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ENGINEERS ▪ SCIENTISTS

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December 7, 2007
File No. 2032.00 O

Mr. David Lederer, Project Manager
United States Environmental Protection Agency
Office of Site Remediation & Restoration
One Congress Street, Suite 1100 (HBO)
Boston, MA 02114-2023

Re: Version 02F Draft of the Addendum to the Remedial Investigation Report
Phase 1B-4/1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Dear Mr. Lederer:

On behalf of Tyco Healthcare Group, LP (Tyco), Sanborn, Head & Associates, Inc. (SHA) has attached three copies of the *Version 02F Draft of the Addendum to the Remedial Investigation Report-Phase 1B-4/1B-5 Investigations, Blackburn & Union Privileges Superfund Site, Walpole, Massachusetts.* Additionally, we have attached four copies of the report on compact disc (CD).

Please feel free to contact the undersigned with questions.

Very truly yours,
SANBORN, HEAD & ASSOCIATES, INC.

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BAG/CLH/TMW:tmw

Encl. 3 paper copies/4 CD copies – Version 02F Draft of the Addendum to the Remedial Investigation Report

SDMS 287799

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VERSION 02F DRAFT
ADDENDUM TO THE REMEDIAL INVESTIGATION REPORT
PHASE 1B-4/1B-5 INVESTIGATIONS

Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Prepared for
Tyco Healthcare Group, LP

Prepared by
Sanborn, Head & Associates, Inc.

File 2032.00
December 2007

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ABBREVIATION AND ACRONYM LIST

%	Percent
>	Greater Than
<	Less Than
AMS	Applied Marine Sciences, Inc.
AMSL	Above Mean Sea Level
AOC	Area of Containment
APH	Air-Phase Petroleum Hydrocarbons
Aquatec	Aquatec Biological Sciences, Inc.
ARARs	Applicable and Relevant and Appropriate Requirements
AST	Above Ground Storage Tank
ASTM	American Society of Testing Materials
AVOCs	Aromatic Volatile Organic Compounds
AVS	Acid Volatile Sulfides
AWHL	Alpha Woods Hole Laboratories (formerly WHGEL)
Axiom	Axiom Partners, Inc
BaP	Benzo(a)pyrene
BERA	Baseline Ecological Risk Assessment
bgs	Below Ground Surface
BHHRA	Baseline Human Health Risk Assessment
Bryant	Bryant & Associates, Inc.
bss	Below Sediment Surface
BT	Benzene And Toluene
BTEX	Benzene, Toluene, Ethylbenzene, and (m,p,o) Xylenes
^{o}C	Degrees Centigrade
Ca	Calcium
Canonie	Canonie Environmental Services, Inc.
CCCI	Camin Cargo Control, Inc.
cfs	Cubic Feet Per Second
CGI	Combustible Gas Indicator
cis-1,2-DCE	cis-1,2 dichloroethene
Cl	Chloride
cm^2	Square Centimeters
CO_3	Carbonate
C-O-C	Chain-Of-Custody
COPC	Chemical Of Potential Concern
COPEC	Chemical Of Potential Ecological Concern
Cosmec	Cosmec, Inc.
CT	Central Tendency
CTE	Central Tendency Exposure
CV	Coefficient Of Variation
CVOC	Chlorinated Volatile Organic Compounds

CWM	Chemical Waste Management, Inc.
DAPL	Dense Aqueous Phase Liquid
DO	Dissolved Oxygen
DQIs	Data Quality Indicators
DUR	Data Usability Report
EAI	Eastern Analytical Laboratories, Inc.
EB	Equipment Blank
EDI	Environmental Drilling, Inc.
EDRA	Existing Data Review And Analysis Report
EPA	United States Environmental Protection Agency
EPC	Exposure Point Concentration
ER-L	Effects Range - Low
ESN	ESN North Atlantic
FD	Field Duplicate
FS	Feasibility Study
FSP	Field Sampling Plan
ft	Feet
ft/day	Feet Per Day
ft/ft	Feet Per Foot
ft/yr	Feet Per Year
ft^2	Square Feet
ft^2/day	Square Feet Per Day
ft^3	Cubic Feet
ft^3/day	Cubic Feet Per Day
g/cm^3	Grams Per Cubic Centimeter
GC/MS	Gas Chromatograph/Mass Spectrometer
GC/MS-EI	Gas Chromatograph/Mass Spectrometer - Electron Ionization
GC/MS-SIM	Gas Chromatograph/Mass Spectrometer - Selected Ion Monitoring
GLWQI	Great Lakes Water Quality Initiative
GPR	Ground Penetrating Radar
HASP	Health and Safety Plan
HCO_3	Bicarbonate
HDPE	High Density Polyethylene
He	Helium
HQ	Hazard Quotient
HIs	Hazard Indices
HRGI	Hager-Richter Geosciences, Inc.
IATL	International Asbestos Testing Laboratory, Inc.
IDW	Investigation Derived Waste
in/yr	Inches Per Year
ISC	Initial Site Characterization
K	Potassium

Kendall	The Kendall Company
lb/ft^3	Pounds Per Cubic Foot
LELs	Lowest Effect Levels
LOAELs	Lowest Observed Adverse Effects Level
LOED	Lowest Observed Effects Dose
M&E	Metcalf & Eddy, Inc.
MADEP	Massachusetts Department of Environmental Protection
Maher	D.L. Maher, Inc.
MCA	Menzie, Cura & Associates, Inc.
MCP	Massachusetts Contingency Plan
MCLs	USEPA National Primary Drinking Water Standards Maximum Contaminant Levels
meq/L	Milli Equivalents Per Liter
MFL	Million Fibers Per Liter
Mg	Magnesium
mg/kg	Milligrams Per Kilogram
mg/L	Milligrams Per Liter
mL/min	Milliliters Per Minute
MPC	Measurement Performance Criteria
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MTBE	Methyl Tertiary Butyl Ether
mV	Millivolts
Na	Sodium
NaCl	Sodium Chloride
NAD	North American Datum
NAI	Normandeau Associates, Inc.
NCDC	National Climatic Data Center
ND	Not Detected (Above Laboratory Detection Limits)
NEH	New Environmental Horizons, Inc.
NGVD	National Geodetic Vertical Datum
NO_3	Nitrate
NOAA	National Oceanic and Atmospheric Administration
NOAELs	No Observed Adverse Effects Levels
NOED	No Observed Effects Dose
Norfolk	Norfolk Services, Inc.
NRWQC	National Recommended Water Quality Criteria
NS	Not Sampled or No Sample Date Available
NSR	No Significant Risk
NTU	Nephelometric Turbidity Unit
NWS	National Weather Service
Order	Administrative Order by Consent
ORNL	Oak Ridge National Laboratory
ORP	Oxidation Reduction Potential

OSWER	USEPA Office of Solid Waste and Emergency Response
PAHs	Polycyclic Aromatic Hydrocarbons
PALs	Project Action Levels
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity
PBL	Probability
PCB	Polychlorinated Biphenyls
pE	Redox Potential
PELs	Probable Effects Levels
PID	Photo Ionization Detector
PLM	Polarized Light Microscopy
PPAs	Potentially Productive Aquifers
ppb	Parts Per Billion
ppm	Parts Per Million
ppmV	Parts Per Million by Volume
PQL	Project Quantitation Limit
PQOs	Project Quality Objectives
PRGs	Preliminary Remediation Goals
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance / Quality Control
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RI	Remedial Investigation
RI/FS	Remedial Investigation / Feasibility Study
RI Report	03F Draft Remedial Investigation Report, SHA 2007
RME	Reasonable Maximum Exposure
RPD	Relative Percent Difference
s.u.	Standard Units (pH)
SAP	Sampling and Analysis Plan
SCVs	Secondary Chronic Values
SDG	Sample Delivery Group
SEM	Simultaneously Extractable Metals
SHA	Sanborn, Head & Associates, Inc.
Shaffers	The Shaffer Realty Nominee Trust and BIM Corporation
SIM	Select Ion Monitoring
Site	Blackburn & Union Privileges Superfund Site
SO_4	Sulfate
SOPs	Standard Operating Procedures
SOW	Scope of Work
SQBs	Sediment Quality Benchmarks
SQC	Sediment Quality Criteria
SVOCs	Semi Volatile Organic Compounds

SWQC	Surface Water Quality Criteria
TAL	Target Analyte List
TB	Trip Blank
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leachate Procedure
TDS	Total Dissolved Solids
TECs	Threshold Effect Concentrations
TELs	Threshold Effects Levels
TEM	Transmission Electron Microscopy
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TWA	Time Weighted Average
Tyco	Tyco Healthcare Group, LP
µg/dL	Micrograms Per Deciliter
µg/kg	Micrograms Per Kilogram
µg/L	Micrograms Per Liter
µmol/g	Micromoles Per Gram
µS/cm	Microsiemens Per Centimeter
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds
VPH/EPH	Volatile Petroleum Hydrocarbons/Extractable Petroleum Hydrocarbons
WAD	Weak Acid Dissociable
WHGEL	Woods Hole Group Environmental Laboratory
Work Plan	Work Plan for The Phase IA Remedial Investigation for the Blackburn and Union Privileges Superfund Site, Walpole, Massachusetts
YSI	Yellow Springs Instruments, Inc.

EXECUTIVE SUMMARY

This report has been prepared by Sanborn, Head & Associates, Inc. (SHA) on behalf of Tyco Healthcare Group, LP (Tyco), in accordance with the requirements of the Administrative Order By Consent (Order) for the Remedial Investigation/Feasibility Study (RI/FS) and the "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (United States Environmental Protection Agency [USEPA], 1989). This document is an addendum to the Remedial Investigation Report (SHA, 2007). In general, this report summarizes the results of Phase 1B-4 and 1B-5 investigations (additional site characterization activities) performed as part of the Remedial Investigation (RI) for the Blackburn & Union Privileges Superfund Site located in Walpole, Massachusetts (Site). However, this Executive Summary and the conclusions presented in Sections 7.0, 8.0, and 9.0 of this report reflect overall summaries and conclusions of the RI, including the Baseline Human Health Risk Assessment (BHHRA) and Baseline Ecological Risk Assessment (BERA), completed at the Site.

Overview of the Remedial Investigation

The purpose of the RI was to evaluate the nature and extent of contaminants of potential concern[1] in various media at the Site and to evaluate the potential risks that these COPCs may pose to human health or the environment. In general, the RI consisted of the following:

1. A review of background information and previous environmental activities completed at the Site;
2. Completion of multiple field investigations with associated laboratory analyses;
3. An evaluation of the quality of the data collected as part of the RI;
4. An evaluation of the physical characteristics of the Site;
5. An evaluation of the nature and extent of the COPCs detected at the Site;
6. An evaluation of the transport and fate of the COPCs detected at the Site; and
7. An evaluation of the potential risk that these COPCs pose to human health or the environment (i.e., ecological receptors).

Summary of Key Findings

The presence and distribution of COPCs at the Site generally correlates with manufacturing operations that have occurred on portions of the Site over at least the past 100 years, and possibly dating back to the late 17th century. The principal COPCs observed at the Site include the following:

[1] For brevity and for the purpose of this Executive Summary, contaminants of potential concern (COPCs) shall refer to those analytes that were identified in the BHHRA and BERA documents as either COPCs or contaminants of potential ecological concern (COPECs). Some of the COPCs detected at the Site are most likely present as contaminants attributable to the industrial history of the Site; others may represent naturally occurring or background conditions.

- Elevated pH – associated with the use of sodium hydroxide (a strong base), which was formerly used in a cotton mercerizing and bleaching operation;

- Metals – primarily associated with various manufacturing activities formerly conducted at the Site, and in the case of groundwater, also due to the mobilization of certain metals from fill or naturally occurring soils by high pH conditions and other related geochemical factors;

- Organic chemicals – primarily polynuclear aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs), which are generally associated with coal and various petroleum products formerly used at the Site; and

- Asbestos – primarily associated with the former manufacturing of asbestos clutch and brake linings at the Site.

Following standard approaches used for RIs, this report does not draw conclusions about whether COPCs are present in the environment because of Site-related activities, or whether they represent a background condition unrelated to the Site. Additionally, the RI does not draw conclusions about whether chemicals are elevated in the environment over concentrations that may be expected to be naturally occurring, or whether a potential adverse effect to human health or the environment is of sufficient magnitude to warrant a remedial action. These matters of perspective, and the risk-management decisions that ensue, will be addressed in the forthcoming Feasibility Study (FS).

The following text summarizes the key findings of the RI. Figure ES-1 depicts those areas of the Site and surrounding properties that are referenced in the following Executive Summary text.

Summary of Soil Conditions

During the 1992 asbestos Removal Action, asbestos-containing soil excavated from various areas of the Site was consolidated on-Site by others in an area located south of the former mill building west of South Street. In addition, excavated asbestos-containing soil from the former mill tailrace was consolidated in a high density polyethylene (HDPE)-lined containment cell constructed in former Settling Basin No. 2 west of the former mill building. These areas south and west of the former mill building, along with an existing area of asbestos-containing soil north of the former mill building have been designated the Area of Containment (AOC). The AOC is subject to a deed restriction that limits uses of this property, and an eight-foot high barbed-wire security fence surrounds its perimeter.

In general, the highest concentrations of COPCs in soil were detected in the AOC. Elevated pH conditions and elevated concentrations of metals, PAHs, VOCs, and asbestos remain in soils within the AOC. Lower concentrations of metals, PAHs, and VOCs in soil were also observed

in the East of South Street, Old Railroad, and Former Lower Mill Pond Areas of the Site (these areas are shown on Figure ES-1).

A risk assessment was not performed for soils in the AOC, as this area of the Site is deed restricted, and we acknowledge that an assessment of risk to human health or the environment would indicate potential risk in the absence of a deed restriction. However, a risk assessment was performed for soils from the remainder of the Site.

Currently, there is no significant risk predicted to human receptors from the elevated concentrations of COPCs in soil at the Site (i.e., outside the AOC). However, there is potential risk (via inhalation) to a hypothetical future Site worker from elevated concentrations of one VOC in indoor air in the East of South Street Area. There is also potential risk to a hypothetical future resident on the East of South Street, Old Railroad, and Former Lower Mill Pond Areas, from elevated concentrations of one metal, PAHs, and one VOC; however, unrestricted residential development is not a reasonably anticipated future use of these areas of the Site based on the current zoning By-Laws.

Outside of the AOC, the only area of the Site where soil with asbestos concentrations greater than 1% (the cleanup standard applied during the previous asbestos Removal Action) has been observed is at one sample location on the East of South Street Area. Because the 1% cleanup standard for asbestos was identified as an Applicable and Relevant and Appropriate Requirement (ARAR) early in the RI process, and because USEPA is in the process of revising their guidelines for evaluating potential human health risk from asbestos in soil, a risk assessment for asbestos in soil has not been performed as part of the RI. However, we understand that USEPA intends to perform an assessment of potential risk from asbestos in soil (and sediment) that will be documented in a forthcoming report. The purpose of the assessment will be to determine if asbestos in soil at concentrations less than 1% presents an unacceptable risk to human health.

There is also potential ecological risk to terrestrial birds and/or small mammals from elevated concentrations of metals in the East of South Street Area and the West of South Street Area. However these risks have not yet been compared to background risks (e.g., the potential risks in the soil reference area). This analysis will be performed as part of the forthcoming FS.

Summary of Groundwater Conditions

With few limited exceptions, groundwater COPCs at relatively elevated concentrations were limited to beneath the central portion of the AOC and the former mill building, extending to the Neponset River in the vicinity of the former mill tailrace. Historical releases of sodium hydroxide have resulted in the formation of an area of elevated pH. Although the original sodium hydroxide source was eliminated over 20 years ago with termination of manufacturing activities, a dense aqueous phase liquid (DAPL - pH conditions greater than 12.5 s.u.) of sodium hydroxide resides beneath the AOC. In addition to elevated pH, metals, PAHs, and VOCs are present in groundwater beneath the Site at elevated concentrations, primarily within and west of

the AOC, apparently at "steady state" conditions. Groundwater from the area of the AOC discharges to the Neponset River in the vicinity of the former mill tailrace. Groundwater with elevated COPC concentrations does not appear to migrate south or west of the Neponset River, nor is it expected to migrate beyond the River in the future.

Currently, there are no human or ecological receptors that are exposed to Site groundwater (i.e., there are no drinking water wells within 500 feet of the Site) because groundwater COPCs are not expected to migrate beyond their current location, existing drinking water wells beyond 500 feet of the Site are not likely to be impacted in the future by elevated concentrations of COPCs in groundwater from the Site. In addition, future use of Site groundwater as tap water is highly unlikely. However, as a matter of conservatism at the request of USEPA, the potential risk from Site groundwater being used as tap water by hypothetical future residents was assessed, and resulted in risk being predicted from pH, metals, PAHs, and VOCs. In addition, the BHHRA evaluated potential risk from a hypothetical future construction worker contacting groundwater at the Site, and resulted in potential risk from elevated pH conditions on the West of South Street and Lot 208/209 Areas.

Summary of Surface Water Conditions

The highest concentrations of COPCs in surface water were observed in the former mill tailrace, due primarily to the fact that this area of the Site is a key discharge area for Site groundwater. Elevated pH conditions and elevated concentrations of metals and PAHs were observed in surface water samples collected from the former mill tailrace. However, concentrations of these same COPCs in the surface water of the Neponset River adjacent to and downstream of the Site appear to be consistent with background concentrations of these COPCs in surface water, suggesting that while groundwater with elevated COPC concentrations discharges to the former mill tailrace and Neponset River, this groundwater discharge has not adversely effected surface water quality in the Neponset River outside of the former mill tailrace.

There is potential risk to a wader in the former mill tailrace due to elevated pH conditions in surface water in this area. No other significant current or potential future risks to human receptors exposed to surface water were identified.

There is potential for adverse effects to fish and benthic invertebrates from elevated concentrations of metals and PAHs due to exposure to surface water in the former mill tailrace. Potential adverse effects to fish and benthic invertebrates in the Neponset River are limited to only one metal. However, concentrations of metals observed in the Neponset River near and downstream of the Site appear to be associated with background concentrations of metals in surface water.

Summary of Sediment Conditions

In general, the highest concentrations of COPCs in sediment were located within the former mill tailrace and Lewis Pond. However, elevated concentrations of COPCs in sediment also occurred

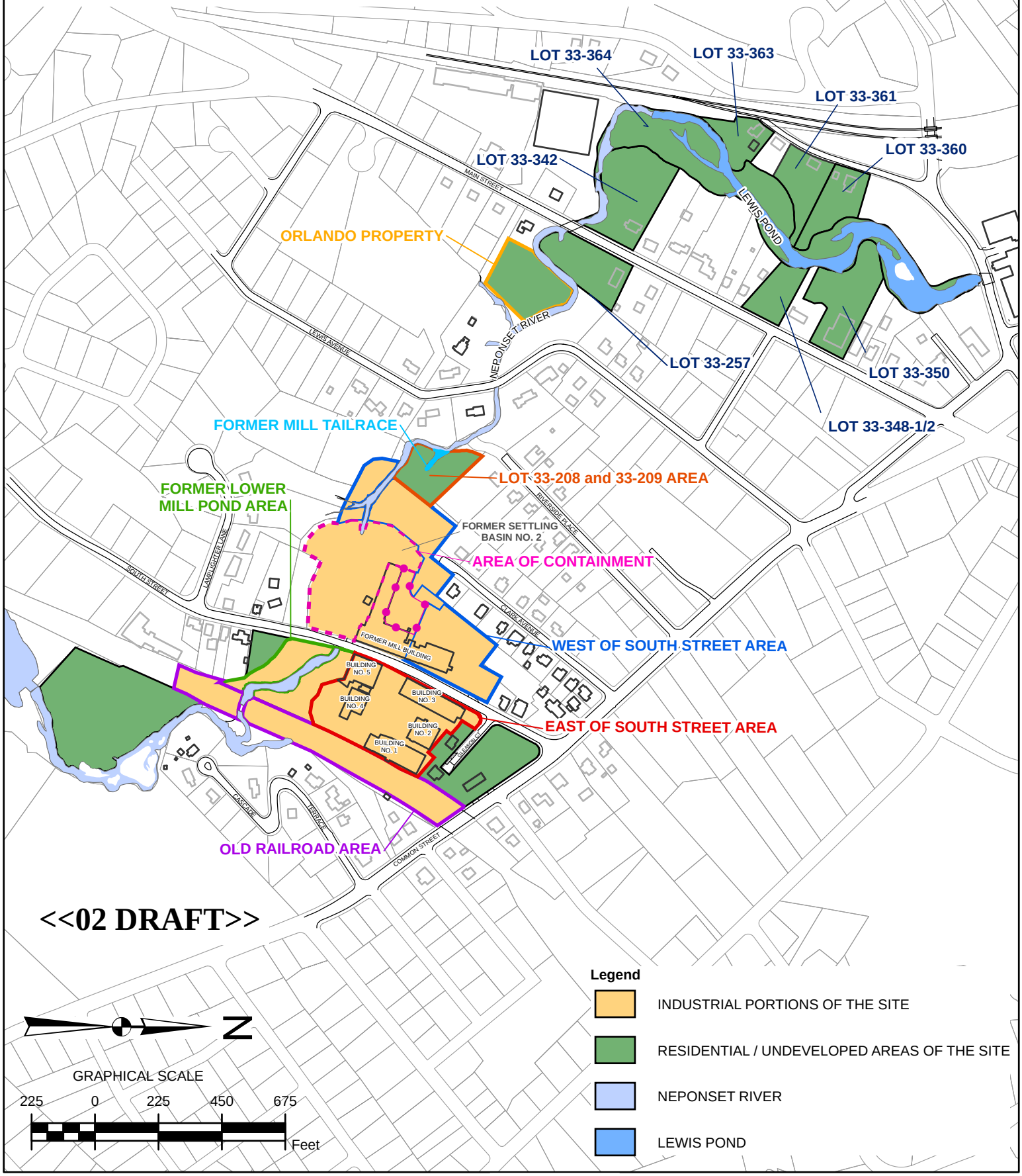
in the Neponset River and floodplain of the Neponset River (including the Orlando Property west of the area where asbestos contamination was addressed in a Removal Action completed in 1993). Sediment COPCs include metals, PAHs, and asbestos.

The only potential risk to human receptors from exposure to sediment at the Site is from the presence of one metal in floodplain sediment on Lot #33-257. However, this potential risk is based on just two soil samples collected on this lot. Additional delineation of metals on Lot #33-257 was proposed as part of the RI to improve the estimate of metals exposures; however, the property owner denied access to perform this sampling.

Asbestos was detected at concentrations greater than 1% in the former mill tailrace, Neponset River Floodplain (Lot #33-257, Lot #33-360), and Lewis Pond in sediment samples collected by SHA in 2000 and 2001; however, asbestos was not detected above 1% in sediment samples collected in 2006 by USEPA's subcontractor, many of which were located in close proximity to samples collected by SHA that had concentrations of asbestos greater than 1%. The explanation for these differences could be due to several factors (e.g., temporal factors; heterogeneous distribution of asbestos in sediments***;*** or analytical, sample preparation, and/or sample collection methods, etc.). Hence, prior to initiating remedial action of asbestos-impacted sediments, further assessment of the distribution of asbestos should be conducted in concert with further evaluation of appropriate asbestos sampling and analytical methods to refine the extent of asbestos sediment concentrations that warrant remedial action. As indicated above, a risk assessment for asbestos in sediment has not been performed as part of the RI. However, USEPA will be performing an assessment of potential risk from asbestos in sediment (and soil) that will be documented in a forthcoming report.

There is potential ecological risk to terrestrial birds and/or small mammals from elevated concentrations of metals within the Neponset River floodplain. In addition, there is potential ecological risk to aquatic wildlife from elevated concentrations of metals and one semi-volatile organic compound within the upper former mill tailrace, Lewis Pond and the Neponset River. These risks are a result of ecological receptors being exposed to both sediment and biota in these areas. However these risks have not yet been compared to background risks. This analysis will be performed as part of the forthcoming FS.

FIGURE ES-1
GENERAL SITE PLAN
ADDENDUM TO THE REMEDIAL INVESTIGATION REPORT - PHASE 1B-4 / 1B-5 INVESTIGATIONS
BLACKBURN & UNION PRIVILEGES SUPERFUND SITE



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1.0 INTRODUCTION

This Remedial Investigation (RI) report addendum (RI Report Addendum) summarizes the results of the Phase 1B-4 RI and Phase 1B-5 RI (additional Site characterization activities) performed as part of the RI for the Blackburn & Union Privileges Superfund Site in Walpole, Massachusetts (Site). In addition, the overall conclusions of the RI (inclusive of the results from the Baseline Human Health Risk Assessment [BHHRA] and Baseline Ecological Risk Assessment [BERA]) are included in this RI Report Addendum. This report has been prepared by Sanborn, Head & Associates, Inc. (SHA) on behalf of our client, Tyco Healthcare Group, LP (Tyco), in accordance with the requirements of the Administrative Order By Consent (Order) for the Remedial Investigation/Feasibility Study (RI/FS) and the "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (United States Environmental Protection Agency [USEPA], 1989).

This report is an addendum to version 03F Draft RI Report (RI Report – SHA, 2007), which addressed the Phase 1A, Phase 1B-1, Phase 1B-2, and Phase 1B-3 investigations.

1.1 Additional Site Characterization Objectives

The objectives of the Phase 1B-4 and Phase 1B-5 RIs were to:

- Gather additional Site characterization data for the RI;
- Gather data necessary to fill in data gaps to support the BHHRA;
- Gather additional data to support the BERA; and
- Gather additional data for the forthcoming FS.

A general Site description and history are provided in Section 1.2 of the RI Report, with more detailed information presented in SHA's "Existing Data Review and Analysis Report" (EDRA [SHA, 2000b]). In addition, RI activities completed prior to the Phase 1B-4 and Phase 1B-5 RIs are included in Section 2 of the RI Report. A Site Locus Plan is provided as Figure 1. A Site Vicinity Plan is provided as Figure 2; a General Site Features Plan is included as Figure 3. A discussion of the major Site features identified on these figures is included in Section 1.2.1 the RI Report.

SHA's work and this Report are subject to the Limitations presented in Appendix A.

1.2 Report Organization

As described above, this report is an addendum to the RI Report. Therefore, the reader is assumed to be familiar with the RI Report. As such, with limited exception, information presented in the RI Report is not reiterated herein.

This Report is organized as follows:

- The Executive Summary provides a summary of the results of the comprehensive RI (inclusive of the findings presented in SHA's RI Report, the results of the Phase 1B-4 and Phase 1B-5 RIs, the BHHRA, and the BERA).

- Section 1.0 – Introduction, describes the objectives of Phase 1B-4 and Phase 1B-5 RIs completed at the Site.

- Section 2.0 – Study Area Investigation, summarizes the field and analytical program completed during the Phase 1B-4 and Phase 1B-5 RIs.

- Section 3.0 – Summary of Field and Laboratory Quality Assurance/Quality Control Results and Implications for Site Data, summarizes the results of data validation, as described in the Phase 1B-4 and Phase 1B-5 Data Usability Assessment Report prepared by New Environmental Horizons, Inc. (NEH), achievement of project quality objectives (PQOs), and evaluation of the RI data quality with respect to the project as a whole.

- Section 4.0 – Physical Characteristics of the Site Area, generally describes the local climate conditions, Site geology, surface water hydrology, and Site hydrogeology as presented in the RI Report. This section also provides a summary of the groundwater and surface water elevations and flow directions observed during the Phase 1B-4 and Phase 1B-5 RIs.

- Section 5.0 – Nature and Extent of Analytes Detected, describes the distribution of analytes in soil, groundwater, surface water, sediment, and soil vapor by supplementing the findings of the RI Report with data collected during the Phase 1B-4 and Phase 1B-5 RIs.

- Section 6.0 – Analyte Transport and Fate, presents the results of the evaluation of migration pathways and transport mechanisms by supplementing the findings of the RI Report with data collected during the Phase 1B-4 and Phase 1B-5 RIs.

- Section 7.0 – Summary of the BERA, summarizes the results of the ecological risk assessment.

- Section 8.0 – Summary of the BHHRA, summarizes the results of the human health risk assessment.

- Section 9.0 – Conclusions, provides the principal conclusions of the RI (inclusive of the findings presented in SHA's RI Report, the results of the Phase 1B-4 and Phase 1B-5 RIs, the BHHRA, and the BERA) and implications for the FS.

2.0 STUDY AREA INVESTIGATION

Work completed as part of the Phase 1A RI, the Phase 1B-1 RI, the Phase 1B-2 RI, and the Phase 1B-3 RI was summarized in the RI Report and is therefore not reiterated herein. This section focuses on work completed as part of the Phase 1B-4 and Phase 1B-5 RIs.

The Phase 1B-4 RI was conducted in accordance with the Phase 1B-4 Remedial Investigation Work Plan (SHA, 2006a). The purpose of this phase of work was to further characterize Site conditions in the vicinity of test boring SB-09. Specific tasks included the installation of soil vapor probes and collection /analysis of soil vapor samples, and the completion of test borings and the collection/analysis of soil samples.

The Phase 1B-5 RI was conducted in accordance with the Phase 1B-5 Remedial Investigation Work Plan (SHA, 2006b). The purpose of this phase of work was to further characterize Site groundwater, surface water, and floodplain sediment conditions. Specific tasks included the collection/analysis of groundwater and surface water samples, and the collection/analysis of floodplain sediment samples.

Further discussion of the field activities and laboratory analyses performed in support of the Phase 1B-4 and Phase 1B-5 RIs are presented in Sections 2.1 through 2.7 of this Report. Analytical results generated during the RI are tabulated in Tables 4 through 19 of this report. Exploration logs and other field documentation are included in Appendices B through F. The locations of field explorations are depicted on Figures 4 through 8.

In addition, Section 2.8 of the report summarizes work completed by Metcalf & Eddy on behalf of USEPA. This work involved sampling and analysis, for asbestos content, of soil and sediment samples at or near the site.

2.1 Site Survey

A survey of the Phase 1B-4 and Phase 1B-5 exploration locations was performed by Bryant Associates, Inc. (Bryant) of Boston, Massachusetts, a licensed land surveyor and subcontractor to SHA in October and November 2006. Additionally in January 2007, Bryant conducted an elevation survey check of several well point and staff gauge locations that were suspected of potential movement since their initial installation. Bryant surveyed the elevations and horizontal locations of newly-completed test boring, soil vapor implant, and floodplain sediment sample locations. In addition, Bryant surveyed the elevations and horizontal locations of newly installed staff gauges, which were installed due to the loss of old staff gauge locations. Horizontal locations are referenced to the Massachusetts State Plane Coordinate System (NAD1983), and elevations are referenced to the National Geodetic Vertical Datum (NGVD) of 1929. As noted previously, exploration locations are depicted on Figures 4 to 8.

2.2 Soil Characterization

On September 7, 2006 SHA observed the completion of soil borings SB-09A and SB-09A1, which were located in the vicinity of previously completed soil boring SB-09. The soil borings were completed by ESN North Atlantic of Scarborough, Maine (ESN) using direct-push drilling techniques consistent with Standard Operating Procedure (SOP) S-2032H. Soil sampling was performed continuously from the ground surface to the completion depth of the boring. Soil boring SB-09A1 was completed proximate to (e.g., within 1 to 2 feet) SB-09A to collect an additional soil sample after refusal was encountered in soil boring SB-09A. Boring logs for soil borings SB-09A and SB-09A1 are included in Appendix B-1. The location of the newly installed soil borings are depicted on Figure 4. Two soil samples, one from 2 to 3.5 feet below ground surface (ft bgs) and one from 6 to 7.5 ft bgs, were collected and submitted for laboratory analysis. Soil samples were submitted to Alpha Woods Hole Laboratories (AWHL) of Raynham, Massachusetts, for Volatile Organic Compound (VOC) analysis (including 2-methylnaphthalene) by USEPA Method 8260B. Table 1A provides a summary of the soil sampling and analysis program. Soil data collected as part of this and previous RI activities are presented in Tables 4 and 5, and further discussed in Section 5.1 of this Report.

A summary of data validation and data usability of these soil data is presented in Section 3.0 of this Report.

2.3 Groundwater and Surface Water Elevation Monitoring

SHA measured water levels at monitoring wells, well points, and staff gauges on September 19, 2006. Groundwater and surface water elevations recorded during the Site-wide water level monitoring round are presented in Tables 2 and 3, respectively.

2.4 Groundwater Characterization

SHA personnel collected a total of 46 groundwater samples from previously installed monitoring wells and well points between September 25 and October 5, 2006, in accordance with the low-flow groundwater sampling guidelines described in SOP S-1669F as amended by modifications approved by USEPA in September 2001, and SOP S-2032E for the Collection of Groundwater from Shallow Well Points.

As summarized in Table 1B, groundwater samples were submitted to AWHL for chemical analyses including:

- VOCs by USEPA Method 8260B;
- Polycyclic aromatic hydrocarbons (PAHs) plus carbazole and bis(2-ethylhexyl)phthalate by USEPA Method 8270C-Select Ion Monitoring (SIM);
- Target Analyte List (TAL) metals by USEPA Methods 6020A and 7470A (mercury);

- Ferrous iron by USEPA Method 9056 and 7199;
- Anions (chloride, nitrate, and sulfate) by USEPA Method 300.0;
- Alkalinity by USEPA method 310.1;
- Sulfide by USEPA Method 376.2;
- Total dissolved solids (TDS) by USEPA Method 160.1;
- Total Kjeldahl Nitrogen (TKN) by USEPA Method 351.3;
- Total Organic Carbon (TOC) by USEPA Method 415.1;
- Density by American Society for Testing and Materials (ASTM) Method D-4052;
- Viscosity by ASTM Method D-445; and
- Ethene/ethane/methane by Method AM20Gax.

AWHL of Raynham, Massachusetts performed all of the groundwater analyses, with the following exceptions, which were subcontracted by AWHL: ferrous iron and ethene/ethane/methane analyses by Microseeps, Inc. of Pittsburg, Pennsylvania; TKN by Groundwater Analytical, Inc. of Buzzards Bay, Massachusetts; TOC by Katahdin Analytical Services of Westbrook, Maine; and density and viscosity by Camin Cargo Control, Inc. of Chelsea, Massachusetts.

The results of groundwater analyses are presented in Tables 6 through 11. The field parameters in groundwater from well SH-12S were measured in the field, no other parameters were analyzed from this well. A summary of data validation and data usability of these groundwater data is presented in Section 3.0 of this Report. Groundwater Quality Field Sampling Summary Forms are included in Appendix B-2. Groundwater sampling locations are depicted on Figure 5.

In accordance with SOP S-1669F, field screening of groundwater samples for specific conductance, oxidation-reduction potential (ORP), dissolved oxygen (DO), turbidity, and temperature was performed during groundwater sampling. In addition, field measurements of pH were collected from each groundwater monitoring well or well point. The results of field screening are summarized in Tables 6 and 8. Results are also provided in the Groundwater Field Sampling Summary Forms, included in Appendix B-2.

2.5 Surface Water Characterization

SHA collected surface water samples on September 29, 2006. Surface water samples were collected from select surface water quality sampling stations (SW-102, SW-105, SW-107, and

SW-108; see Figure 6). The samples were collected in accordance with SOP S-1669G of the Quality Assurance Project Plan (QAPP).

As summarized in Table 1C, surface water samples were submitted to AWHL for analysis of:

- VOCs by USEPA Method 8260B;
- Semi-volatile organic compounds (SVOCs) by 8270C-EI and PAHs by USEPA Method 8270C-SIM;
- TAL metals by USEPA Methods 6020 and 7400 (as applicable – total and dissolved); and
- TOC by USEPA Method 9060 (modified – performed by Katahdin Analytical Services under subcontract to AWHL).

In accordance with SOP S-1669G, surface water samples were field-screened for DO, ORP, specific conductance, and temperature. In addition, field measurements of pH were collected at each surface water sample location. The results of field screening are summarized in Table 12. Surface Water Quality Field Sampling Summary forms are included in Appendix B-3. Surface water data are presented in Tables 14 to 16. A summary of data validation and data usability of these surface water data is presented in Section 3.0 of this Report.

2.6 Sediment Characterization

On October 13, 2006, SHA personnel collected sediment from six sampling locations FP-09A, FP-09B, FP-09C, FP-09D, FP-09E and FP-09F located on Lot #33-360 (Figure 7). Sediment samples were collected in accordance with SOPs S-1669G and S-1669E. Three sediment sampling locations (FP-09D, FP-09E and FP-09F) were located within the 100-year floodplain of Lewis Pond, and three were located outside of the 100-year floodplain (FP-09A, FP-09B and FB-09C)[2]. Two samples were collected from each location, one from approximately from 0 to 1 ft bgs and one from 1 to 3 feet bgs. Samples were collected using a stainless steel hand auger. Floodplain sediment samples were submitted to AWHL for analysis of selected PAHs by USEPA Method 8270C-SIM; and select metals (arsenic and lead) by USEPA Method 6020.

Table 1D provides a summary of the sediment sampling and analysis program. Sediment data are presented in Tables 17 and 18. A summary of data validation and data usability of these sediment data is presented in Section 3.0 of this Report. Sediment Field Sampling Summary Forms are included in Appendix B-4.

[2] Floodplain samples are listed as "sediment" in the project database, though this medium may be considered soil as the percent solids ranged from 67.6% to 89.9%.

2.7 Soil Vapor Characterization

On September 6 and 7, 2006, SHA collected soil vapor samples from soil vapor implants that were installed by hand or using a direct-push drilling rig (Figure 8). Soil vapor implants installed at exterior locations (SV-01, SV-02, SV-03, SV-04, SV-05, and SV-06) were completed by ESN with observation by SHA personnel. Installation of the exterior soil vapor implants was performed in accordance with SOP S-2032I. SHA completed the installation of interior subslab soil vapor implants (SV-07, SV-08, SV-09, and SV-10) in accordance with SOP S-2032K.

Subsequent to implant installation (and a 12-hour stabilization period for exterior implants), a peristaltic pump was attached to the implant tubing, and a minimum of three tubing volumes was evacuated before sample collection. Subsequent to this purging, a field-screening sample was collected via a Gillian® pump into a 1-liter Tedlar® bag. The sample was screened for VOCs using a Photovac Model 2020 PID equipped with a 10.6 eV lamp. The rate of sampling and purging did not exceed 200 milliliters per minute (mL/min).

As part of the field screening of the soil vapor samples, a tracer gas (Helium [He]) was released at the vapor implant location to assess for leakage of ambient air into the sampling equipment and/or between the probe and the soil. The presence and concentration of He as detected with a portable He detector (e.g. Dielectric Technologies, Model MGD-2002 [or equivalent] capable of detection to approximately 25 ppmV He) was used to evaluate the integrity of the soil gas samples. If He was determined to be present in the field screening sample, the implant was re-installed.

Subsequent to field screening for VOCs and He, soil vapor samples were collected from the vapor implants using 6-liter stainless steel Summa canisters fitted with 1-hour flow controllers using the methodology outlined in SOPs S-2032J (exterior) and S-2032K (interior sub slab). Where field duplicate samples were collected, 2-hour flow controllers were used to fill the Summa canisters. The samples were submitted to AWHL of Raynham, Massachusetts for analysis of VOCs by USEPA Method TO-15, and 2-methylnaphthalene and naphthalene by Massachusetts Department of Environmental Protection (MADEP) Method APH.

Subsequent to sampling, the vapor implants were decommissioned by removing the Teflon tubing and backfilling the resulting hole with hydrated granular bentonite. Vapor implants decommissioned in paved or concrete areas were backfilled at the ground surface with concrete or cold patch, as appropriate.

In addition to soil vapor samples, an ambient (outdoor) air sample (AA-01) was collected and analyzed as a quality assurance/quality control (QA/QC) measure. The ambient air sample was collected in accordance with SOP S-2032L.

Table 1E provides a summary of the soil vapor sampling and analysis program. Soil vapor analytical data are presented in Table 19. A summary of data validation and data usability of these soil vapor data is presented in Section 3.0 of this Report. Soil Vapor Field Sampling Summary Forms and an Ambient Air Sampling Summary Form are included in Appendix B-5.

2.8 USEPA's Additional Asbestos Investigation

In July 2006, on behalf of USEPA, Metcalf & Eddy (M&E) collected soil and sediment samples to further refine the extent of asbestos at the Site. A total of approximately 130 soil and sediment samples were collected from 76 exploration locations, and submitted for laboratory analysis of asbestos using Polarized Light Microscopy (PLM) in accordance with Method 435 of the California Environmental Protection Agency Air Resources Board Determination of Asbestos Content of Serpentine Aggregate (CARB435; CARB, 1991) and EPA/600/R-93/116 Method for the Determination of Asbestos in Bulk Building Materials (USEPA, 1993). A 400-point count was performed to obtain a reporting limit of 0.25%. Soil samples were collected with either direct push drilling techniques or a hand auger. Sediment samples were generally collected with a hand auger. Figures 72 through 74 depict the soil and sediment sample locations completed by M&E[3] in 2006 and by SHA during previous RI sampling efforts.

In general, soil samples were collected through the depth of fill in 2-foot (ft) intervals. Sediment samples were collected from 0-0.5 ft below ground surface (bgs), or 0-1 ft bgs in Lewis Pond and the Neponset River Floodplain.

A detailed description of M&E's asbestos sampling activities is provided in Appendix I and is summarized in Section 5.0 of this Report.

[3] Figures 72 through 74 are Figures 2-2, 2-3, and 2-4, respectively of M&E's Data Evaluation Report (Appendix I).

3.0 SUMMARY OF FIELD AND LABORATORY QUALITY ASSURANCE/ QUALITY CONTROL RESULTS AND IMPLICATIONS FOR SITE DATA

This section summarizes the Data Usability Assessments performed for the Phase 1B-4 RI and Phase 1B-5 RI activities. The Data Usability Assessment Report for the Phase 1B-4 and Phase 1B-5 RI activities for the Blackburn & Union Privileges Superfund Site, Walpole, MA, prepared by the project Quality Assurance Officer (QAO), NEH. This third-party assessment includes additional details regarding the quality of the data generated as compared to the PQOs, measurement performance criteria (MPC), and data quality indicators (DQIs) defined in the Phase 1B-4 Work Plan (SHA, 2006a), Phase 1B-5 Work Plan (SHA, 2006b), and QAPP Worksheets (SHA, 2000 QAPP plus QAPP tables included in the Phase 1B-4 and 1B-5 Work Plans), and the use or limitations of such data for project decisions. The Data Usability Assessment Report is included in Appendix C and consists of the following documents:

- Data Usability Worksheets – tables generated in compliance with risk assessment guidance to assist data users in understanding the usability of results generated in terms of precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS parameters)[4], including:

- Data Usability Worksheet – Human Health Risk: Phase 1B-4 Soil Vapor & Soil;

- Data Usability Worksheet – Human Health Risk: Phase 1B-5 Media (Sediment, Groundwater, & Surface Water);

- Data Usability Worksheet – Ecological Risk: Sediment & Surface Water;

- Tables of statistical measures of data quality, including completeness, accuracy represented as potential bias in qualified results, sensitivity in comparison to project action limits (PALs), and precision and representativeness as measured by field duplicate precision for all media and all parameters (these tables support the Data Usability Worksheet information);

- Data Usability Reports – individual reports, compliant with USEPA Region I data validation guidance, generated for each laboratory data package deliverable or sample delivery group (SDG), which include details of data validation actions (qualifications) and usability assessment of precision, representativeness, accuracy (bias), and sensitivity of the results; and

- Field Audit Checklists performed by SHA in support of the field collection oversight for the Phase 1B-4 and Phase 1B-5 RI activities.

[4] PARCCS parameters are discussed in Sections 3.2.1 through 3.2.5 of this Report.

3.1 Overall Evaluation of Data Quality Compared to Project Objectives

Results of the Phase 1B-4 RI and Phase 1B-5 RI were evaluated in terms of the data as a whole in achieving the PQOs to make environmental project decisions compared to the specific project objectives defined in the Work Plans. Evaluating the data quality with respect to the project objectives was performed through the evaluation of the representativeness and completeness of the data set, after evaluations of other PARCCS parameters had been successfully performed.

As discussed in Section 3.2.2 of this Report, representativeness describes the extent to which the sampling design and implementation (including sample collection and analysis) adequately reflects the environmental conditions of the Site. Evaluation of representativeness was performed through a review of chemical and non-chemical data. One quantitative measurement of representativeness was evaluated via relative percent difference (RPD) precision criteria for field duplicate (FD) samples. Other measures used to evaluate representativeness included review of successful implementation of the sampling design (location, relevant media, and numbers of samples) through field notes, field audits, and chain-of-custody documentation.

As discussed in Section 3.2.4 of this Report, completeness of the data set defines the effectiveness of the sampling and analysis for each medium by measuring the amount of valid/usable data collected. Completeness was calculated for each parameter and media and compared to the project goal of generation of 90% valid/usable data for both Phase 1B-4 and Phase 1B-5.

3.1.1 Phase 1B-4 Achievement of Project Objectives

The Phase 1B-4 Work Plan primary objective was to "gather and assess data to further evaluate the potential risk from inhalation of indoor air impacted by intrusion of subsurface vapors in the vicinity of soil boring SB-09" (Section 1.0, Phase 1B-4 Work Plan, SHA, 2006a). Further clarification of the project objectives stated that the soil vapor and soil sampling and analysis were "intended to further define the nature and extent of VOC concentrations in the vicinity of SB-09, and provide additional data to assess potential risks due to inhalation and direct contact with contaminated soil in this area" (Section 2.0, Phase 1B-4 Work Plan, SHA, 2006a). The data usability assessment for the Phase 1B-4 data, summarized in 1) the *Data Usability Worksheet – Human Health Risk: Phase 1B-4 Soil Vapor & Soil*, and the associated tables of data quality measures including completeness Tables 3 and 7 (Appendix C), demonstrate that the data generated during Phase 1B-4 are representative and of sufficient quality (compared to MPCs and PARCCS) to be used for these two project objectives, summarized as follows:

- *Project objectives were met through the collection of samples representative of exposure concentrations for the relevant media (soil vapor and soil) and of sufficient quality to be used in quantitative risk assessment, demonstrated by the completeness achievement of 100% valid/usable VOC data.*

3.1.2 Phase 1B-5 Achievement of Project Objectives

The Phase 1B-5 Work Plan project objective was to further refine the BHHRA calculations, further assess the groundwater and surface water contaminant locations, prepare for future FS-related analyses, and to further refine the exposure from these constituents [*lead, arsenic, and benzo(a)pyrene in floodplain sediments*] to the receptors evaluated as part of the BHHRA (Section 2.0, Phase 1B-5 Work Plan, SHA, 2006b). This project goal was further refined to include the objective of additional chemical information in floodplain sediment as input to the BERA (September 21, 2006 response to EPA comments, SHA). The data usability assessments for the Phase 1B-5 data, summarized in two worksheets; 1) *Data Usability Worksheet – Human Health Risk: Phase 1B-5 Media (Sediment, Groundwater, & Surface Water) and 2) Data Usability Worksheet – Ecological Risk: Sediment & Surface Water,* and the associated tables of data quality measures including completeness Tables 4 through 6 (Appendix C), demonstrate that the data generated during Phase 1B-5 are representative and of sufficient quality (compared to MPCs and PARCCS) to be used for these project objectives, summarized as follows:

- *Project objectives were met through the collection of samples representative of exposure concentrations for the relevant media (groundwater, surface water, and floodplain sediments) and of sufficient quality to be used in both quantitative risk assessments and establishing the extent of the surface water and groundwater plume, demonstrated by the completeness achievement of 99% to 100% valid/usable data for VOCs, SVOCs/PAHs and metals in all media.*

- *Project objective to prepare for future FS-related analyses was met through the collection of samples representative of concentrations in groundwater for relevant physical and chemical parameters and of sufficient quality to be used to evaluate feasibility of groundwater remedial alternatives (including natural attenuation), demonstrated by the completeness achievement of 100% valid/usable data for all parameters including: alkalinity, anions (chloride, nitrate, sulfate), sulfide, TKN, TDS, gases (ethane, ethene, methane), ferrous iron, TOC, density, and viscosity.*

3.2 Evaluation of Data Gaps

The usability of the data summarized in the *Data Usability Worksheets*, associated data quality statistics tables, and detailed in the individual Data Usability Reports for each laboratory set of data, indicate that the MPC for precision, accuracy, representativeness, completeness, comparability, and sensitivity were met for all definitive parameters (SVOCs [including PAHs], VOCs, and metals), with several minor exceptions. Minor instances where the MPC were not met are documented through qualification of the data. Data qualified U, UJ, or J were considered usable for project objectives because, although they may have fallen outside of MPC, they were within acceptable tolerances for usability based on USEPA data validation and risk assessment guidance. Rejected data (qualified R) fell outside of both the project MPC and the acceptable tolerances for usability and were therefore considered unusable for project decisions.

Based on the data usability assessment and statistical evaluations of the data, as presented in the *Data Usability Worksheets* and Tables 1 through 25 included in Appendix C, comparison to

PQOs and MPCs as summarized in this section below, and particularly in light of the achievement of 100% usable data for Phase 1B-4 and 99.9% usable data for Phase 1B-5, no data gaps were identified that would impact the use of these data sets for risk assessment evaluations and other project needs.

3.2.1 Accuracy (Bias)

The significance of accuracy or bias in qualified chemical results was evaluated, considering whether the qualified concentration was significantly above or below the PAL, and whether a compound was a historical Site-related contaminant or a chemical of potential concern (COPC) from previous draft risk evaluations. The three results for 2-chloroethylvinyl ether in groundwater samples SH-24S/09-28-06 and SH-13S/09-28-06, and surface water sample SW-108/09-29-06, that were determined to be unusable (rejected) due to severe matrix affects on the accuracy of the results were not considered for Site characterization or risk assessments. This does not impact the usability of the Phase 1B-5 groundwater data set for project needs because: 1) the 99% completeness achieved for VOC data gives a sufficient Site-wide data set; 2) 2-chloroethylvinyl ether was not detected in any Site samples of any media and is not a COPC based on screening results of the BHHRA; and 3) based on available data, this compound is not thought to have been used at the Site.

No systematic biases in the other qualified data were noted for soil vapor, soil, sediment, groundwater, or surface water results for Phase 1B-4 and Phase 1B-5. Bias in qualified results is summarized in the Data Usability Worksheets and detailed in Tables 8 through 12 included in Appendix C. Additionally, data users can check sample-specific bias in qualified results as documented in the project database fields "Bias" and "Res_Comment" and detailed in the individual Data Usability Reports (Appendix C).

3.2.2 Precision and Representativeness

The QC results that might affect precision and representativeness for the media tested, including results of trip blanks, equipment rinseate blanks, chain-of-custody interpretation, matrix spike/matrix spike duplicate (MS/MSD) and FD results were evaluated. Overall, the results for Phase 1B-4 and Phase 1B-5 were considered usable in terms of precision and representativeness of the data, with the understanding that results qualified for FD imprecision indicate heterogeneity for certain compounds that might affect the representativeness of the sample.

