gaps will be further developed and refined in a Supplemental Phase III QAPP scheduled to be prepared in the Spring of 2006:

DATA GAPS:

- The soils and groundwater in the general vicinity of the former Building 41 have not been characterized adequately. For example, no surface soils and limited shallow subsurface soils have been collected in much of the area and both soils and groundwater investigations to date have focused primarily on the northeastern section of the building. While at least one source does exist in or in close proximity to this area, its exact location has not yet been identified. As noted below, other source areas may also exist in the general vicinity of the former Building 41.

- The PAH contamination (and to a lesser extent the CVOC contamination) in the surface and shallow-subsurface soils in the western section of north-central portion of Site 16 (i.e., the extended boundary Creosote Dip Tank Area) has not been fully characterized. This includes the area identified as the former location of the up-ended creosote dip tank and an area in the vicinity of SB16-28/SB16-07. If remediation is determined to be necessary for this area during the RI, the boundaries of the contamination have not been delineated sufficiently to support soil removal and possibly other remedial alternatives.

- The PAH contamination (and to a lesser extent the CVOC contamination) in the surface and shallow-subsurface soils in the vicinity of the former FFTA have not been fully characterized.

- The VOC contamination (primarily CVOC) in the vicinity of SB16-41 (the southern portion of the north central area of Site 16) has not been delineated. There is a general lack of soils characterization in the area. [Only one soil boring (SB16-41) has been advanced in the area.] This is a marginal concern [vinyl chloride contamination (21 µg/kg) slightly exceeded the RIDEM direct contact criterion (20 µg/L)] in shallow subsurface soils but a deeper sample was not collected at SB16-41. The cis-1,2-dichloroethene concentration reported for this location (1,800 µg/kg) is also notable. Limited investigation of PAHs may be warranted in this area because of the nature of the operations in the north central portion of Site 16.

- In addition to the area-specific soils data gaps listed in preceding bullets, the soil investigations conducted have been limited because they have focused primarily on the previously identified EBS source areas and primarily on subsurface soils. Additional limited soil sampling throughout Site 16 is recommended to more fully establish the extent of soils contamination at Site 16 and solidify the conceptual model for the site.

- A background soil data set does not currently exist for Site 16. Although the data collected to date suggest that metals are not significant contaminants of concern at Site 16, a background soil data set for metals and pesticides in particular would be very useful to both the human and ecological risk assessments.

- The TCE contamination in the intermediate overburden may not be completely bounded to the northwest in the vicinity of MW16-45I (the former FFTA) and north near MW16-05I. Additionally, there is some question as to whether or not the source of the TCE noted in MW16-05I is solely related to the CVOC plume migrating from the former Building 41 area or whether a secondary source is also present in the area, e.g. to the west or southwest of MW16-05I, in the northern central portion of Site 16.

- Data from intermediate wells to the east/southeast of the former Building 41 (e.g., MW16-37I and MW16-38I) in the railroad spur area suggest that there may be more than one source of CVOCs in area east/southeast of the former Building 41 area.

- The eastern edge of the TCE plume in the intermediate groundwater zone in the vicinity of MW16-39I and MW16-57I has not been defined and suggests that an additional CVOC source may be present beyond the eastern boundary of Site 16.

- Groundwater flow information in the area to the south and east of the former Building 41 (e.g., in the area between the former Building 41 and Buildings 318/319) is limited. Also, the CVOC profile in the

area between the former Building 41 and Buildings 318/319 has not been completely defined. Additional groundwater elevation data should be collected in that area to refine the understanding of groundwater flow directions.

- Information regarding the hydraulic conductivity in the bedrock zone is limited and additional data are needed from a limited number of wells to complete the conceptual model regarding groundwater flow rates. The precise locations of the wells will be selected during preparation of the Supplemental Phase III QAPP.

- The vertical and lateral extent of TCE contamination in the shallow and deep bedrock zones has not been completely determined. Although the groundwater contamination in the bedrock zones is expected to mimic the contamination pattern noted in the deep overburden, a limited number of additional bedrock wells is recommended to assure that extent of the CVOC contamination in the bedrock is understood.

- Since degreasing operations were moved from the former Building 41 to Building 319, soils and groundwater should be investigated around Building 319 to determine if it too is a source of CVOCs.

PRELIMINARY RECOMMENDATIONS FOR RESOLVING DATA GAPS:

- Additional site screening using membrane interface probe (MIP) survey, soil gas surveys, and/or PAH field test kits to identify any additional areas that need to be investigated for delineating contamination or identifying residual contaminant sources. MIP investigations have not previously been conducted (or only conducted to a limited degree) in the vicinity of the former Building 41 area, in the area to the south and east of the former Building 41, and in the eastern section of Site 16 in general. Because CVOCs are the primary contaminants of concern, a soil gas survey of the site would not only assist in the characterization of the site, it would also provide data useful to the preparation of the human health risk assessment. Because PAHs are the primary SVOCs of concern in the north central portion of Site 16, field screening using PAH test kits may assist in the location of additional sampling points to delineate the extent of the PAH/potential fuel-related contamination.

- Soil sampling (surface and subsurface sampling) in the known sources areas (listed above) as well as Site 16 in general to further identify and delineate contamination. One thought is that a soil sampling grid could be established for Site 16, in general, and for the known source areas of concern listed above. The grid would be adjustable. The initial grid spacing would be related to the degree of exploration previously conducted and the degree of potential for the presence of unexplored contaminant sources. A stratified random sampling design is proposed to refine the nature and extent of contamination that would be sufficient to support risk assessments and an FS. The

recommended analytical program has a focus on CVOCs, BTEX, and SVOCs with a limited number of samples also analyzed for pesticides and metals.

- A soils background study is recommended to support the human health and ecological risk assessments. Because the available data suggest that metals are not significant site-related contaminants, the background study will be somewhat limited in scope. The soils background study will focus on metals, but should also include a limited number of samples analyzed for pesticides and PAHs.

- Installation of additional monitoring wells is recommended for areas described above where groundwater flow is not completely defined and where contamination is currently not considered to be bounded or delineated to the extent necessary to complete the RI [e.g., in the general vicinity of MW16-45I, to the southwest, south, and east (e.g., MW16-39I, MW16-57I) of the former Building 41 area].

- Additional aquifer testing is recommended for the bedrock wells to define the hydraulic conductivity in the bedrock zone. In lieu of monitoring wells, installation of piezometers may be useful in locations where only groundwater elevation data must be collected. Installation of staff gauges at local ponds and measurement of water levels at the staff gauges is also recommended to complete the understanding of water levels and groundwater flow directions.

- An additional round of groundwater monitoring is recommended for any new monitoring well installed and select existing wells. The analytical program should focus on CVOCs with limited monitoring for PAHs and metals (unfiltered and filtered samples).