Phase 1B-4

As this was a targeted sampling effort to address specific data gaps in the vicinity of SB-09 to evaluate the VOC inhalation pathway and further assess soil concentrations, a non-statistical approach was used to determine location and number of samples for Phase 1B-4. Sampling was performed consistent with the Phase 1B-4 Work Plan, which was designed to provide representativeness of samples in the vicinity of SB-09. No deviations in sampling design or protocols were noted that would affect data representativeness.

The laboratory reported soil vapor results for 26 compounds that were not requested in the project-specific list of 40 VOCs in the Phase 1B-4 Work Plan. The results for these "extra" compounds, listed in the *Data Usability Worksheet – Human Health Risk: Phase 1B-4 Soil & Soil Vapor*, were non-detected or detected at levels below the calibration range (as estimated values). These extra soil vapor results, though not planned for this work, were evaluated for their potential contribution to risk, as described in the BHHRA.

Due to analytical method limitations of the USEPA TO-15 method used for soil vapor analysis of VOCs, the laboratory could not analyze two compounds in soil vapor samples that were successfully analyzed in the soils (2-chloroethylvinyl ether and bromochloromethane). As these compounds were non-detected in the associated soil results at SB-09, it is not expected that they would have been detected in the soil vapor; therefore, this does not represent a data gap.

All detected VOC results in soil vapor met FD precision with the one exception of acetone. Evidence of sample heterogeneity was observed in the soil sample for 2-methylnaphthalene and naphthalene. Further details are presented in the *Data Usability Worksheet – Human Health Risk: Phase 1B-4 Soil & Soil Vapor* and Tables 23A and 23E included in Appendix C.

Phase 1B-5

Sampling for all three media was performed consistent with the Phase 1B-5 Work Plan, which was designed to provide representativeness of samples for floodplain sediment, groundwater, and surface water for the project objectives summarized in Section 3.1.2 above. Data gaps identified in the groundwater monitoring well network after completion of the Phase 1A RI were addressed in the Phase 1B RI with the installation of additional groundwater monitoring wells. Groundwater samples were collected from the existing monitoring well network during Phase 1B-5. No deviations in sampling design or protocols were noted that would affect data representativeness.

Metals results in sediment, groundwater, and surface water showed acceptable precision and representativeness in the FD samples with one exception for copper in the dissolved metals surface water sample. All VOC results in the surface water primary and duplicate samples were not detected; the two detected results in groundwater showed acceptable precision. SVOCs/PAHs showed acceptable precision in groundwater; however, evidence of sample heterogeneity for several PAHs was observed in the floodplain sediment field duplicate samples at location FP-09/0-1/10-13-06, and surface water location SW-105B/09-29-06. Further details are presented in the *Data Usability Worksheet – Human Health Risk: Phase 1B-5 Media (Sediment, Groundwater & Surface Water)* and Tables 23A through 23E included in Appendix C.

The influence of heterogeneity on the risk estimates are discussed in the uncertainty sections of the BHHRA and BERA, as applicable.

3.2.3 Comparability

All data for soil, sediment, groundwater, and surface water were determined to be comparable to prior data generated for the Site based upon use of SOPs defined in the QAPP documents for field sampling, analysis, and data review, and use of the same analytical laboratory (AWHL) for all chemical analyses, with one exception. VOC data in the single soil sample SB-09A/S-2/09-07-06 are not directly comparable to other medium-level (methanol-preserved) results in the Site database due to the difference in handling moisture correction (accounting for moisture contribution of the sample to the overall extract volume analyzed) compliant with the most current USEPA method (SW-846 Method 8000C). Previous medium-level (methanol-preserved) VOC soil data for this Site were not moisture-corrected, based on older versions of the USEPA method. This issue is isolated to this single sample and does not affect low-level (water-preserved) VOC soil sample results; therefore, it does not present a data gap for Phase 1B-4 project objectives.

Comparability of soil vapor data was acceptable based on adherence to Phase 1B-4 Work Plan and QAPP procedures, as this medium had not been previously sampled or analyzed at the Site.

3.2.4 Completeness

For Phase 1B-4, 100% completeness of valid/usable data was achieved for the combined data set including two media. For Phase 1B-5, 99.9% completeness was achieved for the combined data set including three media. These completeness statistics are notable, particularly given the type and the complexity of the media sampled during Phase 1B-4 and Phase 1B-5, which included soil vapor, soil, floodplain sediment, surface water, and groundwater (some with pH up to 14 standard units [s.u.]). Details are presented in Tables 3 through 7 included in Appendix C.

3.2.5 Sensitivity

Sensitivity was evaluated based on a comparison of the detection (reporting) limits of non-detected results to the PALs. Details are presented in Tables 13 through 22 included in Appendix C. All non-detected data for soil vapor, soil, floodplain sediment, groundwater, and surface water are considered usable because of the limitations of "best available technology", necessary dilutions due to the complexity of the sample matrix (high pH groundwaters), and because the approach of using ½ of the RL for concentrations reported as not detected in the estimate of exposure point concentrations resulted in most of the compounds achieving detection limits equal to or below the PAL or specific risk-based screening level used for the BHHRA and the BERA. Further details are presented in the Data Usability Worksheets included in Appendix C, in the uncertainty sections of the BERA and BHHRA, and below.

<u>Phase 1B-4</u>

A majority of the non-detected VOC results in soil and soil vapor met PALs (see Tables 13 and 22 in Appendix C). Seven VOCs (bromodichloromethane, carbon tetrachloride, chloroform, dibromochloromethane, 1,2-dichloroethane, 1,1,2,2-tetrachloroethane, and 1,1,2-trichloroethane) were reported as non-detected with detection limits exceeding the PALs, due to limitations of the

most current GC/MS analytical methods used. These exceedances of sensitivity, anticipated in the Phase 1B-4 Work Plan (2006), do not pose a data gap because: 1) of the allowance in risk assessment uncertainty for the limitations of "best available technology"; 2) the use of ½ the reporting limit in the quantitative risk assessment results in most compounds achieving detection levels less than or equal to the PAL; and 3) none of these VOCs, with the exception of chloroform, have been detected in Site samples collected from any media and none are thought to have been used at the Site. In addition, chloroform has not been detected in soil samples collected in the vicinity of SB-09 (the focus of Phase 1B-4 sampling objectives for VOCs) and has been detected in relatively few soil samples collected at other Site locations.

Phase 1B-5

All non-detected results for metals and PAHs in sediments were reported at detection limits below the PALs. Comparisons of PALs to sample reporting limits for each compound/analyte in sediment can be found in Tables 17 and 18, included in Appendix C.

Surface water results were reviewed against risk-based PALs developed for both ecological and human receptors; some compounds met sensitivity for the BERA but not the BHHRA, and vice versa. All non-detected results for metals and SVOC/PAHs in surface water were reported at detection limits below the risk-based PALs, with one exception for dibenz(a,h)anthracene in support of human health risk. Non-detected surface water VOC results for the following 12 compounds did not meet human health PALs: bromodichloromethane, carbon tetrachloride, chloroform, dibromochloromethane, 1,2-dichloroethane, 1,2-dichloropropane, cis-1,3-dichloropropene, trans-1,3-dichloropropene, 1,1,2,2-tetrachloroethane, tetrachloroethene, trichloroethene (TCE), and vinyl chloride. Non-detected VOC results for carbon disulfide, cis-1,2-dichloropropene, trans-1,3-dichloropropene, and m,p-xylene exceeded ecological PALs.

All exceedances of PALs in surface water data were due to method limitations, even though the most current EPA GC/MS-EI and GC/MS-SIM methods were used for analysis. Comparisons of analytical reporting limits to PALs for each compound/analyte in surface water can be found in Tables 19 through 21, included in Appendix C.

These exceedances of sensitivity, anticipated in the Phase 1B-5 Work Plan (2006), do not pose a data gap because 1) of the allowance in risk assessment uncertainty for the limitations of "best available technology"; 2) the use of ½ the reporting limit in the quantitative risk assessment results in most compounds achieving detection levels less than or equal to the PAL; and 3) none of these VOCs have been detected in surface water samples from previous sampling rounds.

For groundwater, nearly all (96%) of the non-detected results for metals met PALs. Exceptions were for metals results in two high pH (pH > 9 s.u.) groundwater locations SH-01D and SH-01R (for aluminum, antimony, arsenic, beryllium, cadmium, chromium, iron, lead, manganese, selenium, and thallium). These exceedances of sensitivity for metals in groundwater do not pose a data gap because 1) of the allowance in risk assessment uncertainty for the limitations of "best available technology"; 2) the use of ½ the reporting limit in the quantitative risk assessment results in most metals achieving detection levels less than or equal to the PAL; and 3) many of

these metals were detected at these locations historically, and/or groundwater samples collected from multiple sample rounds in down gradient monitoring wells met PALs.

All non-detected groundwater results for SVOCs/PAHs met PALs with the exceptions of benzo(a)pyrene and dibenz(a,h)anthracene, due to method limitations. Many VOCs did not meet PALs due to method limitations and dilutions needed to reduce matrix effects in high pH samples. Eleven VOCs (bromodichloromethane, bromoform, carbon tetrachloride, dibromochloromethane, 1,2-dichloroethane, 1,2-dichloropropane, cis-1,3-dichloropropene, trans-1,3-dichloropropene, 1,1,2,2-tetrachloroethane, tetrachloroethene, and vinyl chloride) were non-detected in all of the groundwater samples with detection limits that did not meet PALs due to method limitations. These exceedances of sensitivity for VOCs in groundwater do not pose a data gap because 1) of the allowance in risk assessment uncertainty for the limitations of "best available technology"; 2) the use of ½ the reporting limit in the quantitative risk assessment results in most VOCs achieving detection levels less than or equal to the PAL; and 3) none of these VOCs have been detected in Site samples collected from any media.

In summary, most of the non-detected results that did not meet PALs in groundwater were from samples with complex matrices exhibiting high pH values (>9 s.u.), high specific conductance, and visual observation of color and foaming. These attributes suggest that the cause of the elevated detection limits was due to the complicated nature of Site groundwater in certain locations and/or a limitation of currently available analytical methods to successfully quantitate these compounds in this complex medium. Consequently, similar matrix effects and/or analytical difficulty would be anticipated in repeat analyses of these samples. Therefore, all non-detected data for groundwater are considered usable because of the limitations of "best available technology" (USEPA GC/MS-EI and GC/MS-SIM methods) and necessary dilutions due to the complex groundwater matrix. Furthermore, the approach of using ½ of the RL in the estimate of exposure point concentrations resulted in most of the compounds achieving detection limits at or below the PALs to support the BHHRA.

3.3 Procedures Used for Data Validation and Data Usability Assessment

Following the protocols established in the QAPP (SHA, 2000 plus subsequent QAPP Worksheets in Phase 1B-4 and 1B-5 Work Plans, 2006) and in the Region I, USEPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses (USEPA, 1996a), NEH performed independent evaluations (data validation and usability assessments) of the Phase 1B-4 and Phase 1B-5 sampling and analysis results with the MPC for precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS parameters) established in the QAPP documents.

The EPA Region I Tier Levels for data validation were defined commensurate with data uses such that all definitive data were validated at the Tier III or Tier II level, and non-definitive data at a Tier I (enhanced) level. NEH performed EPA Region I Tier III level data validation for the soil vapor data for VOCs because Phase 1B-4 was the first time this medium was sampled and analyzed for this Site. NEH performed USEPA Region I Tier II level data validation for all definitive parameters (VOCs, SVOC/PAHs, and metals) in soil, sediment, groundwater, and

surface water. EPA Region I Tier I (enhanced to include method QC review) level data validation was performed for all non-definitive parameters in surface water (TOC) and groundwater (anions [chloride, nitrate, sulfate], alkalinity, sulfide, TDS, TKN, ferrous iron, gases [ethane, ethene, methane], TOC, density, and viscosity). The combined data validation and usability assessments were documented by NEH in the individual Data Usability Reports generated for each laboratory data package (SDG), included as Appendix C.

Details on the process of the data validation and usability assessments, definitions of Tier levels of review, the application of data validation qualifiers to the data as a result of these assessments, and the qualifier definitions can be found in the following prior Site documents:

- Phase 1A Data Usability Report, 2002 (Section 3.0)
- Phase 1B Data Usability Report, 2004 (Section 3.0)
- Phase 1B-4 Work Plan, 2006 (Appendix A, EPA-NE QAPP Worksheet #29a, #29b, and #29c)
- Phase 1B-5 Work Plan, 2006 (Appendix A, EPA-NE QAPP Worksheet #29a and #29b)
- Original Site QAPP, 2000 (Sections 18, 19, and 20 and Appendix E, NEH Standard Operating Procedure for data usability assessment).

4.0 PHYSICAL CHARACTERISTICS OF STUDY AREA

This section summarizes updated climate data and presents a general summary of the groundwater elevation and flow direction from the 2006 water level measurement round. Refer to the RI Report for a summary of the following:

- Demography and Land Use (Section 4.1 of the RI Report)
- Groundwater Use (Section 4.1.3 of the RI Report)
- Surface Water Use (Section 4.1.4 of the RI Report)
- Climate (Section 4.2 of the RI Report)
- Geologic Setting (Section 4.3 of the RI Report)
- Hydrology (Section 4.4 of the RI Report)

4.1 Climate

Weather data were obtained for the days on which SHA personnel were on Site (between September 19 and October 6, 2006) during the Phase 1B-4 and Phase 1B-5 RIs. Temperature and precipitation data were taken from the National Climatic Data Center (NCDC) of Asheville, North Carolina for the Walpole 2 Station located approximately five miles south of the Site, and are recorded as the daily average. Wind speed and barometric pressure data were taken from the National Weather Service (NWS) weather station located in Norwood, Massachusetts and are recorded as the daily averages. Additionally, SHA recorded weather observations on the field reports for the dates that they were on Site. Weather data (e.g., temperature, barometric pressure, wind speed and direction, and precipitation) are summarized in Appendix Table H-1.

4.2 Summary of the 2006 Groundwater Elevations and Flow Direction

Groundwater and surface water elevations from the 2006 water level measurement round are summarized in Tables 2 and 3, respectively. Additionally, Figures 9 through 11 present groundwater elevation contour plans for the shallow, deep, and bedrock wells from the 2006 water level round (completed in September 2006). In general, groundwater elevations and flow directions observed in September 2006 are consistent with observations from previous water level measurement rounds, suggesting that seasonal fluctuations in water levels have little effect on the overall groundwater flow regime. See Section 4.4.3.1 and Figures 15A through F of the RI Report for discussion of SHA's observations from previous water level measurement rounds conducted prior to September 2006.

The text in the following bullets summarizes several general observations regarding the 2006 groundwater flow conditions, including:

- Shallow overburden groundwater at the Site generally flows to the northwest (Figure 9).

- Deep overburden groundwater generally flows in a westerly direction until reaching the central portion of the Site (approximately the well SH-01D location), while west of this area, groundwater generally flows northwest (Figure 10).

- In and around monitoring well SH-01D is an area of apparent converging groundwater flow that is likely a result of the presence of high pH fluids - dense aqueous phase liquid (DAPL [i.e., pHs above about 12.5 s.u.]. The density contrast between DAPL and ambient groundwater likely inhibits mixing of DAPL and ambient groundwater in a manner similar to that of a salt water / fresh water interface in coastal aquifers. Based on hydrologic and chemical data, we expect that there is a relatively distinct boundary between DAPL and ambient groundwater at the Site with limited mixing occurring between the DAPL and ambient groundwater.

- Bedrock groundwater at the Site generally flows in a northwesterly direction (Figure 11).

- The Neponset River in the vicinity of the former mill tailrace is a key discharge area for Site groundwater. A summary of vertical gradients is presented in Appendix B-2.

5.0 NATURE AND EXTENT OF ANALYTES DETECTED DURING THE PHASE 1B-4 AND PHASE 1B-5 REMEDIAL INVESTIGATIONS

This section describes the observed nature and extent of analytes[5] at the Site based on the results of chemical laboratory analyses, as well as field screening and observation conducted during the Phase 1B-4 and Phase 1B-5 RIs. To spare the reader redundancy, we have not reiterated the more comprehensive discussions related to the distribution of analytes that were presented in the RI Report. Rather, we have focused this discussion on data collected as part of the Phase 1B-4 and Phase 1B-5 RIs. For details regarding the distribution of analytes conducted as part of earlier RI investigations, the reader is encouraged to refer to the RI Report. However, tables with analytical data that are presented in this report include data that were collected as part of the overall RI.

For discussion of the significance of Phase 1B-4 and Phase 1B-5 analyte distribution with regard to prior sampling rounds and/or for a discussion regarding analyte transport and fate, the reader is referred to Section 6.0 of this Report. Overall RI conclusions (inclusive of the findings presented in SHA's RI Report, the results of the Phase 1B-4 and Phase 1B-5 RIs, the BHHRA, and the BERA) are presented in Section 9.0.

The following subsections are not written to stand alone, but assume that the reader will refer to the appropriate tables and figures while reading this section.

5.1 Distribution of Analytes in Soil Samples Collected During the Phase 1B-4 RI

This section summarizes the distribution of analytes in soil samples collected in 2006. A more comprehensive discussion of the distribution of analytes in soil is presented in the RI Report. Soil samples collected during the Phase 1B-4 RI were collected from the vicinity of previously installed boring SB-09 to further assess concentrations of VOCs in soil in this area. SHA performed PID headspace screening of soil samples collected during the Phase 1B-4 RI. These results are presented on the soil boring logs included in Appendix B-1.

In July 2006, on behalf of USEPA, M&E collected soil and sediment samples and analyzed these samples for asbestos in order to further refine the extent of asbestos contamination in soil and sediment at the Site. M&E's Data Evaluation Report for Additional Asbestos Investigations is included as Appendix I. Figure 75[6] shows the results of the asbestos analyses in soil. Of the soil samples M&E submitted for asbestos laboratory analysis, only one soil sample contained concentrations of asbestos above 1% (asbestos was detected at a concentration of 1.75% in M&E sample I-3.5 at a depth of 0.5 to 4 feet bgs, which was located on the East of South Street Area). One percent was the cleanup standard applied during the previous asbestos Removal Action.

[5] The term "analyte" as used in this Section, refers generally to chemicals detected above human health or ecological COPC screening levels through analysis of environmental samples obtained at the Site completed pursuant to the QAPP. Some of the analytes detected at the Site are most likely present as contaminants attributable to the industrial history of the Site; others may represent naturally occurring or background conditions.
[6] Figure 75 is Figure 3-1 of M&E's Data Evaluation Report (Appendix I).

Asbestos was detected at concentrations between 0.25% and 1% in three samples collected from one soil boring located east of South Street (M&E samples collected from M-5.5 @ 0-0.5, 0.5-2, and 2-4 ft bgs, with concentrations of 0.25%, 0.5%, and 0.75% respectively). Asbestos was not detected at concentrations greater than or equal to 0.25% (the laboratory detection limit) in any other soil sample collected by M&E as part of their 2006 sampling activities.

SHA collected two soil samples from SB-09A at depths of 2 to 3.5 ft bgs and 6 to 7.5 ft bgs, which were submitted for VOC analysis (including 2-methlynaphthalene and naphthalene). Tables 4 and 5 present a summary of soil analytical results from soil samples collected during the Phase 1B-4 RI. Figures 12 through 14 present the results of selected VOC and SVOC analytical results from lower soils during the 2006 sampling. VOC and SVOC analytical results from lower soil samples collected during the RI are also presented in Tables 4 and 5. Soil analytical results were compared to COPC screening levels used in the BHHRA and BERA. Two COPC screening levels were developed for the soil data, a human health screening level, and an ecological screening level:

- The human health COPC screening level is the lower of the Massachusetts Contingency Plan (MCP) Method 2 S-1 (used as a screening level for the direct contact pathway) standards applicable in the GW-1 setting, and the USEPA Region IX Preliminary Remediation Goals (PRGs);

- The ecological chemical of potential ecological concern (COPEC) screening level is the lower of the Oak Ridge National Laboratory (ORNL) Ecological Toxicological Benchmarks and the USEPA Ecological Soil Screening Levels.

Consistent with discussion of soil data presented in the RI Report, the following text discusses analyte concentrations of soil samples collected during the Phase 1B-4 RI compared to human health COPC screening levels. These data are not compared to ecological COPECs in the following text; however, Tables 4 and 5 compare the soil analytical results to both human health and ecological screening levels. Figures 12 through 14 present the distribution of 2-methylnaphthalene, naphthalene, and TCE in "lower" soil samples (those samples collected at depths greater than 1 ft bgs) collected during the comprehensive RI (including the Phase 1B-4 samples) relative to their respective human health and ecological COPC screening levels. It should be emphasized that an exceedance of a human health or ecological screening level may indicate potential risk, but does not necessarily mean that there is risk. Also, such an exceedance does not necessarily indicate that the effects would be exhibited by receptors under Site-specific conditions. Risks from soil analytes are evaluated in the BHHRA and BERA, and summarized in Sections 7.0 and 8.0 of this Report. Typically, when data are considered in the context of actual Site-specific criteria, these screening levels are shown to be conservative and lower than final approved cleanup standards, at least for many parameters.

The following analytes were detected above laboratory reporting limits in the soil sample collected from a depth of 2 to 3.5 ft bgs in the SB-09A boring: 2-methlynaphthalene, naphthalene, cis-1,2 dichloroethene (cis-1,2-DCE), and trichloroethene (TCE). However, only

TCE was detected at a concentration (21,000 µg/kg) greater than its respective human health COPC screening level of 53 µg/kg.

TCE (2.6 µg/kg) and acetone (13 µg/kg) were detected in the deeper soil sample collected from 6 to 7.5 ft bgs in the SB-09A boring; however, neither of these analytes were detected above their human health COPC screening levels of 53 µg/kg and 500,000 µg/kg, respectively.

In general, the distribution of analytes detected in the vicinity of SB-09A was relatively limited both horizontally and vertically. While the concentration of TCE detected in SH-09A was greater than that detected in the soil sample collected from SB-09 (completed during the Phase 1A RI), soil samples from borings previously completed in the vicinity of soil boring SB-09 and SB-09A (SB-10, SB-19, and SB-20 – all completed during the Phase 1A RI) did not exhibit detectable concentrations of TCE, suggesting that the horizontal extent of TCE concentrations above human health COPC screening levels is relatively limited. In addition, while TCE concentrations in the sample collected from SB-09A at 2 to 3.5 ft bgs, and the sample collected from SB-09 at 2 to 6 ft bgs were above the human health COPC screening level, the concentration of TCE in the deeper sample collected from SB-09A at 6 to 7.5 ft bgs was below its human health COPC screening level, suggesting that the vertical extent of TCE above human health COPC screening levels is also relatively limited.

Naphthalene was detected above its human health COPC screening level in the soil sample collected from 2 to 6 ft bgs in boring SB-09. However, as indicated above, naphthalene was not detected above human health COPC screening levels in either soil sample collected from SB-09A during the Phase 1B-4 RI. As depicted on Figure 13, the horizontal and vertical distribution of naphthalene above its human health COPC screening level is relatively limited.

5.2 Distribution of Analytes in Groundwater

The USEPA Region IX Preliminary Remediation Goals for Tapwater Ingestion (Region IX Tap Water PRGs), the USEPA Vapor Intrusion Screening Values, and the USEPA National Primary Drinking Water Standards Maximum Contaminant Levels (MCLs) were selected as benchmarks for comparison of groundwater analyte concentrations. Consistent with the RI Report, for presentation purposes, analyte concentrations are compared only to the Region IX Tap Water PRGs in the text of this Report; however, Tables 9 to 12 and Figures 54 to 62 also include comparisons of relevant groundwater sample analytical results to the USEPA Vapor Intrusion Screening Values and MCLs. For comparative purposes, Tables 9 to 12 and Figures 54 to 62 present groundwater data from previous groundwater sampling rounds conducted as part of the RI.

With a few limited exceptions that appear primarily associated with background conditions, the occurrence of groundwater analytes at relatively elevated concentrations is confined to the Area of Containment (AOC) and the area immediately downgradient of the AOC. No potable or non-potable supply wells exist within 500 feet of the Site, and as discussed in Section 6.0 of this report, contaminated groundwater at the Site discharges to surface water in the vicinity of

the former mill tailrace, and does not represent a threat to downgradient areas. A discussion of background conditions is included in Section 5.2.2 of the RI Report.

5.2.1 Groundwater Geochemistry

5.2.1.1 Results of Field and Laboratory Screening of Groundwater

Groundwater field screening results from the 2006 groundwater sampling round are summarized below and presented in Table 6, and on the Groundwater Field Sampling Summary forms, included in Appendix B-2. In addition to field screening, groundwater samples were submitted for laboratory screening analysis of density and viscosity. The results of the density and viscosity analysis are summarized below and presented in Table 7.

The field screening results from the 2006 groundwater sampling round are generally consistent with previous sampling rounds. As discussed in Section 6.0 of the RI, the distribution of pH in groundwater is a good indicator of the occurrence of groundwater contamination at this Site. Consistent with previous sampling rounds, the 2006 field screening results indicate that groundwater with elevated pH conditions (greater than 9.0 s.u.) exhibits relatively elevated specific conductance measurements, low DO concentrations, and low ORP values. As groundwater pH increases, density and viscosity measurements also increase.

5.2.1.1.a Dissolved Oxygen

The concentration of DO measured in Site groundwater in 2006 ranged from 0 to 6.3 mg/L. The expected maximum DO concentration for groundwater is approximately 11 to 16 mg/L (Drever, 1997), based on water in equilibrium with atmospheric oxygen at a temperature of 8 to 10 degrees Centigrade (°C). As depicted on Appendix Figure D-3 and consistent with historic groundwater data, DO values from the 2006 sampling round appear to decrease with increasing pH. In addition, as depicted on Appendix Figure D-3, groundwater collected from monitoring wells screened in deep stratigraphic units (e.g., glacial till or bedrock) generally has lower DO values than groundwater collected from shallower stratigraphic units (e.g., fill or ice contact sand / sand and gravel) for a given pH range during the 2006 sampling round.

5.2.1.1.b Oxidation Reduction Potential

The ORP values measured in groundwater samples collected in 2006 exhibited a large range from -511 millivolts (mV) to 283 mV. Typically, a large range in values was also observed for groundwater from a given depth level, and for groundwater samples within and outside the area of elevated pH. However, as depicted on Appendix Figure D-4 and consistent with historic groundwater data collected at the Site, ORP values from the 2006 sampling round generally decrease with depth. In addition as depicted on Appendix Figure D-4, ORP values generally exhibited an inverse relationship with pH during the 2006 sampling round.

5.2.1.1.c Other Field Screening Parameters

Plots of temperature, specific conductance, and turbidity versus pH from the 2006 sampling round are included as Appendix Figures D-1, D-2, and D-5, respectively. Consistent with previous sampling rounds, temperature and turbidity do not appear to correlate with pH; whereas, specific conductance appears to correlate well with pH.

5.2.1.1.d Density and Viscosity

As presented in Table 7, the density of the groundwater samples collected in 2006 ranged from 0.999 g/cm^3 (essentially equivalent to that of water) to 1.1069 g/cm^3 at SH-01D. The kinematic viscosity of the groundwater samples collected in 2006 ranged from 1.1 Centipoise (essentially equivalent to that of water[7]) to 2.13 Centipoise. As depicted on Appendix Figures D-6 and D-7, consistent with previous historic groundwater sample results, density and viscosity appear to correlate well with pH in samples collected in 2006, particularly at pHs greater than approximately 13.0 s.u.

5.2.1.2 Results of Field Measurements of pH in Groundwater

The distributions of pH conditions in shallow and deep overburden, and bedrock groundwater from the 2006 sampling round are depicted on Figures 15 through 17, and summarized in Table 8. Consistent with previous sampling rounds, a area of elevated pH (greater than 9 s.u.) was present within and downgradient of the AOC in shallow and deep overburden, and bedrock groundwater during the 2006 sampling round. As discussed in Sections 5.2.1.1 and 5.2.1.2 of the RI Report, groundwater with pH greater than approximately 12.5 s.u. exhibits increased density and kinematic viscosity (see Table 7 and Appendix Figures K-6 and K-7 from the RI Report and Appendix Figures D-6 and D-7 from this Report); based on this fact, and the observed distribution of elevated pH, groundwater with pH greater than approximately 12.5 s.u. appears to act as a DAPL. As depicted on Figures 16 and 17 and consistent with previous sampling rounds, the DAPL portion of the elevated pH groundwater is limited in lateral and vertical extent to groundwater from deep overburden (and shallow bedrock in one location – SH-01R) within the central portion of the soil and asphalt-capped AOC.

5.2.1.3 Results of Water Quality Parameter Analysis

Water quality parameters, including alkalinity, chloride, sulfate, nitrate, TKN, and the major cations were measured in groundwater samples from the shallow, deep, and bedrock monitoring wells. These data are summarized in Table 9. As depicted on Appendix Figures D-40 through D-44 and consistent with previous sampling rounds, groundwater results from the 2006 sampling round indicate that alkalinity exhibits a positive correlation with pH, whereas chloride (Cl), nitrate (NO_3), sulfate (SO_4), and TKN do not. Consistent with previous sampling rounds and as depicted on Appendix Figures D-11 through D-39, of the major cation results from the 2006

[7] The kinematic viscosity of water at 20°C is 1.0019 Centipoise (Weast, 1982).

sampling round, potassium (K) and sodium (Na) positively correlate with pH; calcium (Ca) and magnesium (Mg) do not.

Trilinear diagrams showing the relative proportions of cations (Ca, Mg, and the sum of Na+K) and anions (Cl, SO_4, and alkalinity [which is presented on the diagram as the sum of carbonate and bicarbonate {CO_3+HCO_3}, but also includes hydroxide]) in samples from shallow, deep, and bedrock monitoring wells from the 2006 sampling round have been included as Figures 18 through 20. Figures 18A, 19A, and 20A present data collected in 2006. Figures 18B, 19B, and 20B show groundwater data collected in 2001, 2002, 2003, and 2006. The variation in major ion concentrations is likely attributable to several factors, including reactions with Site analytes (including pH) and with formation materials. Section 5.2.1.3 of the RI Report provides a general overview of the geochemical composition of Site groundwater, including a brief spatial analysis of water quality at the Site and a comparison of the concentrations of the various ions to the pH of the groundwater. The water quality characteristics of the 2006 groundwater data are generally consistent with the water quality characteristics described in Section 5.2.1.3 of the RI Report. Refer to the RI Report and Figures 18-20 of this report for further detail regarding this matter.

5.2.2 Results of Chemical Analysis of Groundwater

Tables 9 through 11 present a summary of groundwater analytical results from groundwater samples collected during the Phase 1B-5 RI as well as groundwater analytical results from prior groundwater sampling rounds. For brevity and consistency with the text of the RI Report, the text of this section discusses the groundwater analytical results from the Phase 1B-5 sampling round compared to the USEPA Region IX Tap Water PRGs (where available); however, Tables 9 through 11 compare the groundwater analytical results of all of the RI groundwater sampling rounds to MCLs and Vapor Intrusion Screening Levels (where available). In addition, Figures 21 through 62 depict the concentrations of selected analytes relative to all three of these screening levels for the 2006 sampling round[8].

It should be emphasized that an exceedance of the USEPA Region IX Tap Water PRGs may indicate potential risk, but does not necessarily mean that there is risk. Also, such an exceedance does not necessarily indicate that the effects would be exhibited by receptors under Site-specific conditions. Risks from groundwater analytes are evaluated in the BHHRA, and summarized in 8.0 of this Report. Typically, when data are considered in the context of actual Site-specific criteria, the USEPA Region IX Tap Water PRGs are shown to be conservative and lower than final approved cleanup standards, at least for many parameters.

[8] Figures 21 through 62 present the analytical results of groundwater samples collected as part of the RI. The exceedance indices (e.g., the graphic depiction of a exceedance of the Region IX Tap Water PRGs, MCLs, or EPA Vapor Intrusion Screening Levels) are based on the results of the 2006 groundwater sampling round. If no samples were collected in 2006, the concentration from the most recent prior sampling round was used for comparison to the applicable criteria.

5.2.2.1 Distribution of Inorganic Parameters in Groundwater

Consistent with results from previous groundwater sampling rounds and as presented on Table 9, metals were the predominant analytes detected in groundwater. Concentrations of aluminum, antimony, arsenic, chromium, copper, iron, lead[9], manganese, nickel, and vanadium were detected above their respective Region IX Tap Water PRGs in groundwater samples collected during the 2006 sampling round. Figures 21 through 50 depict the spatial distribution of these metals as compared to the Region IX Tap Water PRGs (where applicable). Relationships between various metals and pH are presented in Appendix Figures D-11 to D-39. The following observations are noted with regard to the apparent correlation of specific metals versus pH from the 2006 sampling round

- Aluminum, antimony, arsenic, copper, nickel, and vanadium appear to exhibit a relatively strong correlation with pH, which suggests that these metals may not necessarily be present in source soils as "contaminants". Rather, at least a portion of these metals may be present in groundwater as a result of dissolution of naturally occurring concentrations of metals in source soils and/or bedrock, while others (e.g., copper and nickel) may be present in groundwater as a result of dissolution of these metals in fill soils within the AOC.

- Chromium and lead exhibit a relatively weak correlation with pH, and their presence at elevated concentrations may therefore be more suggestive of elevated source soil concentrations.

- Iron and manganese exhibit a weak correlation with pH, and are likely controlled more by oxidation state, rather than pH or source area concentrations.

As presented in Table 9, other metals detected in groundwater samples including: barium, beryllium, cadmium, cobalt, mercury, selenium, silver, thallium, and zinc were either not detected at concentrations above the Region IX Tap Water PRGs, or only a few of the groundwater samples had concentrations of these metals in excess of the Region IX Tap Water PRGs, and are therefore unlikely to be related to historic Site activities or due to elevated pH conditions mobilizing metals present in Site soils.

5.2.2.2 Distribution of SVOCs in Groundwater

As summarized in Table 10, only two non-PAH SVOCs were detected in groundwater at concentrations above the Region IX Tap Water PRGs during the 2006 groundwater sampling round:

[9] There is currently no USEPA Region IX Tap Water PRG for lead. Lead concentrations were compared to the USEPA MCL for drinking water (15 µg/L).

- Concentrations of bis(2-ethylhexyl)phthalate exceeded the Region IX Tap Water PRG (4.8 µg/L) in three locations (SH-01R, SH-17S, and WP-03 at concentrations ranging from 5.4 to 6.9 µg/L); and

- Concentrations of carbazole exceeded the Region IX Tap Water PRG (3.4 µg/L) in two locations (SH-01D and SH-01R at concentrations of 9.5 and10 µg/L, respectively).

As presented in Table 10 and consistent with previous groundwater sampling rounds, the majority of SVOCs detected in groundwater at concentrations above their respective Region IX Tap Water PRGs during the 2006 sampling round were PAHs. A summary of the PAHs detected in groundwater during the 2006 sampling round, their maximum observed concentrations, and a tally of their occurrence in the shallow, deep, and bedrock monitoring wells at concentrations in excess of their respective Region IX Tap Water PRGs is presented in the table below:

2006 Exceedance Summary
PAHs in Groundwater
USEPA Region IX Tap Water PRGs

PAH	USEPA Region IX Tap Water PRG (µg/L)	Maximum Reported Concentration 2006 (µg/L)	Number of locations with groundwater concentration exceeding Region IX Tap Water PRG in 2006		
			Shallow wells	Deep wells	Bedrock wells
Benzo(a)anthracene	0.092	1.6	3	1	1
Benzo(a)pyrene	0.0092	1.8	6	1	1
Benzo(b)fluoranthene	0.092	1.4	1	0	1
Benzo(k)fluoranthene	0.92	1.3	1	0	0
Dibenz(a,h)anthracene	0.0092	0.4	2	0	1
Fluorene	24	26	0	0	1
Indeno(1,2,3-cd)pyrene	0.092	1.1	1	0	0
Naphthalene	0.62	2,300	5	2	2

Although detected above the analytical reporting limit in one or more groundwater samples, no Region IX Tap Water PRGs exist for the following PAHs: acenaphthylene, benzo[g,h,i]perylene, 2-methylnaphthalene, and phenanthrene.

Total PAH concentrations range from below the analytical reporting limit to 2,797 µg/L. On average, naphthalene and 2-methylnaphthalene constitute approximately 62% of the total PAH concentration. In samples with greater than 50 µg/L total PAHs, naphthalene and 2-methylnaphthalene constitute approximately 67% of the total PAH concentration. As depicted in Figures 51 through 53, in general, elevated PAH concentrations (greater than approximately 50 µg/L) were detected in groundwater from wells within the soil- and asphalt-capped portions of the AOC and wells located within the downgradient wetland / former mill tailrace area. In

general, groundwater samples with total PAHs concentrations above 50 µg/L also had elevated pH (i.e., pH > 9.0 s.u.). Elevated PAH concentrations appear to be simply co-located with the pH, rather than correlated with elevated pH as are some metals due to enhanced solubility with elevated pH.

Total PAH concentrations are depicted on Figures 51 through 53. The distribution of benzo(a)pyrene, 2-methylnaphthalene and naphthalene are presented on Figures 54 through 62.

5.2.2.3 Distribution of VOCs in Groundwater

As presented in Table 11 and consistent with previous groundwater sampling rounds, limited VOC contamination was detected in groundwater samples collected during 2006. During the 2006 sampling round, concentrations of total VOCs in groundwater ranged from below the analytical reporting limit to 1,609 µg/L (SH-01R). The dominant VOCs detected in groundwater were aromatic volatile organic compounds (AVOCs), primarily benzene, toluene, ethylbenzene, and total xylenes (collectively, the "BTEX" compounds), and styrene. As summarized in Table 12, concentrations of VOCs exceeding applicable Region IX Tap Water PRGs or USEPA Vapor Intrusion Screening Values were primarily located within the soil- and asphalt-capped portions of the AOC and the downgradient wetland / former mill tailrace area.

The distribution of total AVOCs is depicted in Figures 63, 64, and 65 for shallow, deep, and bedrock groundwater, respectively. As depicted on these Figures, the area of AVOCs in groundwater is primarily located within and downgradient of the AOC.

A summary of the AVOCs detected in groundwater, their maximum observed concentrations and a tally of their occurrence in the shallow, deep, and bedrock monitoring wells at concentrations in excess of their respective Region IX Tap Water PRGs is presented in the table below:

2006 Exceedance Summary
AVOCs in Groundwater
USEPA Region IX Tap Water PRGs

AVOC	USEPA Region IX Tap Water PRG (µg/L)	Maximum Reported Concentration 2006 (µg/L)	Number of locations with groundwater concentration exceeding Region IX Tap Water PRG in 2006		
			Shallow wells	Deep wells	Bedrock wells
Benzene	0.35	270	2	2	1
Toluene	72	590	0	1	1
Ethylbenzene	130	200	0	1	1
Xylene (total)	21	380	0	1	1

Only two chlorinated volatile organic compounds (CVOCs) were detected at concentrations in excess of their respective Region IX Tap Water PRGs in groundwater samples collected during

the 2006 groundwater sampling round: chloroform and TCE. Chloroform was detected in six shallow monitoring wells (SH-21S, SH-22S, SH-24S, SH-25S, SH-27S, and SH-28S) and three deep monitoring wells (SH-18D, SH-19D, and SH-27D) at concentrations up to 1 µg/L, in excess of the Region IX Tap Water PRG (0.17 µg/L) during the 2006 sampling round. TCE was detected at concentrations up to 3.9 µg/L, in excess of the Region IX Tap Water PRG (0.028 µg/L) in groundwater samples collected from one shallow monitoring well (SH-25S), three deep monitoring wells (SH-05D, SH-25D, and SH-27D), and four bedrock monitoring wells (SH-06R-A, SH-06R-B, SH-27R, and SH-28R) during the 2006 sampling round. Figures 66 through 68 show the distribution of TCE for shallow, deep, and bedrock groundwater, respectively.

No other VOCs (those VOCs not included as AVOCs or CVOCs) were detected at concentrations in excess of their respective Region IX Tap Water PRGs in groundwater samples collected during the 2006 groundwater sampling round.

5.3 Distribution of Analytes in Surface Water

Tables 14 and 16 present a summary of surface water analytical results from samples collected during the Phase 1B-5 RI. For comparative purposes, surface water analytical results were compared to COPC screening levels used in the BHHRA and BERA. Two COPC screening levels were developed for the surface water data, a human health screening level, and an ecological screening level:

- The human health COPC screening level is the USEPA Region IX Tap Water PRG.
- The ecological screening level in surface water is the lowest of the GLWQI Tier II Values[10], USEPA Aquatic SWQCs[11], or the ORNL Tier II SCVs[12].

Consistent with discussion of surface water data presented in the RI Report, the following text discusses analyte concentrations of surface water samples collected during the Phase 1B-5 RI compared to human health COPC screening levels. These data are not compared to ecological COPECs in the following text; however, Tables 14 through 16 compare the surface water analytical results to both human health and ecological screening levels. Surface water sample analytical results are also compared to the appropriate benchmarks on the shallow groundwater figures (selected Figures 21 to 66).

It should be emphasized that an exceedance of a human health or ecological screening level may indicate potential risk, but does not necessarily mean that there is risk. Also, such an exceedance does not necessarily indicate that the effects would be exhibited by receptors under Site-specific

[10] Great Lakes Water Quality Initiative Tier II methodology values, as reported in Ecotox Thresholds table (USEPA, 1996).
[11] USEPA National Recommended Surface Water Quality Criteria (314CMR 22) (USEPA, 2006; http://www.epa.gov/waterscience/criteria/wqcriteria.html) for the protection of aquatic life (chronic freshwater criteria).
[12] Oak Ridge National Laboratory Tier II Secondary Chronic Values (SCVs) for Aquatic Biota (Suter & Tsao, 1996; http://www.esd.ornl.gov/programs/ecorisk/documents/tm96r2.pdf).

conditions. Risks from surface water analytes are evaluated in the BHHRA and BERA, and summarized in Sections 7.0 and 8.0 of this Report. Typically, when data are considered in the context of actual Site-specific criteria, these screening levels are shown to be conservative and lower than final approved cleanup standards, at least for many parameters.

With limited exceptions that appear associated with background surface water conditions, COPCs were not detected at concentrations above Region IX PRGs in the 2006 surface water samples other than in the sample collected from the former mill tailrace (SW-107). As described in Section 4.4.2.1 of the RI Report, elevated concentrations of COPCs in the surface water of the former mill tailrace is consistent with the presumption that this feature is a primary discharge area for groundwater from the Site.

5.3.1 Surface Water Geochemistry

5.3.1.1 Results of Field Screening of Surface Water

In accordance with SOP S-1669G, field screening of surface water samples for specific conductance, temperature, DO, and ORP was performed during the September 29, 2006 round of surface water sampling. The results of field screening are summarized in Table 14, presented on the Field Sampling Summary forms included in Appendix B-3, and are discussed below.
Specific conductance measured in surface water samples from the Neponset River (SW-105B and SW-108) was 286 microsiemens per centimeter (µS/cm). The specific conductance at SW-102 (located upgradient of the Site) was 282 µS/cm, while the specific conductance value measured in surface water from the former mill tailrace area (location SW-107) of 950 µS/cm was elevated relative to those measured in surface water from the Neponset River.

The DO concentration measured in surface water in the Neponset River ranged from 10.0 mg/L (at 16.8°C) in SW-105 to 10.8 mg/L (at 16.7°C) in SW-108. The DO concentration measured at SW-102 was 9.4 mg/L (at 16.8°C). The DO concentration measured at SW-107 was 2.8 mg/L (at 15.3°C). The expected maximum DO concentration for surface water is approximately 9.6 mg/L based on water in equilibrium with atmospheric oxygen at a temperature of 16°C (Drever, 1997).

In general, ORP values measured in surface water in September 2006 ranged from 81 mV at SW-105 to 136 mV at SW-108. The ORP reading at SW-102 was 62 mV, while the ORP reading at SW-107 was 130 mV.

Temperature measurements for surface water ranged from 16.7°C at SW-108 to 16.8°C at SW-105. The temperature at SW-102 was 16.8°C and at SW-107 was 15.3°C.

5.3.1.2 Results of Field Measurements of pH in Surface Water

Measurements of surface water pH were collected during the surface water sampling round on September 29, 2006 (Table 13). The pH of surface water samples ranged from approximately

6.7 s.u. at SW-108 to 7.0 s.u. at SW-105. The pH measured at SW-102 was approximately 6.5 s.u., while the pH measured at SW-107 was approximately 7.1 s.u.

5.3.2 Results of Chemical Analysis of Surface Water Samples

As described in Section 2.0 of this report and consistent with Section 8.4 of the QAPP, water samples were collected on September 29, 2006 from four surface water quality sampling stations established at the Site. For comparative purposes, Tables 14 to 16 and selected Figures 21 to 66 present surface water data from the 2006 and previous sampling rounds conducted as part of the RI. Surface water concentrations presented in selected Figures 21 to 50 are for total metals. Both total and dissolved metals concentrations are presented in Table 14.

5.3.2.1 Distribution of Inorganic Parameters in Surface Water

Inorganic parameters in surface water (including TOC) from the 2006 sampling round are presented on Table 14. A summary of those metals that were detected at concentrations above their respective Region IX Tap Water PRGs in surface water samples collected during the 2006 sampling round is presented below:

2006 Exceedances of Region IX PRGs

- Arsenic (total and dissolved): SW-102, SW-105, SW-107, and SW-108;
- Manganese (total): SW-102 and SW-105; and
- Vanadium (total and dissolved): SW-107.

Aluminum, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, nickel, potassium, selenium, sodium, and zinc were detected in one or more surface water samples, but at concentrations below their respective Region IX PRGs, where available. SW-107, located in the former mill tailrace, frequently had the highest concentration for many of the inorganic parameters measured in surface water.

5.3.2.2 Distribution of SVOCs in Surface Water

As indicated in Section 2.6 of this Report, the surface water samples collected during the 2006 sampling round were analyzed for PAHs, bis(2-Ethylhexyl)phthalate and carbazole. The following analytes were detected in one or more surface water samples above laboratory reporting limits in the 2006 surface water samples:

- Acenaphthene
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Acenaphthylene
- Chrysene
- Dibenz(a,h)anthracene
- Fluoranthene
- Fluorene
- Anthracene
- Indeno(1,2,3-cd)pyrene
- 2-Methylnaphthalene
- Naphthalene
- Phenanthrene
- Pyrene

However, the only SVOCs detected at concentrations exceeding their respective Region IX PRGs, were: benzo(a)anthracene, benzo(a)pyrene, and dibenz(a,h)anthracene in SW-107.

5.3.2.3 Distribution of VOCs in Surface Water

As summarized in Table 19, VOCs were not detected above laboratory reporting limits in any of the surface water samples submitted for analysis in the 2006 sampling round.

5.4 Distribution of Analytes in Sediment

This section summarizes the distribution of analytes in sediment samples collected in 2006. A more comprehensive discussion of the distribution of analytes in sediment is presented in the RI Report. Sediment samples were collected (in October 2006) during the Phase 1B-4 RI from locations on Lot #33-360 to further assess potential risk to various receptors from floodplain sediment impacted by lead, arsenic, and PAHs. In addition, M&E collected (in July 2006) sediment samples in and around Lewis Pond to further assess the distribution of asbestos in sediment.

In 2006, 12 sediment samples were collected from six newly established floodplain sediment locations (FP-09A, FP-09B, FP-09C, FP-09D, FP-09E and FP-09F; with two samples at each location from depths of 0–1' bgs and 1-3' bgs) on Lot #33-360 and submitted for laboratory analysis of PAHs, arsenic, and lead. The analytical data for these floodplain sediment samples and other sediment data collected during the RI are presented on Tables 17 and 18. For comparative purposes, sediment analytical results were compared to COPC screening levels used in the BHHRA and BERA. Two COPC screening levels were developed for the sediment data, a human health screening level, and an ecological screening level:

- The human health COPC screening level is the USEPA Region IX Residential Soil PRGs[13].

- The ecological screening level in sediment is the lowest of the USEPA Region IX Res. Soil PRGs, 1990 NOAA ER-Ls[14], Threshold Effects Levels (TELs)/Probable

[13] USEPA Region IX Res. Soil PRGs values are from the USEPA Region IX Residential Soil Preliminary Remediation Goals (PRGs), dated October 1, 2004. PRGs based on non-cancer effects are multiplied by 0.1 per USEPA Guidance (USEPA Region 1, Risk Update Number 5, September 1999). The soil PRGs are used as a conservative estimate of target risk levels, and some exposure pathways included in the residential soil PRG development may not be applicable for sediment exposure.

[14] 1990 NOAA ER-Ls indicates National Oceanic and Atmospheric Administration (NOAA) Effects Range - Low (ER-L). The values are from "The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program," from the National Ocean Service, Rockville, Maryland, March 1990, NOAA, page 138.

- Effects Levels (PELs)[15], Ontario LELs[16], USEPA SQBs[17], USEPA SQCs[18], and MADEP TECs[19].

Consistent with discussion of sediment data presented in the RI Report, the following text discusses analyte concentrations of floodplain sediment samples collected during the Phase 1B-5 RI compared to Region IX Residential Soil PRGs. These data are not compared to ecological screening levels in the following text; however, Tables 17 and 18 compare the sediment analytical results to both human health and ecological screening levels.

It should be emphasized that an exceedance of a human health or ecological screening level may indicate potential risk, but does not necessarily man that there is risk. Also, such an exceedance does not necessarily indicate that the effects would be exhibited by receptors under Site-specific conditions. Risks from sediment analytes are evaluated in the BHHRA and BERA, and summarized in Sections 7.0 and 8.0 of this Report. Typically, when data are considered in the context of actual Site-specific criteria, these screening levels are shown to be conservative and lower than final approved cleanup standards, at least for many parameters.

In general, shallow sediment data collected in 2006 suggests that concentrations of PAHs and lead were higher in samples collected from the FP-09 location during the earlier sediment sampling performed in 2000 and 2001 than in the other samples collected on Lot #33-360 during the 2006 sampling round. However, the concentrations of PAHs and lead were generally higher in deep sediment samples from outside the mapped 100-year floodplain, than in deep sediment samples from within the 100-year floodplain at Lot #33-360.

5.4.1 Distribution of PAHs in Lot #33-360 2006 Floodplain Sediment Samples

As presented on Table 18, and depicted on Figure 69, PAHs were detected in each of the Lot #33-360 floodplain sediment samples. Total PAH concentrations were greater in the shallow (0 to 1 ft bgs) floodplain sediment samples than in the deeper (1 to 3 ft bgs) samples. Total PAH concentrations detected in shallow sediment samples collected in 2006 ranged from 481 µg/kg in FP-09C to 6,879 µg/kg in FP-09E. The total PAH concentrations detected in the deeper

[15] Threshold Effects Levels (TELs) and "Probable Effects Levels (PELs)" indicate the values presented are from "A Preliminary Evaluation of Sediment Quality Assessment Values for Freshwater Ecosystems," by Smith, et al., J. Great Lakes Res., 22(3): 624-638.
[16] Ontario Lowest Effect Levels (LELs) values are from "Development of the Ontario Provincial Sediment Quality Guidelines for Polycyclic Aromatic Hydrocarbons (PAHs)," Ministry of Environment and Energy, Ontario, Canada, January 1994.
[17] USEPA SQBs values presented are Sediment Quality Benchmarks (SQBs) from USEPA Ecotox Thresholds (1996).
[18] USEPA SQCs values are Sediment Quality Criteria (SQC) from USEPA Ecotox Thresholds (1996). The values are the lower limit of the 95 percent confidence interval.
[19] MADEP TECs values are from the Massachusetts Department of Environmental Protection (MADEP) "Recommended Freshwater Sediment Screening Values" (May 2002), which are based on the consensus-based threshold effect concentrations (TECs) from "Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems," by MacDonald, et al., Archives of Environmental Contamination and Toxicology, 36:20-31.

sediment samples collected in 2006 ranged from 61 µg/kg in FP-09A to 2,279 µg/kg in FP-09E. As depicted on Figure 69, elevated concentrations of PAHs were observed both within and outside the mapped 100-year floodplain. Fill soils were observed in samples collected from the FP-09B and FP-09E locations.

All of the PAHs were detected above laboratory reporting limits in one or more samples in of the floodplain sediment samples submitted for analysis in 2006. The table below summarizes those 2006 floodplain sediment samples from Lot #33-360 that had concentrations of one or more PAHs above their respective Region IX Residential Soil PRGs, where available.

2006 Exceedance Summary
Floodplain Sediment
USEPA Region IX Residential Soil PRGs for PAHs

Analyte	USEPA Region IX PRG (µg/kg)	Exceedance Locations Shallow (0-1 feet)	Exceedance Locations Deep (1-3 feet)
Benzo(a)anthracene	620	FP-09E	-
Benzo(a)pyrene	62	FP-09A, FP-09B, FP-09D, FP-09D, FP-09E, FP-09F	FP-09D, FP-09E
Benzo(b)fluoranthene	620	FP-09E	-
Dibenz(a,h)anthracene	62	FP-09D, FP-09E	-

"-" indicates that there was no exceedance for this analyte

5.4.2 Distribution of Lead and Arsenic in Lot #33-360 2006 Floodplain Sediment Samples

As presented on Table 17, the concentration of arsenic in the shallow 2006 sediment samples ranged from 1.4 mg/kg in FP-09C to 14 mg/kg in FP-09D. The concentration of arsenic in the deeper 2006 sediment samples ranged from 0.98 mg/kg in FP-09A to 9.7 mg/kg in FP-09D.

As presented in Table 17 and Figure 70, the concentration of lead in the shallow 2006 sediment samples (0 to 1 ft bgs) ranged from 21 mg/kg in FP-09C to 330 mg/kg in FP-09D. The detected concentrations of lead in the deeper sediment samples (1 to 3 ft bgs) ranged from 8.3 mg/kg in FP-09C to 340 mg/kg in FP-09F.

Arsenic was detected at concentrations in excess of its Region IX Residential Soil PRG (0.39 mg/kg) in all of the floodplain sediment samples collected during 2006. Lead was not detected above its Region IX Residential Soil PRG (400 mg/kg) in any of the floodplain sediment samples collected during 2006.

5.4.3 Distribution of Asbestos in Sediment - Lewis Pond Vicinity

The distribution of asbestos in sediment in Lewis Pond and the surrounding floodplain was discussed in Section 5 of the RI Report. As depicted on Figure 76[20], asbestos was detected at concentrations greater than 1% (the cleanup standard applied during the previous asbestos Removal Action) in several sediment samples in this area (i.e., samples collected from locations LP-01, LP-03 through LP-10; FP-09). In 2006, on behalf of USEPA, M&E collected 29 (including duplicates) additional sediment samples from Lewis Pond and the surrounding floodplain, and analyzed these samples for asbestos in order to further refine the extent of asbestos in sediment. Asbestos was not detected above 1% in any of these sediment samples collected by M&E. Asbestos was detected at or above the laboratory reporting limit of 0.25%, but below 1%, in three of these sediment samples (FPS-14-ME, LP-24R-ME, and LP-23R-ME, at concentrations of 0.75%, 0.25%, and 0.25%, respectively). M&E's Data Evaluation Report for Additional Asbestos Investigations is included as Appendix I.

While asbestos was detected at concentrations greater than 1% in sediment samples collected as part of SHA's RI sampling activities in 2000 and 2001, asbestos was not detected above 1% in sediment samples collected by M&E in 2006, many of which were located in close proximity to samples collected by SHA that had concentrations of asbestos greater than 1%. While this difference could be explained by temporal or spatial differences in samples collected by SHA versus those collected by M&E, there also could be variations due to analytical, sample preparation, and/or sample collection methods in the asbestos results from SHA's work compared to M&E's work. Samples collected by SHA were analyzed by PLM and TEM. Samples collected by M&E were analyzed by PLM using Method CARB 435.

5.5 Distribution of Analytes in Soil Vapor

In 2006, ten soil vapor samples (SV-01 through SV-10) were collected from the vicinity of soil boring SB-09. The analytical data for soil vapor samples are presented on Table 19. For comparative purposes, VOCs detected in soil vapor samples were compared to USEPA's Target Soil Gas Concentrations21, the human health COPC screening levels.
It should be emphasized that an exceedance of a Target Soil Gas Concentration may indicate potential risk, but does not necessarily mean that there is risk. Also, such an exceedance does not necessarily indicate that the effects would be exhibited by receptors under Site-specific conditions. Risks from soil vapor analytes are evaluated in the BHHRA, and summarized in Sections 7.0 and 8.0 of this Report. Typically, when data are considered in the context of actual Site-specific criteria, these screening levels are shown to be conservative and lower than final approved cleanup standards, at least for many parameters.

[20] Figure 76 is Figure 3-2 of M&E's Data Evaluation Report (Appendix I).
[21] Target Soil Gas Concentrations values are from Table 2C in the USEPA Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils. Target soil gas concentrations based on non-carcinogenic effects are multiplied by 0.1 per USEPA Guidance (USEPA Region I, Risk Update Number 5, September 1999.

The table below summarizes those samples that exceeded their respective Target Soil Gas Concentrations, where available.

2006 Exceedance Summary
Soil Vapor
Target Soil Gas Concentrations

Analyte	Target Soil Gas Concentrations ($\mu g/m^3$)	Exceedance Locations
AVOCs		
Benzene	3.1	SV-06, SV-07, SV-08, SV-10
Ethylbenzene	22	SV-06
Trimethylbenzene (1,2,4-)	6	SV-02, SV-06, SV-09
Trimethylbenzene (1,3,5-)	6	SV-01, SV-02, SV-06
CVOCs		
Carbon tetrachloride	1.6	SV-08
Chloroform	1.1	SV-01
Dichloroethene (cis-1,2-)	35	SV-01
Methylene chloride	52	SV-08
Tetrachloroethene	8.1	SV-10
Trichloroethene	0.22	SV-01, SV-02, SV-03, SV-06, SV-07, SV-08, SV-09, SV-10
PAHs		
Naphthalene	3	SV-01, SV-02, SV-09

Note:
1) The reporting limit for TCE was greater than the Target Soil Gas Concentration.

Concentrations of 2-methylnaphthalene, naphthalene, and TCE in soil samples collected from SB-09 observed in the Phase 1A RI were elevated. The elevated concentrations of these analytes were the primary reason for completing the soil vapor sampling performed as part of the Phase 1B-4 RI. Therefore, Figure 71 presents the distribution of these analytes in soil vapor.

6.0 SUMMARY OF PHASE 1B-4/PHASE 1B-5 REMEDIAL INVESTIGATION DATA AND ADDITIONAL ASBESTOS INVESTIGATION

The conclusions derived from analysis of data collected as part of the Phase 1B-4 and Phase 1B-5 RIs are consistent with conclusions regarding the source and location of analytes at the Site that were presented in the RI Report. As described in the RI Report, the primary analyte source area at the Site is the AOC. Soils within the AOC appear to act as a source of groundwater contamination that extends westerly towards the Neponset River in the vicinity of the former mill tailrace. This area also continues to be the location of the DAPL (i.e., pH>12.5 s.u.), and resultant area of elevated pH (i.e., pH>9 s.u.) that extends from the AOC towards the Neponset River in the vicinity of the former mill tailrace. The groundwater data also suggest that the occurrence of metals is attributable to the presence of metals in AOC soils from former manufacturing activities and from high pH conditions, combined with other related geochemical factors, mobilizing certain metals in fill or naturally occurring soils within this area.

The 2006 data suggest that the general distribution of analytes at the Site is consistent with the results presented in the RI Report. As discussed in further detail below, a comparison of groundwater and surface water data collected in 2006 to data presented in the RI Report supports this assertion. Floodplain sediment data collected in 2006 also further refined the understanding of the distribution of lead, arsenic, and PAHs in sediment on Lot #33-360. In general, the floodplain sediment data collected on Lot #33-360 suggest that the highest concentrations of these analytes are found in the vicinity of FP-09. In addition, soil vapor data collected in 2006 suggest that elevated concentrations (i.e., sufficient to engender potential inhalation risks [refer to Section 8.0] of VOCs (i.e., TCE, naphthalene, and 2-methylnaphthalene) are limited to the immediate vicinity of soil boring SB-09.[22]

As discussed previously, data collected by M&E in July 2006 indicate that outside of the AOC, the only area of the Site where soil or sediment with asbestos concentrations greater than 1% was observed is at one soil sample location on the East of South Street Area. M&E's 2006 soil and sediment sampling also served to further refine the distribution of asbestos at concentrations less than 1%, but greater than or equal to 0.25%. M&E's report discussing the findings of the asbestos sampling is included in Appendix I and discussed in Section 6.3.

As described in further detail below, with limited exceptions, the concentrations of analytes in groundwater and surface water in 2006 were similar to or less than concentrations observed in previous groundwater and surface water sampling rounds performed in 2001/2002/2003. While the general format of the this Report is consistent with the RI Report, Section 6.0 of this Report is slightly different than Section 6.0 (the Fate and Transport section) of the RI Report. SHA has not reiterated general conclusions regarding fate and transport of analytes in groundwater, surface water, and sediment in this Report, because the overall conclusions of fate and transport

[22] As described in Section 8.0 and further described in the BHHRA, inhalation risk to the future resident or site worker is limited to the area in and around SB-09. However, there is also potential risk to a future construction worker in the vicinity of soil boring SB-14 from inhalation of air within a hypothetical trench due to elevated concentrations of naphthalene and 2-methylnaphthalene in soil in this area. Soil vapor data were not collected in the vicinity of SB-14 as part of the Phase 1B-4 or Phase 1B-5 investigations.

of contaminants in these media would not change materially if we updated our calculations with data collected from the Phase 1B-4 or Phase 1B-5 RIs. Rather, discussions related to groundwater and surface water in this section of the Report are focused on how concentrations of analytes have changed relative to previous sampling rounds.

In the case of floodplain sediment on Lot #33-360, we present herein a general discussion of the distribution of analytes as they have been further refined with the Phase 1B-5 data in the context of the transport and fate mechanisms for sediment at the Site, which are described in greater detail in the RI Report.

Soil vapor samples were not collected as part of earlier investigations documented in the RI Report; therefore, we present a brief summary of general soil vapor analyte transport and fate mechanisms as they may have effected the distribution of analytes observed in soil vapor samples collected as part of the Phase 1B-4 RI.

6.1 Comparison to Previous Findings - Groundwater

To provide insight on the changes to analyte concentrations over time, we compared the 2006 analyte concentration to the maximum concentration from previous sampling rounds at each location. By comparing concentrations from 2006 to maximum values from previous rounds, increases and decreases in analyte concentrations (relative to previous maximum values) can be identified.

The following set of criteria were developed to compare the 2006 results to the maximum concentration of previous sampling rounds. We have developed three general categories for this comparison. These categories are described below:

Category 1: The 2006 analyte concentration was determined to be less than the maximum concentration of the previous sampling rounds, or reported concentrations are below laboratory reporting limits for all sampling rounds if the:

- 2006 maximum detected concentration was less than previously detected maximum concentration; or
- 2006 non-detect reporting limit was less than previously detected maximum concentration; or
- Concentrations have been below laboratory reporting limits for all of the sampling rounds.

Category 2: The 2006 analyte concentration was considered greater than (or equal to) the previously measured maximum concentration if the:

- 2006 maximum detected concentration was greater than (or equal to) previously detected maximum concentration; or
- 2006 detected value was greater than previous non-detect reporting limit.

Category 3: The result of the comparison was considered indeterminate if the:

- Well was not sampled in 2006; or
- 2006 detected value was less than previously measured non-detect reporting limit; or
- 2006 non-detect reporting limit was greater than previously detected maximum concentration; or
- pH value from 2006 was rejected (applicable to pH values only).

The table below presents on an analyte-by-analyte basis, a comparison of the 2006 groundwater concentrations to the maximum concentrations from previous sampling rounds.

Summary of 2006 Groundwater Concentrations Compared to Maximum Concentrations from Previous Sampling Rounds (Numbers of Sampling Locations)

Analyte	Shallow			Deep			Bedrock		
	Category 1	Category 2	Category 3	Category 1	Category 2	Category 3	Category 1	Category 2	Category 3
pH (figures 15 - 17)	18	5	1	8	0	3	9	2	0
Aluminum (figures 21 - 23)	17	0	6	6	2	3	11	0	0
Antimony (figures 24 - 26)	20	0	3	10	0	1	9	1	1
Arsenic (figures 27 - 29)	11	11	1	4	6	1	3	8	0
Chromium (figures 30 - 32)	18	2	3	5	0	6	5	0	6
Copper (figures 33 - 35)	17	3	3	7	2	2	5	3	3
Iron (figures 36 - 38)	13	10	0	7	3	1	7	4	0
Manganese (figures 39 - 41)	20	2	1	9	1	1	7	3	1
Lead (figures 42 - 44)	17	4	2	7	1	3	10	0	1
Nickel (figures 45 - 47)	16	1	6	5	0	6	7	0	4
Vanadium (figures 48 - 50)	10	5	8	5	2	4	7	3	1
Benzo(a)pyrene (figures 54 - 56)	21	1	1	8	0	3	9	0	2
2-Methylnaphthalene (figures 57 - 59)	22	1	0	11	0	0	10	1	0
Naphthalene (figures 60 - 62)	22	1	0	10	1	0	10	1	0
Total AVOCs (figures 63 - 65)	20	0	3	10	1	0	10	0	1
Trichloroethene (figures 66 - 68)	23	0	0	10	0	1	9	1	1

Notes:
1. "Indet." = Indeterminate from reporting limits. Indeterminate classifications for pH represent locations where data was rejected during validation.

As indicated on the above table, and as shown on Figures 15 through 68, with limited exceptions, concentrations of analytes detected in the 2006 groundwater samples were generally similar to or lower than the maximum concentrations observed in groundwater samples collected from previous sampling rounds.

A more detailed comparison of 2006 groundwater data to data from previous sampling rounds is presented below. The concentrations of analytes from all groundwater sampling rounds for which we have provided figures in this Report are also presented graphically in time-series format in Appendix E. In addition, tables within Sections 6.1.2 and 6.1.3 present a summary of significant changes in groundwater concentrations relative to their respective Region IX PRGs.

6.1.1 Elevated pH Conditions

The findings regarding the distribution and occurrence of elevated pH in groundwater from the 2006 sampling round were consistent with the findings summarized in the RI Report. In general, areas of the Site where relatively high pH conditions were observed prior to 2006 (e.g., the AOC and areas downgradient of the AOC) exhibited similarly high pH conditions during the 2006 sampling round. In addition, areas of the Site where metals concentrations were relatively low prior to 2006 (e.g., areas east of South Street) exhibited similar pH conditions during the 2006 sampling round. The following list presents key findings regarding the distribution and occurrence of pH conditions in groundwater based on SHA's review of the 2006 groundwater data.

- DAPL (pH greater than approximately 12.5 s.u.) is present within the glacial till and shallow bedrock in the vicinity of the old mill bleachery (see Figures 16 and 17).
    - The DAPL has a density and viscosity greater than that of ambient groundwater such that limited mixing of DAPL and ambient groundwater occurs.
    - The DAPL is not present in shallow groundwater at the Site (see Figure 15).
- The DAPL is undergoing dissolution / dilution by ambient groundwater such that the groundwater emanating from the DAPL has a pH of approximately 12.5 s.u. Elevated pH groundwater (e.g., greater than 9 s.u.) extends from the DAPL area, downgradient (e.g., west) towards the Neponset River in the vicinity of the former mill tailrace.
- Unlike DAPL, groundwater exhibiting pH measurements less than about 12.5 s.u. has density and viscosity sufficiently similar to ambient groundwater such that it generally behaves hydraulically similar to ambient groundwater. Hence, this elevated pH groundwater is more strongly influenced by the vertically upward hydraulic gradients between the glacial till and the overlying sand/sand and gravel observed in downgradient portions of the Site than the denser more viscous DAPL. These upward hydraulic gradients induce a vertically upward component of groundwater flow explaining the absence of elevated pH groundwater within the underlying glacial till in downgradient portions of the Site.
- The elevated pH and DAPL conditions in groundwater are likely well evolved (at steady-state), and the pH of the groundwater in the glacial till downgradient of the DAPL source area is unlikely to substantially change in the future. This is supported by the observations of pH conditions in the 2006 data compared to the previous

groundwater data. In general, groundwater pH conditions and metals concentrations in 2006 were similar to or slightly lower than pH conditions or metals concentrations observed prior to 2006.

As depicted on Figures 15, 16, and 17, the horizontal and vertical extent of elevated pH including DAPL in groundwater from the 2006 sampling round has changed relatively little compared to previous sampling rounds. In addition, with few exceptions, the pH values observed at a particular location in 2006 were generally similar to or slightly less than pH values observed in previous sampling rounds. Groundwater from the following wells had higher pH values in the 2006 sampling round than in previous sampling rounds:

- Shallow Wells: SH-03S, SH-25S, SH-27S;
- Deep Wells: None; and
- Bedrock Wells: SH-2R, SH-17R.

With the exception of well SH-17R (where the pH increased from 10.0 s.u. in 2003 to 10.6 s.u. in 2006), groundwater from these wells had only slightly higher pH values (i.e., increases of less than or equal 0.3 s.u.) in 2006, and had pH values of less than or equal to 7.5 s.u. for all sampling rounds.

6.1.2 Inorganic Analytes

The findings regarding the distribution and occurrence of metals in groundwater from the 2006 sampling round were generally consistent with the findings summarized in the RI Report. In general, areas of the Site where relatively high metals concentrations were observed prior to 2006 (e.g., the AOC and areas downgradient of the AOC) exhibited similarly high concentrations of metals during the 2006 sampling round. In addition, areas of the Site where metals concentrations were relatively low and/or were not detected prior to 2006 (e.g., areas east of South Street) exhibited similar concentrations of metals during the 2006 sampling round. The following list presents key findings regarding the distribution and occurrence of metals in groundwater based on SHA's review of the 2006 groundwater data.

- With few exceptions (e.g., iron, manganese, and arsenic), elevated groundwater concentrations of apparently Site-related metals are located within and downgradient of the AOC (west towards the Neponset River in the vicinity of the former mill tailrace).

- The elevated pH conditions in groundwater appear to be an important control in the occurrence of certain metals in groundwater (see table below). Elevated pH conditions in groundwater have mobilized metals, which are present in fill or naturally-occurring soils within and downgradient of the AOC.

- Some metals are present in the DAPL and elevated pH groundwater area, apparently due to a general collocation of their source areas (i.e., AOC soils with elevated metals

concentrations) with the high pH source area rather than due to elevated pH conditions mobilizing these metals. Refer to the table below for a summary of these metals.

- The primary factors that appear to control the distribution and mobility of metals in groundwater at the Site are summarized in the table below. Further discussion of these controls is presented in the RI Report.

Primary Controls on Metals Distribution and Mobility

Analyte	pH	AOC Soil Concentrations	Oxidation State
Aluminum	X		
Antimony	X		
Arsenic	X		X
Chromium	X	X	
Copper	X	X	
Iron			X
Lead		X	
Manganese			X
Nickel	X	X	
Vanadium	X		

- As presented in the table in Section 6.1 arsenic concentrations in 2006 were higher than the maximum detected concentration of arsenic from previous sampling rounds at many locations. However, arsenic concentrations in several of the 2006 groundwater samples were lower than the maximum detected concentration from previous sampling rounds. The cause for these fluctuations in arsenic concentrations is unknown; however, as shown in the table above, the primary controls related to arsenic concentrations in groundwater are thought to be pH conditions and oxidation state.

As presented on Figures 21 to 50, with few exceptions, the concentrations of metals in groundwater at the Site during the 2006 sampling round were similar to, or slightly less than, the maximum concentration observed in groundwater samples collected during previous sampling rounds. Appendix Figures E-1 to E-31 summarize the concentrations of various analytes with respect to time. The table below summarizes instances where concentrations of a given analyte have changed enough during the 2006 sampling round such that their concentrations in 2006 resulted in either: an exceedance of a Region IX PRG when they were previously below the Region IX PRG; or their concentrations in 2006 were below the Region IX PRG when they were previously above the Region IX PRG.

Analyte	PRG (µg/L)	Shallow		Deep		Bedrock	
		New Exceedances 2006	No Longer Exceeds PRG	New Exceedances 2006	No Longer Exceeds PRG	New Exceedances 2006	No Longer Exceeds PRG
Aluminum (figures 21 - 23)	3,600		SH-06S, WP-04		SH-03D		
Antimony (figures 24 - 26)	1.5		WP-01, WP-04		SH-27D		
Arsenic (figures 27 - 29)	0.045				SH-28D		SH-27R
Chromium (figures 30 - 32)	11		SH-01S, SH-02S, SH-06S, SH-13S, SH-19S, SH-26S		SH-02D, SH-03D, SH-06D, SH-09D		
Copper (figures 33 - 35)	150						
Iron (figures 36 - 38)	1,100	WP-05	SH-09S, SH-15S	SH-15D	SH-09D, SH-12D, SH-28D		SH-02R
Manganese (figures 39 - 41)	88		SH-01S, SH-09S, SH-11S, SH-16S, SH-22S, SH-23S, SH-27S, SH-28S, WP-03		SH-18D, SH-19D, SH-28D		
Lead (figures 42 - 44)	15 *						
Nickel (figures 45 - 47)	73		WP-04				SH-06-R-B
Vanadium (figures 48 - 50)	3.6		SH-13S, SH-14S		SH-03D, SH-14D, SH-27D		

Notes:
1. Blank cells indicate that there was no significant change in 2006 following the criteria described for the above table.
2. * = There is currently no PRG for lead, instead the USEPA MCL was used for comparison.
3. The only groundwater samples with reporting limits greater than screening levels and with previous detections above screening levels were: SH-01D (aluminum, antimony, chromium, iron, and manganese); SH-01R (antimony, chromium, iron, and lead); and SH-27R and SH-28D (arsenic).

The fate and transport of metals in groundwater is discussed in further detail in the RI Report.

6.1.3 Organic Analytes

The distribution and occurrence of organics in groundwater from the 2006 sampling round were generally consistent with the findings summarized in the RI Report. In general, areas of the Site where relatively high organics concentrations were observed prior to 2006 (e.g., the AOC and

areas downgradient of the AOC) exhibited similarly high concentrations of organics during the 2006 sampling round. In addition, areas of the Site where organics concentrations were relatively low and/or were not detected prior to 2006 (e.g., areas east of South Street) exhibited similar concentrations of organics during the 2006 sampling round. The following list presents key findings regarding the distribution and occurrence of organics in groundwater based on SHA's review of the 2006 groundwater data.

- The primary organic analytes in groundwater at the Site are PAHs and AVOCs. These analytes are generally located within or downgradient of the AOC, with limited occurrence of PAHs at relatively low concentrations in areas east of South Street.

- Organic analytes are present in the DAPL and elevated pH groundwater areas, apparently due to a general collocation of their source area with the high pH source area. Although the high pH conditions are not thought to enhance the leaching of organic analytes, the high pH conditions may be responsible for the relatively limited amount of biodegradation of these analytes observed in Site groundwater.

- The bulk of the PAHs detected in groundwater at the Site were lighter molecular weight PAHs (i.e., naphthalene and 2-methylnaphthalene). Similarly, the bulk of the AVOCs detected in groundwater at the Site were the BTEX compounds.

- With the exception of one groundwater sample collected from monitoring well SH-21S (located on the east side of South Street), benzo(a)pyrene (BaP) was only detected at concentrations in excess of its Region IX PRG at locations within and downgradient of the AOC in 2006.

- In addition to AVOCs, TCE was detected at relatively low concentrations in groundwater samples within, downgradient, and sidegradient of the AOC. While TCE was detected at concentrations above the Region IX PRG of 0.028 µg/L in a number of groundwater samples collected in 2006, none of the groundwater samples collected during 2006 had TCE concentrations above the MCL of 5 µg/L.

As depicted on Figures 51 to 68, with few exceptions, the concentrations of the primary PAHs of concern (naphthalene, 2-methylnaphthalene, and BaP), AVOCs, and TCE in the 2006 groundwater samples were similar to or lower than the concentrations of these analytes in previous groundwater sampling rounds. A comparison of total PAH concentrations from the 2006 sampling round to concentrations from previous sampling rounds is problematic due to lower laboratory reporting limits achieved for the 2006 groundwater samples compared to reporting limits from previous sampling rounds. However, as depicted on Figures 51 to 53, the general distribution and relative concentrations of total PAHs in groundwater have changed relatively little when compared to previous sampling rounds. Areas of the Site where relatively high PAH concentrations were observed prior to 2006 (e.g., the AOC and areas downgradient of the AOC) exhibited similarly high concentrations of total PAHs during the 2006 sampling round.

In addition, areas of the Site where total PAH concentrations were relatively low and/or were not detected prior to 2006 (e.g., areas east of South Street) exhibited similar concentrations of total PAHs during the 2006 sampling round.

Appendix Figures E-32 to E-41a summarize the concentrations of various organic analytes with respect to time. The table below summarizes instances where concentrations of BaP, naphthalene or TCE changed enough during the 2006 sampling round such that their concentrations in 2006 resulted in either: an exceedance of a Region IX PRG when they were previously below the Region IX PRG; or their concentrations in 2006 were below the Region IX PRG when they were previously above the Region IX PRG.

Analyte	PRG (µg/L)	Shallow		Deep		Bedrock	
		New Exceedances 2006	No Longer Exceeds PRG	New Exceedances 2006	No Longer Exceeds PRG	New Exceedances 2006	No Longer Exceeds PRG
Benzo(a)pyrene (figures 54 - 56)	0.0092		SH-26S	SH-01D	SH-08D		
Naphthalene (figures 60 - 62)	0.62		SH-02S, SH-21S, SH-26S				SH-02R
Trichloroethene (figures 66 - 68)	0.028						

Notes:
1. Blank cells indicate that there was no significant change in 2006 following the criteria described for the above table.
2. The only analytes with reporting limits greater than screening levels and with previous detections above screening levels were: BaP in wells SH-13S, SH-17S, SH-27D, and SH-27S; and TCE in wells SH-02R, SH-03D, and SH-22S.

The fate and transport of organic analytes in groundwater is discussed in further detail in the RI Report.

6.2 Comparison to Previous Findings - Surface Water

Similar to the analysis for groundwater discussed in Section 6.1, the concentrations of analytes detected in surface water in 2006 were compared to previous maximum concentrations from 2001, 2002 and 2003. As with groundwater, with few exceptions concentrations in 2006 were similar to or slightly less than previous maximum concentrations. The table below summarizes the number of sampling locations in each scenario relative to previous maximum concentrations (consistent with the categories described in Section 6.1):

Summary of 2006 Surface Water Concentrations Compared to Maximum Concentrations from Previous Sampling Rounds (Numbers of Sampling Locations)

Analyte	Category 1	Category 2	Category 3
pH (figures 15 - 17)	3	1	0
Aluminum (figures 21 - 23)	4	0	0
Antimony (figures 24 - 26)	4	0	0
Arsenic (figures 27 - 29)	1	1	2
Chromium (figures 30 - 32)	4	0	0
Copper (figures 33 - 35)	4	0	0
Iron (figures 36 - 38)	2	2	0
Manganese (figures 39 - 41)	2	2	0
Lead (figures 42 - 44)	1	0	3
Nickel (figures 45 - 47)	2	2	0
Vanadium (figures 48 - 50)	1	0	3
Benzo(a)pyrene (figures 54 - 56)	1	0	3
2-Methylnaphthalene (figures 57 - 59)	1	0	3
Naphthalene (figures 60 - 62)	3	0	1
Total AVOCs (figures 63 - 65)	3	0	1
Trichloroethene (figures 66 - 68)	4	0	0

Notes:
1. "Indet." = Indeterminate from reporting limits
2. The four surface water samples collected and analyzed in 2006 were SW-102, SW-105, SW-107 and SW-108.

A more detailed comparison of 2006 surface water data to data from previous sampling rounds is presented below. The concentrations of analytes from all surface water sampling rounds for which we have provided figures in this Report are also presented graphically in time-series format in Appendix E. In addition, tables within Section 6.2.2 and 6.2.3 present a summary of significant changes in surface water concentrations relative to their respective Region IX PRGs. In general, this report does not present a comparison of concentrations of analytes in Site media

to "background" conditions; however, in the case of surface water data, a "background" comparison is helpful to understand the contaminant concentrations in surface water upstream of the Site. Therefore, the surface water data from locations SW-105 and SW-108 (both located downstream of the industrial portions of the Site) are compared to the corresponding data from the upstream surface water location SW-102 in the following sections.

6.2.1 Elevated pH Conditions

The findings regarding the distribution and occurrence of elevated pH in surface water from the 2006 sampling round were generally consistent with the findings summarized in the RI Report. In general, areas of the Site where relatively high pH conditions were observed prior to 2006 (e.g., the former mill tailrace) exhibited similarly high pH conditions during the 2006 sampling round. In addition, areas of the Site where pH conditions were relatively low prior to 2006 (e.g., the Neponset River) exhibited similar pH conditions during the 2006 sampling round. The following list presents key findings regarding the distribution and occurrence of pH conditions in surface water based on SHA's review of the 2006 surface water data.

- Elevated pH conditions (pH>9 s.u.) were not observed in the surface water samples collected from the Neponset River.

- The pH of Neponset River surface water samples SW-105 and SW-108 (7.0 and 6.7 s.u. in 2006, respectively) collected from the vicinity and downstream of the presumed groundwater discharge area were similar to the pH of the upstream surface water sample SW-102 (7.1 s.u. in 2006).

- The surface water sample SW-107 from the former mill tailrace had a pH of 8.6. While this is not considered elevated based on the criteria established in the RI Report (e.g., pH>9 s.u.), it is higher than the pH of surface water samples collected from the Neponset River, and is likely reflective of the former mill tailrace being a key discharge area for the high pH Site groundwater.

The pHs of the surface water samples collected in 2006 were similar to or lower than the maximum pH from previous sampling rounds.

6.2.2 Inorganic Analytes

The findings regarding the distribution and occurrence of metals in surface water from the 2006 sampling round were generally consistent with the findings summarized in the RI Report. In general, areas of the Site where relatively high metals concentrations were observed prior to 2006 (e.g., the former mill tailrace) exhibited similarly high metals concentrations during the 2006 sampling round. In addition, areas of the Site where metals concentrations were relatively low prior to 2006 (e.g., the Neponset River) exhibited similar concentrations during the 2006 sampling round. The following list presents key findings regarding the distribution and occurrence of metals in surface water based on SHA's review of the 2006 surface water data.

- With few exceptions, concentrations of metals in samples collected from the Neponset River in areas downstream or within the vicinity of the presumed groundwater discharge area (e.g., SW-105 and SW-108) were generally similar to the concentrations observed in the upstream Neponset River sample SW-102.

- Higher metals concentrations were observed in surface water sample SW-107 from the former mill tailrace as compared to the metals concentrations in the Neponset River samples. These higher concentrations are likely reflective of the former mill tailrace being a key discharge area for Site groundwater with elevated metals concentrations.

The table below summarizes instances where concentrations of a given inorganic analyte have changed enough during the 2006 sampling round such that their concentrations in 2006 resulted in either an exceedance of their Region IX PRG when they were previously below the Region IX PRG; or their concentrations in 2006 were below the Region IX PRG when they were previously above the Region IX PRG.

Analyte	PRG (µg/L)	New Exceedances 2006	No Longer Exceeds PRG in 2006
Aluminum (figure 21)	3,600		SW-107
Arsenic (figure 27)	0.045	SW-102, SW-105, SW-108	
Chromium (figure 30)	11		SW-107
Iron (figure 36)	1,100		SW-107
Manganese (figure 39)	88	SW-102	SW-107

Notes:
1. Blank cells indicate that there was no significant change in 2006 following the criteria described for the above table in Section 6.1.3.
2. The reporting limits for arsenic in surface water samples collected from SW-102, SW-105, and SW-108 in sampling rounds prior to 2006 were above the PRG for arsenic; therefore, it is uncertain if the arsenic concentrations from 2006 in these samples are really "new exceedances."

6.2.3 Organic Analytes

The findings regarding the distribution and occurrence of organic analytes in surface water from the 2006 sampling round were generally consistent with the findings summarized in the RI Report. In general, areas of the Site where relatively high organic analyte concentrations were observed prior to 2006 (e.g., the former mill tailrace) exhibited similarly high concentrations during the 2006 sampling round. In addition, areas of the Site where organic analyte concentrations were relatively low prior to 2006 (e.g., the Neponset River) exhibited similar concentrations during the 2006 sampling round. The following list presents key findings

regarding the distribution and occurrence of organic analytes in surface water based on SHA's review of the 2006 surface water data.

- Concentrations of organic analytes in 2006 in samples collected from the Neponset River in areas downstream or within the vicinity of the presumed groundwater discharge area (e.g., SW-105 and SW-108) were generally similar to or lower than the concentrations observed in the upstream Neponset River sample SW-102. No organic analytes were observed at concentrations in excess of their respective Region IX Tap Water PRGs in the surface water samples collected in 2006 in the Neponset River (e.g., SW-102, SW-105, and SW-108).

- Higher organic analyte concentrations, in some cases exceeding their Region IX Tap Water PRGs, were observed in surface water sample SW-107 from the former mill tailrace as compared to the organic analyte concentrations in the Neponset River samples. These higher concentrations are likely reflective of the former mill tailrace being a key discharge area for Site groundwater with elevated organic analyte concentrations .

- The only instance where a concentration of a given analyte changed enough during the 2006 sampling round such that it either exceeded its respective Region IX when it was previously below the Region IX PRG; or the 2006 concentration was below its respective Region IX when it was previously above the Region IX PRG was naphthalene at the SW-107 sample location. The concentration of naphthalene declined to below the Region IX PRG of 0.62 µg/L in 2006 at this location.

6.3 Summary of Sediment and Additional Asbestos Data

6.3.1 Metals and PAHs on Lot #33-360

As described in Section 2.6, floodplain sediment samples collected during the Phase 1B-5 RI were submitted for laboratory analysis of arsenic, lead, and PAHs. Arsenic, benzo(a)anthracene, BaP, benzo(b)fluoranthene, and dibenz(a,h)anthracene were detected in one or more sediment samples at concentrations exceeding their respective Region IX PRGs screening levels in the samples collected from Lot #33-360 during the Phase 1B-5 RI. Lead was not detected above its Region IX PRG in the floodplain sediment samples collected from Lot #33-360 during the Phase 1B-5 RI.

As discussed in the RI Report, the distribution of PAHs, lead, and arsenic at relatively elevated concentrations could be related to transport by the Neponset River of sediment impacted by historic Site activities, and deposition of this impacted sediment in this portion of the floodplain of the Neponset River. However, as depicted on Figures 69 and 70, data collected during the Phase 1B-5 RI suggest that other non-Site related anthropogenic sources of contamination (e.g., fill material) may have also contributed to the elevated concentrations of PAHs, lead, and arsenic observed in sediment on Lot #33-360. This is evidenced by relatively elevated concentrations of PAHs, lead, and arsenic in samples collected:

1) from outside of the mapped 100-year floodplain of the Neponset River, in topographically higher areas; and
2) in both the shallow (0 to 1 foot) and deep (1 to 3 feet)[23] sampling intervals.

6.3.2 Additional Asbestos Investigations in Soil and Sediment

As described in Section 5, M&E collected approximately 130 soil and sediment samples in 2006 to further refine the distribution of asbestos at the Site. Soil samples collected by M&E suggest that concentrations of asbestos greater than the laboratory reporting limit of 0.25% are limited to two sample boring locations located east of South Street. Only one soil sample contained concentrations of asbestos greater than 1% (the cleanup standard applied during the previous 1993 Removal Action). The occurrence of asbestos in soils east of South Street is likely due to the former asbestos-related manufacturing activities in this portion of the Site.

As described in Section 5, and depicted on Figure 76, sediment samples collected by M&E in Lewis Pond and the surrounding floodplain have further refined the distribution of asbestos in this area. Asbestos was not detected above 1% in any of these sediment samples collected by M&E. Asbestos was detected at or above the laboratory reporting limit of 0.25%, but below 1%, in three of these sediment samples (FPS-14ME, LP-24R-ME, and LP-23R-ME). M&E's sample results suggest that the concentrations of asbestos in sediments greater than 1% are limited to areas in the vicinity of locations LP-01 through LP-10 and FP-09, sampled by SHA in 2001. As discussed in Section 6 of the RI Report the Neponset River's transport and deposition of sediment impacted by historic Site activities likely contributed to the occurrence of asbestos in these areas.

6.4 Analyte Sources, Transport and Fate in Soil Vapor

Diffusion and advection are the primary mechanisms of transport of subsurface soil vapor. Diffusion occurs when gas molecules move from high concentration to low concentration. With volatile contaminants, diffusion occurs when concentration gradients are created by higher contaminant concentrations near a contaminant source and lower contaminant concentrations in the surrounding area. Diffusion can result in the upward, lateral, or downward migration of vapors through the vadose zone. Advection is the transport mechanism by which soil gas moves as a result of pressure gradients[24], which can be generated by atmospheric pressure changes or by temperature changes in the soil. Variability in Site characteristics, such as soil porosity, soil moisture content, effective permeability, ground surface cover, ambient temperature, and age of a release effect the rate and distance of vapor migration (NJDEP, 2005).

[23] The soil sample descriptions of samples collected from the 1 to 3 feet sampling interval were often not consistent with floodplain-type sediments; rather, samples collected at depths below 1 to 3 feet were often characterized as fill material suggesting that these sediments/soils were the result of other anthropogenic sources of contamination unrelated to the Site.
[24] Advection is also referred to as convection.

Volatile contaminants in the subsurface partition from impacted soil and/or groundwater into soil vapor and are transported via diffusion and advection. However, similar to groundwater, there are several contaminant attenuation mechanisms for volatile organic compounds in soil vapor. The attenuation mechanisms can be part of two main groups: transport phenomena (e.g., advection, dispersion, and diffusion), and phase change/reaction processes (e.g., solubilization in groundwater, sorption, and biodegradation). Transport phenomena tend to lower analyte concentrations by dilution, but will not lower overall analyte mass. Phase change/reaction processes tend to decrease contaminant migration rates, concentrations, and overall mass. In the field, these attenuation processes may be difficult to distinguish and quantify.

Volatiles not attenuated in the subsurface may migrate from the source to potential receptors. Vapor intrusion is the migration of volatile chemicals as gases from the subsurface into overlying buildings (USEPA, 2002). Chemicals volatilize from impacted soil and/or groundwater beneath a building and diffuse toward regions of lower chemical concentration (e.g., the atmosphere, conduits, basements, etc.). If diffusing volatiles encounter the "zone of influence"[25] of a building with negative pressurization (relative to the outdoors and surrounding soil), soil gas may flow into the building via advection. The rate of movement of the vapors into the building is difficult to quantify and can depend on many factors such as soil type/moisture content, chemical properties, building design and condition, and pressure differential. Granular fill materials placed beneath concrete slabs or adjacent to building footings may be much more permeable to air flow than surrounding soils, and therefore form preferential pathways for the migration of vapors into buildings (NJDEP, 2005).

As depicted on Figure 71, soil vapor sampling was conducted as part of the Phase 1B-4 RI in the area surrounding soil boring SB-09 due primarily to elevated concentrations of TCE, naphthalene, and 2-methylnaphthalene in soil samples collected from this location during the Phase 1A RI. Based on the limited extent of these analytes detected in soil vapor, subsurface transport of volatiles in soil vapor away from the presumed SB-09 soil source area appears to be relatively insignificant. For example, concentrations of TCE in soil vapor drop up to 3 orders of magnitude within approximately 15 feet of SB-09 (see Figure 71). Similarly, concentrations of naphthalene in soil vapor above Target Soil Gas Concentrations were limited to samples SV-01, SV-02, and SV-09 (all less than 40 feet from SB-09). In addition, 2-methylnaphthalene was not detected above its Target Soil Gas Concentration in any of the soil vapor samples.

[25] The zone of influence of a building is considered to be the subsurface area beneath and adjacent to a building where soil gas advection/convection is possible. Soil gas can enter the relatively low pressure zone of influence, and flow via preferential pathways into buildings under negative pressurization. The zone of influence of a building forms as a result of barometric pressure changes, wind load, thermal currents, or depressurization from building ventilation systems (e.g., stack effects). See NJDEP, 2005 and USEPA, 2002 for a more detailed description on this topic.

7.0 SUMMARY OF THE BASELINE ECOLOGICAL RISK ASSESSMENT

This section presents a summary of the principal findings and conclusions from the BERA completed for the Site in conjunction with the RI. The reader is referred to the BERA Report included under separate cover for more detailed discussion of the methods and results of the BERA.

The BERA evaluates risk to ecological receptors from exposure to chemicals detected at the Site. COPECs were detected in surface water, sediment, soil, terrestrial invertebrates, fish, and aquatic invertebrates. To conduct this assessment, personnel from the Science Collaborative evaluated potential adverse ecological effects from exposure to chemicals detected in these media at the Site. A detailed description of the Site is provided in Section 1.2 of the RI Report. Chemical concentration data for surface water, sediment, soil, terrestrial invertebrate, fish, and aquatic invertebrate samples that were used in the BERA are provided in the tables attached to this report and the RI Report.

Following standard approaches used for Ecological Risk Assessments completed under CERCLA, the BERA evaluates baseline potential adverse ecological effects only. The BERA does not draw conclusions about whether COPECs are present in the environment because of Site-related activities, or whether they represent a background condition unrelated to the Site. The BERA does not draw conclusions about whether chemicals are elevated in the environment over concentrations that may be expected to be naturally occurring, or whether an adverse effect is of sufficient magnitude to warrant remedial action. These matters of perspective, and the risk-management decisions that ensue, will be addressed in the forthcoming FS.

7.1 Overview of Risk Analyses

The basis for assessing the potential for adverse effects was to evaluate potential exposures in terrestrial and aquatic environments to representative receptors. These receptors represent various trophic levels and feeding types within each environment. The following tables show the representative species and their exposures addressed in the aquatic and terrestrial environments.

Exposures in Terrestrial Environments				
Species	**Exposure Media**	**Exposure Route**	**Basis for Exposure Estimates**	**Exposure Zones**
Short-Tailed Shrew	Earthworms; Soil; Surface Water	Ingestion	Measured COPEC concentrations in earthworms and soil	East of South Street; West of South Street; Orlando Property; Floodplain; Neponset River (surface water)
American Robin	Earthworms; Soil; Surface Water	Ingestion	Measured COPEC concentrations in earthworms and soil	East of South Street; West of South Street; Orlando Property; Floodplain; Neponset River (surface water)

Exposures In Aquatic Environments				
Species	**Exposure Media**	**Exposure Route**	**Basis for Exposure Estimates**	**Exposure Zones**
Fish	Surface water	Ingestion; Direct Contact	Measured COPEC concentrations in surface water and fish tissue	Neponset River and Lewis Pond
Benthic Invertebrates	Sediment	Ingestion; Direct Contact	Measured COPEC concentrations in tissue from bioaccumulation testing; direct exposure to sediment in toxicity testing	Neponset River; Lewis Pond; upper former mill tailrace
Great Blue Heron	Fish	Ingestion	Measured COPEC concentrations in fish whole body tissue	Neponset River; Lewis Pond
Kingfisher	Fish	Ingestion	Measured COPEC concentrations in fish whole body tissue	Neponset River; Lewis Pond
Muskrat	Aquatic Plants; Benthic Invertebrates; Sediment;	Ingestion	Calculated COPEC concentrations in plants; Measured COPEC concentrations in benthic invertebrates and sediment	Neponset River; Lewis Pond; upper former mill tailrace
Raccoon	Aquatic Plants; Benthic Invertebrates; Sediment; Fish	Ingestion	Calculated COPEC concentrations in plants; Measured COPEC concentrations in fish, benthic invertebrates, and sediment	Neponset River; Lewis Pond

The potential for an adverse effect to each receptor was expressed as a hazard quotient (HQ - the ratio of exposure concentrations, doses, or body burdens [exposure point concentration – EPC] to

an analogous toxicity factor). Two pairs of individually calculated HQs were used for each receptor to assess potential adverse effect from chronic exposure to each COPEC in each exposure area. These pairs included HQs based on: comparison of a NOAEL (No Observed Adverse Effects Level) or NOED (No Observed Effects Dose), and a LOAEL (Lowest Observed Adverse Effects Level) or LOED (Lowest Observed Effects Dose) to an EPC derived from the Central Tendency Exposure (CTE) case; and comparison of a NOAEL or NOED, and a LOAEL or LOED to an EPC derived from the Reasonable Maximum Exposure (RME) case. The RME provides an estimate of potential exposure that is thought to be relatively conservative (high) not unreasonable, and the CTE provides an estimate of average exposure.

The CTE case is the basis for the chronic risk conclusions, but the CTE and the RME cases contribute to judgments about the level of confidence in the risk conclusions. SHA's opinion is that a compound with an HQ (based on comparison to the NOAEL/NOED) that exceeds 1 based on the RME, but not the CTE case, does not represent a potential risk but rather No Significant Risk (NSR) because the assessment incorporates multiple levels of conservative elements.

Acute HQs were also calculated for each mammalian receptor to assess potential adverse effect from acute exposure to each COPEC in each exposure area (avian acute toxicity factors were generally not available). The acute HQs were calculated based on: comparison of an acute NOAEL or NOED, and an acute LOAEL or LOED to an EPC based on the maximum concentration of the COPEC detected in the relevant medium and area**.**

Each characterization of potential adverse ecological effects includes a statement of risk level as either NSR or Potential Risk and an accompanying statement of confidence (high, moderate, low). The characterization assumes "potential adverse ecological effect" and "risk" are the same.

In addition, COPEC concentrations in surface water were compared to surface water benchmarks[26] to evaluate potential adverse effects to fish and benthic invertebrates.

7.2 Summary of Key Findings

7.2.1 Potential Adverse Effects in the Terrestrial Environment

The following table summarizes the findings of the BERA with respect to the potential for adverse ecological effects associated with maintenance of terrestrial birds and small mammals on-Site and at the reference area. In the table:

[26] Surface Water Benchmarks were the National Recommended Water Quality Criteria (NRWQC). If NRWQC were unavailable for a particular contaminant, the benchmark was the Secondary Chronic Value taken from the Great Lakes Water Quality Initiative Tier II Methodology.

L - Indicates potential adverse ecological effects with a low confidence level.
M - Indicates potential adverse ecological effects with a moderate confidence level.
H - Indicates potential adverse ecological effects with a high confidence level.
Blank Space – Indicates NSR

Terrestrial		Aluminum chronic	Aluminum acute	Cadmium chronic	Chromium chronic	Lead chronic	Selenium chronic	Vanadium chronic	Zinc chronic
East of South St.	Robin	L				H	M		L
	Shrew	H	L				M	L	
West of South St.	Robin	L				L	M		L
	Shrew	H	H				L	L	
Orlando Property	Robin	L				H	H		L
	Shrew	H	L				H	L	
Floodplain	Robin	L		L	L	H	M		L
	Shrew	H	H			L		L	
Soil Reference Area	Robin	L				H	M		L
	Shrew	H	L					L	

However in general, risk estimates for aluminum are likely to overestimate the potential adverse ecological effects for the following reasons:

- Aluminum is an abundant component of the earth's crust and occurs naturally in soils and sediments at concentrations that are generally many orders of magnitude higher than anthropogenic inputs (USEPA, 2003);

- The forms of soluble aluminum, which may be toxic, are poorly understood and difficult to measure (USEPA, 2003); and

- Potential adverse effects to ecological receptors at this Site are overestimated as they are at other sites, because standard methods for the analysis of aluminum are not specific to the toxic forms of aluminum.

In addition, while cadmium, chromium, lead, selenium, vanadium, and zinc pose potential chronic risk at varying degrees of confidence in one or more areas to the robin and/or shrew, these risks have not yet been compared to background risks (e.g., the potential risks in the soil

reference area) and/or the distribution and occurrence of these contaminants at the Site. This analysis will be performed as part of the forthcoming FS.

7.2.2 Potential Adverse Effects in the Aquatic Environment

7.2.2.1 Potential Adverse Effects to Fish and Benthic Invertebrates

- There is a potential for adverse effects to fish at Lewis Pond (aluminum and zinc exposure). However, for the same reasons presented above for terrestrial environments, in general, risk estimates for aluminum are likely to overestimate its potential adverse ecological effects.

- There is no significant risk to benthic invertebrates at Lewis Pond.

- There is a potential for adverse effects to fish and invertebrates in the Neponset River and lower former mill tailrace from surface water exposures of dissolved barium, copper, lead, manganese, vanadium, benzo(a)anthracene, benzo(a)pyrene, and pH as indicated by exceedances of surface water benchmarks (National Recommended Water Quality Criteria [NRWQC] and Massachusetts Surface Water Quality Criteria), and the exceedance of one residue effect level (zinc) in fish.

- The weight-of-evidence indicates no risk to benthic invertebrates in the upper former mill tailrace.

- There are also no potential adverse ecological effects to the warm water fishery in the Neponset River from the chemical impacts in the upper former mill tailrace because observations of the conditions in the upper former mill tailrace indicate that it is not a fish habitat, and it is physically isolated from the waters of the Neponset River.

In addition to those listed above, there is a potential for adverse effects to fish and invertebrates in the Neponset River Reference Area from surface water exposure to dissolved barium as indicated by exceedances of surface water benchmarks.

Also, while barium, copper, lead, manganese, vanadium, zinc, benzo(a)anthracene, and benzo(a)pyrene pose potential chronic risk at varying degrees of confidence in one or more areas to fish and/or benthic invertebrates, these risks have not yet been compared to background risks and/or the distribution and occurrence of these contaminants at the Site. This analysis, and the compliance with ARARs (including those for pH), will be performed as part of the forthcoming FS.

7.2.2.2 Potential Adverse Effects to Aquatic Wildlife

The following table summarizes the potential for adverse effects to aquatic wildlife at the Site and in reference areas. In the table:

L - Indicates potential adverse ecological effects with a low confidence level.
M - Indicates potential adverse ecological effects with a moderate confidence level.
H - Indicates potential adverse ecological effects with a high confidence level.
Blank Space – Indicates NSR

Aquatic Wildlife		bis(2-ethylhexyl)phthalate	Aluminum		Lead		Nickel	Vanadium
		chronic	chronic	acute	chronic	acute	chronic	chronic
Lewis Pond	Kingfisher	L						
	Muskrat		H	L			L	
	Raccoon		H	L	L	L	L	L
Neponset River	Kingfisher	L						
	Muskrat		H	L				
	Raccoon		H	L				L
Upper Former Mill Tailrace	Muskrat		H	L				
Lower Pond Reference	Kingfisher							
	Muskrat		H	L				
	Raccoon		H	H				L
Neponset River Reference	Kingfisher							
	Muskrat		L					
	Raccoon		H	L				L

However for the same reasons presented above for terrestrial environments, in general, risk estimates for aluminum are likely to overestimate its potential adverse ecological effects. Also, while bis(2-ethylhexyl)phthalate, lead, nickel and vanadium pose potential chronic risk at varying degrees of confidence in one or more areas to the kingfisher, muskrat and/or raccoon, these risks have not yet been compared to background risks and/or the distribution and occurrence of these contaminants at the Site. This analysis will be performed as part of the forthcoming FS.

7.2.2 Uncertainties

The exposure assumptions, modeling (e.g., calculated COPEC concentrations in plants, food chain modeling), and toxicity information used to estimate exposure are subject to uncertainty, the more important of which are discussed in the uncertainty analysis section (See Section 5.4 of the BERA). These uncertainties were addressed by using conservative assumptions so that the exposures and risks presented in this assessment are more likely to be overestimated than underestimated.

8.0 SUMMARY OF THE BASELINE HUMAN HEALTH RISK ASSESSMENT

This section presents a summary of the principal findings and conclusions from the BHHRA completed for the Site in conjunction with the RI. The reader is referred to the BHHRA Report included under separate cover for more detailed discussion of the methods and results of the BHHRA.

The BHHRA evaluates risk to humans from exposure to chemicals detected at the Site. COPCs to human health were detected in a range of environmental media that people might contact including: soil, soil gas, groundwater, surface water, sediment, and edible fish tissue. To conduct this assessment, personnel from the Science Collaborative evaluated potential human health effects from exposure to chemicals detected in these media at the Site. A detailed description of the Site is provided in Section 1.2 of the RI Report (SHA, 2007). Chemical concentration data for soil, soil gas, groundwater, surface water, sediment, and fish samples that were used in the BHHRA are provided in the tables attached to this report and the RI Report (SHA, 2007).

Following standard approaches used for Human Health Risk Assessments completed under CERCLA, the BHHRA evaluates baseline potential human health risk only. The BHHRA does not draw conclusions about whether COPCs are present in the environment because of Site-related activities, or whether they represent a background condition unrelated to the Site. The BHHRA does not draw conclusions about whether chemicals are elevated in the environment over concentrations that may be expected to be naturally occurring, or whether a potential adverse effect is of sufficient magnitude to warrant remedial action. These matters of perspective, and the risk-management decisions that ensue, will be addressed in the forthcoming FS.

8.1 Overview of Risk Analyses

Potential cancer risks, non-cancer hazard indices, and probabilities of exceeding a blood lead concentration benchmark were calculated for hypothetical exposure scenarios that represent the exposure patterns summarized below. In addition, a qualitative evaluation was conducted for pH in soil, groundwater, sediment and surface water.

The hypothetical exposure scenarios, for the most part, reflect what are thought to be relatively conservative representations of current and realistic possible future land uses. Two important exceptions are the unrealistic assumptions of: 1) future residential development of parcels in the Limited Manufacturing Zoning District that encompasses the East of South Street Area, the Old Railroad and Former Lower Mill Pond Area, the AOC, and the West of South Street Area (as defined in the BHHRA), and 2) use of groundwater at the Site as a source of tap water (See Section 1.4.1 of the BHHRA Report for an explanation of why Site groundwater is not a viable source of tap water).

COPCs primarily include metals, PAHs, several VOCs, and elevated pH. Cancer risks and non-cancer hazard indices were calculated for each scenario, including those associated with the

RME and the CT exposure. The RME provides an estimate of high levels of exposure (protective of the 90th or 95th upper percentile of the exposed population), and the CT provides an estimate of average levels of exposure. Total cancer risks for child and adult were summed to yield a cancer risk for the current and future residential scenarios and for the current/future fisher scenario (fish consumption only). Cancer risks were compared to USEPA's cancer risk range (1E-06 to 1E-04). Noncancer effects were described with total hazard indices (HIs), which are calculated by summing HQs across all COPCs, and with target organ-specific HIs, which are calculated by dividing total HIs in accordance with each COPC's target organ. Total and target organ-specific HIs were compared to a benchmark HI of 1. Predicted probabilities of blood lead concentrations exceeding 10 µg/dL were compared to a benchmark of 5%. pH values of sediment, soil, surface water, and groundwater were compared to federal and state pH benchmarks and criteria applicable to each of these media.

Summary of Exposure Scenarios in the BHHRA

Exposure Scenario	Exposure Pathways by Environmental Medium					
	Soil	**Soil Gas**	**Groundwater**	**Surface water**	**Sediment**	**Fish**
Current						
Resident (adult/child)	Ingestion, dermal contact, ingestion of garden produce, inhalation of indoor air	Inhalation of indoor air	Inhalation of indoor air (not used for tap water)	-	-	-
Trespasser (older child)	Ingestion, dermal contact	-	-	-	-	-
Site Worker (adult)	Ingestion, dermal contact, inhalation of indoor air	Inhalation of indoor air	-	-	-	-
Current/Future						
Fisher (adult/child)	-	-	-	Dermal contact (adult)	Dermal contact, ingestion (adult)	Ingestion (adult/child)
Wader (older child)	-	-	-	Dermal contact	Dermal contact, ingestion	-
Future						
Resident (adult/child)	Ingestion, dermal contact, ingestion of garden produce, inhalation of indoor air	Inhalation of indoor air	Inhalation of indoor air, use as tap water	-	-	-

Summary of Exposure Scenarios in the BHHRA

Exposure Scenario	Exposure Pathways by Environmental Medium					
	Soil	Soil Gas	Groundwater	Surface water	Sediment	Fish
Current						
Site Worker (adult)	Ingestion, dermal contact, inhalation of indoor air	Inhalation of indoor air	Inhalation of indoor air	-	-	-
Construction Worker (adult)	Ingestion, dermal contact, fugitive dust, inhalation of trench air	Inhalation of trench air	Dermal contact, inhalation of trench air	-	-	-

" –" signifies that the medium of exposure is not applicable

8.2 Summary of Key Findings

Table 8-1 summarizes cancer risks that exceed USEPA's risk range, non cancer hazard indices that exceed 1, lead hazard with a probability greater than 5% of exceeding a blood lead concentration of 10 µg/dL, and those areas where elevated pH conditions in groundwater or surface water could present potential risk. In addition, these risks/hazards are summarized on the following [figures at the end of this chapter]:

- Figure 8-1 – Current Scenarios
- Figure 8-2 – Future Residential Scenarios (not including tap water)
- Figure 8-3 – Future Residential Tap Water Scenarios
- Figure 8-4 – Future Site Worker or Construction Worker Scenarios

The cancer risks and non-cancer hazards summarized in Table 8-1 and Figures 8-1 through 8-4 are due to current or potential future exposures of receptors to COPCs in groundwater, surface water, soil, and soil gas. With the exception of a wader in the former mill tailrace and a resident on Lot #33-257, those areas where cancer risks are greater than 1E-4, non-cancer hazard indices are greater than 1, lead hazards have a probability greater than 5% of exceeding a blood lead concentration of 10 µg/dL, and pH conditions are elevated involve potential future receptors, not current receptors. Additional discussion of SHA's findings is provided below.

8.2.1 Groundwater and Surface Water Cancer Risks and Non-Cancer Hazards

The text in the following bullets summarizes the general findings regarding potential risks/hazards from Site groundwater:

- *Elevated pH conditions* in the former mill tailrace, West of South Street On-Facility area and Lot #33-208/33-209 area pose potential hazard to a wader or construction

worker coming into contact with surface water or groundwater with elevated pH conditions, based on a comparison of pH measurements to regulatory guidelines.

All other areas where groundwater presents a potential risk and/or hazard to receptors (i.e., future residents) arise from the unrealistic assumption that groundwater will be used as tap water. As noted earlier and described in Section 1.4.1 of the BHHRA Report, the potential future use of Site groundwater as tap water is highly unlikely.

8.2.2 Soil and Soil Gas Cancer Risks and Non-Cancer Hazards

The text in the following bullets summarizes the general findings regarding potential risks/hazards from Site soil and soil gas:

- *Lead* concentrations in soil on residential Lot #33-257 pose a potential hazard from direct contact with soil for a current and future resident, and a potential future construction worker. However, this estimate of hazard is based on just two soil samples collected on this lot. SHA/Tyco proposed additional delineation of lead as part of the RI to improve our estimate of lead exposures; however, the property owner denied access to SHA/Tyco to perform this sampling.

- *Carcinogenic PAHs and arsenic* concentrations in soil pose potential cancer risk from direct contact with soil for a potential future resident at three exposure points (East of South Street On-Facility [“SB-09 area” and “non-SB-09 area”], and Old Railroad and Former Lower Mill Pond Area). In addition, arsenic concentrations in soil pose potential non-cancer hazard from direct contact with soil and ingestion of garden produce for a potential future resident at Old Railroad and Former Lower Mill Pond Area.

- *Trichloroethene* concentrations in soil pose potential carcinogenic risk from inhalation of indoor air at one exposure point (East of South Street On-Facility “SB-09 area”) for a potential future resident or site worker.

8.2.3 Uncertainties

The exposure assumptions, modeling (e.g., chemical uptake in home garden plants and subsurface vapor intrusion modeling), and toxicity information used to estimate exposure are subject to several sources of uncertainty, the more important of which are discussed in the uncertainty analysis section (See Section 6 of the BHHRA Report). These uncertainties were addressed by using conservative assumptions so that the exposures and risks presented in this assessment are more likely to be overestimated than underestimated.

Asbestos is present at the Site in soil and sediment; however, the BHHRA does not include an assessment of potential risk due to asbestos. In part, this is because in the past USEPA’s cleanup standard of 1% in soil was identified as an ARAR at the Site, and at CERCLA sites across the

country. In addition, current USEPA guidance documents do not present a clear methodology for evaluation of risk from asbestos. USEPA is currently considering whether the 1% cleanup standard is sufficiently protective; therefore, USEPA has elected to assess risk due to asbestos-impacted soil and sediment. The results of USEPA's assessment are expected to be presented in a future RI addendum report prepared by USEPA.

An early life evaluation of carcinogenic risk from PAHs was conducted and summarized in the Uncertainty Analysis (See Section 6 of the BHHRA Report). Inclusion of this evaluation increases the baseline cancer risk estimates for most areas for the current and future residents, the current trespasser, and the current/future wader and fisher. However, only one scenario with a baseline cancer risk within USEPA's risk range changes to a cancer risk above the risk range with inclusion of the early life evaluation (i.e. the cancer risk for a future resident at West of South Street On-Facility increases from 8E-05 to 2E-04 from ingestion and dermal contact with soil and ingestion of garden produce).

Table 8-1
Summary of Risks and Hazards Exceeding USEPA's Risk Range and/or Hazard Index Limit, PBL > 5%, or Elevated pH Exposure
Blackburn & Union Privileges Site
Walpole, Massachusetts

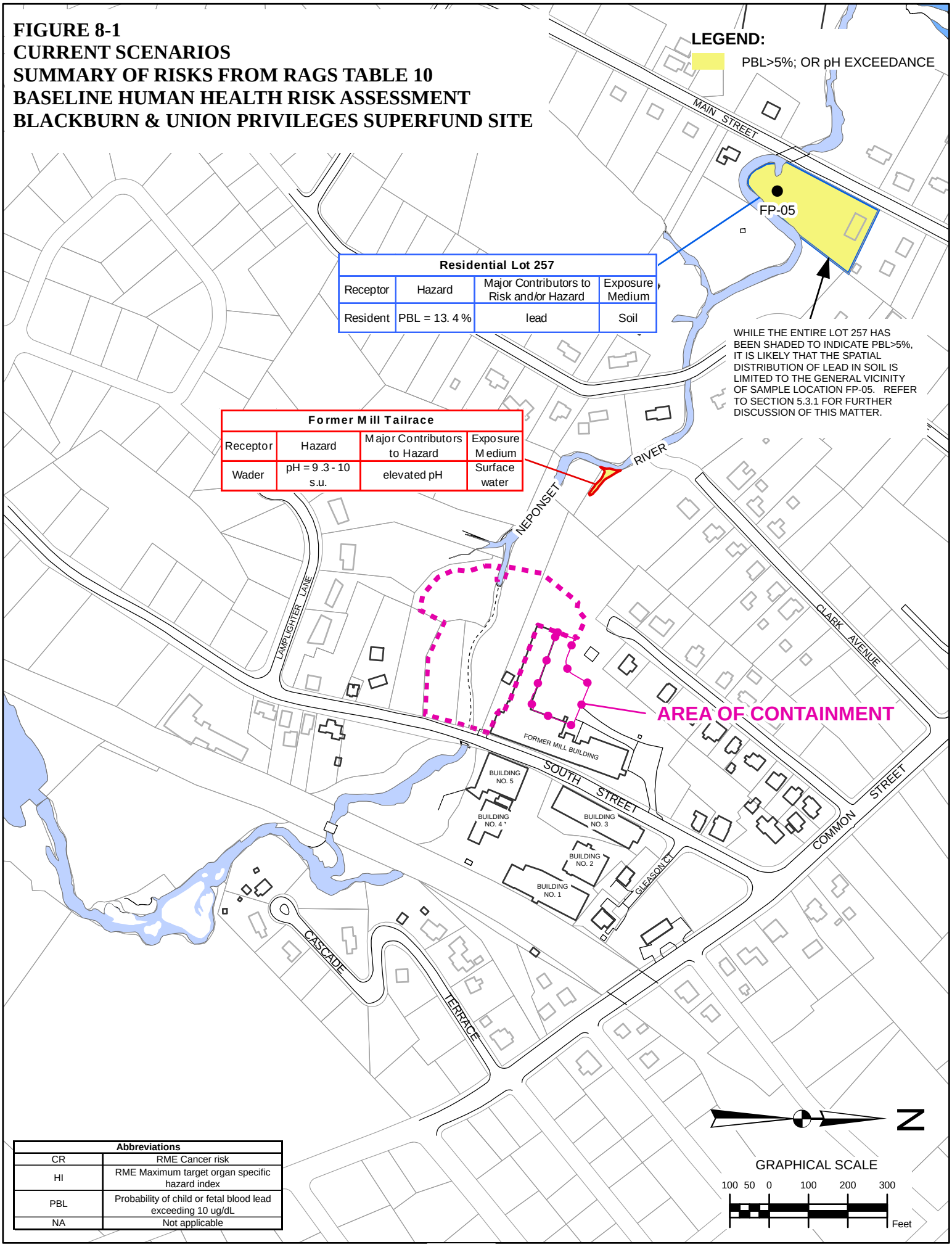
Exposure Area	Timeframe	Receptor	Exposure Type	Cancer Risk	Max Target Organ Specific HI	PBL	Exposure Medium	Major Contributors [1] to Risk and Hazard
Residential Lot 257	Current	Resident	RME	---	---	13.40%	Soil	Lead
	Future	Construction Worker	RME	---	---	6.50%	Soil	Lead
Former Mill Tailrace	Current/Future	Wader	---	---	---	---	Surface Water	Elevated pH (9.3 to 10 s.u.)
West of South Street On-Facility	Future	Construction Worker	---	---	---	---	Dermal Contact with Groundwater	Elevated pH (9.7 to 11.99 s.u.)
East of South Street On-Facility (SB-09 area)	Future	Resident	RME	8.E-04	---	---	Soil	Benzo(a)pyrene
							Indoor Air from Soil Gas	Trichloroethylene (TCE)
		Site Worker	RME	3.E-04	---	---	Indoor Air from Soil Gas	Trichloroethylene (TCE)
East of South Street On-Facility (non-SB-09 area)	Future	Resident	RME	3.E-04	2	---	Soil	Benzo(a)pyrene
Old Railroad and Former Lower Mill	Future	Resident	RME	5.E-04	4	---	Soil	Arsenic
							Plant tissue from Soil	Arsenic
Off-facility groundwater Lot 208 / Lot 209	Future	Resident	RME	2.E-03	20	8.08%	Tap Water from Groundwater	Arsenic; Manganese; Vanadium
								Lead
							Shower Vapor from Groundwater	Naphthalene
			CT	---	4	---	Tap Water from Groundwater	Arsenic
			---	---	---	---	Tap Water from Groundwater	Elevated pH (10.1 to 11.9 s.u.)
		Construction Worker	---	---	---	---	Dermal Contact with Groundwater	Elevated pH (10.1 to 11.9 s.u.)
Off-site groundwater east of Neponset River (SH-27)	Future	Resident	RME	---	2	---	Tap Water from Groundwater	Trichloroethylene (TCE); Manganese
Off-site groundwater east of Neponset River (SH-28)	Future	Resident	RME	---	3	---	Tap Water from Groundwater	Manganese

Table 8-1
Summary of Risks and Hazards Exceeding USEPA's Risk Range and/or Hazard Index Limit, PBL > 5%, or Elevated pH Exposure
Blackburn & Union Privileges Site
Walpole, Massachusetts

Exposure Area	Timeframe	Receptor	Exposure Type	Cancer Risk	Max Target Organ Specific HI	PBL	Exposure Medium	Major Contributors (1) to Risk and Hazard
On-Site Groundwater	Future	Resident	RME	2.E-02	300	---	Tap Water from Groundwater	Benzene; 2-Methylnaphthalene; Naphthalene; Benzo(a)pyrene; 4-Methylphenol; Antimony; Arsenic; Chromium VI; Manganese; Nickel; Vanadium; Zinc
							Shower Vapor from Groundwater	Benzene; 2-Methylnaphthalene; Naphthalene
			CT	3.E-04	10	---	Tap Water from Groundwater	Arsenic; Manganese; Vanadium
							Shower Vapor from Groundwater	Naphthalene
			---	---	---	---	Tap Water from Groundwater	Elevated pH (8.8 to 14.1 s.u.)

Note:
RME = Reasonable Maximum Exposure
CT = Central Tendency Exposure
(1) Chemicals that contribute non-cancer hazard > 1 and/or cancer risk > 10-4 for the given exposure medium are included.
(2) "--" means cancer risk is less than 10^{-4}, maximum target organ HI is less than 1, no chemicals have an HQ >1, PBL < 5%, or exposure type is neither RME or CT.
(3) PBL = Percent probability of child or fetal blood lead exceeding 10 ug/dL.

FIGURE 8-1
CURRENT SCENARIOS
SUMMARY OF RISKS FROM RAGS TABLE 10
BASELINE HUMAN HEALTH RISK ASSESSMENT
BLACKBURN & UNION PRIVILEGES SUPERFUND SITE

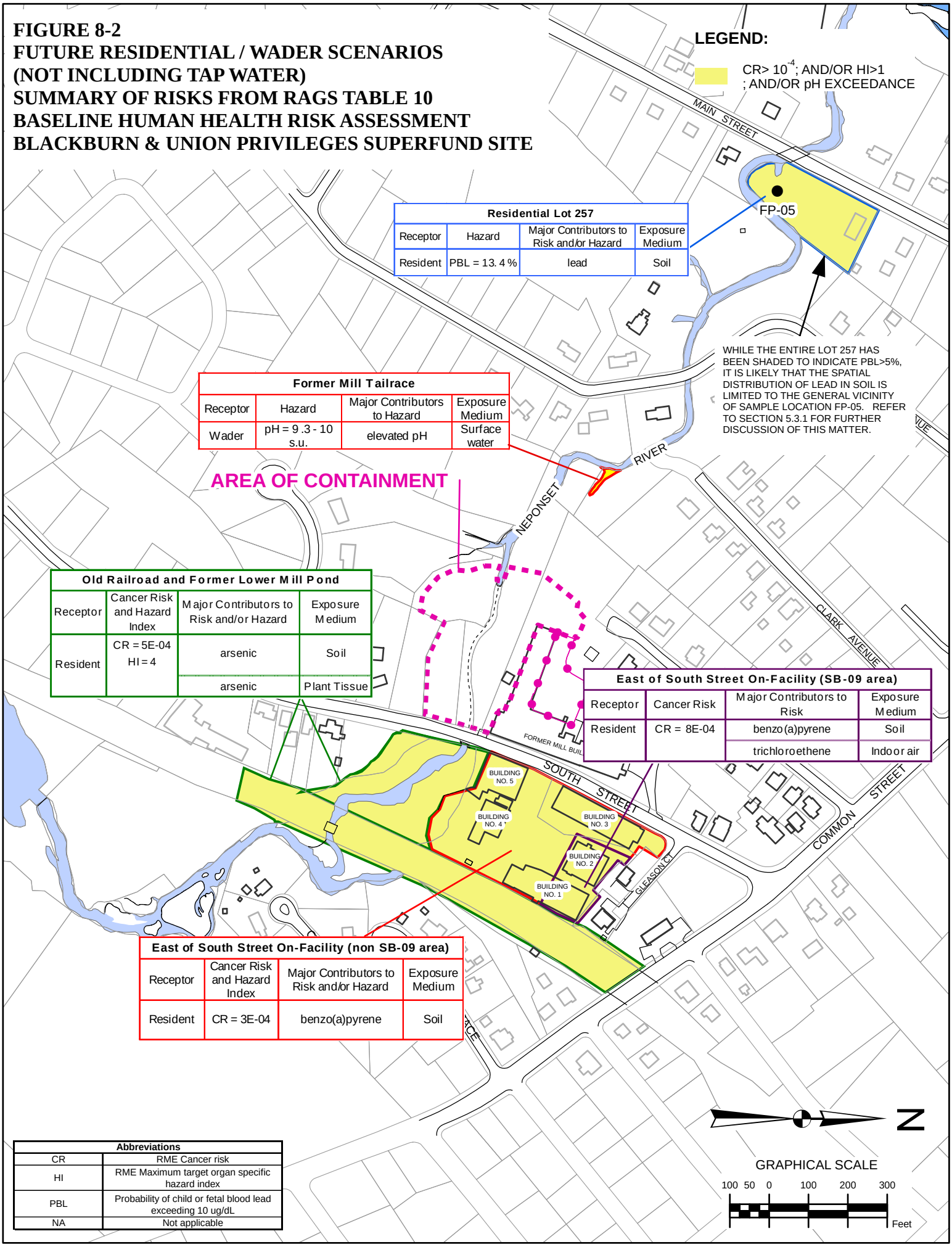


Residential Lot 257			
Receptor	Hazard	Major Contributors to Risk and/or Hazard	Exposure Medium
Resident	PBL = 13. 4 %	lead	Soil

Former Mill Tailrace			
Receptor	Hazard	Major Contributors to Hazard	Exposure Medium
Wader	pH = 9 .3 - 10 s.u.	elevated pH	Surface water

Abbreviations	
CR	RME Cancer risk
HI	RME Maximum target organ specific hazard index
PBL	Probability of child or fetal blood lead exceeding 10 ug/dL
NA	Not applicable

FIGURE 8-2
FUTURE RESIDENTIAL / WADER SCENARIOS (NOT INCLUDING TAP WATER)
SUMMARY OF RISKS FROM RAGS TABLE 10
BASELINE HUMAN HEALTH RISK ASSESSMENT
BLACKBURN & UNION PRIVILEGES SUPERFUND SITE



Residential Lot 257			
Receptor	Hazard	Major Contributors to Risk and/or Hazard	Exposure Medium
Resident	PBL = 13. 4 %	lead	Soil

Former Mill Tailrace			
Receptor	Hazard	Major Contributors to Hazard	Exposure Medium
Wader	pH = 9 .3 - 10 s.u.	elevated pH	Surface water

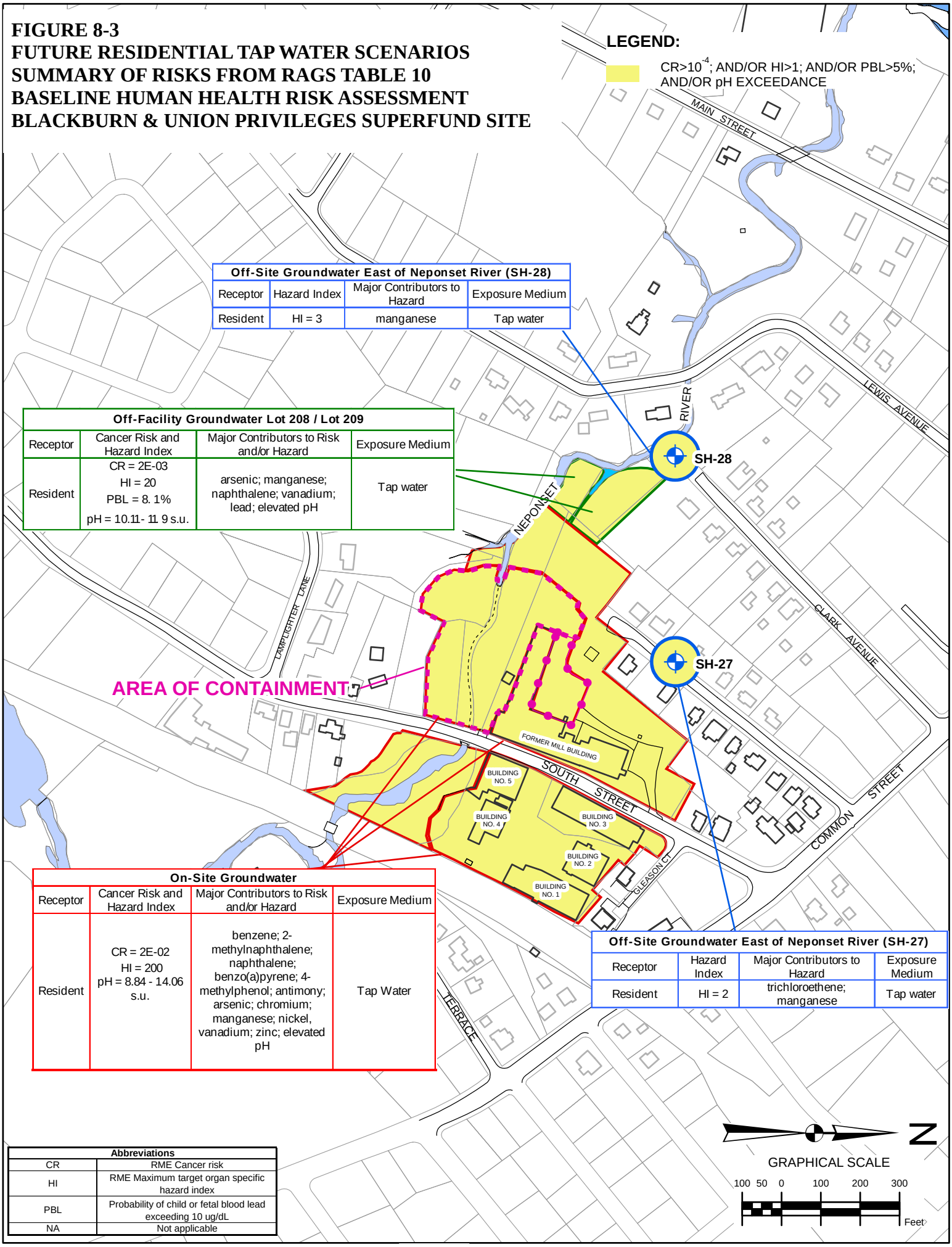
Old Railroad and Former Lower Mill Pond			
Receptor	Cancer Risk and Hazard Index	Major Contributors to Risk and/or Hazard	Exposure Medium
Resident	CR = 5E-04 HI = 4	arsenic	Soil
		arsenic	Plant Tissue

East of South Street On-Facility (SB-09 area)			
Receptor	Cancer Risk	Major Contributors to Risk	Exposure Medium
Resident	CR = 8E-04	benzo(a)pyrene	Soil
		trichloroethene	Indoor air

East of South Street On-Facility (non SB-09 area)			
Receptor	Cancer Risk and Hazard Index	Major Contributors to Risk and/or Hazard	Exposure Medium
Resident	CR = 3E-04	benzo(a)pyrene	Soil

Abbreviations	
CR	RME Cancer risk
HI	RME Maximum target organ specific hazard index
PBL	Probability of child or fetal blood lead exceeding 10 ug/dL
NA	Not applicable

FIGURE 8-3
FUTURE RESIDENTIAL TAP WATER SCENARIOS
SUMMARY OF RISKS FROM RAGS TABLE 10
BASELINE HUMAN HEALTH RISK ASSESSMENT
BLACKBURN & UNION PRIVILEGES SUPERFUND SITE



Off-Site Groundwater East of Neponset River (SH-28)			
Receptor	Hazard Index	Major Contributors to Hazard	Exposure Medium
Resident	HI = 3	manganese	Tap water

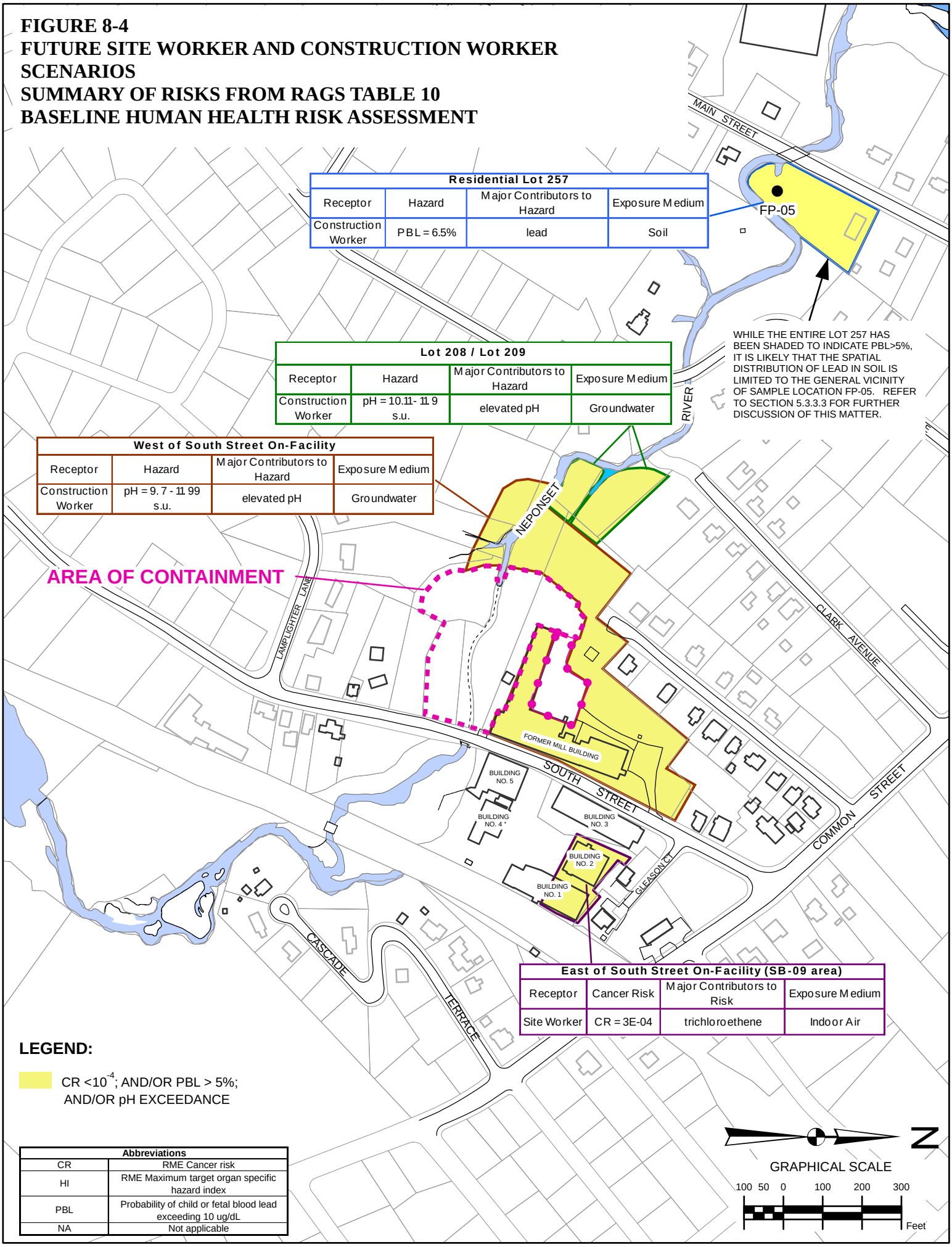
Off-Facility Groundwater Lot 208 / Lot 209			
Receptor	Cancer Risk and Hazard Index	Major Contributors to Risk and/or Hazard	Exposure Medium
Resident	CR = 2E-03 HI = 20 PBL = 8. 1% pH = 10.11- 11. 9 s.u.	arsenic; manganese; naphthalene; vanadium; lead; elevated pH	Tap water

On-Site Groundwater			
Receptor	Cancer Risk and Hazard Index	Major Contributors to Risk and/or Hazard	Exposure Medium
Resident	CR = 2E-02 HI = 200 pH = 8.84 - 14.06 s.u.	benzene; 2-methylnaphthalene; naphthalene; benzo(a)pyrene; 4-methylphenol; antimony; arsenic; chromium; manganese; nickel, vanadium; zinc; elevated pH	Tap Water

Off-Site Groundwater East of Neponset River (SH-27)			
Receptor	Hazard Index	Major Contributors to Hazard	Exposure Medium
Resident	HI = 2	trichloroethene; manganese	Tap water

Abbreviations	
CR	RME Cancer risk
HI	RME Maximum target organ specific hazard index
PBL	Probability of child or fetal blood lead exceeding 10 ug/dL
NA	Not applicable

FIGURE 8-4
FUTURE SITE WORKER AND CONSTRUCTION WORKER SCENARIOS
SUMMARY OF RISKS FROM RAGS TABLE 10
BASELINE HUMAN HEALTH RISK ASSESSMENT



Residential Lot 257			
Receptor	Hazard	Major Contributors to Hazard	Exposure Medium
Construction Worker	PBL = 6.5%	lead	Soil

Lot 208 / Lot 209			
Receptor	Hazard	Major Contributors to Hazard	Exposure Medium
Construction Worker	pH = 10.11- 11.9 s.u.	elevated pH	Groundwater

West of South Street On-Facility			
Receptor	Hazard	Major Contributors to Hazard	Exposure Medium
Construction Worker	pH = 9.7 - 11.99 s.u.	elevated pH	Groundwater

East of South Street On-Facility (SB-09 area)			
Receptor	Cancer Risk	Major Contributors to Risk	Exposure Medium
Site Worker	CR = 3E-04	trichloroethene	Indoor Air

Abbreviations	
CR	RME Cancer risk
HI	RME Maximum target organ specific hazard index
PBL	Probability of child or fetal blood lead exceeding 10 ug/dL
NA	Not applicable

9.0 OVERALL REMEDIAL INVESTIGATION CONCLUSIONS

This section presents a summary of the overall findings and conclusions of the RI. We present herein a summary of the nature and extent of analytes in various matrices at the Site, the transport and fate of these analytes, and the potential risks that these analytes pose to human health or ecological receptors.

The presence and distribution of the highest concentrations of analytes at the Site generally correlates with manufacturing operations that have occurred on portions of the Site over at least the past 100 years, and possibly dating back to the late 17th century. The principal analytes observed at the Site during the RI are elevated pH (defined as pH greater than 9 s.u.), metals, SVOCs (primarily PAHs), and VOCs (with the exception of TCE, primarily AVOCs).

In general, we have limited discussion in this section to those analytes that contribute significantly[27] to potential risk to human health or ecological receptors as described in Sections 7.0 and 8.0 of this Report. Following standard approaches used for Human Health and Ecological Risk Assessments completed under CERCLA, the BHHRA and BERA evaluated baseline potential human health risk and ecological risk only. Neither the BHHRA, nor the BERA drew conclusions about whether COPCs or COPECs are present in the environment because of Site-related activities, or whether they represent a background condition unrelated to the Site. Additionally, neither the BHHRA, nor the BERA drew conclusions about whether chemicals are elevated in the environment over concentrations that may be expected to be naturally occurring, or whether a potential adverse effect is of sufficient magnitude to warrant remedial action. These matters of perspective, and the risk-management decisions that ensue, will be addressed in the forthcoming FS.

9.1 Summary of Analytes in Soil

Approximately 145 soil samples[28] and 10 soil vapor samples were submitted for laboratory analysis during the RI. The soil vapor samples were collected to investigate the potential for VOC soil contaminants to migrate into indoor air. Since the analytes detected in soil vapor are directly related to the analytes detected in soil, we have included a discussion related to soil vapor analytes in this section.

[27] For the purpose of adding perspective to the risk assessment results in the context of the Site characterization results, significant contributions of analytes in Site media are those analytes that present potential adverse ecological effects (as summarized in Section 7.0), and those analytes that contribute cancer risk at levels $>10^{-4}$, non cancer hazard >1, and/or PBL>5% (as summarized in Section 8.0).

[28] Note that the BHHRA and BERA consider floodplain sediment (i.e., in the Floodplain Area and Orlando Property) to be "soil" as opposed to "sediment" due to the manner in which receptors are exposed to this matrix. However, the transport and fate of analytes in floodplain sediment is due to migration with surface water and sediment in the Neponset River; therefore, we have presented summary discussions related to floodplain sediment in Section 9.4.

During the 1992 asbestos Removal Action, asbestos-containing soil excavated from various areas of the Site was consolidated on-Site by others in an area located south of the former mill building. In addition, excavated asbestos-containing soil/sediment from the former mill tailrace was consolidated in a high density polyethylene (HDPE)-lined containment cell constructed in former Settling Basin No. 2 west of the former mill building. These areas south and west of the former mill building, along with an existing area of asbestos-containing soil north of the former mill building have been designated the AOC[29]. South and west of the former mill building, the AOC is capped with six inches of clean vegetated topsoil, placed over 24 inches of clean sand; north of the mill building, the AOC is covered with an asphalt cap. The AOC is subject to deed restrictions and an eight-foot high barbed-wire security fence surrounds its perimeter.

In general, the highest concentrations of soil analytes were detected below the AOC. Elevated pH conditions and elevated concentrations of metals, SVOCs (primarily PAHs), AVOCs, and asbestos[30] remain in this area.

The distribution of metals analytes in soil beneath the AOC is relatively heterogeneous, presumably reflecting historical fill placement practices. In some areas of the AOC, these fill soils are located beneath the groundwater table. The elevated pH conditions are a result of historic releases of sodium hydroxide in this portion of the Site, which appear to have mobilized metals analytes in fill soils and natural soils resulting in impact to groundwater. The primary organic analytes detected in AOC soils were PAHs and to a lesser extent AVOCs – predominantly the lighter molecular weight PAHs (naphthalene and 2-methylnaphthalene) and BTEX compounds, suggesting petroleum related sources for organic analytes in this area (such as former petroleum related ASTs and USTs located in the AOC).

The risk assessment did not consider soils in the AOC as this area of the Site is deed restricted. We acknowledge that an assessment of risk to human health or the environment would indicate potential risk in the absence of the cap, fence, and deed restriction.

Elevated concentrations of metals, PAHs, and VOCs in soil were also observed in the East of South Street, Old Railroad, and Former Lower Mill Pond areas of the Site, but at generally lower concentrations and more spatially intermittent than in the AOC. The highest concentrations of VOCs were observed in the northeast portion of the East of South Street Area (near soil boring SB-09). These VOCs (primarily TCE) were also observed in soil vapor samples collected in this area. However, elevated concentrations of soil vapor analytes detected in the northeast portion of the East of South Street Area were limited to within approximately 15 feet of soil boring SB-09, suggesting a relatively localized area of elevated concentrations of analytes in soil and soil vapor. Notably, soil vapor samples collected from along the property boundary with the residential lots on Gleason Court contained relatively low concentrations of VOCs. Accordingly,

[29] Refer to Section 9.4 of this report for information on asbestos contamination in floodplain sediment.
[30] SHA did not analyze soil samples from the AOC for asbestos; however, given that the AOC was the result of an asbestos Removal Action, elevated concentrations of asbestos in soil are expected.

as described below, no significant risk to current residents from vapor migration to indoor air on Gleason Court is apparent.

As described in Section 8.0, currently, there is no significant risk predicted to human receptors from the elevated concentrations of analytes in soil or soil vapor in the East of South Street, Old Railroad, and former Mill Pond areas of the Site.

With regard to possible future scenarios, there is potential significant risk to hypothetical future human receptors in the East of South Street, Old Railroad, and Former Lower Mill Pond Areas, which are summarized below:

- *Carcinogenic PAHs and arsenic* concentrations in soil pose potential cancer risk from direct contact with soil for a potential future resident at the East of South Street, Old Railroad, and Former Lower Mill Pond Area. In addition, arsenic concentrations in soil pose potential non-cancer hazard from direct contact with soil and ingestion of garden produce for a potential future resident at the Old Railroad and Former Lower Mill Pond Area.

- *Trichloroethene* concentrations in soil pose potential carcinogenic risk from inhalation of indoor air in the northeast portion of the East of South Street Area for a potential future resident or Site worker.

Outside of the AOC, the only area of the Site where soil with asbestos concentrations greater than 1% have been observed is located at one sample location on the East of South Street Area. Only one other soil sample location at the Site contained asbestos concentrations greater than 0.25%; this soil boring was also located on the East of South Street Area[31]. As indicated in Section 8.2.3, a risk assessment for asbestos in soil or sediment has not been performed as part of the RI. However, we understand that USEPA intends to perform an assessment of potential risk from asbestos in soil and sediment that will be documented in a forthcoming report.

As indicated in Section 7.0, there is also potential ecological risk to terrestrial birds and/or small mammals from elevated concentrations of aluminum, lead, selenium, vanadium, and zinc in the East of South Street Area and the West of South Street Area[32]. However these risks have not yet been compared to background risks (e.g., the potential risks in the soil reference area). This analysis will be performed as part of the forthcoming FS.

[31] Note that SHA did not collect these samples. These samples were collected by USEPA's oversight contractor (M&E) as part of a soil and sediment sampling program aimed at further delineating the extent of asbestos in these matrices. Refer to M&E's Data Evaluation Report for Additional Asbestos Investigations in Appendix I for further detail.

[32] The ecological risk assessment exposure areas are slightly different than the human health risk assessment exposure areas. Refer to Figures 3.1a, 3.1b, and 3.3 in the BERA for a depiction of ecological exposure areas.

9.2 Summary of Analytes in Groundwater

With few limited exceptions, groundwater analytes at relatively elevated concentrations were limited to beneath the central portion of the AOC and the former mill building, extending to the Neponset River in the vicinity of the former mill tailrace. Historical releases of sodium hydroxide have resulted in the formation of an area of significantly elevated pH conditions beneath the AOC. Although the original sodium hydroxide source was eliminated over 20 years ago with termination of manufacturing activities, an area of DAPL (pH conditions greater than 12.5 s.u.) of sodium hydroxide resides beneath and proximate to the central portion of the westerly-extending wing of the former mill building (where the former sodium hydroxide ASTs and the former bleachery were located). Metals, PAHs, and VOCs are also present in groundwater beneath the Site at elevated concentrations, primarily within and extending downgradient of the AOC.

The DAPL is limited in lateral and vertical extent to groundwater from deep overburden and shallow bedrock within the AOC. The increased density and viscosity of the DAPL causes these fluids to migrate downward in the subsurface generally under the influence of gravity. The density and viscosity contrast between DAPL and ambient groundwater also likely inhibits mixing of DAPL and ambient groundwater; such that, dissipation of the DAPL is a slow process. The DAPL serves as a source of sodium hydroxide to ambient groundwater. Accordingly, an area of elevated pH in groundwater extends westerly from the DAPL source to the Neponset River where groundwater discharges to the Neponset River in the vicinity of the former mill tailrace.

The high pH conditions, and other related geochemical factors, appear to be largely responsible for the observed high metals concentrations, by mobilizing certain metals that are present in fill or naturally-occurring soils within and downgradient of the AOC. Some metals and organic analytes are also present in the elevated pH area, apparently due to a general collocation of their source areas with the elevated pH source area.

The elevated pH, metals, PAH, and AVOC conditions in groundwater are likely well evolved (at "steady-state"). These conditions are expected to remain relatively consistent, with slow attenuation, for an extended time frame.

Currently, there are no human or ecological receptors that are exposed to Site groundwater. Existing public and private wells in Walpole are not likely to be impacted in the future by elevated pH conditions or other analytes from groundwater at the Site, because these receptors are located well beyond the point of Site groundwater discharge in the vicinity of the former mill tailrace.

With regard to future scenarios, there is potential risk to a hypothetical future construction worker coming into contact with groundwater with elevated pH conditions in the West of South Street Area, and on Lots #33-208/209. Future use of Site groundwater as tap water is highly unlikely. However, as a matter of conservatism at the request of USEPA, the potential risk from

Site groundwater being used as tap water by hypothetical future residents was assessed, and resulted in risk being predicted from pH, metals, PAHs, and VOCs.

9.3 Summary of Analytes in Surface Water

As described previously, groundwater from the Site migrates from the industrial portions of the Site towards the Neponset River. The discharge area for impacted groundwater is the former mill tailrace. Consequently, the highest concentrations of analytes in surface water were observed in the former mill tailrace, including elevated pH and elevated concentrations of metals and PAHs. With the exception of a few metals (iron, arsenic, barium, and manganese) that are likely associated with background[33] concentrations in surface water, no analytes were detected at concentrations above human health or ecological screening levels in the Neponset River. Accordingly, while groundwater with elevated analyte concentrations discharges to the former mill tailrace, this groundwater discharge has not adversely impacted surface water quality in the Neponset River.

There is potential risk to a wader in the former mill tailrace due to elevated pH conditions in surface water in this area. No other significant current or potential future risks to human receptors exposed to surface water were identified in the BHHRA.

There is potential for adverse effects to fish and benthic invertebrates in the lower portion of the former mill tailrace from surface water exposures of barium, copper, lead, manganese, vanadium, benzo(a)anthracene and benzo(a)pyrene as indicated by exceedances of ecological surface water benchmarks. Note that the BERA included the lower portion of the former mill tailrace as part of the Neponset River for the analysis of potential impacts to fish and benthic invertebrates. Outside of the former mill tailrace, only barium concentrations in the Neponset River exceed ecological benchmarks. As described above, barium concentrations observed in the Neponset River appear to be associated with background conditions.

9.4 Summary of Analytes in Sediment

Sediment samples were collected from the Neponset River, former mill tailrace, Lewis Pond, and the floodplain of the Neponset River (including the Orlando Property)[34]. The RI also included collection of fish tissue samples, earthworm samples, and invertebrate samples exposed to Site sediment in these areas. A general discussion of potential adverse ecological effects due to exposure to sediment and/or one or more of these biological media is presented here. The reader

[33] In general, this report does not present a comparison of concentrations of analytes in Site media to "background" conditions; however, in the case of surface water data, a "background" comparison is helpful to understand the contaminant concentrations in surface water upstream of the Site. Refer to Section 6.2 for further discussion regarding this matter.

[34] Note that the BHHRA and BERA consider floodplain sediment soil as opposed to sediment due to the manner in which receptors are exposed to this matrix. However, the transport and fate of analytes in floodplain sediment is due to migration with surface water and sediment in the Neponset River; therefore, we have presented summary discussions related to floodplain sediment in this Section as opposed to Section 9.1.

is referred to the BERA report for a discussion of the nature and extent, and the fate and transport of analytes in these media, and their relative contributions to ecological risk.

In general, the highest concentrations of sediment analytes were detected in the former mill tailrace and Lewis Pond. However, elevated concentrations of analytes in sediment were also detected in the Neponset River and floodplain of the Neponset River. Elevated concentrations of metals, PAHs, and asbestos occur in sediment samples collected as part of the RI. In general, once these analytes entered the surface environment at the Site, they were likely transported to their current location with surface water and sediment migrating in the Neponset River. However, many of these analytes (particularly many metals) could be a result of background conditions rather than analytes sourced at the Site. As described above, an assessment of background concentrations of analytes in sediment has not been conducted as part of the RI. If necessary, this will be a matter for further consideration in the forthcoming FS.

As summarized in Section 8.0 and further described in the BHHRA, the only potential risk to human receptors from exposure to sediment at the Site is from the presence of lead in floodplain sediment (soil) on Lot #33-257. Lead concentrations in soil on residential Lot #33-257 pose a potential hazard from direct contact with soil for both a current resident and potential future construction worker. However, this estimate of hazard is based on just two soil samples collected on this lot. Additional delineation of lead on Lot #33-257 was proposed as part of the RI to improve the estimate of lead exposures; however, the property owner denied access.

Asbestos was detected at concentrations greater than 1% in the former mill tailrace, Neponset River Floodplain, and Lewis Pond. Concentrations of asbestos greater than or equal to the laboratory reporting limit of 0.25%, but less than 1%, were observed in Lewis Pond and the floodplain surrounding Lewis Pond[35]. As indicated above, a risk assessment for asbestos in soil or sediment has not been performed as part of the RI. However, we understand that USEPA will perform an assessment of potential risk from asbestos in soil and sediment that will be documented in a forthcoming report.

As indicated in Section 7.0, there is potential ecological risk to terrestrial birds and/or small mammals from elevated concentrations of aluminum, cadmium, chromium, lead, selenium, vanadium, and zinc within the floodplain of the Neponset River (including the Orlando Property) in either sediment and/or biota. In addition, there is potential ecological risk to aquatic wildlife from elevated concentrations of aluminum, bis(2-ethylhexyl)phthalate, lead, nickel, and/or vanadium within the upper former mill tailrace, Lewis Pond and the Neponset River in either sediment and/or biota. However these risks have not yet been compared to background risks (e.g., the potential risks in the soil, sediment, or reference areas). This analysis will be performed as part of the forthcoming FS.

[35] SHA did not collect all of the sediment samples in Lewis Pond and the floodplain of Lewis Pond. Some sediment samples were collected by USEPA's oversight contractor (M&E) as part of a soil and sediment sampling program aimed at further delineating the extent of asbestos in these matrices. Refer to M&E's Data Evaluation Report for Additional Asbestos Investigations in Appendix I for further detail.

9.5 Implications for the Feasibility Study

The following text summarizes those areas of the Site that are likely to require remedial action based on the results of the RI. Once unacceptable (e.g.,"actionable") risks have been identified, Remedial Action Objectives (RAOs) will be developed as part of the FS process. Subsequently, the FS will consider a range of alternatives to address these RAOs.

As described above, neither the BHHRA, nor the BERA drew conclusions about whether COPCs or COPECs are present in the environment because of Site-related activities, or whether they represent a background condition unrelated to the Site. Neither the BHHRA, nor the BERA drew conclusions about whether chemicals are elevated in the environment over concentrations that may be expected to be naturally occurring, or whether a potential adverse effect is of sufficient magnitude to warrant remedial action. These matters of perspective, and the risk-management decisions that ensue, will be addressed in the forthcoming FS. However, preliminary review of the ecological risks summarized above suggests that with the exception of surface water conditions in the former mill tailrace, elevated concentrations of analytes that contribute to potential adverse ecological effects would not likely result in "actionable" levels of risk using commonly accepted practices for risk management decisions at CERCLA sites. Therefore, with the exception of surface water conditions in the former mill tailrace, this section assumes that there are no "actionable" ecological risks at the Site.

The BHHRA conservatively assumes that unrestricted residential development could occur on all areas of the Site (with the exception of the deed restricted AOC). As a practical matter, unrestricted residential development of those portions of the Site that are industrial (e.g., the East of South Street, the Old Railroad, the Former Lower Mill Pond, and the West of South Street Areas) is highly unlikely, particularly in consideration of the current zoning of these areas largely as "limited manufacturing". This residential assumption results in the potential for risk to a future resident coming into contact with soils with elevated concentrations of arsenic and carcinogenic PAHs in the East of South Street, Old Railroad, and Former Lower Mill Pond Areas. The future resident would also be exposed to potential risks from inhalation of indoor air impacted by soil/soil vapor with elevated concentrations of TCE in the northeastern portion of the East of South Street Area.

As requested by USEPA, remedial alternatives that address potential risks related to residential-type development alternatives on these portions of the Site (e.g., a child in daycare and/or a school-aged child) will be considered in the FS. Therefore, the FS will consider remedial alternatives that either limit or eliminate the potential for a future residential-type receptor coming into contact with: soils with elevated concentrations of arsenic and carcinogenic PAHs, TCE, or TCE-impacted indoor air.

The Town of Walpole has stated its preference that the future use of the East of South Street, Old Railroad, Former Lower Mill Pond, and/or the West of South Street Areas be for a municipal or commercial office building, or for age-qualified housing. Such potential future uses are more likely, and if these portions of the Site were to be developed in this manner, the most sensitive

potential human receptor would likely be a Site Worker. The BHHRA evaluated potential risk to a future Site Worker and determined that there was potential risk from inhalation of indoor air impacted by soil/soil vapor with elevated concentrations of TCE in the northeastern portion of the East of South Street Area. Hence, the FS will consider remedial alternatives that prevent inhalation of TCE-impacted indoor air by a future Site Worker by either limiting the potential impact to indoor air by soil vapor (i.e., vapor mitigation), or eliminating soils with elevated TCE concentrations.

While an area of groundwater with elevated pH conditions and elevated concentrations of metals, PAHs, and VOCs remains beneath and downgradient of the AOC, future use of this groundwater as tapwater is highly unlikely. Therefore, the FS will consider placing deed restrictions on the future use of groundwater on those portions of the Site with contaminated groundwater. Elevated pH conditions in groundwater on the West of South Street Area and Lots #33-208/209 present potential risk to a future construction worker; therefore, the FS will consider deed restrictions that limit the potential for a future construction worker to come in contact with groundwater with elevated pH conditions.

Surface water in the Neponset River does not appear to be adversely impacted by the Site. However, both the BHHRA and BERA identified potential risks to receptors from surface water in the former mill tailrace. The elevated pH conditions present a risk to a wader coming into contact with this water. There is also potential for adverse effects to fish and benthic invertebrates in the lower portion of the former mill tailrace from surface water exposures of barium, copper, lead, manganese, vanadium, benzo(a)anthracene and benzo(a)pyrene as indicated by exceedances of ecological surface water benchmarks. As described in this report and the RI Report, the former mill tailrace is a key discharge area for groundwater at the Site. Hence, the FS will consider remedial alternatives that limit discharge of groundwater from the Site to the former mill tailrace.

Sediments in the former mill tailrace, Neponset River Floodplain, and Lewis Pond and to a limited extent, soil in the East of South Street Area, have concentrations of asbestos above 1%. Risks from asbestos in soil or sediment were not evaluated as part of the RI; however, the final FS will consider remedial alternatives that either limit exposure to, or eliminate soil/sediment with concentrations of asbestos greater than preliminary remediation goals that will be established as part of the FS. Differences in asbestos concentrations in samples collected by SHA versus those located in close proximity and collected by M&E have been observed. The explanation for these differences could be due to several factors (e.g., temporal factors; heterogeneous distribution of asbestos in sediments; or analytical, sample preparation, and/or sample collection methods, etc.). Hence, prior to initiating remedial action of asbestos-impacted sediments, further assessment of the distribution of asbestos should be conducted in concert with further evaluation of appropriate asbestos sampling and analytical methods to refine the extent of asbestos sediment concentrations that warrant remedial action.

As described above, the AOC (inclusive of the Settling Basin #2 Containment Cell) contains soils with elevated pH conditions and elevated concentrations of metals, PAHs, VOCs, and asbestos. The risk assessment did not consider soils in the AOC as this area of the Site is deed restricted. We acknowledge that an assessment of risk to human health or the environment would likely indicate potential risk in the absence of the cap, fence, and deed restriction. The FS will consider remedial alternatives that address the potential for human or ecological receptors to come into contact with AOC soils, including the adequacy of current controls.

10.0 REFERENCES

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TABLES

TABLE 1A
Summary of Soil Sampling and Analysis Program
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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Total Depth of Exploration (ft)	Sample(s) Analyzed			SDG Number	Analyses Performed
		Number	Depth Interval (ft)	Collection Date		
SH-01R	70	S-5	8 - 10	06/25/01	BU601	Grain Size
		S-8	17 - 19	06/25/01	BU601	Grain Size
SH-02R	72	S-13	40 - 42	06/26/01	BU601	Grain Size
SH-04D	78	S-4	6 - 8	02/07/01	BU601	Grain Size
		S-15	58 - 58.5	02/09/01	BU607	Grain Size
SH-05S	18.4	S-1	6.5 - 8.5	07/24/01	BU102A	SVOCs, VOCs, Metals, WAD Cyanide
SH-05D	58.2	S-4	6 - 8	01/30/01	BU607	Grain Size
SH-07D	60	S-4	15 - 17	06/22/01	BU607	Grain Size
SH-08S	19	S-6	10 - 12	12/07/00	BU607	Grain Size
SH-15S	18	S-1	14 - 16	02/20/01	BU601	Grain Size
SH-15D	61	S-13	48 - 48.5	02/16/01	BU607	Grain Size
SH-17S	13	S-3	11 - 13	02/27/01	BU607	Grain Size
SH-18S	25	S-1-2	20 - 24	07/24/01	BU109	SVOCs, VOCs, Metals, WAD Cyanide
SH-19R	60.1	S-4	15 - 17	06/27/01	BU607	Grain Size
		S-7	35 - 37	06/27/01	BU607	Grain Size
		S-7	35 - 37	Dup.	BU607	Grain Size
SH-22S	25	S-6	16 - 17	06/28/01	BU607	Grain Size
SB-01	3.4	SS-01	0 - 1	05/09/01	BU107	SVOCs, Metals, WAD Cyanide
		S-1-2	0 - 3.4	05/09/01	BU107	SVOCs, Metals, WAD Cyanide
SB-02	2	SS-02	0 - 1	04/26/01	BU106; BU402†	SVOCs, Metals, WAD Cyanide
SB-03	3.3	SS-03	0 - 1	5/9/2001‡	BU107	SVOCs, Metals, WAD Cyanide
		S-2	2 - 3.3	05/09/01	BU601	Grain Size
SB-04	15	SS-04	0 - 1	03/21/01	BU103	SVOCs, VOCs, Metals, WAD Cyanide, TOC
		S-4-5	6 - 10	03/21/01	BU103	SVOCs, Metals, WAD Cyanide
SB-05	14.5	SS-05	0 - 1	03/19/01	BU103	SVOCs, Metals, WAD Cyanide
		S-2-3	2 - 6	03/19/01	BU103	SVOCs, Metals, WAD Cyanide
SB-06	31.3	SS-06	0 - 1	03/15/01	BU103	SVOCs, Metals, WAD Cyanide
		S-4-5	6 - 10	03/16/01	BU103	SVOCs, VOCs, Metals, WAD Cyanide, TOC
		S-8	14 - 16	03/16/01	BU601	Grain Size
		S-13	24 - 26	03/16/01	BU601	Grain Size
SB-07	10	SS-07	0 - 1	3/15/2001‡	BU103	SVOCs, VOCs, Metals, WAD Cyanide, TOC
		S-3	4 - 6	03/15/01	BU103	SVOCs, Metals, WAD Cyanide
SB-08	9.3	SS-08	0 - 1	03/14/01	BU103	SVOCs, Metals, WAD Cyanide
SB-08A	10	S-4-5	6 - 9.3	03/15/01	BU103	SVOCs, Metals, WAD Cyanide
		S-5	8 - 10	03/15/01	BU601	Grain Size
		S-5	8 - 10	Dup.	BU601	Grain Size
SB-09	10.4	SS-09	0 - 1	04/23/01	BU106	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
		S-2-3	2 - 6	04/23/01	BU106	SVOCs, VOCs, Metals, WAD Cyanide
SB-09A	7.5	S-2	2 - 3.5	09/07/06	BU114	VOCs, 2-Methylnaphthalene and Naphthalene
		S-3	6 - 7.5	09/07/06	BU114	VOCs, 2-Methylnaphthalene and Naphthalene
SB-10	6	SS-10	0 - 1	06/07/01	BU110	SVOCs, Metals, WAD Cyanide
		S-3	4 - 6	06/07/01	BU110; BU601	SVOCs, VOCs, Metals, WAD Cyanide
SB-11	16	SS-11	0 - 1	06/07/01	BU110	SVOCs, Metals, WAD Cyanide
		S-2-3	2 - 6	06/07/01	BU110	SVOCs, VOCs, Metals, WAD Cyanide
SB-12	12	SS-12	0 - 1	04/17/01	BU105	SVOCs, Metals, WAD Cyanide
		S-1-2	0 - 4	04/18/01	BU105	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide
		S-1-2	0 - 4	Dup.	BU105	VPH/EPH

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Location	Total Depth of Exploration (ft)	Sample(s) Analyzed			SDG Number	Analyses Performed
		Number	Depth Interval (ft)	Collection Date		
SB-13/ SB-13A/ SB-13B	8/ 8/ 10 @	SS-13	0 - 1	04/13/01	BU105	SVOCs, Metals, WAD Cyanide
		S-3-4	4 - 8	04/13/01	BU105; BU111	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
		S-3-4	4 - 8	Dup.	BU105	Pesticides/PCBs, TOC
SB-14	10	SS-14	0 - 1	04/13/01	BU105	SVOCs, Metals, WAD Cyanide
		S-3-4	4 - 8	04/13/01	BU105	SVOCs, VOCs, Metals, WAD Cyanide
SB-15	19.8	SS-15	0 - 1	04/16/01	BU105	SVOCs, Metals, WAD Cyanide
		S-2-3	2 - 6	04/16/01	BU105	SVOCs, VOCs, Metals, WAD Cyanide
SB-16	10	SS-16	0 - 1	6/6/2001‡	BU110	SVOCs, Metals, WAD Cyanide
		S-3-4	4 - 8	6/6/2001‡	BU110	SVOCs, VOCs, Metals, WAD Cyanide
SB-17	12	SS-17	0 - 1	4/5/2001‡	BU104	SVOCs, Metals, WAD Cyanide
		S-4-5	6 - 10	04/05/01	BU104; BU111	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide
SB-18	12	SS-18	0 - 1	04/11/01	BU105	SVOCs, Metals, WAD Cyanide
		S-2-3	2 - 5.4	04/11/01	BU105	SVOCs, VOCs, Metals, WAD Cyanide
SB-19	18	SS-19	0 - 1	06/08/01	BU110	SVOCs, Metals, WAD Cyanide
		S-1-2	0.4 - 4	06/08/01	BU110	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
		S-1-2	0.4 - 4	Dup.	BU110	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
SB-20	18.4	SS-20	0 - 1	06/12/01	BU110	SVOCs, Metals, WAD Cyanide
		S-2-3	2 - 6	06/12/01	BU110	SVOCs, VOCs, Metals, WAD Cyanide
SB-21	12.5	SS-21	0 - 1	04/02/01	BU104	SVOCs, VOCs, Metals, WAD Cyanide,Pesticides/PCBs, TOC
		S-3-4	4 - 8	04/02/01	BU104; BU111	SVOCs, VOCs, Metals, WAD Cyanide
SB-22	9.5	SS-22	0 - 1	06/13/01	BU110; BU111	SVOCs, Metals, WAD Cyanide
		S-3	4 - 5.1	06/13/01	BU110; BU111	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
SB-23	12	SS-23	0 - 1	4/11/2001‡	BU105	SVOCs, Metals, WAD Cyanide
		S-2-3	2 - 6	4/11/2001‡	BU105	SVOCs, VOCs, Metals, WAD Cyanide
SB-24	11.3	SS-24	0 - 1	04/12/01	BU105	SVOCs, Metals, WAD Cyanide
		S-3-4	4 - 8	04/12/01	BU105; BU111	SVOCs, VOCs, Metals, WAD Cyanide
SB-25	10.6	SS-25	0 - 1	03/29/01	BU104	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
		SS-25	0 - 1	Dup.	BU104	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
		S-4-5	6 - 10	03/29/01	BU104	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide
		S-4-5	6 - 10	Dup.	BU104	VPH/EPH
SB-26	6.8	SS-26	0 - 1	03/30/01	BU104	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
		S-2-3	2 - 5.7	03/30/01	BU104	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
SB-27	12	SS-27	0 - 1	6/15/2001‡	BU110	SVOCs, Metals, WAD Cyanide
		S-2-3	2 - 6	6/15/2001‡	BU110	SVOCs, VOCs, Metals, WAD Cyanide, TOC
SB-28	55	SS-28	0 - 1	07/23/01	BU109	SVOCs, VOCs, Metals, WAD Cyanide, TOC
		S-3-4	4 - 8	07/23/01	BU109	SVOCs, Metals, WAD Cyanide
		S-6	14 - 15.3	07/23/01	BU607	Grain Size
		S-11	43.5 - 45.5	07/23/01	BU607	Grain Size
SB-29	10	SS-29	0 - 1	03/28/01	BU103	SVOCs, Metals, WAD Cyanide

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Location	Total Depth of Exploration (ft)	Sample(s) Analyzed			SDG Number	Analyses Performed
		Number	Depth Interval (ft)	Collection Date		
SB-30	14	SS-30	0 - 1	03/28/01	BU104	SVOCs, Metals, WAD Cyanide
		S-4-5	6 - 10	03/28/01	BU104	SVOCs, Metals, WAD Cyanide
SB-31	31	SS-31	0 - 1	02/26/01	BU102	SVOCs, VOCs, Metals, WAD Cyanide, TOC
		SS-31	0 - 1	Dup.	BU102	SVOCs, VOCs, Metals, WAD Cyanide, TOC
		S-3-4	4 - 8	02/26/01	BU102	SVOCs, Metals, WAD Cyanide
SB-32	2	SS-32	0 - 1	2/22/2001‡	BU102	SVOCs, Metals, WAD Cyanide
SB-33	4	SS-33	0 - 1	2/23/2001‡	BU102	SVOCs, Metals, WAD Cyanide
SB-34	2	SS-34	0 - 1	5/2/2001‡	BU107	SVOCs, Metals, WAD Cyanide
SB-35	3.5	SS-35	0 - 1	5/2/2001‡	BU107	SVOCs, Metals, WAD Cyanide
		S-1-2	0 - 3.5	5/2/2001‡	BU107	SVOCs, VOCs, Metals, WAD Cyanide, TOC
SB-36	8	SS-36	0 - 1	02/21/01	BU102	SVOCs, Metals, WAD Cyanide
SB-37	6.2	SS-37	0 - 1	04/23/01	BU106	SVOCs, Metals, WAD Cyanide
SB-38	4	SS-38	0 - 1	04/23/01	BU106	SVOCs, VOCs, Metals, WAD Cyanide, TOC
		S-2-3	2 - 4	04/23/01	BU106; BU111	SVOCs, Metals, WAD Cyanide
SB-39	10	SS-39	0 - 1	02/22/01	BU102	SVOCs, Metals, WAD Cyanide
SB-40	12	SS-40	0 - 1	02/26/01	BU102	SVOCs, Metals, WAD Cyanide
		S-2-3	2 - 6	02/26/01	BU102	SVOCs, VOCs, Metals, WAD Cyanide, TOC
SB-41/ SB-41A	4.8/ 7 @	S-1-2	3 - 7	3/20/2001‡	BU103	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
		S-1-2	3 - 7	Dup.	BU103	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
SB-41D	30	S-5-6	15 - 22	7/27/2001‡	BU109	SVOCs, VOCs, Metals, WAD Cyanide
SB-42	30	S-1-2	2.7 - 7	7/27/2001‡	BU109	SVOCs, VOCs, Metals, WAD Cyanide
		S-3-4	10 - 15.9	7/27/2001‡	BU109	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
		S-3-4	10 - 15.9	Dup.	BU109	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
		S-4	15 - 15.9	07/27/01	BU607	Grain Size
SB-43	29	S-1-2	3 - 6	08/01/01	BU109	SVOCs, VOCs, Metals, WAD Cyanide
		S-3-4	6 - 9	08/01/01	BU109	SVOCs, VOCs, Metals, WAD Cyanide
SB-44	80	S-1-2	4 - 8	07/31/01	BU109	SVOCs, VOCs, Metals, WAD Cyanide
		S-3-4	8 - 12	07/31/01	BU109	SVOCs, VOCs, Metals, WAD Cyanide
		S-7	17.5 - 18	07/31/01	BU109; BU111	SVOCs, Metals, WAD Cyanide
		S-8	20 - 22	07/31/01	BU607	Grain Size
SB-45	95	S-1-2	3 - 7	07/19/01	BU109	SVOCs, VOCs, Metals, WAD Cyanide
		S-4-5	10 - 14	07/19/01	BU109	SVOCs, VOCs, Metals, WAD Cyanide
		S-7	17 - 18	07/19/01	BU601	Grain Size
		S-23	80 - 81.5	07/30/01	BU601	Grain Size
SB-46	46.5	S-1-2	3 - 5.5	7/18/2001‡	BU109	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
		S-3-4	17 - 21	07/18/01	BU109	SVOCs, VOCs, Metals, WAD Cyanide
SB-46B	21	S-1-2	8 - 12	7/18/2001‡	BU109	SVOCs, VOCs, Metals, WAD Cyanide
SB-47	57	S-1-2	1 - 5	7/25/2001‡	BU109	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
		S-3-4	5 - 9	7/25/2001‡	BU109	SVOCs, VOCs, Metals, WAD Cyanide
SB-48	4	S-1-2	0.5 - 4	12/14/00	BU101	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide
SB-48A	16	S-3-4	4 - 7.3	12/14/00	BU101	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide
SB-49	10	S-1-2	0 - 4	04/24/01	BU106	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide
		S-3-4	4 - 8	04/24/01	BU106	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide, Pesticides/PCBs, TOC

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Blackburn & Union Privileges Superfund Site
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Location	Total Depth of Exploration (ft)	Sample(s) Analyzed			SDG Number	Analyses Performed
		Number	Depth Interval (ft)	Collection Date		
SB-50	10	S-1-2	0 - 4	04/24/01	BU106	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide
		S-3-4	4 - 8	04/24/01	BU106	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide
SB-51	19	S-1-2	0.8 - 4	12/07/00	BU101	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide
		S-5-6	8 - 12	12/07/00	BU101	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide
SB-52	40	S-1-2	4 - 8	4/18/2001‡	BU105	SVOCs, VOCs, Metals, WAD Cyanide
		S-4-5	10 - 14	4/18/2001‡	BU105	SVOCs, VOCs, Metals, WAD Cyanide
SB-53	45.5	S-1-2	2.3 - 7	07/13/01	BU109	SVOCs, VOCs, Metals, WAD Cyanide
		S-3-4	19 - 23	07/13/01	BU109	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
SB-54	1.4	S-1	0.4 - 1.4	05/03/01	BU107	SVOCs, VOCs, Metals, WAD Cyanide
SB-55	1.3	S-1	0.3 - 1.3	5/3/2001‡	BU107	SVOCs, VOCs, Metals, WAD Cyanide
SB-56	1.8	S-1	0.8 - 1.8	05/03/01	BU107	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
		S-1	0.8 - 1.8	Dup.	BU107	SVOCs, VOCs, Metals, WAD Cyanide, Pesticides/PCBs, TOC
SB-57	1.5	S-1	0.5 - 1.5	5/3/2001‡	BU107	SVOCs, VOCs, Metals, WAD Cyanide
SB-58	16	SS-58	0 - 1	4/26/2001‡	BU106	SVOCs, Metals, WAD Cyanide
		S-2-3	2 - 5.5	4/26/2001‡	BU106	SVOCs, Metals, WAD Cyanide
SB-59	11.8	SS-59	0 - 1	04/26/01	BU106	SVOCs, VOCs, Metals, WAD Cyanide
		S-4-5	6 - 10	04/26/01	BU106; BU111	SVOCs, Metals, WAD Cyanide
SB-60	11	SS-59	0 - 1	04/25/01	BU106	SVOCs, Metals, WAD Cyanide
		S-4-5	6 - 8.5	04/25/01	BU106; BU111	SVOCs, Metals, WAD Cyanide
SB-61	10.3	SS-61	0 - 1	04/25/01	BU106	SVOCs, Metals, WAD Cyanide
		S-1-2	0 - 4	04/25/01	BU106	SVOCs, Metals, WAD Cyanide
SB-62	16	SS-62	0 - 1	04/17/01	BU105	SVOCs, VOCs, Metals, WAD Cyanide
		SS-62	0 - 1	Dup.	BU105	SVOCs, VOCs, Metals, WAD Cyanide
		S-3-4	4 - 8	04/17/01	BU105; BU111	SVOCs, VOCs, Metals, WAD Cyanide
SB-63	14.5	SS-63	0 - 1	04/02/01	BU104	SVOCs, Metals, WAD Cyanide
		S-1-2	0 - 4	04/02/01	BU104	SVOCs, Metals, WAD Cyanide
SB-64	17.5	SS-64	0 - 1	03/23/01	BU103	SVOCs, Metals, WAD Cyanide
		S-3-4	4 - 8	03/23/01	BU103	SVOCs, VOCs, Metals, WAD Cyanide
SB-65	29	SS-65	0 - 1	03/26/01	BU103; BU111	SVOCs, Metals, WAD Cyanide
		S-4-5	6 - 11	03/26/01	BU103	SVOCs, Metals, WAD Cyanide
SB-66	9	SS-66	0 - 1	07/09/01	BU108	SVOCs, Metals, WAD Cyanide
		S-3-4	4 - 8	07/10/01	BU108; BU111	SVOCs, Metals, WAD Cyanide
SB-67	6	SS-67	0 - 1	07/11/01	BU108	SVOCs, VOCs, Metals, WAD Cyanide
SB-68	6	SS-68	0 - 1	07/11/01	BU108	SVOCs, Metals, WAD Cyanide
		S-2-3	2 - 6	07/11/01	BU108; BU111	SVOCs, VOCs, Metals, WAD Cyanide
SB-69	6	SS-69	0 - 1	07/10/01	BU108	SVOCs, Metals, WAD Cyanide
SB-70	6	SS-70	0 - 1	07/10/01	BU108	SVOCs, VOCs, Metals, WAD Cyanide
		SS-70	0 - 1	Dup.	BU108	SVOCs, VOCs, Metals, WAD Cyanide
SB-71	6	SS-71	0 - 1	7/10/2001‡	BU108	SVOCs, Metals, WAD Cyanide
SB-72	6	SS-72	0 - 1	7/10/2001‡	BU108	SVOCs, Metals, WAD Cyanide
		S-1-2	0 - 4	7/10/2001‡	BU108	SVOCs, Metals, WAD Cyanide
SB-73	6	SS-73	0 - 1	07/10/01	BU108	SVOCs, Metals, WAD Cyanide

TABLE 1A
Summary of Soil Sampling and Analysis Program
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Total Depth of Exploration (ft)	Sample(s) Analyzed			SDG Number	Analyses Performed
		Number	Depth Interval (ft)	Collection Date		
UST-1/	1.2/	S-1-2	0.2 - 5	04/04/01	BU104	SVOCs, VOCs, VPH/EPH
UST-1A/	1.8/	S-3-4	5 - 9	04/04/01	BU104	SVOCs, VOCs, VPH/EPH
UST-2	12	S-1-2	0.3 - 4	4/5/2001‡	BU104	SVOCs, VOCs, VPH/EPH
		S-3-4	4 - 8	4/5/2001‡	BU104	SVOCs, VOCs, VPH/EPH
UST-3	12	S-1-2	0.2 - 4	04/04/01	BU104	SVOCs, VOCs, VPH/EPH
		S-3-4	4 - 8	04/04/01	BU104	SVOCs, VOCs, VPH/EPH
UST-4	10.6	S-1-2	1 - 4	12/11/00	BU101	SVOCs, VOCs, VPH/EPH
		S-3-4	4 - 7.3	12/11/00	BU101	SVOCs, VOCs, VPH/EPH
		S-5	8 - 8.7	12/12/00	BU601	Grain Size
UST-5	14	S-1-2	0.5 - 4	12/12/00	BU101	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide
		S-1-2	0.5 - 4	Dup.	BU101	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide
		S-3-4	4 - 6.8	12/13/00	BU101	SVOCs, VOCs, VPH/EPH
		S-7	12 - 14	12/13/00	BU601	Grain Size
UST-6	8.5	S-1-2	0.4 - 4	12/13/00	BU101	SVOCs, VOCs, VPH/EPH
		S-3-4	4 - 8	12/13/00	BU101	SVOCs, VOCs, VPH/EPH
EUA-1	0.5	NA	0 - 0.5	08/08/03	BU112	Select SVOCs, Select Metals, TOC, Grain Size
		NA	0 - 0.5	Dup.	BU112	Select SVOCs, Select Metals, TOC, Grain Size
EUA-2	0.5	NA	0 - 0.5	08/08/03	BU112	Select SVOCs, Select Metals, TOC, Grain Size
EUA-3	0.5	NA	0 - 0.5	08/08/03	BU112	Select SVOCs, Select Metals, TOC, Grain Size
FPW-1	0.5	NA	0 - 0.5	08/08/03	BU112	Select SVOCs, Select Metals, TOC, Grain Size
FPW-2	0.5	NA	0 - 0.5	08/08/03	BU112	Select SVOCs, Select Metals, TOC, Grain Size
FPW-3	0.5	NA	0 - 0.5	08/08/03	BU112	Select SVOCs, Select Metals, TOC, Grain Size
OP-1	0.5	NA	0 - 0.5	08/08/03	BU112	Select SVOCs, Select Metals, TOC, Grain Size
OP-2	0.5	NA	0 - 0.5	08/08/03	BU112	Select SVOCs, Select Metals, TOC, Grain Size
OP-3	0.5	NA	0 - 0.5	08/08/03	BU112	Select SVOCs, Select Metals, TOC, Grain Size
OSA-1	0.5	NA	0 - 0.5	08/07/03	BU112	Select SVOCs, Select Metals, TOC, Grain Size
OSA-2	0.5	NA	0 - 0.5	08/12/03	BU112	Select SVOCs, Select Metals, TOC, Grain Size
OSA-3	0.5	NA	0 - 0.5	08/12/03	BU112	Select SVOCs, Select Metals, TOC, Grain Size
OSR-1-S	0.5	NA	0 - 0.5	11/21/03	BU113	Select SVOCs, Select Metals, TOC, Grain Size
		NA	0 - 0.5	Dup.	BU113	Select SVOCs, Select Metals, TOC, Grain Size
OSR-2-S	0.5	NA	0 - 0.5	11/04/03	BU113	Select SVOCs, Select Metals, TOC, Grain Size
OSR-3-S	0.5	NA	0 - 0.5	10/31/03	BU113	Select SVOCs, Select Metals, TOC, Grain Size

TABLE 1A
Summary of Soil Sampling and Analysis Program
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Notes:

1. Depths indicated are approximate and represent depths in feet (ft) below the ground surface. Samples were collected by SHA on the dates indicated. Refer to the boring and monitoring well logs and field sampling summaries in Appendix B-1 for further information.

2. "†" Sample SS-02 / 04-26-01, from location SB-02, was originally submitted with sample delivery group (SDG) BU106; however, due to the low percent solids present in this sample, it was moved to sediment SDG BU402 and freeze-dried prior to analysis. Refer to the data validation reports included in the Data Usability Report (SHA, 2002) for additional information.

3. "‡" A split sample was collected from this location by the United States Environmental Protection (USEPA) oversight contractor, Metcalf & Eddy (M&E).

4. Chemical analyses for samples collected in 2000, 2001, and 2003 were generally performed by Woods Hole Group Environmental Laboratories (WHGEL) of Raynham, Massachusetts; TOC and grain size analyses were performed by Applied Marine Sciences, Inc. (AMS) of League City, Texas.

Chemical analyses for samples collected in 2006 were performed by Alpha Woods Hole Laboratories (AWHL - formerly WHGEL) of Raynham, Massachusetts.

5. "SVOCs" indicates analysis for semi-volatile organic compounds performed by USEPA Method 8270C-EI, and polycyclic aromatic hydrocarbons (PAHs) by USEPA Method 8270C using selective ion monitoring (SIM) (when required to achieve Project Action Levels). Refer to Table 4 of this Report (for lower soil samples) or to Table 11C of the Remedial Investigation Report (for upper soil samples) for lists of individual analytes and validated analytical results.

"Select SVOCs*" indicates analysis for benzoic acid, butylbenzylphthalate, carbazole, dibenzofuran, 1,2-dichlorobenzene, 4-methylphenol, and PAHs performed by USEPA Method 8270C-SIM. Refer to Table 4 of this Report (for lower soil samples) or to Table 11C of the Remedial Investigation Report (for upper soil samples) for lists of individual analytes and validated analytical results.

"2-Methylnaphthalene and Naphthalene" indicates analysis for 2-methylnaphthalene and naphthalene by USEPA Method 8260B. Refer to Table 4 of this Report for validated analytical results.

"VOCs" indicates analysis for volatile organic compounds performed by USEPA Method 8260B. Refer to Table 5 (for lower soil samples) or to Table 11D of the Remedial Investigation Report (for upper soil samples) for lists of individual analytes and validated analytical results.

"VPH/EPH" indicates analysis for volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH) performed by Massachusetts Department of Environmental Protection (MADEP) methods MADEP-VPH-98-1 and MADEP-EPH-98-1, respectively. Refer to Table 4 of this Report for lists of individual analytes and validated analytical results.

"Metals" indicates analysis for the target analyte list (TAL) of metals, including aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc performed by USEPA Methods 6010B and 6020; and analysis for mercury performed by USEPA Method 7471A. Refer to Tables 11B and 12B of the Remedial Investigation Report for validated analytical results.

"Select Metals**" indicates analysis for aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, selenium, thallium, vanadium, and zinc performed by USEPA Methods 6010 and 6020B; and analysis for mercury performed by USEPA Method 7471A. Refer to Table 11B of the Remedial Investigation Report for validated analytical results.

"WAD Cyanide" indicates analysis for weak acid dissociable cyanide performed by USEPA Method 4500-CN I. Refer to Tables 11B and 12B of the Remedial Investigation Report for validated analytical results.

"Pesticides/PCBs" indicates analysis for pesticides performed by USEPA Method 8081A, and analysis for polychlorinated biphenyls (PCBs) performed by USEPA Method 8082. Refer to Tables 11E and 12E of the Remedial Investigation Report for individual analyte lists and validated analytical results.

"TOC" indicates analysis for total organic carbon by USEPA Method 9060 (modified). Refer to Table 7A of the Remedial Investigation Report for validated analytical results.

"Grain Size" indicates analysis for grain size in accordance with American Society of Testing and Materials (ASTM) Method D-422. Refer to Table 6A of the Remedial Investigation Report for validated analytical results.

6. Refer to Section 2 of the text for further explanation and discussion regarding analytical program. Location designations are:
"SH-" series locations are borings in which a monitoring well was installed.
"SB-" series locations are borings with no monitoring well installed.
"UST-" series locations are areas around former underground storage tank locations.
"EUA-" series locations are within the east upland area.
"FPW-" series locations are within the floodplain.
"OP-" series locations are within the Orlando property.
"OSA-" series locations are within the on-site area.
"OSR-" series locations are within the on-site reference area.

7. "Dup." indicates a blind field duplicate was collected at this location on the same date as the primary sample and submitted for the listed analyses.
"NA" indicates that the category is not applicable as only one sample was collected from each of these locations.

8. "@" indicates at some locations, insufficient sample volume was recovered from the required sample interval. This necessitated that additional boring(s) be advanced to the required sample interval. These additional boring(s) were completed adjacent to the original boring. Samples were designated by the first boring from which a portion of the sample was collected. See boring and monitoring well logs included in Appendix B for additional information.

9. A description of the analytical program completed on the co-located earthworm samples for the EUA-, FPW-, OP-, OSA- and OSR-series samples is presented on Table 2F of the Remedial Investigation Report.

TABLE 1B
Summary of Groundwater Sampling and Analysis Program
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Sample Date	SDG Number	Analyses Performed
SH-01S	09/12/01‡	BU204	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/21/02	BU208B	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/28/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/05/06	BU214	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-01D	09/12/01	BU204	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/22/02	BU208A	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/29/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/03/06	BU214	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-01R	09/13/01	BU204	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/22/02	BU208A	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/30/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/04/06	BU214	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-02S	09/12/01	BU204	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/24/02	BU208B	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/29/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-02D	09/13/01	BU204	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/23/02	BU208A	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/30/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-02R	09/12/01	BU204	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/16/02	BU208B	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/04/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/29/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-03S	09/11/01	BU204	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/16/02	BU208B	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/03/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/29/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-03D	09/12/01	BU204	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/23/02	BU208B	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/03/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/03/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-04S	09/11/01	BU204	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/20/02‡	BU208A	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/28/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/04/06	BU214	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-04D	09/11/01	BU203	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/21/02	BU207	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/05/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN

TABLE 1B
Summary of Groundwater Sampling and Analysis Program
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Sample Date	SDG Number	Analyses Performed
SH-05S	09/11/01‡	BU204	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	Dup.	BU204	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/21/02‡	BU208A	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	Dup.	BU208A	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/29/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/04/06	BU214	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
	Dup.	BU214	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-05D	09/11/01‡	BU203	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/21/02	BU207	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/04/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/02/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-05R-A	11/10/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/03/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-05R-B	11/11/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/03/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-06S	09/06/01‡	BU202	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/22/02	BU206A	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/29/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-06D	09/06/01	BU202	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	Dup.	BU202	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/22/02	BU206A	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	Dup.	BU206A	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/29/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-06R-A	11/05/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/02/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-06R-B	11/06/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/02/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-07S	09/07/01‡	BU202	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	Dup.	BU202	VPH/EPH
	05/22/02	BU206A	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	Dup.	BU206A	VPH/EPH
	10/29/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-07D	09/07/01	BU202	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/22/02	BU206A	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/30/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-08S	09/06/01	BU201	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/21/02‡	BU205	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/28/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-08D	09/07/01	BU202	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/20/02‡	BU206A	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/29/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN

TABLE 1B
Summary of Groundwater Sampling and Analysis Program
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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Sample Date	SDG Number	Analyses Performed
SH-09S	09/07/01‡	BU202	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/17/02	BU206B	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/31/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-09D	09/07/01‡	BU202	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/23/02	BU206B	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/28/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-10S	09/10/01	BU203	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/23/02	BU207	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/31/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-11S	09/07/01	BU202; BU203†	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/16/02	BU207	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/03/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-12S	09/11/01	BU203	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/17/02	BU207	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/03/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-12D	09/12/01	BU203	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/17/02	BU207	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/03/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-13S	09/11/01	BU203	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	Dup.	BU203	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/16/02	BU207	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	Dup.	BU207	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/03/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/27/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-14S	09/10/01	BU202	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/20/02	BU206B	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/04/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/02/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
	Dup.	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-14D	09/10/01	BU203	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/20/02	BU207	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/04/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/02/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-15S	09/10/01‡	BU202	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/20/02	BU206B	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	10/28/03	BU211	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/03/06	BU214	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-15D	09/10/01‡	BU203	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/17/02	BU207	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/04/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/27/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron

TABLE 1B
Summary of Groundwater Sampling and Analysis Program
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Sample Date	SDG Number	Analyses Performed
SH-16S	09/11/01	BU203	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/17/02	BU207	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/19/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
SH-17S	09/06/01	BU201	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/20/02‡	BU205	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide, Anions, Alkalinity,TKN
	11/19/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/25/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-17D	11/20/03	BU211	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	Dup.	BU211	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/05/06	BU214	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-17R	11/20/03	BU211	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/04/06	BU214	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-18S	09/04/01	BU201	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/15/02	BU205	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	09/26/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-18D	09/04/01	BU201	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/15/02	BU205	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	09/26/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-19S	09/05/01	BU201	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	Dup.	BU201	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/21/02‡	BU205	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	Dup.	BU205	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	09/28/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-19D	09/05/01	BU201	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/16/02	BU205	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	09/25/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-19R	09/05/01	BU201	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/16/02	BU205	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	09/28/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-20S	09/05/01	BU201	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/17/02	BU205	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
SH-21S	09/06/01	BU201	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/16/02	BU205	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	09/26/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-22S	09/05/01‡	BU201	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/17/02	BU205	SVOCs, VOCs, VPH/EPH, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	09/25/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron

TABLE 1B
Summary of Groundwater Sampling and Analysis Program
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Sample Date	SDG Number	Analyses Performed
SH-23S	09/04/01	BU201	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	05/15/02	BU205	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TKN
	11/04/03	BU210	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/25/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-24S	11/06/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/28/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-24R	11/06/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/27/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-25S	11/05/03‡	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/26/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-25D	11/05/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/27/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-26S	10/28/03	BU211	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/04/06	BU214	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-27S	11/21/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/25/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-27D	11/19/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	Dup.	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/02/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-27R	11/20/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/29/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-28S	11/06/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/27/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
	Dup.	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-28D	11/06/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/27/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
SH-28R	11/07/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/29/06	BU213	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
WP-01	11/04/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/26/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
WP-02	11/04/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
WP-03	11/05/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/28/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron

TABLE 1B
Summary of Groundwater Sampling and Analysis Program
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Sample Date	SDG Number	Analyses Performed
WP-04	11/07/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/27/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
WP-05	11/07/03	BU209	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	09/27/06	BU212	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
WP-06	10/28/03	BU211	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN
	10/05/06	BU214	Select SVOCs*, VOCs, Metals, Anions, Alkalinity, TOC, TDS, Sulfide, TKN, Density, Viscosity, Gases, Ferrous Iron
WP-07	10/27/03	BU211	SVOCs, VOCs, Metals, WAD Cyanide, Anions, Alkalinity, TOC, TDS, Sulfide, TKN

Notes:

1. Samples were collected by SHA on the dates indicated. Refer to the field sampling summaries in Appendix B-2 for further information.

2. "†" Sample SH-11S/09-07-01 was submitted with sample delivery group (SDG) BU203, but was batched, analyzed, reported, and invoiced with SDG BU202 by Woods Hole Group Environmental Laboratories (WHGEL).

3. "‡" A split sample was collected from this location by the United States Environmental Protection (USEPA) oversight contractor, Metcalf & Eddy (M&E).

4. Laboratory analyses for samples collected in 2001, 2002, and 2003 were performed by WHGEL of Raynham, Massachusetts, except for total Kjeldahl nitrogen (TKN) which was performed by Groundwater Analytical, Inc. of Buzzards Bay, Massachusetts.

Laboratory analyses for samples collected in 2006 were performed by Alpha Woods Hole Laboratories (AWHL - formerly WHGEL) of Raynham, Massachusetts, except TKN which was performed by Groundwater Analytical, Inc. of Buzzards Bay, Massachusetts; total organic carbon (TOC) which was performed by Katahdin Analytical Services, Inc. of Westbrook, Maine; density and viscosity which were performed by Camin Cargo Control, Inc. of Chelsea, Massachusetts; and ethane, ethene, methane, and ferrous iron which were performed by Microseeps, Inc. of Pittsburgh, Pennsylvania.

5. "SVOCs" indicates analysis for semi-volatile organic compounds performed by USEPA Method 8270C-EI, and polycyclic aromatic hydrocarbons (PAHs) by USEPA Method 8270C using selective ion monitoring (SIM) (when required to achieve Project Action Levels). Refer to Table 10 for list of individual compounds and validated analytical results.

"Select SVOCs*" indicates analysis for bis(2-ethylhexyl)phthalate, carbazole, and PAHs performed by USEPA Method 8270C-SIM. Refer to Table 10 for list of individual compounds and validated analytical results.

"VOCs" indicates analysis for volatile organic compounds performed by USEPA Method 8260B. Refer to Table 11 for list of individual compounds and validated analytical results.

"Metals" indicates analysis for the target analyte list (TAL) of metals, including aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc performed by USEPA Methods 6010B and 6020; and analysis for mercury performed by USEPA Method 7470A. Refer to Table 9 for validated analytical results.

"WAD Cyanide" indicates analysis for weak acid dissociable cyanide performed by USEPA Method 4500-CN I. Refer to Table 9 for validated analytical results.

"Anions" indicates analysis for chloride, nitrate, and sulfate performed by USEPA Method 300.0. Refer to Table 9 for validated analytical results.

"Alkalinity" indicates analysis for alkalinity performed by USEPA Method 310.1. Refer to Table 9 for validated analytical results.

"TKN" indicates analysis for total Kjeldahl nitrogen performed by USEPA Method 351.3. Refer to Table 9 for validated analytical results.

"TOC" indicates analysis for total organic carbon performed by USEPA Method 415.1. Refer to Table 9 for validated analytical results.

"TDS" indicates analysis for total dissolved solids performed by USEPA Method 160.1. Refer to Table 9 for validated analytical results.

"Sulfide" indicates analysis for sulfide performed by USEPA Method 376.2. Refer to Table 9 for validated analytical results.

"VPH/EPH" indicates analysis for volatile petroleum hydrocarbons (VPH) and extractible petroleum compounds (EPH) performed by Massachusetts Department of Environmental Protection (MADEP) methods MADEP-VPH-98-1 and MADEP-EPH-98-1, respectively. Refer to Table 11 for list of individual analytes and validated analytical results.

"Density" indicates analysis for density performed by ASTM Method D4052-96 (2002). Refer to Table 7 for analytical results.

"Viscosity" indicates analysis for viscosity performed by ASTM Method D445-01. Refer to Table 7 for analytical results.

"Gases" indicates analysis for ethane, ethene, and methane by Method AM20GAx. Refer to Table 9 for validated analytical results.

"Ferrous Iron" indicates analysis for ferrous iron by USEPA Methods 9056 and 7199. Refer to Table 9 for validated analytical results.

6. Refer to Section 2 of the text of this Report and Section 2 of the RI Report for further explanation and discussion regarding the analytical program.

7. "Dup." indicates a blind field duplicate was collected at this location on the same date as the primary sample and submitted for the listed analyses.

TABLE 1C
Summary of Surface Water Sampling and Analysis Program
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Sample Date	SDG Number	Analyses Performed
SW-102	04/05/01	BU301; BU501	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	08/01/01	BU302; BU504	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	09/29/06	BU303	Select SVOCs*, Metals, TOC
SW-103	04/04/01‡	BU301; BU501	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	08/01/01‡	BU302; BU504	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SW-105	04/04/01	BU301; BU501	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	08/01/01	BU302; BU504	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	09/29/06	BU303	Select SVOCs*, Metals, TOC
	Dup.	BU303	Select SVOCs*, Metals, TOC
SW-106	04/04/01‡	BU301; BU501	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	Dup.	BU301; BU501	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	08/01/01	BU302; BU504	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	Dup.	BU302; BU504	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SW-107	04/04/01	BU301; BU501	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	08/01/01	BU302; BU504	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	09/29/06	BU303	Select SVOCs*, Metals, TOC
SW-108	04/04/01	BU301; BU501	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	08/01/01‡	BU302; BU504	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	09/29/06	BU303	Select SVOCs*, Metals, TOC
SWR-1	04/05/01	BU301; BU501	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	08/02/01	BU302; BU504	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SWR-2	04/05/01	BU301; BU501	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	08/02/01	BU302; BU504	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SWR-3	04/05/01	BU301; BU501	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	08/02/01	BU302; BU504	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SWR-4	04/05/01	BU301; BU501	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	08/02/01	BU302; BU504	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SWR-5	04/05/01	BU301; BU501	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	08/01/01	BU302; BU504	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos

Notes:

1. Samples were collected by SHA on the dates indicated. Refer to the field sampling summaries in Appendix B-3 for further information.

2. "‡" A split sample was collected from this location by the United States Environmental Protection (USEPA) oversight contractor, Metcalf & Eddy (M&E).

4. Chemical analyses for samples collected in 2001 were generally performed by Woods Hole Group Environmental Laboratories (WHGEL) of Raynham, Massachusetts. Asbestos analyses were performed by International Asbestos Testing Laboratory (IATL) of Mt. Laurel, New Jersey.

Chemical analyses for samples collected in 2006 were generally performed by Alpha Woods Hole Laboratories (AWHL - formerly WHGEL), except analysis for TOC which was performed by Katahdin Analytical Services, Inc. of Westbrook, Maine.

4. "SVOCs" indicates analysis for semi-volatile organic compounds by USEPA Method 8270C-EI, and polycyclic aromatic hydrocarbons (PAHs) by USEPA Method 8270C using selective ion monitoring (SIM) (when required to achieve Project Action Levels). Refer to Table 15 for list of individual compounds and validated analytical data.

"Select SVOCs*" indicates analysis for bis(2-ethylhexyl)phthalate, carbazole, and PAHs performed by USEPA Method 8270C-SIM. Refer to Table 15 for list of individual compounds and validated analytical results.

"VOCs" indicates analysis for volatile organic compounds by USEPA Method 8260B. Refer to Table 16 for list of individual compounds and validated analytical data.

"Metals" indicates analysis for the target analyte list (TAL) of metals, including dissolved and total aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc by USEPA Method 6020; and analysis for mercury by USEPA Method 7000 series with gold amalgamation preparation. Refer to Table 14 for validated analytical data.

"WAD Cyanide" indicates analysis for weak acid dissociable cyanide by USEPA Method 4500-CN I. Refer to Table 14 for validated analytical data.

"TOC" indicates analysis for total organic carbon. Samples collected in April 2001 were analyzed by USEPA Method 9060 (modified). Samples collected in August 2001 were analyzed by USEPA Method 415.1. Refer to Table 14 for validated analytical data.

"Asbestos" indicates analysis for asbestos by USEPA Methods 600/4-83-043 and 100.1. Refer to Table 14F of the Remedial Investigation Report for list of individual analytes and validated analytical data.

5. Refer to Section 2 of the text for further explanation of the analytical program. Location designations are:
"SW-" series locations are Site surface water sampling locations.
"SWR-" series locations are surface water reference sampling locations.

6. "Dup." indicates a blind field duplicate was collected at this location on the same date as the primary sample and submitted for the listed analyses.

TABLE 1D
Summary of Sediment Sampling and Analysis Program
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Sample Date	Sample Depth (ft)	SDG Number	Analyses Performed
Neponset River Sediments				
NR-1	07/26/01‡	0 - 0.3	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	Dup.	0 - 0.3	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
NR-2	07/26/01	0 - 0.2	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
NR-3	07/26/01‡	0 - 0.2	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
NR-4	07/26/01‡	0 - 0.5	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
NR-5†	07/26/01	0 - 0.2	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	12/18/02	0 - 0.5	BU409;BU801	Select SVOCs**, Metals, TOC, Bioaccumulation
NR-6	07/26/01‡	0 - 0.3	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
NR-7	07/25/01	0 - 0.1	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	12/18/02	0 - 0.5	BU409;BU801	Ammonia, Select SVOCs**, Select VOCs, Metals, TOC, Bioaccumulation, Toxicity
NR-8	07/25/01‡	0 - 0.2	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	12/18/02	0 - 0.5	BU409;BU801	Ammonia, Select SVOCs**, Select VOCs, Metals, TOC, Bioaccumulation, Toxicity
Neponset River (Upstream of the Site) Reference Sediments				
SedRN-1	07/26/01‡	0 - 0.2	BU401; BU602	TOC, Grain Size
	05/24/02	0 - 0.5	BU407; BU507	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	Dup.	0 - 0.5	BU407; BU507	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SedRN-2	07/26/01	0 - 0.2	BU401; BU602	TOC, Grain Size
	05/24/02	0 - 0.5	BU407; BU507	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Asbestos
SedRN-3	07/26/01	0 - 0.2	BU401; BU602	TOC, Grain Size
	05/24/02‡	0 - 0.5	BU407; BU507	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Asbestos
SedRN-4	07/26/01	0 - 0.2	BU401; BU602	TOC, Grain Size
	05/24/02‡	0 - 0.5	BU407; BU507	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Asbestos
	12/18/02	0 - 0.5	BU409;BU801	Ammonia, Select SVOCs**, Select VOCs, Metals, TOC, Bioaccumulation, Toxicity
SedRN-5	07/26/01	0 - 0.2	BU401; BU602	TOC, Grain Size
	05/24/02‡	0 - 0.5	BU407; BU507	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Asbestos
Lewis Pond Sediments				
LP-01	07/31/01‡	0 - 0.5	BU402; BU503; BU603	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	Dup.	0 - 0.5	BU402; BU503; BU603	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	12/18/02	0 - 0.5	BU409;BU801	Ammonia, Select SVOCs**, Select VOCs, Metals, TOC, Bioaccumulation, Toxicity
LP-02	07/31/01	0 - 0.3	BU402; BU503; BU603	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
LP-03	07/31/01‡	0 - 0.4	BU402; BU503; BU603	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
LP-04	07/31/01	0 - 0.5	BU402; BU503; BU603	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
LP-05	07/30/01‡	0 - 0.5	BU402; BU503; BU603	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
LP-06	07/30/01‡	0 - 0.5	BU402; BU503; BU603	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	12/18/02	0 - 0.5	BU409;BU801	Select SVOCs**, Metals, TOC, Bioaccumulation
LP-07	07/30/01	0 - 0.5	BU402; BU503; BU603	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
LP-08	07/30/01	0 - 0.5	BU402; BU503; BU603	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
LP-09	07/30/01‡	0 - 0.5	BU402; BU503; BU603	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	12/18/02	0 - 0.5	BU409;BU801	Select SVOCs**, Metals, TOC, Bioaccumulation
LP-10	07/30/01	0 - 0.5	BU402; BU503; BU603	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
Lower Pond (Norwood, Massachusetts) Reference Sediments				
SedRNwd-01	11/15/01	0 - 0.5	BU405; BU606	TOC, Grain Size
	12/17/02‡	0 - 0.5	BU408; BU508	Ammonia, SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
	Dup.	0 - 0.5	BU408; BU508	Ammonia, SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SedRNwd-02	11/15/01	0 - 0.5	BU405; BU606	TOC, Grain Size
	12/17/02	0 - 0.5	BU408; BU508	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SedRNwd-03	11/15/01	0 - 0.5	BU405; BU606	TOC, Grain Size
	12/17/02	0 - 0.5	BU408; BU508	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SedRNwd-04	11/15/01	0 - 0.5	BU405; BU606	TOC, Grain Size
	12/17/02	0 - 0.5	BU408; BU508	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SedRNwd-05	11/15/01	0 - 0.5	BU405; BU606	TOC, Grain Size
	12/17/02	0 - 0.5	BU408; BU508	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SedRNwd-06	11/15/01	0 - 0.5	BU405; BU606	TOC, Grain Size
	12/17/02	0 - 0.5	BU408; BU508	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SedRNwd-07	11/15/01	0 - 0.5	BU405; BU606	TOC, Grain Size
	12/17/02	0 - 0.5	BU408; BU508	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SedRNwd-08	11/15/01	0 - 0.5	BU405; BU606	TOC, Grain Size
	12/17/02	0 - 0.5	BU408; BU508	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SedRNwd-09	11/15/01	0 - 0.5	BU405; BU606	TOC, Grain Size
	12/17/02	0 - 0.5	BU408; BU508	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos
SedRNwd-10	11/15/01‡	0 - 0.5	BU405; BU606	TOC, Grain Size
	Dup.	0 - 0.5	BU405; BU606	TOC, Grain Size
	12/17/02	0 - 0.5	BU408; BU508	SVOCs, VOCs, Metals, WAD Cyanide, TOC, Asbestos

TABLE 1D
Summary of Sediment Sampling and Analysis Program
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Sample Date	Sample Depth (ft)	SDG Number	Analyses Performed
Stoughton Pond (Stoughton, Massachusetts) Reference Sediments				
SedRS-01	11/15/01	0 - 0.5	BU403; BU604	TOC, Grain Size
	Dup.	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRS-02	11/15/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRS-03	11/15/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRS-04	11/15/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRS-05	11/15/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRS-06	11/15/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRS-07	11/15/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRS-08	11/15/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRS-09	11/15/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRS-10	11/15/01‡	0 - 0.5	BU403; BU604	TOC, Grain Size
Memorial Pond (Walpole, Massachusetts) Reference Sediments				
SedRW-01	11/16/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRW-02	11/16/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRW-03	11/16/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRW-04	11/16/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRW-05	11/16/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRW-06	11/16/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRW-07	11/16/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRW-08	11/16/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRW-09	11/16/01	0 - 0.5	BU403; BU604	TOC, Grain Size
SedRW-10	11/16/01	0 - 0.5	BU403; BU604	TOC, Grain Size
Floodplain Sediments				
FP-01	10/10/01‡	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	Dup.	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FP-02	10/10/01	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FP-03	10/10/01	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FP-04	10/10/01	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FP-05	10/10/01‡	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	08/05/03‡	0 - 1	BU410; BU509	Select SVOCs*, Select Metals
	Dup.	0 - 1	BU410; BU509	Select SVOCs*, Select Metals
	08/05/03	01/03/07	BU410; BU509	Select SVOCs*, Select Metals
FP-06	10/10/01	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	08/05/03	0 - 1	BU410; BU509	Select SVOCs*, Select Metals
	08/05/03	01/03/07	BU410; BU509	Select SVOCs*, Select Metals
FP-08	10/10/01	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FP-09	10/10/01	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	08/05/03	0 - 1	BU410; BU509	Select SVOCs*, Select Metals
	08/05/03	01/03/07	BU410; BU509	Select SVOCs*, Select Metals
FP-09A	10/13/06	0 - 1	BU412	PAHs, Arsenic and Lead
	10/13/06	01/03/07	BU412	PAHs, Arsenic and Lead
FP-09B	10/13/06	0 - 1	BU412	PAHs, Arsenic and Lead
	10/13/06	01/03/07	BU412	PAHs, Arsenic and Lead
FP-09C	10/13/06	0 - 1	BU412	PAHs, Arsenic and Lead
	10/13/06	01/03/07	BU412	PAHs, Arsenic and Lead
FP-09D	10/13/06	0 - 1	BU412	PAHs, Arsenic and Lead
	10/13/06	01/03/07	BU412	PAHs, Arsenic and Lead
FP-09E	10/13/06	0 - 1	BU412	PAHs, Arsenic and Lead
	10/13/06	01/03/07	BU412	PAHs, Arsenic and Lead
FP-09F	10/13/06	0 - 1	BU412	PAHs, Arsenic and Lead
	10/13/06	01/03/07	BU412	PAHs, Arsenic and Lead
FP-10	10/10/01‡	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
Floodplain Reference Sediments				
FPR-01	10/09/01‡	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FPR-02	10/09/01	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FPR-03	10/09/01	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FPR-04	10/09/01	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FPR-05	10/09/01‡	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FPR-06	10/09/01	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FPR-07	10/09/01	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FPR-08	10/09/01	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FPR-09	10/09/01	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
FPR-10	10/09/01‡	0 - 1	BU404; BU505; BU605	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos

TABLE 1D
Summary of Sediment Sampling and Analysis Program
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Sample Date	Sample Depth (ft)	SDG Number	Analyses Performed
Former Mill Tailrace Sediments				
TR-1	07/25/01‡	0 - 0.5	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
TR-2	07/25/01	0 - 0.4	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
TR-3	07/25/01‡	0 - 0.4	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	12/16/02‡	0 - 0.5	BU409;BU801	Ammonia, Select SVOCs**, Select VOCs, Metals, TOC, Bioaccumulation, Toxicity
	Dup.	0 - 0.5	BU409;BU801	Ammonia, Select SVOCs**, Select VOCs, Metals, TOC, Bioaccumulation, Toxicity
	08/06/03	0 - 2.5	BU509	Asbestos
TR-4	08/07/03	0 - 0.4	BU509	Asbestos
	07/25/01	0 - 3	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
TR-5	07/25/01‡	0 - 0.6	BU401; BU502; BU602	SVOCs, VOCs, Metals, WAD Cyanide, TOC, AVS/SEM, Grain Size, Asbestos
	08/06/03‡	0 - 2.9	BU-509	Asbestos

Notes:

1. Samples were collected by SHA on the dates indicated. Refer to the field sampling summaries in Appendix B-4 for further information.

2. "†" The stake at the original NR-5 location was lost after the July 26, 2001 sample was collected. The location was re-established as NR-5A for the December 18, 2002 sample.

3. "‡" A split sample was collected from this location by the United States Environmental Protection (USEPA) oversight contractor, Metcalf & Eddy (M&E).

4. Chemical analyses for samples collected in 2001, 2002, and 2003 were generally performed by Woods Hole Group Environmental Laboratories (WHGEL) of Raynham, Massachusetts; grain size analyses were performed by Applied Marine Sciences, Inc. (AMS) of League City, Texas and WHGEL. Asbestos analyses were performed by International Asbestos Testing Laboratory (IATL) of Mt. Laurel, New Jersey. Toxicity and bioaccumulation analyses were performed by Aquatec Biological Sciences, Inc. (Aquatec) of South Bennington, Vermont.

Chemical analyses for samples collected in 2006 were performed by Alpha Woods Hole Laboratories (AWHL - formerly WHGEL) of Raynham, Massachusetts.

5. "SVOCs" indicates analysis for semi-volatile organic compounds by USEPA Method 8270C-EI, and polycyclic aromatic hydrocarbons (PAHs) by USEPA Method 8270C using selective ion monitoring (SIM) (when required to achieve Project Action Levels). Refer to Table 18 of this Report for list of individual compounds and validated analytical data.
"Select SVOCs*" indicates analysis for bis(2-ethylhexyl)phthalate and carbazole by USEPA Method 8270C-EI and PAHs by USEPA Method 8270C-SIM. Refer to Table 18 of this Report for list of individual compounds and validated analytical data.
"Select SVOCs**" indicates analysis for benzoic acid, benzyl alcohol, bis[2-ethylhexyl]phthalate, carbazole, 2,4-dimethylphenol, di-n-octylphthalate, 4-methylphenol, and 4-nitroaniline by USEPA Method 8270C-EI; and PAHs by USEPA Method 8270C-SIM. Refer to Table 18 of this Report for list of individual compounds and validated analytical data.
"VOCs" indicates analysis for volatile organic compounds by USEPA Method 8260B. Refer to Table 15D of the Remedial Investigation Report for list of individual compounds and validated analytical data.
"Select VOCs" indicates analysis for acetone, 2-butanone (methyl ethyl ketone [MEK]), carbon disulfide, and methyl-tert-butyl ether by USEPA Method 8260B. Refer to Table 15D of the Remedial Investigation Report for validated analytical data.
"Metals" indicates analysis for the target analyte list (TAL) of metals, including aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc. Samples collected in 2001 were analyzed by USEPA Methods 6010B/6020 and 7471A (mercury only). Samples collected in 2002 and 2003 were analyzed by USEPA Methods 6010B/6020A and 7471A (mercury only). Refer to Table 15B of the Remedial Investigation Report for validated analytical data.
"Select Metals" indicates analysis for aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc by USEPA Methods 6010B/6020 and 7471A (mercury only). Refer to Table 15B of the Remedial Investigation Report for validated analytical data.
"Arsenic and Lead" indicates analysis for arsenic and lead by USEPA Method 6020A. Refer to Table 17 of this Report for validated analytical data.
"WAD Cyanide" indicates analysis for weak acid dissociable cyanide by USEPA Method 4500-CN I. Refer to Table 15B of the Remedial Investigation Report for validated analytical data.
"Ammonia" indicates analysis for ammonia as nitrogen by USEPA Method 350.1. Refer to Table 15B of the Remedial Investigation Report for validated analytical data.
"TOC" indicates analysis for total organic carbon by USEPA Method 9060 (modified). Refer to Table 7B of the Remedial Investigation Report for validated analytical data.
"AVS/SEM" indicates analysis for acid volatile sulfides and simultaneously extracted metals (cadmium, copper, lead, nickel, and zinc) by USEPA AVSSEM SOP v2.0 9/4/92. Refer to Table 15B of the Remedial Investigation Report for validated analytical data.
"Asbestos" indicates analysis for asbestos. Samples collected in 2001 and 2002 were analyzed by USEPA Region I Method 1994 and TEM ELAP Method 198.4. Samples collected in 2003 were analyzed by USEPA Region I Method 1994 and USEPA Method 600/R-93-116 (July 1993). Refer to Table 15E of the Remedial Investigation Report for list of individual analytes and validated analytical data.
"Grain Size" indicates analysis for grain size in accordance with American Society of Testing and Materials (ASTM) Method D-422. Refer to Table 6B of the Remedial Investigation Report for validated analytical results.
"Bioaccumulation" indicates testing for bioaccumulation in invertebrates in accordance with Aquatec's Standard Operating Procedure (SOP) entitled "Oligochaete, *Lumbriculus variegates* , 28-day Bioaccumulation Test for Sediments". Refer to Table 2G of the Remedial Investigation Report for a description of the sampling and analysis program completed on *Lumbriculus variegates* , and Tables 17A and 17B for validated analytical results of chemical analyses performed on the *Lumbriculus variegates* .
"Toxicity" indicates testing for toxicity in accordance with Aquatec's SOP entitled "Amphipod, *Hyalella azteca* , 28-day Survival and Growth Toxicity Testing for Sediments".

6. Refer to Section 2 of this Report for further explanation and discussion regarding analytical program. Location designations are:
"NR-" series locations are along the bed of the Neponset River immediately downstream of the Site.
"SedRN-" series locations are reference locations along the bed of the Neponset River upstream of the Site.
"LP-" series locations are along three transects across Lewis Pond.
"SedRNwd-" series locations are Lewis Pond reference locations located in Lower Pond in Norwood, Massachusetts.
"SedRS-" series locations are Lewis Pond reference locations located in Stoughton Pond in Stoughton, Massachusetts.
"SedRW-" series locations are Lewis Pond reference locations located in Memorial Pond in Walpole, Massachusetts.
"FP-" series locations are in the floodplain downstream of the Site, between the Site and the dam at Lewis Pond.
"FPR-" series locations are reference floodplain samples located upstream of the Site.
"TR-" series locations are in the former mill tailrace.

7. "Dup." indicates a blind field duplicate was collected at this location on the same date as the primary sample and submitted for the listed analyses.

TABLE 1E
Summary of Soil Vapor Sampling and Analysis Program
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Sample Date	SDG Number	Analyses Performed
SV-01	09/07/06	BU1001	VOCs, 2-Methylnaphthalene and Naphthalene
	Dup.	BU1001	VOCs, 2-Methylnaphthalene and Naphthalene
SV-02	09/07/06	BU1001	VOCs, 2-Methylnaphthalene and Naphthalene
SV-03	09/07/06	BU1001	VOCs, 2-Methylnaphthalene and Naphthalene
SV-04	09/07/06	BU1001	VOCs, 2-Methylnaphthalene and Naphthalene
SV-05	09/07/06	BU1001	VOCs, 2-Methylnaphthalene and Naphthalene
SV-06	09/07/06	BU1001	VOCs, 2-Methylnaphthalene and Naphthalene
SV-07	09/07/06	BU1001	VOCs, 2-Methylnaphthalene and Naphthalene
SV-08	09/07/06	BU1001	VOCs, 2-Methylnaphthalene and Naphthalene
SV-09	09/07/06	BU1001	VOCs, 2-Methylnaphthalene and Naphthalene
SV-10	09/07/06	BU1001	VOCs, 2-Methylnaphthalene and Naphthalene
AA	09/07/06	BU1001	VOCs, 2-Methylnaphthalene and Naphthalene

Notes:

1. Samples were collected by SHA on the dates indicated. Refer to the field sampling summaries in Appendix B-5 for further information.

2. Chemical analyses for samples were performed by Alpha Woods Hole Laboratories (AWHL) of Westborough, Massachusetts.

3. "VOCs" indicates analysis for volatile organic compounds by USEPA Method TO-15. Refer to Table 19 for list of individual compounds and validated analytical data.
"2-Methylnaphthalene and Naphthalene" indicates analysis for 2-methylnaphthalene and naphthalene by MADEP Method APH. Refer to Table 19 for validated analytical data.

4. Refer to Section 2 of the text for further explanation of the analytical program.

5. "Dup." indicates a blind field duplicate was collected at this location on the same date as the primary sample and submitted for the listed analyses.

TABLE 2
Summary of Groundwater Elevations
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Monitoring Well Location	Reference Elevation (ft)	Ground Surface Elevation (ft)	August 20, 2001		October 29, 2001		March 5, 2002		May 14, 2002		November 17&18, 2003		May 25, 2004		September 19, 2006	
			Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
Shallow Monitoring Wells																
SH-01S	167.60	165.35	15.61	151.99	17.06	150.54	15.19	152.41	14.50	153.10	14.78	152.82	14.37	153.23	15.38	152.22
SH-02S	167.22	165.15	16.33	150.89	17.38	149.84	16.05	151.17	15.52	151.70	15.64	151.58	15.08	152.14	16.08	151.14
SH-03S	169.77	167.06	19.79	149.98	20.51	149.26	19.30	150.47	19.04	150.73	19.12	150.65	18.45	151.32	19.48	150.29
SH-04S	151.30	149.53	5.70	145.60	5.99	145.31	5.30	146.00	4.62	146.68	5.58	145.72	5.38	145.92	5.41	145.89
SH-05S	152.16	150.10	5.77	146.39	6.44	145.72	5.26	146.90	4.41	147.75	5.43	146.73	5.18	146.98	5.33	146.83
SH-06S	155.08	155.55	5.62	149.46	7.09	147.99	5.77	149.31	4.09	150.99	4.99	150.09	4.56	150.52	5.64	149.44
SH-07S	161.93	162.31	9.98	151.95	11.57	150.36	9.58	152.35	8.29	153.64	9.28	152.65	5.80	156.13	9.88	152.05
SH-08S	162.52	162.90	6.69	155.83	8.58	153.94	6.74	155.78	5.79	156.73	6.53	155.99	5.65	156.87	6.65	155.87
SH-09S	167.57	165.55	13.66	153.91	14.80	152.77	13.19	154.38	12.69	154.88	13.44	154.13	13.37	154.20	13.84	153.73
SH-10S	174.04	171.44	18.23	155.81	19.11	154.93	18.00	156.04	17.72	156.32	17.94	156.10	17.73	156.31	18.04	156.00
SH-11S	169.91	167.64	15.22	154.69	15.81	154.10	14.83	155.08	14.56	155.35	14.75	155.16	14.51	155.40	15.09	154.82
SH-12S	169.32	167.07	19.27	150.05	19.80	149.52	18.84	150.48	18.59	150.73	18.63	150.69	17.98	151.34	18.97	150.35
SH-13S	168.19	165.72	17.64	150.55	18.16	150.03	17.34	150.85	17.17	151.02	17.24	150.95	16.77	151.42	17.42	150.77
SH-14S	152.28	150.07	4.57	147.71	4.90	147.38	4.33	147.95	3.97	148.31	4.44	147.84	4.19	148.09	4.42	147.86
SH-15S	148.95	146.94	5.17	143.78	5.35	143.60	4.83	144.12	2.26	146.69	3.08	145.87	4.94	144.01	4.89	144.06
SH-16S	150.84	148.83	4.36	146.48	5.54	145.30	3.60	147.24	2.33	148.51	3.54	147.30	3.53	147.31	4.43	146.41
SH-17S	156.28	156.66	7.57	148.71	9.23	147.05	7.67	148.61	6.55	149.73	7.10	149.18	6.00	150.28	7.33	148.95
SH-18S	170.33	168.10	15.94	154.39	17.38	152.95	16.46	153.87	15.20	155.13	15.92	154.41	14.24	156.09	15.86	154.47
SH-19S	168.32	168.55	9.55	158.77	10.47	157.85	9.61	158.71	8.88	159.44	8.61	159.71	8.51	159.81	9.48	158.84
SH-20S	167.90	168.19	9.23	158.67	10.15	157.75	9.24	158.66	8.48	159.42	9.21	158.69	8.42	159.48	9.23	158.67
SH-21S	165.39	165.67	6.26	159.13	6.93	158.46	6.25	159.14	5.79	159.60	5.99	159.40	5.49	159.90	6.14	159.25
SH-22S	170.29	170.61	10.86	159.43	11.68	158.61	10.90	159.39	10.37	159.92	10.77	159.52	9.87	160.42	10.69	159.60
SH-23S	171.86	169.48	7.33	164.53	8.54	163.32	8.22	163.64	7.15	164.71	7.58	164.28	6.41	165.45	7.31	164.55
SH-24S	145.36	145.53	NI		NI		NI		NI		2.04	143.32	1.78	143.58	1.91	143.45
SH-25S	148.93	146.89	NI		NI		NI		NI		4.40	144.53	4.15	144.78	4.68	144.25
SH-26S	145.32	145.60	NI		NI		NI		NI		1.59	143.73	1.49	143.83	1.61	143.71
SH-27S	159.07	159.45	NI		NI		NI		NI		10.69	148.38	9.38	149.69	10.98	148.09
SH-28S	150.94	150.94	NI		NI		NI		NI		8.62	142.32	8.48	142.46	8.55	142.39
WP-01	161.40	157.23	NI		NI		NI		NI		5.63	155.77	5.36	156.04	5.13	156.27
WP-02	160.04	157.25	NI		NI		NI		NI		4.02	156.02	3.71	156.33	3.65	156.39
WP-03	150.36	147.70	NI		NI		NI		NI		2.49	147.87	5.12	145.24	5.12	145.24
WP-04	146.75	143.38	NI		NI		NI		NI		2.78	143.97	1.64	145.11	1.43	145.32
WP-05	145.52	142.61	NI		NI		NI		NI		1.52	144.00	1.34	144.18	1.06	144.46
WP-06	145.19	142.39	NI		NI		NI		NI		2.32	142.87	2.22	142.97	2.08	143.11
WP-07	145.54	142.86	NI		NI		NI		NI		2.08	143.46	2.19	143.35	2.21	143.33
Deep Monitoring Wells																
SH-01D	167.82	165.55	17.67	150.15	17.78	150.04	17.98	149.84	16.65	151.17	17.98	149.84	17.05	150.77	16.76	151.06
SH-02D	166.79	164.14	15.84	150.95	16.64	150.15	15.52	151.27	15.07	151.72	15.09	151.70	14.61	152.18	15.52	151.27
SH-03D	169.27	166.99	18.48	150.79	19.09	150.18	18.16	151.11	17.70	151.57	17.99	151.28	17.04	152.23	18.25	151.02
SH-04D	151.28	149.39	3.39	147.89	4.23	147.05	3.18	148.10	2.53	148.75	2.70	148.58	2.53	148.75	3.08	148.20
SH-05D	151.65	149.96	4.22	147.43	4.98	146.67	3.90	147.75	3.17	148.48	3.65	148.00	3.15	148.50	4.04	147.61
SH-06D	155.22	155.55	6.30	148.92	7.14	148.08	7.29	147.93	5.57	149.65	6.80	148.42	5.85	149.37	5.66	149.56
SH-07D	162.09	162.27	10.81	151.28	11.91	150.18	11.02	151.07	10.13	151.96	9.60	152.49	9.62	152.47	9.81	152.28
SH-08D	162.62	162.80	9.66	152.96	11.32	151.30	9.65	152.97	8.38	154.24	9.30	153.32	8.46	154.16	9.56	153.06
SH-09D	167.28	165.60	14.18	153.10	15.34	151.94	13.83	153.45	13.22	154.06	13.78	153.50	13.40	153.88	14.11	153.17
SH-12D	169.14	166.67	17.98	151.16	18.66	150.48	17.72	151.42	17.30	151.84	17.57	151.57	16.99	152.15	17.75	151.39
SH-14D	151.98	150.16	2.32	149.66	3.00	148.98	2.31	149.67	1.86	150.12	2.06	149.92	1.50	150.48	2.19	149.79

TABLE 2
Summary of Groundwater Elevations
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Monitoring Well Location	Reference Elevation (ft)	Ground Surface Elevation (ft)	August 20, 2001		October 29, 2001		March 5, 2002		May 14, 2002		November 17&18, 2003		May 25, 2004		September 19, 2006	
			Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
SH-15D	148.99	147.13	3.36	145.63	3.88	145.11	2.99	146.00	4.05	144.94	2.98	146.01	2.69	146.30	2.71	146.28
SH-17D	156.59	156.51	NI		NI		NI		NI		7.40	149.19	6.27	150.32	7.63	148.96
SH-18D	170.49	168.10	14.72	155.77	15.99	154.50	14.95	155.54	13.87	156.62	14.63	155.86	13.20	157.29	14.60	155.89
SH-19D	167.99	168.25	10.18	157.81	11.17	156.82	10.25	157.74	9.74	158.25	10.06	157.93	9.06	158.93	10.00	157.99
SH-25D	150.27	147.05	NI		NI		NI		NI		3.74	146.53	2.73	147.54	3.85	146.42
SH-27D	159.24	159.58	NI		NI		NI		NI		11.15	148.09	9.80	149.44	11.33	147.91
SH-28D	150.87	150.94	NI		NI		NI		NI		6.89	143.98	5.80	145.07	6.43	144.44
Bedrock Monitoring Wells																
SH-01R	167.57	165.20	16.35	151.22	17.34	150.23	17.77	149.80	16.22	151.35	16.15	151.42	16.01	151.56	16.44	151.13
SH-02R	166.42	163.91	15.27	151.15	16.02	150.40	15.03	151.39	14.56	151.86	14.88	151.54	14.31	152.11	15.18	151.24
SH-05R-A	152.89	151.31	NI		NI		NI		NI		2.08	150.81	1.03	151.86	2.09	150.80
SH-05R-B	152.94	151.31	NI		NI		NI		NI		1.88	151.06	0.90	152.04	2.00	150.94
SH-06R-A	155.90	156.21	NI		NI		NI		NI		6.37	149.53	5.25	150.65	6.16	149.74
SH-06R-B	156.01	156.21	NI		NI		NI		NI		7.44	148.57	5.31	150.70	6.34	149.67
SH-17R	156.17	156.38	NI		NI		NI		NI		7.05	149.12	6.04	150.13	7.06	149.11
SH-19R	167.88	168.14	9.53	158.35	10.16	157.72	10.20	157.68	9.89	157.99	9.49	158.39	8.61	159.27	8.46	159.42
SH-24R	145.47	145.72	NI		NI		NI		NI		1.56	143.91	1.28	144.19	0.98	144.49
SH-27R	159.79	159.96	NI		NI		NI		NI		11.16	148.63	11.09	148.70	11.52	148.27
SH-28R	150.57	150.39	NI		NI		NI		NI		6.46	144.11	5.67	144.90	6.48	144.09

Notes:

1. Groundwater level measurements were obtained by Sanborn, Head & Associates, Inc. (SHA) during seven "comprehensive" groundwater monitoring rounds completed on the dates indicated using a Slope Indicator Co. water level meter or an oil/water interface probe.

2. Depth measurements and elevations are reported in feet (ft).

3. Reference point elevations and local benchmarks were surveyed by Bryant Associates, Inc. of Boston, Massachusetts in April, August, or December 2001; November 2003; or January 2007. Elevations shown are feet relative to the National Geodetic Vertical Datum (NGVD) of 1929 (above mean sea level).

4. The top of the PVC well casing was used as the reference point for depth to water measurements. For well points located in the river channel, the top of the well casing was used as the reference point. For well points located outside the river channel, the top of the well point was used as the reference point.

5. Due to an obstruction, depth to water measurements for SH-21S for the November 17 and 18, 2003, and September 19, 2006 rounds, were measured on November 24, 2003, and September 26, 2006, respectively.

6. The groundwater measurements at SH-27D/R/S were completed on May 26, 2004 because the wells were obstructed on May 25, 2004.

7. "NI" indicates that the corresponding location was not installed at the time of the measurement.

TABLE 3
Summary of Surface Water Elevations
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Location	Reference Elevation (ft)	August 20, 2001		October 29, 2001		March 5, 2002		May 14, 2002		November 17 & 18, 2003		May 25, 2004		September 19, 2006	
		Depth to Water (ft)	Surface Water Elevation (ft)	Depth to Water (ft)	Surface Water Elevation (ft)	Depth to Water (ft)	Surface Water Elevation (ft)	Depth to Water (ft)	Surface Water Elevation (ft)	Depth to Water (ft)	Surface Water Elevation (ft)	Depth to Water (ft)	Surface Water Elevation (ft)	Depth to Water (ft)	Surface Water Elevation (ft)
SG-101	168.77	2.48	166.29	2.76	166.01	2.12	166.65	Destroyed		Destroyed		Destroyed		Destroyed	
SG-101A-E	168.78	NI		NI		NI		NI		3.05	165.73	Destroyed		Destroyed	
SG-101B	167.85	NI		NI		NI		NI		NI		NI		2.5	165.35
SG-102	173.08	14.47	158.61	Dry		13.98	159.10	13.60	159.48	14.37	158.71	14.09	158.99	14.05	159.03
SG-103	161.26	6.58	154.68	Dry		6.40	154.86	5.53	155.73	Dry		NM		6.29	154.97
SG-104	156.71	8.85	147.86	NM	NM	8.34	148.37	NM		NM		8.64	148.07	9.17	147.54
SG-105	146.23	2.42	143.81	2.48	143.75	Destroyed		Destroyed		Destroyed		Destroyed		Destroyed	
SG-105A	145.91	NI		NI		1.81	144.10	1.20	144.71	2.01	143.90	1.85	144.06	Destroyed	
SG-105B	146.18	NI		NI		NI		NI		NI		NI		1.91	144.27
SG-106	145.96	2.62	143.34	2.34	143.62	2.32	143.64	1.60	144.36	Destroyed		Destroyed		Destroyed	
SG-106A	146.03	NI		NI		NI		NI		2.56	143.47	2.63	143.40	2.86	143.17
SG-107	144.98	2.27	142.71	1.96	143.02	1.58	143.40	0.62	144.36	NM		0.79	144.19	Destroyed	
SG-107A	147.95	NI		NI		NI		NI		4.74	143.21	NM		Destroyed	
SG-107C	144.46	NI		NI		NI		NI		NI		NI		1.50	142.96
SG-107D	143.98	NI		NI		NI		NI		NI		NI		Dry	
SG-107E	144.09	NI		NI		NI		NI		NI		NI		NM	
SG-108	143.90	2.33	141.57	2.52	141.38	1.65	142.25	0.72	143.18	4.05	139.85	3.79	140.11	Destroyed	
SG-108B	145.02	NI		NI		NI		NI		NI		NI		NM	
SG-109	147.07	5.66	141.41	5.83	141.24	5.21	141.86	4.06	143.01	NM		Destroyed		Destroyed	
SG-109A	147.12	NI		NI		NI		NI		NI		5.34	141.78	4.95	142.17
SG-110A	150.16	NI		NI		NI		NI		NI		8.96	141.20	8.45	141.71
SG-111	141.60	2.26	139.34	2.50	139.10	1.87	139.73	1.09	140.51	NM		2.04	139.56	Destroyed	
SG-111A	140.18	NI		NI		NI		NI		NI		NI		1.88	138.30
SG-111B	141.09	NI		NI		NI		NI		NI		NI		NM	
SG-112	143.98	4.76	139.22	4.94	139.04	4.30	139.68	3.78	140.20	NM		4.46	139.52	4.40	139.58
SG-113	149.11	NI		2.33	146.78	1.75	147.36	1.22	147.89	Destroyed		Destroyed		Destroyed	
SG-113-E	148.00	NI		NI		NI		NI		NM		2.56	145.44	2.42	145.58
SG-113-M	148.80	NI		NI		NI		NI		2.92	145.88	2.73	146.07	Destroyed	

Notes:

1. Elevations and depths are reported in feet (ft).

2. Surface water measurements were obtained by Sanborn, Head & Associates, Inc. (SHA) personnel on the dates indicated using a Slope Indicator Co. water level meter, a Solinst Model 101 water level meter or steel tape.

3. Reference point elevations and local benchmarks were surveyed by Bryant Associates, Inc. of Boston, Massachusetts in April 2001, August 2001, December 2001, November 2003, or January 2007. Elevations shown are feet relative to the National Geodetic Vertical Datum (NGVD) of 1929 (above mean sea level).

4. Where staff gauge reference points were observed to be destroyed or suspected of movement, a new/replacement reference point was established in the vicinity of the original location. An alphabetic suffix was appended (without a preceeding "-") to the original location name to designate the new/replacement location. "-E" indicates the staff gauge was installed along the river embankment in the vicinity of the original location. "-M" indicates the staff gauge was installed in the approximate middle of the river in the vicinity of the original location.

5. "NM" indicates that surface water level was not measured at this location/date.
"NI" indicates that the corresponding location was not installed at the time the surface water levels were measured.
"Dry" indicates that no surface water was present at the staff gauge location on the date indicated.
"Destroyed" indicates the staff gauge was missing or suspected of movement on the date indicated. Refer to Note 4 for additional information.

TABLE 4
Summary of Lower Soil Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels										SB-01 / S-1-2 / 05-09-01			SB-04 / S-4-5 / 03-21-01			SB-05 / S-2-3 / 03-19-01			SB-06 / S-4-5 / 03-16-01			SB-07 / S-3 / 03-15-01			SB-08A / S-4-5 / 03-15-01			SB-09 / S-2-3 / 04-23-01			SB-09A / S-2 / 09-07-06			SB-09A / S-3 / 09-07-06			SB-10 / S-3 / 06-07-01		
	Human Health		Ecological								Former Lower Mill Pond			Peripheral Off-Facility Area East of South St.			Peripheral Off-Facility Area East of South St.			Peripheral Off-Facility Area East of South St.			Peripheral Off-Facility Area East of South St.			Peripheral Off-Facility Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.		
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels																																		
			Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																									
Acenaphthene	1,000,000	370,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	5.5	U		19			220			5.4	U		5.6	U		5.5	U		**25,000**									5.1	U	
Acenaphthylene	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	5.5	U		49			390			9.8			5.6	U		5.5	U		12,000									5.1	U	
Anthracene	1,000,000	2,200,000	NS	NS	NS	NS	NS	NS	NS	NS	5.5	U		92			450			10			5.6	U		5.5	U		40,000									9.9		
Benzo(a)anthracene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	14			240			780			28			8.9			7.0			39,000									7.0		
Benzo(a)pyrene	700	62	NS	NS	NS	**1,980**	NS	NS	NS	NS	14			180			600			29			8.1			6.7			**35,000**									5.1	U	
Benzo(b)fluoranthene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	15			310			930			52			9.4			7.6			39,000									5.1	U	
Benzo(g,h,i)perylene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	8.1			52			360			30			6.2			5.5	U		9,800									5.1	U	
Benzo(k)fluoranthene	7,000	6,200	NS	NS	NS	NS	NS	NS	NS	NS	13			150			540			40			6.7			5.5	U		23,000									5.1	U	
Chrysene	7,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	18			240			880			37			10			7.0			39,000									19		
Dibenz(a,h)anthracene	700	62	NS	NS	NS	NS	NS	NS	NS	NS	5.5	U		20			110			14			5.6	U		5.5	U		3,500	J								5.1	U	
Fluoranthene	1,000,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	32			610			2,200			35			20			15			110,000									16		
Fluorene	1,000,000	270,000	NS	**30,000**	NS	NS	NS	NS	NS	NS	5.5	U		19			200			5.4	U		5.6	U		5.5	U		**35,000**									5.1	U	
Indeno(1,2,3-cd)pyrene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	8.6			66			420			33			5.6			5.5	U		13,000									5.1	U	
Methylnaphthalene (2-)	500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	5.5	U		21			340			15			5.6	U		5.5	U		31,000			1,600	J	I	2	UJ	I	37		
Naphthalene	100,000	5,600	NS	NS	NS	NS	NS	NS	NS	NS	5.5	U		21			680			18			5.6	U		5.5	U		82,000			2,500	J	I	2	UJ	I	45		
Phenanthrene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	25			250			850			19			12			10			140,000									22		
Pyrene	700,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	33			450			1,600			30			18			14			85,000									19		
Total PAHs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	180.7			2,789			11,550			399.8			104.9			67.3			761,300			4,100			-			174.9		
Other SVOCs																																									
Benzoic acid	NS	24,000,000	NS	NS	NS	NS	NS	NS	NS	NS	120	J	L	210	UJ	L	210	UJ	L	38	J	L	220	UJ	L	220	UJ	L	5,400	UJ	L								R	
Benzyl Alcohol	NS	1,800,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	UJ	L							200	U	
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
bis(2-Chloroethyl)ether	700	220	NS	NS	NS	NS	NS	NS	NS	NS	38	UJ		96	UJ		96	UJ		98	UJ		100	UJ		100	UJ		950	UJ								35	UJ	
bis(2-Chloroisopropyl)ether	NS	2,900	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	UJ	L	220	UJ	L	220	UJ	L	220	UJ	L	5,400	U								200	U	
bis(2-Ethylhexyl)phthalate	200,000	35,000	NS	NS	**910**	36,000	NS	NS	NS	NS	220	U		210	U		210	U		220	U		39	J		220	U		5,400	U								85	J	
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Butylbenzylphthalate	NS	1,200,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								40	J	
Carbazole	NS	24,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		66	J		220	U		220	U		220	U		23,000									45	J	
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Chloroaniline (4-)	100,000	24,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Chloronaphthalene (2-)	NS	490,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Chlorophenol (2-)	100,000	6,300	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Dibenzofuran	NS	15,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		180	J		220	U		220	U		220	U		28,000									200	U	
Dichlorobenzene (1,2-)	100,000	110,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Dichlorobenzene (1,3-)	100,000	53,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Dichlorobenzene (1,4-)	40,000	3,400	NS	**20,000**	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Dichlorobenzidine (3,3'-)	1,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	UJ	L
Dichlorophenol (2,4-)	40,000	18,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Diethylphthalate	1,000,000	4,900,000	**100,000**	NS	NS	9,084,000	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Dimethylphenol (2,4-)	400,000	120,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Dimethylphthalate	1,000,000	61,000,000	NS	**200,000**	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Di-n-butylphthalate	NS	610,000	200,000	NS	**90**	1,090,000	NS	NS	NS	NS	38	UJ		62	UJ		62	UJ		64	UJ		66	UJ		64	UJ		950	UJ								35	UJ	
Dinitro-2-methylphenol (4,6-)	NS	610	NS	NS	NS	NS	NS	NS	NS	NS	540	U		530	U		530	U		540	U		560	U		550	U		14,000	U								510	U	
Dinitrophenol (2,4-)	40,000	12,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	1,100	U		530	UJ	L	530	U		540	U		560	U		550	U		27,000	U								1,000	UJ	L
Dinitrotoluene (2,4-)	1,000	12,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Dinitrotoluene (2,6-)	NS	6,100	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Di-n-octylphthalate	NS	240,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Hexachlorobenzene	700	300	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Hexachlorobutadiene	5,000	1,800	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Hexachlorocyclopentadiene	NS	37,000	**10,000**	NS	NS	NS	NS	NS	NS	NS	540	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Hexachloroethane	6,000	6,100	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Isophorone	NS	510,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								88	J	
Methylphenol (2-)	NS	310,000	NS	NS	NS	**1,043,900**	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Methylphenol (4-)	NS	31,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Nitroaniline (2-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Nitroaniline (3-)	NS	1,800	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Nitroaniline (4-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Nitrobenzene	NS	2,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Nitrophenol (4-)	NS	NS	NS	**7,000**	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Nitroso-di-n-propylamine (N-)	NS	69	NS	NS	NS	NS	NS	NS	NS	NS	38	UJ		80	UJ		80	UJ		81	UJ		84	UJ		82	UJ		950	UJ								35	UJ	
Nitrosodiphenylamine (N-)	NS	99,000	NS	**20,000**	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Pentachlorophenol	7,000	3,000	**3,000**	6,000	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								510	U	
Phenol	500,000	1,800,000	70,000	**30,000**	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Trichlorobenzene (1,2,4-)	400,000	6,200	NS	**20,000**	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Trichlorophenol (2,4,5-)	1,000,000	610,000	**4,000**	9,000	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Trichlorophenol (2,4,6-)	40,000	610	NS	**10,000**	NS	NS	NS	NS	NS	NS	220	U		210	U		210	U		220	U		220	U		220	U		5,400	U								200	U	
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	120			-			246			38			39			-			51,000			-			-			258		
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	300.7			2,789			11,796			437.8			143.9			67.3			812,300			4,100			-			432.9		

TABLE 4
Summary of Lower Soil Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Concentrations in µg/kg

Analytes	Human Health: MCP Method 2 S-1 Soil	Human Health: USEPA Region IX Res. Soil PRG	Ecological: ORNL Toxicological Benchmarks: Phyto-toxicity	ORNL: Earth-worm	ORNL: Avian	ORNL: Mammal	Ecological: USEPA Eco. Soil Screening Levels: Plant	USEPA: Inverte-brate	USEPA: Mammal	USEPA: Avian	SB-11 / S-2-3 / 06-07-01 Industrial Area East of South St.			SB-12 / S-1-2 / 04-17-01 Industrial Area East of South St.			SB-13A / S-3-4 / 04-13-01 Industrial Area East of South St.			SB-14 / S-3-4 / 04-13-01 Industrial Area East of South St.			SB-15 / S-2-3 / 04-16-01 Industrial Area East of South St.			SB-16 / S-3-4 / 06-06-01 Industrial Area East of South St.			SB-17 / S-4-5 / 04-05-01 Industrial Area East of South St.			SB-18 / S-2-3 / 04-11-01 Industrial Area East of South St.			SB-19 / S-1-2 / 06-08-01 Industrial Area East of South St.			SB-20 / S-2-3 / 06-12-01 Industrial Area East of South St.		
											Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																										
Acenaphthene	1,000,000	370,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	5.2	U		11			7.7			15,000			2,400	J		18			36			1,400			5.5	U		9.4		
Acenaphthylene	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	77			7.7			11			36,000			4,700			250			21			430	J		5.5	U		5.1	U	
Anthracene	1,000,000	2,200,000	NS	NS	NS	NS	NS	NS	NS	NS	34			33			32			66,000			8,300			1,100			34			2,800			10			30		
Benzo(a)anthracene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	90			100			49			83,000			20,000			1,300			37			6,200			14	J	I	67		
Benzo(a)pyrene	700	62	NS	NS	NS	**1,980**	NS	NS	NS	NS	74			95			40			**72,000**			**21,000**			200			33			**6,500**			11	J	I	60		
Benzo(b)fluoranthene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	88			92			51			89,000			25,000			410			40			6,700			12	J	I	73		
Benzo(g,h,i)perylene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	83			75			24			14,000			5,000			48			23			1,000			5.8			52		
Benzo(k)fluoranthene	7,000	6,200	NS	NS	NS	NS	NS	NS	NS	NS	53			66			24			45,000			14,000			270			21			7,500			6.7			34		
Chrysene	7,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	120			110			44			71,000			21,000			1,600			35			6,000			13	J	I	61		
Dibenz(a,h)anthracene	700	62	NS	NS	NS	NS	NS	NS	NS	NS	16			13			6.8			6,100			1,800	J		12			7.9			320	J		5.5	U		7.1		
Fluoranthene	1,000,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	130			230			130			210,000			43,000			6,700			100			15,000			39	J	I	180		
Fluorene	1,000,000	270,000	NS	**30,000**	NS	NS	NS	NS	NS	NS	5.2	U		9.6			18			**44,000**			4,000			120			64			1,200			5.5	U		9.4		
Indeno(1,2,3-cd)pyrene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	50			69			24			21,000			6,500			60			23			1,300			5.6			44		
Methylnaphthalene (2-)	500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	21			5.4	U		5.4	U		17,000			3,400			8.7			27			430	J		5.5	U		5.1	U	
Naphthalene	100,000	5,600	NS	NS	NS	NS	NS	NS	NS	NS	56			5.4	U		6.7			14,000			5,500			11			27			470	J		5.5	U		5.1	U	
Phenanthrene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	130			150			160			200,000			30,000			1,100			170			13,000			35	J	I	130		
Pyrene	700,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	130			210			110			150,000			39,000			6,700			74			14,000			28	J	I	130		
Total PAHs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1152			1,271.3			738.2			1,153,100			254,600			19,907.7			772.9			84,250			180.1			886.9		
Other SVOCs																																										
Benzoic acid	NS	24,000,000	NS	NS	NS	NS	NS	NS	NS	NS	200	J	L	60	J	L	220	UJ	L	4,800	UJ	L	2,500	UJ	L		R		210	UJ	L	1,000	UJ	L		R			R	
Benzyl Alcohol	NS	1,800,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	UJ	L	4,800	U		2,500	U		210	UJ	L	210	U		1,000	U		220	U		200	U	
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
bis(2-Chloroethyl)ether	700	220	NS	NS	NS	NS	NS	NS	NS	NS	37	UJ		38	UJ		38	UJ		840	UJ		440	UJ		36	UJ		37	UJ		180	UJ		39	UJ		36	UJ	
bis(2-Chloroisopropyl)ether	NS	2,900	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	UJ	L	210	U		1,000	U		220	U		200	U	
bis(2-Ethylhexyl)phthalate	200,000	35,000	NS	NS	**910**	36,000	NS	NS	NS	NS	37	J		220	U		220	U		4,800	U		2,500	U		45	J		210	U		1,000	U		220	U		200	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Butylbenzylphthalate	NS	1,200,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		200	J		200	U	
Carbazole	NS	24,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	UJ	L	17,000			3,800			430			210	UJ	L	1,300			220	U		200	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Chloroaniline (4-)	100,000	24,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Chloronaphthalene (2-)	NS	490,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Chlorophenol (2-)	100,000	6,300	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Dibenzofuran	NS	15,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		27,000			1,600	J		210	U		46	J		780	J		220	U		200	U	
Dichlorobenzene (1,2-)	100,000	110,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Dichlorobenzene (1,3-)	100,000	53,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Dichlorobenzene (1,4-)	40,000	3,400	NS	**20,000**	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Dichlorobenzidine (3,3'-)	1,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	210	UJ	L	220	U		220	U		4,800	U		2,500	U		210	UJ	L	210	U		1,000	U		220	UJ	L	200	UJ	L
Dichlorophenol (2,4-)	40,000	18,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Diethylphthalate	1,000,000	4,900,000	**100,000**	NS	NS	9,084,000	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Dimethylphenol (2,4-)	400,000	120,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	UJ	L	220	U		4,800	U		2,500	UJ	L	210	UJ	L	210	U		1,000	U		220	U		200	U	
Dimethylphthalate	1,000,000	61,000,000	NS	**200,000**	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Di-n-butylphthalate	NS	610,000	200,000	NS	**90**	1,090,000	NS	NS	NS	NS	37	UJ		38	UJ		38	UJ		840	UJ		440	UJ		36	UJ		37	UJ		180	UJ		39	UJ		36	UJ	
Dinitro-2-methylphenol (4,6-)	NS	610	NS	NS	NS	NS	NS	NS	NS	NS	520	U		540	U		220	UJ	L	12,000	U		6,200	U			R		210	U		2,500	U		550	U		510	U	
Dinitrophenol (2,4-)	40,000	12,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	1,000	UJ	L	1,100	UJ	L	540	UJ	L	24,000	UJ	L	12,000	UJ	L		R		530	UJ	L	5,000	UJ	L	1,100	UJ	L	1,000	UJ	L
Dinitrotoluene (2,4-)	1,000	12,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Dinitrotoluene (2,6-)	NS	6,100	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Di-n-octylphthalate	NS	240,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Hexachlorobenzene	700	300	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Hexachlorobutadiene	5,000	1,800	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Hexachlorocyclopentadiene	NS	37,000	**10,000**	NS	NS	NS	NS	NS	NS	NS	210	U		220	UJ	L	220	UJ	L	4,800	UJ	L	2,500	UJ	L	210	UJ	L	210	UJ	L	1,000	UJ	L	220	U		200	U	
Hexachloroethane	6,000	6,100	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Isophorone	NS	510,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Methylphenol (2-)	NS	310,000	NS	NS	NS	**1,043,900**	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Methylphenol (4-)	NS	31,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Nitroaniline (2-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Nitroaniline (3-)	NS	1,800	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	UJ	L	4,800	U		2,500	U		210	U		210	UJ	L	1,000	U		220	U		200	U	
Nitroaniline (4-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	UJ	L	4,800	U		2,500	U		210	U		210	UJ	L	1,000	U		220	U		200	U	
Nitrobenzene	NS	2,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	UJ	L	210	U		1,000	U		220	U		200	U	
Nitrophenol (4-)	NS	NS	NS	**7,000**	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Nitroso-di-n-propylamine (N-)	NS	69	NS	NS	NS	NS	NS	NS	NS	NS	37	UJ		38	UJ		38	UJ		840	UJ		440	UJ		36	UJ		37	UJ		180	UJ		39	UJ		36	UJ	
Nitrosodiphenylamine (N-)	NS	99,000	NS	**20,000**	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Pentachlorophenol	7,000	3,000	**3,000**	6,000	NS	NS	NS	NS	NS	NS	520	U		220	U		220	U		4,800	U		2,500	U		520	U		210	U		1,000	U		550	U		510	U	
Phenol	500,000	1,800,000	70,000	**30,000**	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Trichlorobenzene (1,2,4-)	400,000	6,200	NS	**20,000**	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Trichlorophenol (2,4,5-)	1,000,000	610,000	**4,000**	9,000	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Trichlorophenol (2,4,6-)	40,000	610	NS	**10,000**	NS	NS	NS	NS	NS	NS	210	U		220	U		220	U		4,800	U		2,500	U		210	U		210	U		1,000	U		220	U		200	U	
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	237			60			-			44,000			5,400			475			46			2,080			200			-		
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1,389			1,331.3			738.2			1,197,100			260,000			20,382.7			818.9			86,330			380.1			886.9		

TABLE 4
Summary of Lower Soil Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Human Health		Ecological								SB-21 / S-3-4 / 04-02-01			SB-22 / S-3 / 06-13-01			SB-23 / S-2-3 / 04-11-01			SB-24 / S-3-4 / 04-12-01			SB-25 / S-4-5 / 03-29-01			SB-26 / S-2-3 / 03-30-01			SB-27 / S-2-3 / 06-15-01			SB-28 / S-3-4 / 07-23-01			SB-30 / S-4-5 / 03-28-01			SB-31 / S-3-4 / 02-26-01		
			ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Peripheral On-Facility Area West of South St.			Peripheral On-Facility Area West of South St.			Peripheral On-Facility Area West of South St.			Peripheral On-Facility Area West of South St.		
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
	Concentrations in µg/kg																																									
PAHs																																										
Acenaphthene	1,000,000	370,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	5.2	U		5.1	U		5.4	U		5.3	U		5.4	U		6.4			6.0	U		6.0	U		9.9			5.6	U	
Acenaphthylene	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	7.4			5.1	U		5.4	U		5.3	U		5.4	U		6.2			6.0	U		6.0	U		38			5.6	U	
Anthracene	1,000,000	2,200,000	NS	NS	NS	NS	NS	NS	NS	NS	5.2	U		5.1	U		5.4	U		5.3	U		5.4	U		36			6.0	U		6.0	U		41			5.6	U	
Benzo(a)anthracene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	25			5.1	U		8.4			12			14			99			8.6			6.0	U		160			28		
Benzo(a)pyrene	700	62	NS	NS	NS	**1,980**	NS	NS	NS	NS	21			5.1	U		6.5			11			12			92			6.2			6.0	U		160			26		
Benzo(b)fluoranthene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	30			5.1	U		7.7			17			13			82			8.5			6.0	U		130			36		
Benzo(g,h,i)perylene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	12			5.1	U		9.9			11			11			53			6.0	U		6.0	U		110			14	J	L
Benzo(k)fluoranthene	7,000	6,200	NS	NS	NS	NS	NS	NS	NS	NS	9.8			5.1	U		5.4	U		6.7			11			64			6.0	U		6.0	U		100			23		
Chrysene	7,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	33			5.1	U		19			15			22			99			10			6.0	U		200			40	J	L
Dibenz(a,h)anthracene	700	62	NS	NS	NS	NS	NS	NS	NS	NS	5.2	U		5.1	U		5.4	U		5.3	U		5.4	U		11			6.0	U		6.0	U		18			5.6	U	
Fluoranthene	1,000,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	60			7.0			8.4			32			26			180			18			6.0	U		290			76		
Fluorene	1,000,000	270,000	NS	**30,000**	NS	NS	NS	NS	NS	NS	5.2	U		5.1	U		5.4	U		5.3	U		5.4	U		10			6.0	U		6.0	U		29			5.6	UJ	L
Indeno(1,2,3-cd)pyrene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	12			5.1	U		6.6			8.8			9.4			53			6.0	U		6.0	U		93			19		
Methylnaphthalene (2-)	500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	5.2	U		5.1	U		5.4	U		5.3	U		5.4	U		7.3			6.0	U		6.0	U		26			5.6	U	
Naphthalene	100,000	5,600	NS	NS	NS	NS	NS	NS	NS	NS	5.2	U		5.1	U		5.4	U		6.2			5.4	U		12			6.0	U		6.0	U		48			8.6	J	L
Phenanthrene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	40			5.3			9.1			23			21			110			20			6.0	U		360			41	J	L
Pyrene	700,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	59			5.2			10			27			39			160			14			6.0	U		430			65		
Total PAHs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	309.2			17.5			85.6			169.7			178.4			1,080.9			85.3			-			2242.9			376.6		
Other SVOCs																																										
Benzoic acid	NS	24,000,000	NS	NS	NS	NS	NS	NS	NS	NS	210	UJ	L		R		220	UJ	L	210	UJ	L	220	U		110	J		600	UJ	L	240	UJ	L	240	U		72	J	L
Benzyl Alcohol	NS	1,800,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	UJ	L	240	U			R	
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
bis(2-Chloroethyl)ether	700	220	NS	NS	NS	NS	NS	NS	NS	NS	36	UJ		36	UJ		38	UJ		37	UJ		38	UJ		41	UJ		42	UJ		42	UJ		41	UJ		100	UJ	L
bis(2-Chloroisopropyl)ether	NS	2,900	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
bis(2-Ethylhexyl)phthalate	200,000	35,000	NS	NS	**910**	36,000	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Butylbenzylphthalate	NS	1,200,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		55	J		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
Carbazole	NS	24,000	NS	NS	NS	NS	NS	NS	NS	NS	210	UJ	L	200	U		220	U		210	UJ	L	220	U		230	U		240	U		240	U		240	U		220	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
Chloroaniline (4-)	100,000	24,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Chloronaphthalene (2-)	NS	490,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Chlorophenol (2-)	100,000	6,300	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
Dibenzofuran	NS	15,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Dichlorobenzene (1,2-)	100,000	110,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	UJ	L	240	U		240	U		220	UJ	L
Dichlorobenzene (1,3-)	100,000	53,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	UJ	L	240	U		240	U		220	UJ	L
Dichlorobenzene (1,4-)	40,000	3,400	NS	**20,000**	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	UJ	L	240	U		240	U		220	U	
Dichlorobenzidine (3,3'-)	1,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	UJ	L	220	U		210	U		220	U		230	U		240	UJ	L	240	U		240	U		220	UJ	L
Dichlorophenol (2,4-)	40,000	18,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Diethylphthalate	1,000,000	4,900,000	**100,000**	NS	NS	9,084,000	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		160	J	
Dimethylphenol (2,4-)	400,000	120,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Dimethylphthalate	1,000,000	61,000,000	NS	**200,000**	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
Di-n-butylphthalate	NS	610,000	200,000	NS	**90**	1,090,000	NS	NS	NS	NS	36	UJ		36	UJ		38	UJ		37	UJ		38	UJ		41	UJ		42	UJ		42	UJ		41	UJ		65	UJ	
Dinitro-2-methylphenol (4,6-)	NS	610	NS	NS	NS	NS	NS	NS	NS	NS	210	U		510	U		540	U		210	U		540	U		580	U		600	U		240	UJ	L	590	U		560	UJ	L
Dinitrophenol (2,4-)	40,000	12,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	520	UJ	L	1,000	UJ	L	1,100	UJ	L	530	UJ	L	1,100	U		1,200	U			R		600	UJ	L	1,200	U		560	UJ	L
Dinitrotoluene (2,4-)	1,000	12,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
Dinitrotoluene (2,6-)	NS	6,100	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
Di-n-octylphthalate	NS	240,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
Hexachlorobenzene	700	300	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Hexachlorobutadiene	5,000	1,800	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	UJ	L	240	U		240	U		220	U	
Hexachlorocyclopentadiene	NS	37,000	**10,000**	NS	NS	NS	NS	NS	NS	NS	210	UJ	L	200	U		220	UJ	L	210	UJ	L	220	U		230	U			R		240	UJ	L	240	U		560	UJ	L
Hexachloroethane	6,000	6,100	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	UJ	L	240	U		240	U		220	UJ	L
Isophorone	NS	510,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
Methylphenol (2-)	NS	310,000	NS	NS	NS	**1,043,900**	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Methylphenol (4-)	NS	31,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Nitroaniline (2-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Nitroaniline (3-)	NS	1,800	NS	NS	NS	NS	NS	NS	NS	NS	210	UJ	L	200	U		220	U		210	UJ	L	220	U		230	U		240	U		240	U		240	U		220	UJ	L
Nitroaniline (4-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	210	UJ	L	200	U		220	U		210	UJ	L	220	U		230	U		240	U		240	U		240	U		220	U	
Nitrobenzene	NS	2,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Nitrophenol (4-)	NS	NS	NS	**7,000**	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
Nitroso-di-n-propylamine (N-)	NS	69	NS	NS	NS	NS	NS	NS	NS	NS	36	UJ		36	UJ		38	UJ		37	UJ		38	UJ		41	UJ		42	UJ		42	UJ		41	UJ		84	UJ	
Nitrosodiphenylamine (N-)	NS	99,000	NS	**20,000**	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Pentachlorophenol	7,000	3,000	**3,000**	6,000	NS	NS	NS	NS	NS	NS	210	U		510	U		220	U		210	U		220	U		230	U		600	U		240	U		240	U		220	UJ	L
Phenol	500,000	1,800,000	70,000	**30,000**	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
Trichlorobenzene (1,2,4-)	400,000	6,200	NS	**20,000**	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	U	
Trichlorophenol (2,4,5-)	1,000,000	610,000	**4,000**	9,000	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Trichlorophenol (2,4,6-)	40,000	610	NS	**10,000**	NS	NS	NS	NS	NS	NS	210	U		200	U		220	U		210	U		220	U		230	U		240	U		240	U		240	U		220	UJ	L
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			55			-			-			-			110			-			-			-			232		
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	309.2			72.5			85.6			169.7			178.4			1,190.9			85.3			-			2242.9			608.6		

TABLE 4
Summary of Lower Soil Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Human Health		Ecological								Concentrations in µg/kg																													
			ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				SB-35 / S-1-2 / 05-02-01			SB-38 / S-2-3 / 04-23-01			SB-40 / S-2-3 / 02-26-01			SB-41 / S-1-2 / 03-20-01			SB-41D / S-5-6 / 07-27-01			SB-42 / S-1-2 / 07-27-01			SB-42 / S-3-4 / 07-27-01			SB-43 / S-1-2 / 08-01-01			SB-43 / S-3-4 / 08-01-01			SB-44 / S-1-2 / 07-31-01		
											Peripheral Off-Facility Area West of South St.			Peripheral On-Facility Area West of South St.			Peripheral On-Facility Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.		
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																								
Acenaphthene	1,000,000	370,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	6.6	U		6.2	U		5.6	U		98			6.4	U		230	U		13	U		44			24			100	J	
Acenaphthylene	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	6.6	U		6.2	U		5.6	U		120			6.4	U		230	U		13	U		75			53			190	J	
Anthracene	1,000,000	2,200,000	NS	NS	NS	NS	NS	NS	NS	NS	6.6	U		6.2	U		7.1	J	L	360			12			49	J		16			170			49			950		
Benzo(a)anthracene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	8.0			6.2	U		32			610	J	H	35			160	J		56			340			130			2,900		
Benzo(a)pyrene	700	62	NS	NS	NS	**1,980**	NS	NS	NS	NS	9.0			6.2	U		30	J	L	640			42			110	J		76	J	L	360			210			1,700		
Benzo(b)fluoranthene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	11			6.2	U		28			760	J	H	54			140	J		86	J	L	400			450			1,900		
Benzo(g,h,i)perylene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	7.1			6.2	U		17	J	L	250	J	L	46			98	J		20	J	L	140			190			380		
Benzo(k)fluoranthene	7,000	6,200	NS	NS	NS	NS	NS	NS	NS	NS	9.5			6.2	U		19	J	L	380			39			120	J		43	J	I	210			320			1,100		
Chrysene	7,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	12			6.2	U		34	J	L	630	J	H	66			380			100			390			190			2,500		
Dibenz(a,h)anthracene	700	62	NS	NS	NS	NS	NS	NS	NS	NS	6.6	U		6.2	U		5.6	UJ	L	68			9.2			46	J		13	UJ	L	45			51			150	J	
Fluoranthene	1,000,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	18			8.8			54			1,500	J	H	88			210	J		65			840			170			4,100		
Fluorene	1,000,000	270,000	NS	**30,000**	NS	NS	NS	NS	NS	NS	6.6	U		6.2	U		5.6	UJ	L	140			6.4	U		45	J		13	U		85			21			280		
Indeno(1,2,3-cd)pyrene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	7.5			6.2	U		20			260			39			57	J		14	J	L	150			150			480		
Methylnaphthalene (2-)	500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	6.6	U		6.2	U		6.4			150			9.4			100	J		75			45			43			260		
Naphthalene	100,000	5,600	NS	NS	NS	NS	NS	NS	NS	NS	6.6	U		6.2	U		18	J	L	340			26			92	J		34			62			92			340		
Phenanthrene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	12			7.8			37	J	L	1,200	J	H	75			430			160			930			240			3,500		
Pyrene	700,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	17			7.3			70			1,200	J	H	86			190	J		96			650			210			4,700		
Total PAHs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	111.1			23.9			372.5			8,706			626.6			2,227			841			4,936			2,593			25,530		
Other SVOCs																																								
Benzoic acid	NS	24,000,000	NS	NS	NS	NS	NS	NS	NS	NS	210	J	I	74	J	L	73	J	L	690	J	L	260	UJ	L	120	J	L	92	J	L	960	J	L	380	J	L	160	J	L
Benzyl Alcohol	NS	1,800,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U			R		260	U		260	UJ	L	230	UJ	L	260	UJ	L	260	UJ	L	230	UJ	L	240	UJ	L
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
bis(2-Chloroethyl)ether	700	220	NS	NS	NS	NS	NS	NS	NS	NS	46	UJ		43	UJ		100	UJ	L	120	UJ		45	UJ		41	UJ		46	UJ		46	UJ		41	UJ		43	UJ	
bis(2-Chloroisopropyl)ether	NS	2,900	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	UJ	L	260	U		230	U		260	U		260	U		230	U		240	U	
bis(2-Ethylhexyl)phthalate	200,000	35,000	NS	NS	**910**	36,000	NS	NS	NS	NS	260	U		250	U		220	U		110	J		260	U		230	U		260	U		58	J		230	U		46	J	
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Butylbenzylphthalate	NS	1,200,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Carbazole	NS	24,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	UJ	L	220	U		85	J		260	U		230	U		260	U		56	J		230	U		220	J	
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Chloroaniline (4-)	100,000	24,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	UJ	L	260	U		230	U		260	U		260	U		230	U		240	U	
Chloronaphthalene (2-)	NS	490,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Chlorophenol (2-)	100,000	6,300	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Dibenzofuran	NS	15,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	120	J		260	U		230	U		260	U		260	U		230	U		88	J	
Dichlorobenzene (1,2-)	100,000	110,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Dichlorobenzene (1,3-)	100,000	53,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Dichlorobenzene (1,4-)	40,000	3,400	NS	**20,000**	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Dichlorobenzidine (3,3'-)	1,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	260	UJ	L	250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Dichlorophenol (2,4-)	40,000	18,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Diethylphthalate	1,000,000	4,900,000	**100,000**	NS	NS	9,084,000	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Dimethylphenol (2,4-)	400,000	120,000	NS	NS	NS	NS	NS	NS	NS	NS	260	UJ	I	250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Dimethylphthalate	1,000,000	61,000,000	NS	**200,000**	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Di-n-butylphthalate	NS	610,000	200,000	NS	**90**	1,090,000	NS	NS	NS	NS	46	UJ		43	UJ		66	UJ		78	UJ		45	UJ		41	UJ		46	UJ		46	UJ		41	UJ		43	UJ	
Dinitro-2-methylphenol (4,6-)	NS	610	NS	NS	NS	NS	NS	NS	NS	NS	660	U		250	U			R			R		260	UJ	L	230	UJ	L	260	UJ	L	260	UJ	L	230	UJ	L	240	UJ	L
Dinitrophenol (2,4-)	40,000	12,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	1,300	UJ	I	610	UJ	L		R			R		640	UJ	L	580	UJ	L	650	UJ	L	660	UJ	L	580	UJ	L	610	UJ	L
Dinitrotoluene (2,4-)	1,000	12,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Dinitrotoluene (2,6-)	NS	6,100	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Di-n-octylphthalate	NS	240,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		180	J		260	U		230	U		240	U	
Hexachlorobenzene	700	300	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Hexachlorobutadiene	5,000	1,800	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Hexachlorocyclopentadiene	NS	37,000	**10,000**	NS	NS	NS	NS	NS	NS	NS	660	U		250	UJ	L	560	UJ	L		R		260	UJ	L	230	UJ	L	260	UJ	L	260	UJ	L	230	UJ	L	240	UJ	L
Hexachloroethane	6,000	6,100	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	UJ	L	260	U		230	U		260	U		260	U		230	U		240	U	
Isophorone	NS	510,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Methylphenol (2-)	NS	310,000	NS	NS	NS	**1,043,900**	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Methylphenol (4-)	NS	31,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	2,000			260	U		230	U		260	U		9,200			1,900			360		
Nitroaniline (2-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Nitroaniline (3-)	NS	1,800	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	UJ	L	220	UJ	L	260	UJ	L	260	U		230	U		260	U		260	U		230	U		240	U	
Nitroaniline (4-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	UJ	L	220	U		260	UJ	L	260	U		230	U		260	U		260	U		230	U		240	U	
Nitrobenzene	NS	2,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Nitrophenol (4-)	NS	NS	NS	**7,000**	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Nitroso-di-n-propylamine (N-)	NS	69	NS	NS	NS	NS	NS	NS	NS	NS	46	UJ		43	UJ		84	UJ		100	UJ		45	UJ		41	UJ		46	UJ		46	UJ		41	UJ		43	UJ	
Nitrosodiphenylamine (N-)	NS	99,000	NS	**20,000**	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Pentachlorophenol	7,000	3,000	**3,000**	6,000	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Phenol	500,000	1,800,000	70,000	**30,000**	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		310			72	J		240	U	
Trichlorobenzene (1,2,4-)	400,000	6,200	NS	**20,000**	NS	NS	NS	NS	NS	NS	260	U		250	U		220	U		260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Trichlorophenol (2,4,5-)	1,000,000	610,000	**4,000**	9,000	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Trichlorophenol (2,4,6-)	40,000	610	NS	**10,000**	NS	NS	NS	NS	NS	NS	260	U		250	U		220	UJ	L	260	U		260	U		230	U		260	U		260	U		230	U		240	U	
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	210			74			73			3,005			-			120			272			10,584			2,352			874		
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	321.1			97.9			445.5			11,711			626.6			2,347			1,113			15,520			4,945			26,404		

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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Human Health		Ecological								Concentrations in µg/kg																												
			ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				SB-44 / S-3-4 / 07-31-01			SB-44 / S-7 / 07-31-01			SB-45 / S-1-2 / 07-19-01			SB-45 / S-4-5 / 07-19-01			SB-46 / S-1-2 / 07-18-01			SB-46 / S-3-4 / 07-18-01			SB-46B / S-1-2 / 07-18-01			SB-47 / S-1-2 / 07-25-01			SB-47 / S-3-4 / 07-25-01			SB-48 / S-1-2 / 12-14-00		
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.		
											Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																							
Acenaphthene	1,000,000	370,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	28			6.3	U		840	J		6.8			100	J		9.5			13			310			140	J		15		
Acenaphthylene	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	21			6.3	U		210	J		6.5			120	J		7.4			13			69	J		44	J		94		
Anthracene	1,000,000	2,200,000	NS	NS	NS	NS	NS	NS	NS	NS	60			6.3	U		1,700			26			220	J		33			18			520			220	J		100	J	L
Benzo(a)anthracene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	250			6.3	U		2,800			64			410			57			75			1,100			400			150		
Benzo(a)pyrene	700	62	NS	NS	NS	**1,980**	NS	NS	NS	NS	190			6.3	U		**2,400**			52			350			39			72			850			380			180		
Benzo(b)fluoranthene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	230			6.3	U		1,900			58			280			42			81			720			370			130		
Benzo(g,h,i)perylene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	100			6.3	U		710	J		28			190	J		24			53			300			100	J		76		
Benzo(k)fluoranthene	7,000	6,200	NS	NS	NS	NS	NS	NS	NS	NS	120			6.3	U		1,800			35			270			28			50			570			290			140	J	L
Chrysene	7,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	250			6.3	U		3,000			76			440			50			100			1,100			440			180	J	L
Dibenz(a,h)anthracene	700	62	NS	NS	NS	NS	NS	NS	NS	NS	29			6.3	U		250	J		8.0			64	J		6.9			13			92	J		57	J		29		
Fluoranthene	1,000,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	460			6.3	U		7,400			140			840			88			150			1,700			840			240		
Fluorene	1,000,000	270,000	NS	**30,000**	NS	NS	NS	NS	NS	NS	26			6.3	U		980	J		11			160	J		18			10			280			130	J		14	U	
Indeno(1,2,3-cd)pyrene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	100			6.3	U		790	J		29			190	J		21			49			300			150	J		70		
Methylnaphthalene (2-)	500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	41			6.3	U		550	J		6.9			180	J		23			23			220			65	J		28		
Naphthalene	100,000	5,600	NS	NS	NS	NS	NS	NS	NS	NS	89			6.3	U		1,500			18			270			42			57			540			150	J		34	J	L
Phenanthrene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	460			6.3	U		9,500			130			1,000			130			90			2,100			770			210		
Pyrene	700,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	470			6.3	U		6,000			130			760			94			140			1,900			750			340		
Total PAHs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2,924			-			42,330			825.2			5,844			712.8			1,007			12,671			5,296			2,016		
Other SVOCs																																							
Benzoic acid	NS	24,000,000	NS	NS	NS	NS	NS	NS	NS	NS	190	J	L	250	UJ	L	1,100	UJ	L	41	J	L	54	J	L	220	UJ	L	230	UJ	L	120	J	L	65	J	L	1,400	UJ	L
Benzyl Alcohol	NS	1,800,000	NS	NS	NS	NS	NS	NS	NS	NS	250	UJ	L	250	U		1,100	UJ	L	240	UJ	L	220	UJ	L	220	UJ	L	230	UJ	L	220	UJ	L	220	UJ	L	570	UJ	L
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	U	
bis(2-Chloroethyl)ether	700	220	NS	NS	NS	NS	NS	NS	NS	NS	44	UJ		44	UJ		190	UJ		43	UJ		39	UJ	L	38	UJ		40	UJ		39	UJ		39	UJ		260	UJ	
bis(2-Chloroisopropyl)ether	NS	2,900	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	UJ	L	220	U		230	U		220	U		220	U		570	UJ	L
bis(2-Ethylhexyl)phthalate	200,000	35,000	NS	NS	**910**	36,000	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		40	J		220	U		220	U		570	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	UJ	L	220	U		230	U		220	U		220	U		570	U	
Butylbenzylphthalate	NS	1,200,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	U	
Carbazole	NS	24,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	UJ	L	1,100			240	U		85	J		220	U		440			160	J		120	J		570	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	UJ	L
Chloroaniline (4-)	100,000	24,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	UJ	L	220	UJ	L	220	U		230	U		220	U		220	U		570	UJ	L
Chloronaphthalene (2-)	NS	490,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	U	
Chlorophenol (2-)	100,000	6,300	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	UJ	L
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	U	
Dibenzofuran	NS	15,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		980	J		240	U		63	J		220	U		230	U		120	J		53	J		570	U	
Dichlorobenzene (1,2-)	100,000	110,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	U	
Dichlorobenzene (1,3-)	100,000	53,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	UJ	L	220	U		230	U		220	U		220	U		570	U	
Dichlorobenzene (1,4-)	40,000	3,400	NS	**20,000**	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	U	
Dichlorobenzidine (3,3'-)	1,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	UJ	L	220	UJ	L	220	U		230	U		220	U		220	U		570	UJ	L
Dichlorophenol (2,4-)	40,000	18,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	UJ	L
Diethylphthalate	1,000,000	4,900,000	**100,000**	NS	NS	9,084,000	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		38	J		220	U		75	J		220	U		220	U		570	U	
Dimethylphenol (2,4-)	400,000	120,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	UJ	L		R		220	UJ	L	230	UJ	L	220	U		220	U		570	UJ	L
Dimethylphthalate	1,000,000	61,000,000	NS	**200,000**	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	U	
Di-n-butylphthalate	NS	610,000	200,000	NS	**90**	1,090,000	NS	NS	NS	NS	44	UJ		44	UJ		190	UJ		43	UJ		39	UJ		38	UJ		40	UJ		39	UJ		39	UJ		160	UJ	
Dinitro-2-methylphenol (4,6-)	NS	610	NS	NS	NS	NS	NS	NS	NS	NS	250	UJ	L	250	U		1,100	UJ	L	240	UJ	L	220	UJ	L	220	UJ	L	230	UJ	L	220	UJ	L	220	UJ	L	1,400	UJ	L
Dinitrophenol (2,4-)	40,000	12,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	630	UJ	L	630	UJ	L	2,600	UJ	L	610	UJ	L		R		550	UJ	L	580	UJ	L	560	UJ	L	560	UJ	L	1,400	UJ	L
Dinitrotoluene (2,4-)	1,000	12,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	U	
Dinitrotoluene (2,6-)	NS	6,100	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U			R		220	U		230	U		220	U		220	U		570	U	
Di-n-octylphthalate	NS	240,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	UJ	L
Hexachlorobenzene	700	300	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	U	
Hexachlorobutadiene	5,000	1,800	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	U	
Hexachlorocyclopentadiene	NS	37,000	**10,000**	NS	NS	NS	NS	NS	NS	NS	250	UJ	L	250	UJ	L	1,100	UJ	L	240	UJ	L		R		220	UJ	L	230	UJ	L	220	UJ	L	220	UJ	L	570	UJ	L
Hexachloroethane	6,000	6,100	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	UJ	L	220	U		230	U		220	U		220	U		570	U	
Isophorone	NS	510,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		78	J		220	U		220	U		570	U	
Methylphenol (2-)	NS	310,000	NS	NS	NS	**1,043,900**	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	UJ	L	220	U		230	U		220	U		220	U		570	UJ	L
Methylphenol (4-)	NS	31,000	NS	NS	NS	NS	NS	NS	NS	NS	290			250	U		240	J		65	J		220	UJ	L	220	U		230	U		100	J		220	U		570	UJ	L
Nitroaniline (2-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		1,400	U	
Nitroaniline (3-)	NS	1,800	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	UJ	L	1,100	U		240	U		220	UJ	L	220	U		230	U		220	U		220	U		1,400	UJ	L
Nitroaniline (4-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	UJ	L	1,100	U		240	U		220	UJ	L	220	U		230	U		220	U		220	U		1,400	U	
Nitrobenzene	NS	2,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	U	
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	UJ	L
Nitrophenol (4-)	NS	NS	NS	**7,000**	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		1,400	UJ	L
Nitroso-di-n-propylamine (N-)	NS	69	NS	NS	NS	NS	NS	NS	NS	NS	44	UJ		44	UJ		190	UJ		43	UJ		39	UJ		39	UJ		40	UJ		39	UJ		39	UJ		210	UJ	
Nitrosodiphenylamine (N-)	NS	99,000	NS	**20,000**	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	U	
Pentachlorophenol	7,000	3,000	**3,000**	6,000	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		1,400	UJ	L
Phenol	500,000	1,800,000	70,000	**30,000**	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		51	J		220	U		570	UJ	L
Trichlorobenzene (1,2,4-)	400,000	6,200	NS	**20,000**	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	U	
Trichlorophenol (2,4,5-)	1,000,000	610,000	**4,000**	9,000	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		1,400	UJ	L
Trichlorophenol (2,4,6-)	40,000	610	NS	**10,000**	NS	NS	NS	NS	NS	NS	250	U		250	U		1,100	U		240	U		220	U		220	U		230	U		220	U		220	U		570	UJ	L
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	480			-			2,320			106			240			-			633			551			238			-		
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	3,404			-			44,650			931.2			6,084			712.8			1,640			13,222			5,534			2,016		

TABLE 4
Summary of Lower Soil Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Human Health		Ecological								SB-48A / S-3-4 / 12-14-00			SB-49 / S-1-2 / 04-24-01			SB-49 / S-3-4 / 04-24-01			SB-50 / S-1-2 / 04-24-01			SB-50 / S-3-4 / 04-24-01			SB-51 / S-1-2 / 12-7-00			SB-51 / S-5-6 / 12-7-00			SB-52 / S-1-2 / 04-18-01			SB-52 / S-4-5 / 04-18-01			SB-53 / S-1-2 / 07-13-01		
			ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.		
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
	Concentrations in µg/kg																																							
PAHs																																								
Acenaphthene	1,000,000	370,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	410			170	J		940	J	I	42			5.8	U		3.0	U		500			2,000	J	L	7.1			97	J	
Acenaphthylene	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	770			500			220	J		22			5.8	U		3.0	U		420			930	U		5.7	U		250	U	
Anthracene	1,000,000	2,200,000	NS	NS	NS	NS	NS	NS	NS	NS	1,300	J	L	640			1,500	J	I	95			5.8	U		3.0	J	L	590	J	L	2,200	J	L	16			250		
Benzo(a)anthracene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	2,600			2,000			3,100	J	I	190			5.8	U		6.0			920			3,700	J	L	44			610		
Benzo(a)pyrene	700	62	NS	NS	NS	**1,980**	NS	NS	NS	NS	**2,900**			**2,300**			**3,300**	J	I	150			5.8	U		8.0			800			**3,400**	J	L	37			360		
Benzo(b)fluoranthene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	3,100			2,800			3,600	J	I	150			5.8	U		8.0			550			3,700	J	L	33			650		
Benzo(g,h,i)perylene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	1,800			740			770	J	I	88			5.8	U		6.0			570			1,500	J	L	22			290		
Benzo(k)fluoranthene	7,000	6,200	NS	NS	NS	NS	NS	NS	NS	NS	2,100	J	L	2,000			2,600	J	I	120			5.8	U		6.0	J	L	450	J	L	2,300	J	L	34			420		
Chrysene	7,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	3,200	J	L	2,300			3,200	J	I	220			5.8	U		8.0	J	L	1,400	J	L	4,000	J	L	47			1,300		
Dibenz(a,h)anthracene	700	62	NS	NS	NS	NS	NS	NS	NS	NS	300			260	J		290	J	I	16			5.8	U		3.0	U		87			420	J		5.7	U		91	J	
Fluoranthene	1,000,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	6,700			4,100			7,800	J	I	440			5.8	U		11			1,200			9,800	J	L	100			1,300		
Fluorene	1,000,000	270,000	NS	**30,000**	NS	NS	NS	NS	NS	NS	480			220	J		990	J	I	58			5.8	U		3.0	U		810			1,400			7.3			210	J	
Indeno(1,2,3-cd)pyrene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	1,900	J	I	970			1,000	J	I	89			5.8	U		5.0			360			1,700			25			240	J	
Methylnaphthalene (2-)	500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	540			210	J		470	J	I	29			5.8	U		3.0	U		8,500			890	J		5.7	U		180	J	
Naphthalene	100,000	5,600	NS	NS	NS	NS	NS	NS	NS	NS	930	J	L	270	J		1,400	J	I	78			5.8	U		3.0	UJ	L	1,400	J	L	2,000	J	L	16			660		
Phenanthrene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	6,000			2,600			7,200	J	I	480			7.1			6.0			3,800			13,000	J	L	75			1,600		
Pyrene	700,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	6,500			3,700			5,900	J	I	370			5.8	U		14			2,200			7,900	J	L	90			1,300		
Total PAHs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	41,530			25,780			44,280			2,637			7.10			81			24,557			59,910			553.4			9,558		
Other SVOCs																																								
Benzoic acid	NS	24,000,000	NS	NS	NS	NS	NS	NS	NS	NS	1,400	UJ	L	460	UJ	L	400	J	L	250	J	L	110	J	L	260	UJ	L	1,200	UJ	L	930	UJ	L	73	J	L	52	J	L
Benzyl Alcohol	NS	1,800,000	NS	NS	NS	NS	NS	NS	NS	NS	580	UJ	L	460	UJ	L	470	UJ	L	230	UJ	L	230	UJ	L	100	U		470	U		930	UJ	L	230	U		250	UJ	L
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
bis(2-Chloroethyl)ether	700	220	NS	NS	NS	NS	NS	NS	NS	NS	260	UJ		81	UJ		83	UJ		40	UJ		41	UJ		100	U		220	UJ		160	UJ		40	UJ		43	UJ	
bis(2-Chloroisopropyl)ether	NS	2,900	NS	NS	NS	NS	NS	NS	NS	NS	580	UJ	L	460	U		470	U		230	U		230	U		100	UJ	L	470	UJ	L	930	U		230	U		250	U	
bis(2-Ethylhexyl)phthalate	200,000	35,000	NS	NS	**910**	36,000	NS	NS	NS	NS	580	U		460	U		470	U		46	JEB		230	U		80	J		470	UJ	L	930	U		230	U		250	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Butylbenzylphthalate	NS	1,200,000	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	UJ	L	930	U		230	U		250	U	
Carbazole	NS	24,000	NS	NS	NS	NS	NS	NS	NS	NS	760			250	J		1,200	J	I	83	J		230	U		100	U		470	U		1,600			230	U		110	J	
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Chloroaniline (4-)	100,000	24,000	NS	NS	NS	NS	NS	NS	NS	NS	580	UJ	L	460	U		470	U		230	U		230	U		100	UJ	L	470	UJ	L	930	U		230	U		250	U	
Chloronaphthalene (2-)	NS	490,000	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Chlorophenol (2-)	100,000	6,300	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Dibenzofuran	NS	15,000	NS	NS	NS	NS	NS	NS	NS	NS	650			200	J		790	J	I	54	J		230	U		100	U		470	U		1,600			230	U		88	J	
Dichlorobenzene (1,2-)	100,000	110,000	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Dichlorobenzene (1,3-)	100,000	53,000	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Dichlorobenzene (1,4-)	40,000	3,400	NS	**20,000**	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Dichlorobenzidine (3,3'-)	1,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	580	UJ	L	460	U		470	U		230	U		230	U		100	UJ	L	470	UJ	L	930	U		230	U		250	U	
Dichlorophenol (2,4-)	40,000	18,000	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Diethylphthalate	1,000,000	4,900,000	**100,000**	NS	NS	9,084,000	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Dimethylphenol (2,4-)	400,000	120,000	NS	NS	NS	NS	NS	NS	NS	NS	580	UJ	L	460	U		470	U		230	U		230	U		100	UJ	L	470	UJ	L	930	UJ	L	230	UJ	L	250	UJ	L
Dimethylphthalate	1,000,000	61,000,000	NS	**200,000**	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Di-n-butylphthalate	NS	610,000	200,000	NS	**90**	1,090,000	NS	NS	NS	NS	170	UJ		81	UJ		83	UJ		40	UJ		41	UJ		31	UJ		140	UJ		160	UJ		40	UJ		43	UJ	
Dinitro-2-methylphenol (4,6-)	NS	610	NS	NS	NS	NS	NS	NS	NS	NS	1,400	UJ	L	1,200	U		1,200	U		560	U		580	U		260	UJ	L	1,200	UJ	L		R		570	U		250	UJ	L
Dinitrophenol (2,4-)	40,000	12,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	1,400	UJ	L	2,300	U		2,400	U		1,100	U		1,200	U		260	UJ	L	1,200	UJ	L		R		1,100	UJ	L	610	UJ	L
Dinitrotoluene (2,4-)	1,000	12,000	NS	NS	NS	NS	NS	NS	NS	NS	580	UJ	L	460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Dinitrotoluene (2,6-)	NS	6,100	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Di-n-octylphthalate	NS	240,000	NS	NS	NS	NS	NS	NS	NS	NS	580	UJ	L	460	U		470	U		230	U		230	U		100	UJ	L	470	UJ	L	930	U		230	U		250	U	
Hexachlorobenzene	700	300	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Hexachlorobutadiene	5,000	1,800	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Hexachlorocyclopentadiene	NS	37,000	**10,000**	NS	NS	NS	NS	NS	NS	NS	580	UJ	L	460	U		470	U		230	U		230	U		100	UJ	L	470	UJ	L		R		230	UJ	L	250	UJ	L
Hexachloroethane	6,000	6,100	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Isophorone	NS	510,000	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Methylphenol (2-)	NS	310,000	NS	NS	NS	**1,043,900**	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Methylphenol (4-)	NS	31,000	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		160	J	I	230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Nitroaniline (2-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	1,400	U		460	U		470	U		230	U		230	U		260	U		1,200	U		930	U		230	U		250	U	
Nitroaniline (3-)	NS	1,800	NS	NS	NS	NS	NS	NS	NS	NS	1,400	UJ	L	460	U		470	U		230	U		230	U		260	UJ	L	1,200	UJ	L	930	U		230	U		250	U	
Nitroaniline (4-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	1,400	U		460	U		470	U		230	U		230	U		260	U		1,200	U		930	U		230	U		250	U	
Nitrobenzene	NS	2,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Nitrophenol (4-)	NS	NS	NS	**7,000**	NS	NS	NS	NS	NS	NS	1,400	U		460	U		470	U		230	U		230	U		260	U		1,200	U		930	U		230	U		250	U	
Nitroso-di-n-propylamine (N-)	NS	69	NS	NS	NS	NS	NS	NS	NS	NS	220	UJ		81	UJ		83	UJ		40	UJ		41	UJ		39	UJ		180	UJ		160	UJ		40	UJ		43	UJ	
Nitrosodiphenylamine (N-)	NS	99,000	NS	**20,000**	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Pentachlorophenol	7,000	3,000	**3,000**	6,000	NS	NS	NS	NS	NS	NS	1,400	U		460	U		470	U		230	U		230	U		260	U		1,200	U		930	U		230	U		250	U	
Phenol	500,000	1,800,000	70,000	**30,000**	NS	NS	NS	NS	NS	NS	580	U		460	U		120	J	I	230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Trichlorobenzene (1,2,4-)	400,000	6,200	NS	**20,000**	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Trichlorophenol (2,4,5-)	1,000,000	610,000	**4,000**	9,000	NS	NS	NS	NS	NS	NS	1,400	U		460	U		470	U		230	U		230	U		260	U		1,200	U		930	U		230	U		250	U	
Trichlorophenol (2,4,6-)	40,000	610	NS	**10,000**	NS	NS	NS	NS	NS	NS	580	U		460	U		470	U		230	U		230	U		100	U		470	U		930	U		230	U		250	U	
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1,410			450			2,670			433			110			80			-			3,200			73			250		
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	42,940			26,230			46,950			3,070			117.1			161			24,557			63,110			626.4			9,808		

TABLE 4
Summary of Lower Soil Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Concentrations in µg/kg

Analytes	Human Health		Ecological								SB-53 / S-3-4 / 07-13-01			SB-54 / S-1 / 05-03-01			SB-55 / S-1 / 05-03-01			SB-56 / S-1 / 05-03-01			SB-57 / S-1 / 05-03-01			SB-58 / S-2-3 / 04-26-01			SB-59 / S-4-5 / 04-26-01			SB-60 / S-4-5 / 04-25-01			SB-61 / S-1-2 / 04-25-01			SB-62 / S-3-4 / 04-17-01		
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Residential Area East of South St.			Residential Area East of South St.			Residential Area East of South St.			Residential Area East of South St.			Residential Area East of South St.		
			Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																										
Acenaphthene	1,000,000	370,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	**140,000**			220	U		22			5.0	UJ	I	5.1	U		45			5.1	U		5.4	U		5.5	U		6.0	U	
Acenaphthylene	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	500,000			81	J		11			5.0	U		5.1	U		42			5.1	U		5.4	U		5.5	U		6.0	U	
Anthracene	1,000,000	2,200,000	NS	NS	NS	NS	NS	NS	NS	NS	270,000			95	J		86			5.0	UJ	I	5.1	U		120			5.1	U		5.4	U		7.0			6.0	U	
Benzo(a)anthracene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	140,000			360			250			7.0	J	I	5.1	U		270			7.7			5.4	U		25			10		
Benzo(a)pyrene	700	62	NS	NS	NS	**1,980**	NS	NS	NS	NS	**110,000**			350			230			6.5	J	I	5.1	U		240			6.9			5.4	U		24			11		
Benzo(b)fluoranthene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	81,000			420			170			6.6	J	I	5.1	U		270			7.4			5.4	U		27			19		
Benzo(g,h,i)perylene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	32,000	J		180	J		120			5.0	UJ	I	5.1	U		100			5.1	U		5.4	U		17			8.6		
Benzo(k)fluoranthene	7,000	6,200	NS	NS	NS	NS	NS	NS	NS	NS	43,000	J		210	J		160			5.2	J	I	5.1	U		210			5.7			5.4	U		20			6.5		
Chrysene	7,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	140,000			390			250			7.0	J	I	5.1	U		330			8.2			5.4	U		33			14		
Dibenz(a,h)anthracene	700	62	NS	NS	NS	NS	NS	NS	NS	NS	10,000	J		58	J		23			5.0	U		5.1	U		18			5.1	U		5.4	U		5.5	U		6.0	U	
Fluoranthene	1,000,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	290,000			620			330			13	J	I	5.1	U		620			17			9.6			63			28		
Fluorene	1,000,000	270,000	NS	**30,000**	NS	NS	NS	NS	NS	NS	**400,000**			220	U		24			5.0	U		5.1	U		56			5.1	U		5.4	U		5.5	U		6.0	U	
Indeno(1,2,3-cd)pyrene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	36,000	J		200	J		130			5.0	UJ	I	5.1	U		91			5.1	U		5.4	U		17			8.3		
Methylnaphthalene (2-)	500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	930,000			220	U		33			5.0	U		5.1	U		47			5.1	U		5.4	U		5.5	U		6.0	U	
Naphthalene	100,000	5,600	NS	NS	NS	NS	NS	NS	NS	NS	1,900,000			44	J		28			5.0	U		5.1	U		61			5.1	U		5.4	U		5.5	U		6.0	U	
Phenanthrene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	1,000,000			330			340			8.6	J	I	5.1	U		570			12			8.2			43			14		
Pyrene	700,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	370,000			590			440			12	J	I	5.1	U		500			17			7.8			57			23		
Total PAHs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	6,392,000			3,928			2,647			65.9			-			3,590			81.9			25.6			333			142.4		
Other SVOCs																																										
Benzoic acid	NS	24,000,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	UJ	L	72	J	L	210	UJ	L	41	J	L	45	J	L	240	J	L	200	UJ	L	220	UJ	L	95	J	L	240	UJ	L
Benzyl Alcohol	NS	1,800,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	UJ	L	220	U		210	U		200	U		210	U		240	UJ	L	200	U		220	U		220	UJ	L	240	U	
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
bis(2-Chloroethyl)ether	700	220	NS	NS	NS	NS	NS	NS	NS	NS	9,500	UJ		38	UJ		37	UJ		35	UJ		36	UJ		41	UJ		36	UJ		38	UJ		38	UJ		42	UJ	
bis(2-Chloroisopropyl)ether	NS	2,900	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
bis(2-Ethylhexyl)phthalate	200,000	35,000	NS	NS	**910**	36,000	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		55	JEB		200	U		220	U		220	U		240	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Butylbenzylphthalate	NS	1,200,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Carbazole	NS	24,000	NS	NS	NS	NS	NS	NS	NS	NS	20,000	J		220	U		210	U		200	U		210	U		93	J		200	UJ	L	220	UJ	L	220	U		240	UJ	L
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Chloroaniline (4-)	100,000	24,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Chloronaphthalene (2-)	NS	490,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Chlorophenol (2-)	100,000	6,300	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Dibenzofuran	NS	15,000	NS	NS	NS	NS	NS	NS	NS	NS	60,000			220	U		210	U		200	U		210	U		65	J		200	U		220	U		220	U		240	U	
Dichlorobenzene (1,2-)	100,000	110,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Dichlorobenzene (1,3-)	100,000	53,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Dichlorobenzene (1,4-)	40,000	3,400	NS	**20,000**	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Dichlorobenzidine (3,3'-)	1,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Dichlorophenol (2,4-)	40,000	18,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Diethylphthalate	1,000,000	4,900,000	**100,000**	NS	NS	9,084,000	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Dimethylphenol (2,4-)	400,000	120,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	UJ	L	220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Dimethylphthalate	1,000,000	61,000,000	NS	**200,000**	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Di-n-butylphthalate	NS	610,000	200,000	NS	**90**	1,090,000	NS	NS	NS	NS	9,500	UJ		38	UJ		37	UJ		35	UJ		36	UJ		41	UJ		36	UJ		38	UJ		38	UJ		42	UJ	
Dinitro-2-methylphenol (4,6-)	NS	610	NS	NS	NS	NS	NS	NS	NS	NS	54,000	UJ	L	550	U		520	U		500	U		510	U		590	U		200	U		220	U		550	U		240	U	
Dinitrophenol (2,4-)	40,000	12,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	140,000	UJ	L	1,100	U		1,000	U		1,000	U		1,000	U		1,200	U		510	UJ	L	540	UJ	L	1,100	U		600	UJ	L
Dinitrotoluene (2,4-)	1,000	12,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Dinitrotoluene (2,6-)	NS	6,100	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Di-n-octylphthalate	NS	240,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	UJ	L	200	U		220	U		220	U		240	U	
Hexachlorobenzene	700	300	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Hexachlorobutadiene	5,000	1,800	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Hexachlorocyclopentadiene	NS	37,000	**10,000**	NS	NS	NS	NS	NS	NS	NS	54,000	UJ	L	550	U		520	U		500	U		510	U		240	U		200	UJ	L	220	UJ	L	220	U		240	UJ	L
Hexachloroethane	6,000	6,100	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Isophorone	NS	510,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Methylphenol (2-)	NS	310,000	NS	NS	NS	**1,043,900**	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Methylphenol (4-)	NS	31,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Nitroaniline (2-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Nitroaniline (3-)	NS	1,800	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	UJ	L	220	UJ	L	220	U		240	UJ	L
Nitroaniline (4-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	UJ	L	220	UJ	L	220	U		240	UJ	L
Nitrobenzene	NS	2,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Nitrophenol (4-)	NS	NS	NS	**7,000**	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Nitroso-di-n-propylamine (N-)	NS	69	NS	NS	NS	NS	NS	NS	NS	NS	9,500	UJ		38	UJ		37	UJ		35	UJ		36	UJ		41	UJ		36	UJ		38	UJ		38	UJ		42	UJ	
Nitrosodiphenylamine (N-)	NS	99,000	NS	**20,000**	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Pentachlorophenol	7,000	3,000	**3,000**	6,000	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Phenol	500,000	1,800,000	70,000	**30,000**	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Trichlorobenzene (1,2,4-)	400,000	6,200	NS	**20,000**	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Trichlorophenol (2,4,5-)	1,000,000	610,000	**4,000**	9,000	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Trichlorophenol (2,4,6-)	40,000	610	NS	**10,000**	NS	NS	NS	NS	NS	NS	54,000	U		220	U		210	U		200	U		210	U		240	U		200	U		220	U		220	U		240	U	
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	80,000			72			-			41			45			453			-			-			95			-		
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	6,472,000			4,000			2,647			106.9			45			4,043			81.9			25.6			428			142.4		

TABLE 4
Summary of Lower Soil Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels																																						
	Human Health		Ecological								SB-63 / S-1-2 / 04-02-01			SB-64 / S-3-4 / 03-23-01			SB-65 / S-4-5 / 03-26-01			SB-66 / S-3-4 / 07-10-01			SB-68 / S-2-3 / 07-11-01			SB-72 / S-1-2 / 07-10-01			SH-05S / S-1 / 02-05-01			SH-18S / S-1-2 / 07-24-01			UST-1 / S-1-2 / 04/04/01			UST-1 / S-3-4 / 04/04/01		
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				Residential Area East of South St.			Residential Area East of South St.			Residential Area East of South St.			Residential Area West of South St.			Residential Area West of South St.			Residential Area West of South St.			Peripheral On-Facility Area West of South St.			Peripheral On-Facility Area West of South St.			Industrial Area East of South St.			Industrial Area East of South St.		
			Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Invertebrate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																							
Acenaphthene	1,000,000	370,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	6.0	U		5.3	U		5.4	U		5.5	U		5.6	U		9.3			5.6	U		6.4	U		2,100	U		1,100	U	
Acenaphthylene	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	13			5.3	U		5.4	U		5.5	U		5.6	U		16			5.6	UJ	L	6.4	U		3,800			990	J	
Anthracene	1,000,000	2,200,000	NS	NS	NS	NS	NS	NS	NS	NS	16			6.6			5.4	U		5.5	U		5.6	U		31			5.6	UJ	L	6.4	U		2,200			880	J	
Benzo(a)anthracene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	71			11			5.4	U		5.5	U		5.6	U		140			5.6	UJ	L	6.4	U		12,000			3,400		
Benzo(a)pyrene	700	62	NS	NS	NS	**1,980**	NS	NS	NS	NS	66			10			5.4	U		5.5	U		5.6	U		98			5.6	UJ	L	6.4	U		**16,000**			**4,000**		
Benzo(b)fluoranthene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	66			12			6.5			5.5	U		5.6	U		100			5.6	UJ	L	6.4	U		16,000			4,100		
Benzo(g,h,i)perylene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	39			5.3	U		5.4	U		5.5	U		5.6	U		42			5.6	UJ	L	6.4	U		4,100			1,000	J	
Benzo(k)fluoranthene	7,000	6,200	NS	NS	NS	NS	NS	NS	NS	NS	58			6.9			5.4	U		5.5	U		5.6	U		80			5.6	UJ	L	6.4	U		12,000			3,400		
Chrysene	7,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	88			11			6.1			5.5	U		5.6	U		140			5.6	UJ	L	6.4	U		13,000			3,400		
Dibenz(a,h)anthracene	700	62	NS	NS	NS	NS	NS	NS	NS	NS	7.8			5.3	U		5.4	U		5.5	U		5.6	U		16			5.6	UJ	L	6.4	U		1,500	J		330	J	
Fluoranthene	1,000,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	150			25			11			5.5	U		5.6	U		250			7.4	J	L	6.4	U		19,000			6,000		
Fluorene	1,000,000	270,000	NS	**30,000**	NS	NS	NS	NS	NS	NS	6.0	U		5.3	U		5.4	U		5.5	U		5.6	U		17			5.6	UJ	L	6.4	U		410	J		280	J	
Indeno(1,2,3-cd)pyrene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	40			5.3	U		5.4	U		5.5	U		5.6	U		58			5.6	UJ	L	6.4	U		5,600			1,300		
Methylnaphthalene (2-)	500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	6.0	U		5.3	U		5.4	U		5.5	U		5.6	U		6.5			5.6	UJ	L	6.4	U		550	J		720	J	
Naphthalene	100,000	5,600	NS	NS	NS	NS	NS	NS	NS	NS	7.7			5.3	U		5.4	U		5.5	U		5.6	U		17			5.6	UJ	L	6.5			1,200	J		780	J	
Phenanthrene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	100			21			7.8			5.5	U		5.6	U		130			10	J	L	10			4,200			2,400		
Pyrene	700,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	150			22			10			5.5	U		5.6	U		200			11			6.4	U		20,000			6,400		
Total PAHs	NS		NS	NS	NS	NS	NS	NS	NS	NS	872.5			125.5			41.4			-			-			1,350.8			28.4			16.5			131,560			39,380		
Other SVOCs																																							
Benzoic acid	NS	24,000,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	UJ	L	220	UJ	L	220	UJ	L	220	UJ	L	57	J	I	220	UJ	L	260	UJ	L	2,100	U		1,100	U	
Benzyl Alcohol	NS	1,800,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	UJ	L	220	U		260	UJ	L	2,100	U		1,100	U	
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
bis(2-Chloroethyl)ether	700	220	NS	NS	NS	NS	NS	NS	NS	NS	42	UJ		96	UJ		38	UJ		39	UJ		39	UJ		40	UJ		102	UJ		45	UJ		380	UJ		190	UJ	
bis(2-Chloroisopropyl)ether	NS	2,900	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
bis(2-Ethylhexyl)phthalate	200,000	35,000	NS	NS	**910**	36,000	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		200	J		260	U		2,100	U		1,100	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Butylbenzylphthalate	NS	1,200,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Carbazole	NS	24,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	UJ	L	220	UJ	L	220	UJ	L	230	U		220	UJ	L	260	U		450	J		1,100	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Chloroaniline (4-)	100,000	24,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	UJ	L	260	U		2,100	U		1,100	U	
Chloronaphthalene (2-)	NS	490,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Chlorophenol (2-)	100,000	6,300	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Dibenzofuran	NS	15,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		210	J	
Dichlorobenzene (1,2-)	100,000	110,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Dichlorobenzene (1,3-)	100,000	53,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Dichlorobenzene (1,4-)	40,000	3,400	NS	**20,000**	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Dichlorobenzidine (3,3'-)	1,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	UJ	L	260	U		2,100	U		1,100	U	
Dichlorophenol (2,4-)	40,000	18,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Diethylphthalate	1,000,000	4,900,000	**100,000**	NS	NS	9,084,000	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Dimethylphenol (2,4-)	400,000	120,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Dimethylphthalate	1,000,000	61,000,000	NS	**200,000**	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Di-n-butylphthalate	NS	610,000	200,000	NS	**90**	1,090,000	NS	NS	NS	NS	42	UJ		62	UJ		38	UJ		39	UJ		39	UJ		40	UJ		66	UJ		45	UJ		380	UJ		190	UJ	
Dinitro-2-methylphenol (4,6-)	NS	610	NS	NS	NS	NS	NS	NS	NS	NS	600	U		530	U		220	U		220	U		220	U		580	U		560	UJ	L	260	UJ	L	5,400	U		2,700	U	
Dinitrophenol (2,4-)	40,000	12,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	1,200	U		530	UJ	L	540	UJ	L	550	UJ	L	560	UJ	L	580	UJ	I		R		640	UJ	L	11,000	U		5,400	U	
Dinitrotoluene (2,4-)	1,000	12,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Dinitrotoluene (2,6-)	NS	6,100	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Di-n-octylphthalate	NS	240,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Hexachlorobenzene	700	300	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Hexachlorobutadiene	5,000	1,800	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Hexachlorocyclopentadiene	NS	37,000	**10,000**	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	UJ	L	220	UJ	L	220	UJ	L	230	U		220	UJ	L	260	UJ	L	2,100	U		1,100	U	
Hexachloroethane	6,000	6,100	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Isophorone	NS	510,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Methylphenol (2-)	NS	310,000	NS	NS	NS	**1,043,900**	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Methylphenol (4-)	NS	31,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Nitroaniline (2-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Nitroaniline (3-)	NS	1,800	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	UJ	L	220	UJ	L	220	UJ	L	230	U		220	UJ	L	260	U		2,100	U		1,100	U	
Nitroaniline (4-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	UJ	L	220	UJ	L	220	UJ	L	230	U		220	UJ	L	260	U		2,100	U		1,100	U	
Nitrobenzene	NS	2,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Nitrophenol (4-)	NS	NS	NS	**7,000**	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Nitroso-di-n-propylamine (N-)	NS	69	NS	NS	NS	NS	NS	NS	NS	NS	42	UJ		79	UJ		38	UJ		39	UJ		39	UJ		40	UJ		84	UJ		45	UJ		380	UJ		190	UJ	
Nitrosodiphenylamine (N-)	NS	99,000	NS	**20,000**	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Pentachlorophenol	7,000	3,000	**3,000**	6,000	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		580	U		220	U		260	U		2,100	U		1,100	U	
Phenol	500,000	1,800,000	70,000	**30,000**	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Trichlorobenzene (1,2,4-)	400,000	6,200	NS	**20,000**	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Trichlorophenol (2,4,5-)	1,000,000	610,000	**4,000**	9,000	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Trichlorophenol (2,4,6-)	40,000	610	NS	**10,000**	NS	NS	NS	NS	NS	NS	240	U		210	U		220	U		220	U		220	U		230	U		220	U		260	U		2,100	U		1,100	U	
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			-			-			57			200			-			450			210		
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	872.5			125.5			41.4			-			-			1,407.8			228.4			16.5			132,010			39,590		

TABLE 4
Summary of Lower Soil Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Human Health		Ecological								Concentrations in µg/kg																												
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				UST-2 / S-1-2 / 04/05/01			UST-2 / S-3-4 / 04/05/01			UST-3 / S-1-2 / 04/04/01			UST-3 / S-3-4 / 04/04/01			UST-4 / S-1-2 / 12/11/00			UST-4 / S-3-4 / 12/10/00			UST-5 / S-1-2 / 12/12/00			UST-5 / S-3-4 / 12/13/00			UST-6 / S-1-2 / 12/13/00			UST-6 / S-3-4 / 12/13/00		
			Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Invertebrate	Mammal	Avian	Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.		
											Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																							
Acenaphthene	1,000,000	370,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	1,700	J		22			110	J		13			210			11			25			6.0			3.0			310		
Acenaphthylene	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	2,800			69			67	J		11			37			6.0			150			24			27			240		
Anthracene	1,000,000	2,200,000	NS	NS	NS	NS	NS	NS	NS	NS	2,700			34			350			28			200	J	L	20	J	L	180	J	L	31	J	L	30	J	L	280	J	L
Benzo(a)anthracene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	8,900			50			1,100			78			670			67			250			48			88			300		
Benzo(a)pyrene	700	62	NS	NS	NS	**1,980**	NS	NS	NS	NS	**12,000**			110			1,100			61			610			52			270			46			100			180		
Benzo(b)fluoranthene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	15,000			85			1,600			62			580			45			200			29			87			170		
Benzo(g,h,i)perylene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	2,900			41			280			28			360			36			180			22			59			230		
Benzo(k)fluoranthene	7,000	6,200	NS	NS	NS	NS	NS	NS	NS	NS	10,000			52			1,100			52			420	J	L	42	J	L	220	J	L	37	J	L	82	J	L	160	J	L
Chrysene	7,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	9,100			91			1,200			85			820	J	L	72	J	L	280	J	L	55	J	L	95	J	L	580	J	L
Dibenz(a,h)anthracene	700	62	NS	NS	NS	NS	NS	NS	NS	NS	1,100	J		11	U		80	J		5.1	U		63			6.0			28			5.0			10			56		
Fluoranthene	1,000,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	12,000			100			2,000			150			1,600			110			430			76			110			500		
Fluorene	1,000,000	270,000	NS	**30,000**	NS	NS	NS	NS	NS	NS	2,000	J		34			130	J		14			160			6.0			16			9.0			3.0	U		650		
Indeno(1,2,3-cd)pyrene	700	620	NS	NS	NS	NS	NS	NS	NS	NS	4,100			46			310			26			370			29			170			20			61			140		
Methylnaphthalene (2-)	500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	3,400			23			130	J		14			96			13			65			16			8.0			4,900		
Naphthalene	100,000	5,600	NS	NS	NS	NS	NS	NS	NS	NS	8,800			46			61	J		6.8			130.0	J	L	14	UJ	L	86	J	L	10	J	L	9.0	J	L	320	J	L
Phenanthrene	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	5,600			100			1,500			140			1,900			100			380			91			37			2,300		
Pyrene	700,000	230,000	NS	NS	NS	NS	NS	NS	NS	NS	13,000			300			2,300			140			1,500			130			480			96			140			680		
Total PAHs	NS		NS	NS	NS	NS	NS	NS	NS	NS	115,100			1,203			13,418			908.8			9,726			745			3,410			621			946			11,996		
Other SVOCs																																							
Benzoic acid	NS	24,000,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	UJ	L	2,100	U		94	J	L	69	J	L	2,100	UJ	L	280	UJ	L	270	UJ	L	270	UJ	L	1,300	UJ	L
Benzyl Alcohol	NS	1,800,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	UJ	L	2,100	U		200	UJ	L	120	U		2,100	U		110	U		110	U		110	U		530	UJ	L
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
bis(2-Chloroethyl)ether	700	220	NS	NS	NS	NS	NS	NS	NS	NS	410	UJ		2,100	UJ		2,100	UJ		36	UJ		120	U		2,100	U		110	U		110	U		110	U		240	UJ	
bis(2-Chloroisopropyl)ether	NS	2,900	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	UJ	L	2,100	UJ	L	110	UJ	L	110	UJ	L	110	UJ	L	530	UJ	L
bis(2-Ethylhexyl)phthalate	200,000	35,000	NS	NS	**910**	36,000	NS	NS	NS	NS	2,300	U		2,100	U		**2,100**	J		37	J		63	J		**2,100**	J		110	U		110			110	U		530	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Butylbenzylphthalate	NS	1,200,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Carbazole	NS	24,000	NS	NS	NS	NS	NS	NS	NS	NS	760	J		2,100	U		2,100	J		200	U		160			2,100	U		110	U		110	U		110	U		530	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Chloroaniline (4-)	100,000	24,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	UJ	L	2,100	UJ	L	110	UJ	L	110	UJ	L	110	UJ	L	530	UJ	L
Chloronaphthalene (2-)	NS	490,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Chlorophenol (2-)	100,000	6,300	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Dibenzofuran	NS	15,000	NS	NS	NS	NS	NS	NS	NS	NS	2,000	J		2,100	U		2,100	U		200	U		130			2,100	U		110	U		110	U		110	U		530	U	
Dichlorobenzene (1,2-)	100,000	110,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Dichlorobenzene (1,3-)	100,000	53,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Dichlorobenzene (1,4-)	40,000	3,400	NS	**20,000**	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Dichlorobenzidine (3,3'-)	1,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	UJ	L	2,100	UJ	L	110	UJ	L	110	UJ	L	110	UJ	L	530	UJ	L
Dichlorophenol (2,4-)	40,000	18,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Diethylphthalate	1,000,000	4,900,000	**100,000**	NS	NS	9,084,000	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Dimethylphenol (2,4-)	400,000	120,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	UJ	L	2,100	UJ	L	110	UJ	L	110	UJ	L	110	UJ	L	530	UJ	L
Dimethylphthalate	1,000,000	61,000,000	NS	**200,000**	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Di-n-butylphthalate	NS	610,000	200,000	NS	**90**	1,090,000	NS	NS	NS	NS	410	UJ		2,100	UJ		2,100	UJ		36	UJ		34	UJ		2,100	UJ		33	UJ		32	UJ		33	UJ		160	UJ	
Dinitro-2-methylphenol (4,6-)	NS	610	NS	NS	NS	NS	NS	NS	NS	NS	5,800	U		2,100	U		2,100	U		510	U		290	UJ	L	2,100	UJ	L	280	UJ	L	270	UJ	L	270	UJ	L	1,300	UJ	L
Dinitrophenol (2,4-)	40,000	12,000	**20,000**	NS	NS	NS	NS	NS	NS	NS	12,000	U		2,100	U		2,100	U		1,000	U		290	UJ	L	2,100	UJ	L	280	UJ	L	270	UJ	L	270	UJ	L	1,300	UJ	L
Dinitrotoluene (2,4-)	1,000	12,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Dinitrotoluene (2,6-)	NS	6,100	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Di-n-octylphthalate	NS	240,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	UJ	L	2,100	U		110	U		110	UJ	L	110	U		530	UJ	L
Hexachlorobenzene	700	300	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Hexachlorobutadiene	5,000	1,800	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Hexachlorocyclopentadiene	NS	37,000	**10,000**	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	UJ	L	2,100	UJ	L	110	UJ	L	110	UJ	L	110	UJ	L	530	UJ	L
Hexachloroethane	6,000	6,100	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Isophorone	NS	510,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		65	J		120	U		2,100	U		110	U		110	U		110	U		530	U	
Methylphenol (2-)	NS	310,000	NS	NS	NS	**1,043,900**	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Methylphenol (4-)	NS	31,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Nitroaniline (2-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		290	U		2,100	U		280	U		270	U		270	U		1,300	U	
Nitroaniline (3-)	NS	1,800	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		290	UJ	L	2,100	UJ	L	280	UJ	L	270	UJ	L	270	UJ	L	1,300	UJ	L
Nitroaniline (4-)	NS	18,000	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		290	U		2,100	U		280	U		270	U		270	U		1,300	U	
Nitrobenzene	NS	2,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Nitrophenol (4-)	NS	NS	NS	**7,000**	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		290	U		2,100	U		280	U		270	U		270	U		1,300	U	
Nitroso-di-n-propylamine (N-)	NS	69	NS	NS	NS	NS	NS	NS	NS	NS	410	UJ		2,100	UJ		2,100	UJ		36	UJ		44	UJ		2,100	UJ		42	UJ		40	UJ		40	UJ		200	UJ	
Nitrosodiphenylamine (N-)	NS	99,000	NS	**20,000**	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Pentachlorophenol	7,000	3,000	**3,000**	6,000	NS	NS	NS	NS	NS	NS	2,300	U		2,100	UJ	L	2,100	U		200	UJ	L	290	U		2,100	U		280	U		270	U		270	U		1,300	U	
Phenol	500,000	1,800,000	70,000	**30,000**	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Trichlorobenzene (1,2,4-)	400,000	6,200	NS	**20,000**	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Trichlorophenol (2,4,5-)	1,000,000	610,000	**4,000**	9,000	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		290	U		2,100	U		280	U		270	U		270	U		1,300	U	
Trichlorophenol (2,4,6-)	40,000	610	NS	**10,000**	NS	NS	NS	NS	NS	NS	2,300	U		2,100	U		2,100	U		200	U		120	U		2,100	U		110	U		110	U		110	U		530	U	
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2,760			-			4,200			196			422			2,100			-			110			-			-		
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	117,860						17,618			1,104.8			10,148			2,845			3,410			731			946			11,996		

TABLE 4
Summary of Lower Soil Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. (SHA) on the dates indicated; see Table 1A for identity of sample delivery groups (SDGs).

2. For samples collected in 2000 and 2001, Woods Hole Group Environmental Laboratories (WHGEL) of Raynham, Massachusetts, performed analyses for semi-volatile organic compounds (SVOCs) by United States Environmental Protection Agency (USEPA) Method 8270C-EI; and polycyclic aromatic hydrocarbons (PAHs) by USEPA Method 8270C using selective ion monitoring (SIM) (when required to achieve Project Action Levels).

For samples collected in 2006, Alpha Woods Hole Laboratories (formerly WHGEL) of Raynham, Massachusetts, performed analyses for 2-methylnaphthalene and naphthalene by USEPA Method 8260B.

3. Data validation and data usability assessment were performed by SHA and New Environmental Horizons, Inc. (NEH). Results are presented in the Data Usability Report (SHA, 2002), the Phase 1B RI Data Usability Report (SHA, 2004), and in Appendix C of this Report.

4. All concentrations are presented in micrograms per kilogram (µg/kg), which are equivalent to parts per billion (ppb).

5. "COPC Screening Levels" indicates contaminants of potential concern (COPC) screening levels used to determine inclusion of an analyte in the human health or ecological risk assessments. Analyte detections which exceed the lower of the human health screening levels (shaded value) are shaded. Analyte detections which exceed the lowest of the ecological screening levels (**bold** value) are in **bold**.

"MCP Method 2 S-1" indicates Massachusetts Contingency Plan (MCP) Method 2 S-1 Soil Standards for Direct Contact Exposure (310 CMR 40.0000). These values were obtained from the Massachusetts Department of Environmental Protection website www.state.ma.us/dep/bwsc/files/mcp/0975_6a.htm, on April 30, 2004.

"USEPA Region IX Res. Soil PRG" indicates USEPA Region IX Residential Soil Preliminary Remediation Goals (PRGs), dated October 1, 2004. PRGs based on non-cancer effects are multiplied by 0.1 per USEPA Guidance (USEPA Region 1, Risk Update Number 5, September 1999).

"ORNL Toxicological Benchmarks" indicates ecological toxicological benchmarks established by the Oak Ridge National Laboratory (ORNL), as noted below.
"Phytotoxicity" indicates data are from the ORNL paper, "Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision," by Efroymson, R.A., et al.
"Earthworm" indicates data are from the ORNL paper, "Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision," by Efroymson, R.A., et al.
"Avian" indicates data are from the ORNL paper, "Toxicological Benchmarks for Wildlife: 1996 Revision," by Sample, B.E., et al. Values presented are NOAEL-Based benchmarks for food ingestions for the American Robin.
"Mammal" indicates data are from the ORNL paper, "Toxicological Benchmarks for Wildlife: 1996 Revision," by Sample, B.E., et al. Values presented are NOAEL-Based benchmarks for food ingestions for the Short-tailed Shrew.

"USEPA Ecological Soil Screening Levels" indicates data for plants, soil invertebrates, mammals, and avian (birds) are USEPA Ecological Soil Screening Levels (ESSLs) from the USEPA website www.epa.gov/ecotox/ecossl/, last updated 01/30/04.

6. The following qualifiers and biases were assigned during data validation by NEH. Refer to NEH's Data Usability Reports (included in Appendix A.2 of the Data Usability Report [SHA, 2002], and Appendix C of this Report) for additional detail regarding qualifiers and bias.

Qualifiers:

"J" The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"U" The compound was analyzed for, but was not detected. The associated numerical value is the sample-specific reporting limit. The value is usable for project decisions as a non-detect result at the reporting limit.
"UJ" The compound was analyzed for, but was not detected. The sample-specific quantitation (reporting) limit is estimated. The non-detect result is usable for project objectives with documentation of the bias or uncertainty in the result.
"R" Indicates data rejected during validation.
"JEB" The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The compound was detected in an associated equipment blank. The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision, and with possible uncertainty due to the potential for contamination.

Bias:

"L" Low
"I" Indeterminate
"H" High

8. Total concentrations listed (e.g. Total PAHs) are the sum of detected concentrations of the relevant suite of compounds.
"PAHs" are polycyclic aromatic hydrocarbons. "Other SVOCs" are non-PAH semi-volatile organic compounds.

TABLE 5
Summary of Lower Soil Data - Volatile Organic Compounds and VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels																																						
	Human Health		Ecological								SB-06 / S-4-5 / 03-16-01			SB-09 / S-2-3 / 04-23-01			SB-09A / S-2 / 09-07-06			SB-09A / S-3 / 09-07-06			SB-10 / S-3 / 06-07-01			SB-11 / S-2-3 / 06-07-01			SB-12 / S-1-2 / 04-17-01			SB-13A / S-3-4 / 04-13-01			SB-14 / S-3-4 / 04-13-01		
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				Peripheral Off-Facility Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.		
			Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs (µg/kg)																																							
Benzene	40,000	640	NS	NS	NS	**52,200**	NS	NS	NS	NS	2.1	U		1.5	J	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		15	J	I
Ethylbenzene	500,000	190,000	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		7.6	J	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		16	J	I
Styrene	20,000	440,000	**300,000**	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.5	J	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		49	J	I
Toluene	500,000	66,000	200,000	NS	NS	**51,500**	NS	NS	NS	NS	2.1	U		160			230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		31	J	I
Xylene (m,p-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		100			230	U		3.9	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		210	J	I
Xylene (o-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		57	J		230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		120	J	I
Xylenes (total)	500,000	27,000	NS	NS	NS	**4,162**	NS	NS	NS	NS	-			157			-			-			-			-			-			-			330		
Total AVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			327.6			-			-			-			-			-			-			441		
CVOCs (µg/kg)																																							
Carbon tetrachloride	7,000	220	NS	NS	NS	**58,600**	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Chlorobenzene	500,000	15,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Chloroethane	NS	3,000	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Chloroform	200,000	220	NS	NS	NS	**55,000**	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Chloromethane	NS	4,700	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Dichloroethane (1,1-)	100,000	51,000	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Dichloroethane (1,2-)	10,000	280	NS	NS	**14,200**	103,000	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Dichloroethene (1,1-)	2,000	12,000	NS	NS	NS	**109,900**	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Dichloroethene (cis-1,2-)	NS	4,300	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		64	J		230			2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Dichloroethene (trans-1,2-)	500,000	6,900	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Dichloropropane (1,2-)	8,000	340	NS	**700,000**	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Dichloropropene (cis-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Dichloropropene (trans-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Methylene chloride	100,000	9,100	NS	NS	NS	**21,400**	NS	NS	NS	NS	5.5	U		9.5	UJ	I	580	U		4.9	UJ	I	9.0	U		7.0	U		14	U		13	U		14	UJ	I
Tetrachloroethane (1,1,2,2-)	500	410	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Tetrachloroethene	20,000	480	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Trichloroethane (1,1,1-)	100,000	200,000	NS	NS	NS	**2,060,000**	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Trichloroethane (1,1,2-)	2,000	730	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Trichloroethene	70,000	53	NS	NS	NS	**1,387**	NS	NS	NS	NS	2.1	U		**4,500**			**21,000**			2.6	J	I	1.9	U		1.8			2.2	U		2.1	U		2.1	UJ	I
Vinyl chloride	300	79	NS	NS	NS	**623**	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Total CVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			4,564			21,230			2.6			-			1.8			-			-			-		
Other VOCs (µg/kg)																																							
Acetone	500,000	1,400,000	NS	NS	NS	**36,600**	NS	NS	NS	NS	5.1	U		48	J	I	630	U		13	J	I	6.6	JEB		9.0	U		8.1	U		12	U		42	UJ	I
Bromochloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Bromodichloromethane	20,000	820	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Bromoform	100,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Bromomethane	50,000	390	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	UJ	I	2	UJ	I	1.9	UJ	L	1.8	UJ	L	2.2	UJ	I	5.2	UJ	I	5.2	UJ	I
Butanone (2-)	500,000	2,200,000	NS	NS	NS	**6,487,000**	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Carbon disulfide	NS	36,000	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Chloroethylvinyl ether (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	580	U		4.9	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Dibromochloromethane	10,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Hexanone (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Methyl-2-pentanone (4-)	100,000	530,000	NS	NS	NS	**91,600**	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Methyl-tert Butyl Ether	100,000	17,000	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Trichlorofluoromethane	NS	39,000	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Vinyl acetate	NS	43,000	NS	NS	NS	NS	NS	NS	NS	NS	2.1	U		1.9	UJ	I	230	U		2	UJ	I	1.9	U		1.8	U		2.2	U		2.1	U		2.1	UJ	I
Total Other VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			48			-			13			6.6			-			-			-			-		
Total VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			4,939.6			21,230			15.6			6.6			1.8			-			-			441		
VPH (µg/kg)																																							
C5-C8 Aliphatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																			21,000	U									
C9-C12 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																			6,100	U									
C9-C10 Aromatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																			12,000	U									
Total VPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS																			-										
EPH (µg/kg)																																							
C9-C18 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																			3,200	U									
C19-C36 Aliphatic	2,500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																			4,300	U									
C11-C22 Aromatic	800,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																			9,200	U									
Total EPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS																			-										

TABLE 5
Summary of Lower Soil Data - Volatile Organic Compounds and VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Human Health		Ecological								SB-15 / S-2-3 / 04-16-01			SB-16 / S-3-4 / 06-06-01			SB-17 / S-4-5 / 04-05-01			SB-18 / S-2-3 / 04-11-01			SB-19 / S-1-2 / 06-08-01			SB-20 / S-2-3 / 06-12-01			SB-21 / S-3-4 / 04-02-01			SB-22 / S-3 / 06-13-01			SB-23 / S-2-3 / 04-11-01		
											Concentrations in µg/kg																										
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.		
			Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs (µg/kg)																																					
Benzene	40,000	640	NS	NS	NS	**52,200**	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Ethylbenzene	500,000	190,000	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Styrene	20,000	440,000	**300,000**	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Toluene	500,000	66,000	200,000	NS	NS	**51,500**	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.1	J	L	2.6			1.9	U		1.9	U		1.8	U		1.7	J	
Xylene (m,p-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	3.1			1.9	U		1.9	U		1.8	U		1.8	U	
Xylene (o-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.2	J		1.9	U		1.9	U		1.8	U		1.8	U	
Xylenes (total)	500,000	27,000	NS	NS	NS	**4,162**	NS	NS	NS	NS	-			-			-			-			4.3			-			-			-			-		
Total AVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			1.1			6.9			-			-			-			1.7		
CVOCs (µg/kg)																																					
Carbon tetrachloride	7,000	220	NS	NS	NS	**58,600**	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Chlorobenzene	500,000	15,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Chloroethane	NS	3,000	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Chloroform	200,000	220	NS	NS	NS	**55,000**	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Chloromethane	NS	4,700	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Dichloroethane (1,1-)	100,000	51,000	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Dichloroethane (1,2-)	10,000	280	NS	NS	**14,200**	103,000	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Dichloroethene (1,1-)	2,000	12,000	NS	NS	NS	**109,900**	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Dichloroethene (cis-1,2-)	NS	4,300	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Dichloroethene (trans-1,2-)	500,000	6,900	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Dichloropropane (1,2-)	8,000	340	NS	**700,000**	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Dichloropropene (cis-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Dichloropropene (trans-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Methylene chloride	100,000	9,100	NS	NS	NS	**21,400**	NS	NS	NS	NS	9.5	U		7.6	U		7.9	U		14	UJ	I	6.6	U		7.5	UJ	L	17	U		7.5	UJ	L	27	U	
Tetrachloroethane (1,1,2,2-)	500	410	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Tetrachloroethene	20,000	480	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Trichloroethane (1,1,1-)	100,000	200,000	NS	NS	NS	**2,060,000**	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Trichloroethane (1,1,2-)	2,000	730	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Trichloroethene	70,000	53	NS	NS	NS	**1,387**	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Vinyl chloride	300	79	NS	NS	NS	**623**	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Total CVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Other VOCs (µg/kg)																																					
Acetone	500,000	1,400,000	NS	NS	NS	**36,600**	NS	NS	NS	NS	5.5	UJ	L	9.0	U		11	EB		14	UJ	I	11	EB		9.3	U		7.0	EB		9.0	U		17	U	
Bromochloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Bromodichloromethane	20,000	820	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Bromoform	100,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Bromomethane	50,000	390	NS	NS	NS	NS	NS	NS	NS	NS	2.2	UJ	I	1.8	UJ	L	2.0	U		4.7	UJ	I	1.8	UJ	L	1.9	U		1.9	U		1.8	U		4.5	UJ	I
Butanone (2-)	500,000	2,200,000	NS	NS	NS	**6,487,000**	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Carbon disulfide	NS	36,000	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Dibromochloromethane	10,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Hexanone (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Methyl-2-pentanone (4-)	100,000	530,000	NS	NS	NS	**91,600**	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Methyl-tert Butyl Ether	100,000	17,000	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Trichlorofluoromethane	NS	39,000	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		9.8	J	H	2.0	U		1.9	UJ	L	1.8	U		1.0	J		1.9	U		1.8	U		1.8	U	
Vinyl acetate	NS	43,000	NS	NS	NS	NS	NS	NS	NS	NS	2.2	U		1.8	U		2.0	U		1.9	UJ	L	1.8	U		1.9	U		1.9	U		1.8	U		1.8	U	
Total Other VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			9.8			11			-			11			1.0			7.0			-			-		
Total VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			9.8			11			1.1			17.9			1.0			7.0			-			1.7		
VPH (µg/kg)																																					
C5-C8 Aliphatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS							19,000	U																			
C9-C12 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS							5,300	U																			
C9-C10 Aromatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS							11,000	U																			
Total VPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS							-																				
EPH (µg/kg)																																					
C9-C18 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS							7,200																				
C19-C36 Aliphatic	2,500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS							6,200																				
C11-C22 Aromatic	800,000	NS	NS	NS	NS	NS	NS	NS	NS	NS							8,800	U																			
Total EPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS							13,400																				

TABLE 5
Summary of Lower Soil Data - Volatile Organic Compounds and VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Human Health		Ecological								SB-24 / S-3-4 / 04-12-01			SB-25 / S-4-5 / 03-29-01			SB-26 / S-2-3 / 03-30-01			SB-27 / S-2-3 / 06-15-01			SB-35 / S-1-2 / 05-02-01			SB-40 / S-2-3 / 02-26-01			SB-41 / S-1-2 / 03-20-01			SB-41D / S-5-6 / 07-27-01			SB-42 / S-1-2 / 07-27-01		
			ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Peripheral On-Facility Area West of South St.			Peripheral Off-Facility Area West of South St.			Peripheral On-Facility Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.		
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
											Concentrations in µg/kg																										
AVOCs (µg/kg)																																					
Benzene	40,000	640	NS	NS	NS	**52,200**	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		1.7	J			R	
Ethylbenzene	500,000	190,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Styrene	20,000	440,000	**300,000**	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Toluene	500,000	66,000	200,000	NS	NS	**51,500**	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		1.6	J		1.9	J	L
Xylene (m,p-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Xylene (o-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Xylenes (total)	500,000	27,000	NS	NS	NS	**4,162**	NS	NS	NS	NS	-			-			-			-			-			-			-			-				R	
Total AVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			-			-			-			-			3.3			1.9		
CVOCs (µg/kg)																																					
Carbon tetrachloride	7,000	220	NS	NS	NS	**58,600**	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Chlorobenzene	500,000	15,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	UJ	L	1.8	UJ	L	2.5	UJ	L	2.5	U			R	
Chloroethane	NS	3,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Chloroform	200,000	220	NS	NS	NS	**55,000**	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Chloromethane	NS	4,700	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Dichloroethane (1,1-)	100,000	51,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Dichloroethane (1,2-)	10,000	280	NS	NS	**14,200**	103,000	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Dichloroethene (1,1-)	2,000	12,000	NS	NS	NS	**109,900**	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Dichloroethene (cis-1,2-)	NS	4,300	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Dichloroethene (trans-1,2-)	500,000	6,900	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Dichloropropane (1,2-)	8,000	340	NS	**700,000**	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Dichloropropene (cis-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Dichloropropene (trans-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Methylene chloride	100,000	9,100	NS	NS	NS	**21,400**	NS	NS	NS	NS	13	U		5.5	U		5.5	UJ	I	9.3	UJ	L	5.2	U		8.1	UJ	I	10	U		6.2	UJ	I		R	
Tetrachloroethane (1,1,2,2-)	500	410	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Tetrachloroethene	20,000	480	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Trichloroethane (1,1,1-)	100,000	200,000	NS	NS	NS	**2,060,000**	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	5.1	J	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Trichloroethane (1,1,2-)	2,000	730	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Trichloroethene	70,000	53	NS	NS	NS	**1,387**	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	UJ	L	2.5	U			R	
Vinyl chloride	300	79	NS	NS	NS	**623**	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Total CVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			5.1			-			-			-			-			-		
Other VOCs (µg/kg)																																					
Acetone	500,000	1,400,000	NS	NS	NS	**36,600**	NS	NS	NS	NS	13	U		17	U		5.5	UJ	I	10	UJ	L	5.2	U		31	UJ	I	11	U		63	UJ	I	150	J	L
Bromochloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Bromodichloromethane	20,000	820	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Bromoform	100,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Bromomethane	50,000	390	NS	NS	NS	NS	NS	NS	NS	NS	4.8	UJ	I	1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Butanone (2-)	500,000	2,200,000	NS	NS	NS	**6,487,000**	NS	NS	NS	NS	1.9	U		3.9			2.2	UJ	I	2.0	UJ	L	2.1	U		4.3	J	L	2.5	U		16				R	
Carbon disulfide	NS	36,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		0.90	J	L	2.5	U		2.5	U			R	
Chloroethylvinyl ether (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		6.2	UJ	I		R	
Dibromochloromethane	10,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Hexanone (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Methyl-2-pentanone (4-)	100,000	530,000	NS	NS	NS	**91,600**	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Methyl-tert Butyl Ether	100,000	17,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Trichlorofluoromethane	NS	39,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	4.5	J	H	1.8	UJ	L	2.5	U		250	J	H	85	J	L
Vinyl acetate	NS	43,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		1.7	U		2.2	UJ	I	2.0	UJ	L	2.1	U		1.8	UJ	L	2.5	U		2.5	U			R	
Total Other VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			3.9			-			-			4.5			5.2			-			266			235		
Total VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			3.9			-			5.1			4.5			5.2			-			269.3			236.9		
VPH (µg/kg)																																					
C5-C8 Aliphatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS				20,000	U																						
C9-C12 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS				37,000	J	I																					
C9-C10 Aromatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS				17,000	J	I																					
Total VPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS				54,000																							
EPH (µg/kg)																																					
C9-C18 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS				92,000																							
C19-C36 Aliphatic	2,500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS				45,000	J	I																					
C11-C22 Aromatic	800,000	NS	NS	NS	NS	NS	NS	NS	NS	NS				16,000																							
Total EPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS				153,000																							

TABLE 5
Summary of Lower Soil Data - Volatile Organic Compounds and VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Human Health		Ecological								SB-42 / S-3-4 / 07-27-01			SB-43 / S-1-2 / 08-01-01			SB-43 / S-3-4 / 08-01-01			SB-44 / S-1-2 / 07-31-01			SB-44 / S-3-4 / 07-31-01			SB-45 / S-1-2 / 07-19-01			SB-45 / S-4-5 / 07-19-01			SB-46 / S-1-2 / 07-18-01			SB-46 / S-3-4 / 07-18-01		
											Concentrations in µg/kg																									
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.		
			Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs (µg/kg)																																				
Benzene	40,000	640	NS	NS	NS	**52,200**	NS	NS	NS	NS	2.3	UJ	I	1.5	J		2.1	U		3.3			2.2	U		2.1	U		2.2	U		2.2	UJ	L	9.6	J	H
Ethylbenzene	500,000	190,000	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Styrene	20,000	440,000	**300,000**	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Toluene	500,000	66,000	200,000	NS	NS	**51,500**	NS	NS	NS	NS	2.3	UJ	L	9.4			2.1	U		2.6			2.2	U		1.7	J		2.2	U		2.8	J	L	2.0	J	H
Xylene (m,p-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		1.6	J	H	1.9	J		2.2	U		2.1	U		2.2	U		2.2	UJ	L	2.1	J	H
Xylene (o-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Xylenes (total)	500,000	27,000	NS	NS	NS	**4,162**	NS	NS	NS	NS	-			-			1.6			1.9			-			-			-			-			2.1		
Total AVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			10.9			1.6			7.8			-			1.7			-			2.8			13.7		
CVOCs (µg/kg)																																				
Carbon tetrachloride	7,000	220	NS	NS	NS	**58,600**	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Chlorobenzene	500,000	15,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U			R		1.9	U	
Chloroethane	NS	3,000	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Chloroform	200,000	220	NS	NS	NS	**55,000**	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Chloromethane	NS	4,700	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Dichloroethane (1,1-)	100,000	51,000	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Dichloroethane (1,2-)	10,000	280	NS	NS	**14,200**	103,000	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Dichloroethene (1,1-)	2,000	12,000	NS	NS	NS	**109,900**	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Dichloroethene (cis-1,2-)	NS	4,300	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Dichloroethene (trans-1,2-)	500,000	6,900	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Dichloropropane (1,2-)	8,000	340	NS	**700,000**	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Dichloropropene (cis-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Dichloropropene (trans-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Methylene chloride	100,000	9,100	NS	NS	NS	**21,400**	NS	NS	NS	NS	5.7	UJ	I	5.7	UJ	I	5.2	UJ	I	5.4	UJ	I	5.4	UJ	I	5.3	UJ	I	5.5	UJ	I	10	UJ	I	9.6	UJ	I
Tetrachloroethane (1,1,2,2-)	500	410	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Tetrachloroethene	20,000	480	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Trichloroethane (1,1,1-)	100,000	200,000	NS	NS	NS	**2,060,000**	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Trichloroethane (1,1,2-)	2,000	730	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Trichloroethene	70,000	53	NS	NS	NS	**1,387**	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Vinyl chloride	300	79	NS	NS	NS	**623**	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Total CVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Other VOCs (µg/kg)																																				
Acetone	500,000	1,400,000	NS	NS	NS	**36,600**	NS	NS	NS	NS	24	UJ	I	100	UJ	I	130	J	I	98	J	I	76	UJ	I	41	U		43	U		33	UJ	L	28	U	
Bromochloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Bromodichloromethane	20,000	820	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Bromoform	100,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Bromomethane	50,000	390	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	UJ	I	2.2	UJ	I	2.2	UJ	I	1.9	UJ	I
Butanone (2-)	500,000	2,200,000	NS	NS	NS	**6,487,000**	NS	NS	NS	NS	2.3	UJ	I	17			58	J	H	24			24			5.8			7.1			4.3	J	L	5.1	J	H
Carbon disulfide	NS	36,000	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	I	6.1			5.4	J	H	33			2.2	U		9.2			2.2	U		13	J	L	22	J	H
Chloroethylvinyl ether (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	5.7	UJ	L	5.7	UJ	I	5.2	UJ	I	5.4	UJ	I	5.4	UJ	I	2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Dibromochloromethane	10,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Hexanone (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Methyl-2-pentanone (4-)	100,000	530,000	NS	NS	NS	**91,600**	NS	NS	NS	NS	2.3	UJ	L	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Methyl-tert Butyl Ether	100,000	17,000	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Trichlorofluoromethane	NS	39,000	NS	NS	NS	NS	NS	NS	NS	NS	25	J	I	130	J	H	96	J	H	78	J	H	49	J	H	96	J	H	74	J	H	57	J	L	120	J	H
Vinyl acetate	NS	43,000	NS	NS	NS	NS	NS	NS	NS	NS	2.3	UJ	I	2.3	U		2.1	U		2.2	U		2.2	U		2.1	U		2.2	U		2.2	UJ	L	1.9	U	
Total Other VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	25			153.1			289.4			233			73			111			81.1			74.3			147.1		
Total VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	25			164			291			240.8			73			112.7			81.1			77.1			160.8		
VPH (µg/kg)																																				
C5-C8 Aliphatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																										
C9-C12 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																										
C9-C10 Aromatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																										
Total VPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS																										
EPH (µg/kg)																																				
C9-C18 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																										
C19-C36 Aliphatic	2,500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																										
C11-C22 Aromatic	800,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																										
Total EPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS																										

TABLE 5
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Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Human Health		Ecological								SB-46B / S-1-2 / 07-18-01			SB-47 / S-1-2 / 07-25-01			SB-47 / S-3-4 / 07-25-01			SB-48 / S-1-2 / 12-14-00			SB-48A / S-3-4 / 12-14-00			SB-49 / S-1-2 / 04-24-01			SB-49 / S-3-4 / 04-24-01			SB-50 / S-1-2 / 04-24-01			SB-50 / S-3-4 / 04-24-01		
			ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.		
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
											Concentrations in µg/kg																									
AVOCs (µg/kg)																																				
Benzene	40,000	640	NS	NS	NS	**52,200**	NS	NS	NS	NS	1.2	J	L	2.0	U		1.9	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.1	U		1.9	U		2.1	U	
Ethylbenzene	500,000	190,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Styrene	20,000	440,000	**300,000**	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Toluene	500,000	66,000	200,000	NS	NS	**51,500**	NS	NS	NS	NS	3.3	J	L	2.0	U		1.5	J		2.0	UJ	L	2.0	UJ	L	2.0	U		2.1	U		1.9	J		2.1	U	
Xylene (m,p-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	J		2.1	U	
Xylene (o-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.0	J		2.1	U	
Xylenes (total)	500,000	27,000	NS	NS	NS	**4,162**	NS	NS	NS	NS	-			-			-			-			-			-			-			2.9			-		
Total AVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	4.5			-			1.5			-			-			-			-			4.8			-		
CVOCs (µg/kg)																																				
Carbon tetrachloride	7,000	220	NS	NS	NS	**58,600**	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Chlorobenzene	500,000	15,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.1	U		1.9	U		2.1	U	
Chloroethane	NS	3,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Chloroform	200,000	220	NS	NS	NS	**55,000**	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Chloromethane	NS	4,700	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Dichloroethane (1,1-)	100,000	51,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Dichloroethane (1,2-)	10,000	280	NS	NS	**14,200**	103,000	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Dichloroethene (1,1-)	2,000	12,000	NS	NS	NS	**109,900**	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Dichloroethene (cis-1,2-)	NS	4,300	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Dichloroethene (trans-1,2-)	500,000	6,900	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Dichloropropane (1,2-)	8,000	340	NS	**700,000**	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Dichloropropene (cis-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Dichloropropene (trans-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Methylene chloride	100,000	9,100	NS	NS	NS	**21,400**	NS	NS	NS	NS	5.6	UJ	I	5.0	UJ	I	4.7	UJ	I	6.0	UJ	I	5.0	U	H	10	U		22	U		9.7	U		10	U	
Tetrachloroethane (1,1,2,2-)	500	410	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Tetrachloroethene	20,000	480	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Trichloroethane (1,1,1-)	100,000	200,000	NS	NS	NS	**2,060,000**	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Trichloroethane (1,1,2-)	2,000	730	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Trichloroethene	70,000	53	NS	NS	NS	**1,387**	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.1	U		1.9	U		2.1	U	
Vinyl chloride	300	79	NS	NS	NS	**623**	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Total CVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Other VOCs (µg/kg)																																				
Acetone	500,000	1,400,000	NS	NS	NS	**36,600**	NS	NS	NS	NS	130	J	L	5.0	U		38	U		3.0	JEB	I	5.0	JEB	H	56			12	U		4.9	U		5.4	U	
Bromochloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Bromodichloromethane	20,000	820	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Bromoform	100,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Bromomethane	50,000	390	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	I	2.0	UJ	I	1.9	UJ	I	2.0	UJ	L	2.0	U		2.0	U		2.1	UJ	L	1.9	UJ	L	2.1	UJ	L
Butanone (2-)	500,000	2,200,000	NS	NS	NS	**6,487,000**	NS	NS	NS	NS	15	J	L	2.0	U		4.9			2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Carbon disulfide	NS	36,000	NS	NS	NS	NS	NS	NS	NS	NS	24	J	L	2.0	U		3.1			2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Dibromochloromethane	10,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Hexanone (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Methyl-2-pentanone (4-)	100,000	530,000	NS	NS	NS	**91,600**	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Methyl-tert Butyl Ether	100,000	17,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Trichlorofluoromethane	NS	39,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Vinyl acetate	NS	43,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	U		1.9	U		2.0	UJ	L	2.0	U		2.0	U		2.1	U		1.9	U		2.1	U	
Total Other VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	169			-			8.0			3.0			5.0			56			-			-			-		
Total VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	173.5			-			9.5			3.0			5.0			56			-			4.8			-		
VPH (µg/kg)																																				
C5-C8 Aliphatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS										21,000	U		21,000	U		22,000	U		21,000	U		21,000	U		19,000	U	
C9-C12 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS										6,000	U		6,000	U		6,400	U		6,100	U		5,900	U		5,400	U	
C9-C10 Aromatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS										12,000	U		12,000	U		13,000	U		12,000	U		12,000	U		11,000	U	
Total VPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS										-			-			-			-			-			-		
EPH (µg/kg)																																				
C9-C18 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS										3,200	UJ	L	20,000	J	L	4,500			4,600			3,400	U		3,400	U	
C19-C36 Aliphatic	2,500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS										41,000			660,000			21,000			24,000			4,500	U		4,600	U	
C11-C22 Aromatic	800,000	NS	NS	NS	NS	NS	NS	NS	NS	NS										9,200	U		400,000			39,000			33,000			9,800			9,700	U	
Total EPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS										41,000			1,080,000			64,500			61,600			9,800			-		

TABLE 5
Summary of Lower Soil Data - Volatile Organic Compounds and VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Human Health		Ecological								SB-51 / S-1-2 / 12-7-00			SB-51 / S-5-6 / 12-7-00			SB-52 / S-1-2 / 04-18-01			SB-52 / S-4-5 / 04-18-01			SB-53 / S-1-2 / 07-13-01			SB-53 / S-3-4 / 07-13-01			SB-54 / S-1 / 05-03-01			SB-55 / S-1 / 05-03-01			SB-56 / S-1 / 05-03-01		
											Concentrations in µg/kg																											
			ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.		
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs (µg/kg)																																							
Benzene	40,000	640	NS	NS	NS	**52,200**	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		49,000			2.0	U		2.1	U		1.8	U	
Ethylbenzene	500,000	190,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		32,000			2.0	U		2.1	U		1.8	U	
Styrene	20,000	440,000	**300,000**	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		160,000			2.0	U		2.1	U		1.8	U	
Toluene	500,000	66,000	200,000	NS	NS	**51,500**	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		7.9			**140,000**			2.0	U		2.1	U		1.8	U	
Xylene (m,p-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		140,000			2.0	U		2.1	U		1.8	U	
Xylene (o-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		68,000			2.0	U		2.1	U		1.8	U	
Xylenes (total)	500,000	27,000	NS	NS	NS	**4,162**	NS	NS	NS	NS	-			-			-			-			-			**208,000**			-			-			-		
Total AVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			-			7.9			589,000			-			-			-		
CVOCs (µg/kg)																																							
Carbon tetrachloride	7,000	220	NS	NS	NS	**58,600**	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Chlorobenzene	500,000	15,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Chloroethane	NS	3,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Chloroform	200,000	220	NS	NS	NS	**55,000**	NS	NS	NS	NS	2.0	U	H	2.0	U	H	1.5	J	L	2.1	U		2.3	U		12,000	U		1.3	J		2.1	U		1.8	U	
Chloromethane	NS	4,700	NS	NS	NS	NS	NS	NS	NS	NS	2.0	UJ	L	2.0	UJ	L	2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Dichloroethane (1,1-)	100,000	51,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Dichloroethane (1,2-)	10,000	280	NS	NS	**14,200**	103,000	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Dichloroethene (1,1-)	2,000	12,000	NS	NS	NS	**109,900**	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Dichloroethene (cis-1,2-)	NS	4,300	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Dichloroethene (trans-1,2-)	500,000	6,900	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Dichloropropane (1,2-)	8,000	340	NS	**700,000**	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Dichloropropene (cis-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Dichloropropene (trans-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Methylene chloride	100,000	9,100	NS	NS	NS	**21,400**	NS	NS	NS	NS	5.0	UJ	I	6.0	UJ	I	20	UJ	I	14	U		8.0	UJ	I	44,000	UJ	I	14	U		22	U		4.5	U	
Tetrachloroethane (1,1,2,2-)	500	410	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Tetrachloroethene	20,000	480	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Trichloroethane (1,1,1-)	100,000	200,000	NS	NS	NS	**2,060,000**	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Trichloroethane (1,1,2-)	2,000	730	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Trichloroethene	70,000	53	NS	NS	NS	**1,387**	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Vinyl chloride	300	79	NS	NS	NS	**623**	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Total CVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			1.5			-			-			-			1.3			-			-		
Other VOCs (µg/kg)																																							
Acetone	500,000	1,400,000	NS	NS	NS	**36,600**	NS	NS	NS	NS	5.0	U		17	U	H	19	UJ	I	5.3	UJ	L	22	U		31,000	U		5.9	U		5.3	U		4.5	U	
Bromochloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Bromodichloromethane	20,000	820	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Bromoform	100,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Bromomethane	50,000	390	NS	NS	NS	NS	NS	NS	NS	NS	5.0	UJ	L	6.0	UJ	L	2.2	UJ	I	5.3	UJ	I	2.3	UJ	I	12,000	UJ	I	2.0	U		2.1	U		1.8	U	
Butanone (2-)	500,000	2,200,000	NS	NS	NS	**6,487,000**	NS	NS	NS	NS	5.0	U		6.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Carbon disulfide	NS	36,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		7.7			12,000	U		2.0	U		2.1	U		1.8	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Dibromochloromethane	10,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Hexanone (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Methyl-2-pentanone (4-)	100,000	530,000	NS	NS	NS	**91,600**	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Methyl-tert Butyl Ether	100,000	17,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Trichlorofluoromethane	NS	39,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Vinyl acetate	NS	43,000	NS	NS	NS	NS	NS	NS	NS	NS	2.0	U		2.0	U		2.2	UJ	L	2.1	U		2.3	U		12,000	U		2.0	U		2.1	U		1.8	U	
Total Other VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			-			7.7			-			-			-			-		
Total VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			1.5			-			15.6			589,000			1.3			-			-		
VPH (µg/kg)																																							
C5-C8 Aliphatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	18,000	U		22,000	U																								
C9-C12 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	5,300	U		6,200	U																								
C9-C10 Aromatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	11,000	U		12,000	U																								
Total VPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-																									
EPH (µg/kg)																																							
C9-C18 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	3,100	UJ	L	250,000	J	L																							
C19-C36 Aliphatic	2,500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	7,400			530,000																									
C11-C22 Aromatic	800,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	8,700	U		470,000																									
Total EPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	7,400			1,250,000																									

TABLE 5
Summary of Lower Soil Data - Volatile Organic Compounds and VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Human Health		Ecological								SB-57 / S-1 / 05-03-01			SB-62 / S-3-4 / 04-17-01			SB-64 / S-3-4 / 03-23-01			SB-68 / S-2-3 / 07-11-01			SH-05S / S-1 / 02-05-01			SH-18S / S-1-2 / 07-24-01			UST-1 / S-1-2 / 04-04-01			UST-1 / S-3-4 / 04-04-01			UST-2 / S-1-2 / 04-05-01		
											Concentrations in µg/kg																										
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				Industrial Area West of South St.			Residential Area East of South St.			Residential Area East of South St.			Residential Area West of South St.			Peripheral On-Facility Area West of South St.			Peripheral On-Facility Area West of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.		
			Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs (µg/kg)																																					
Benzene	40,000	640	NS	NS	NS	**52,200**	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	UJ	L	2.5	U		9.4	J	L	36	J	L	2.3	J	L
Ethylbenzene	500,000	190,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Styrene	20,000	440,000	**300,000**	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Toluene	500,000	66,000	200,000	NS	NS	**51,500**	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	UJ	L	2.5	U		6.8	J	L	8.7	J	L	3.7	UJ	L
Xylene (m,p-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.6	J	L	4.0	J	L	3.7	UJ	L
Xylene (o-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	1.3	J	L	3.7	UJ	L
Xylenes (total)	500,000	27,000	NS	NS	NS	**4,162**	NS	NS	NS	NS	-			-			-			-			-			-			1.6			5.3			-		
Total AVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			-			-			-			17.8			50			2.3		
CVOCs (µg/kg)																																					
Carbon tetrachloride	7,000	220	NS	NS	NS	**58,600**	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Chlorobenzene	500,000	15,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	UJ	L	2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Chloroethane	NS	3,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Chloroform	200,000	220	NS	NS	NS	**55,000**	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Chloromethane	NS	4,700	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Dichloroethane (1,1-)	100,000	51,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Dichloroethane (1,2-)	10,000	280	NS	NS	**14,200**	103,000	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Dichloroethene (1,1-)	2,000	12,000	NS	NS	NS	**109,900**	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Dichloroethene (cis-1,2-)	NS	4,300	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Dichloroethene (trans-1,2-)	500,000	6,900	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Dichloropropane (1,2-)	8,000	340	NS	**700,000**	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Dichloropropene (cis-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Dichloropropene (trans-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Methylene chloride	100,000	9,100	NS	NS	NS	**21,400**	NS	NS	NS	NS	4.6	U		22	U		7.1	U		5.0	UJ	L	5.0	U	H	6.1	UJ	I	4.6	UJ	L	16	UJ	I	9.3	UJ	L
Tetrachloroethane (1,1,2,2-)	500	410	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Tetrachloroethene	20,000	480	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Trichloroethane (1,1,1-)	100,000	200,000	NS	NS	NS	**2,060,000**	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Trichloroethane (1,1,2-)	2,000	730	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Trichloroethene	70,000	53	NS	NS	NS	**1,387**	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	UJ	L	2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Vinyl chloride	300	79	NS	NS	NS	**623**	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Total CVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Other VOCs (µg/kg)																																					
Acetone	500,000	1,400,000	NS	NS	NS	**36,600**	NS	NS	NS	NS	4.6	U		8.5	U		9.1	U		5.0	UJ	I	10	U	H	6.1	U		4.6	UJ	L	20	JEB	L	110	J	L
Bromochloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Bromodichloromethane	20,000	820	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Bromoform	100,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Bromomethane	50,000	390	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	UJ	I	1.9	U		2.0	UJ	I	2.0	UJ	L	2.5	UJ	I	1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Butanone (2-)	500,000	2,200,000	NS	NS	NS	**6,487,000**	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Carbon disulfide	NS	36,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		6.1			2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Chloroethylvinyl ether (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Dibromochloromethane	10,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Hexanone (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Methyl-2-pentanone (4-)	100,000	530,000	NS	NS	NS	**91,600**	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Methyl-tert Butyl Ether	100,000	17,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Trichlorofluoromethane	NS	39,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Vinyl acetate	NS	43,000	NS	NS	NS	NS	NS	NS	NS	NS	1.9	U		2.2	U		1.9	U		2.0	U		2.0	U		2.5	U		1.9	UJ	L	2.0	UJ	L	3.7	UJ	L
Total Other VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			-			6.1			-			-			20			110		
Total VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			-			6.1			-			17.8			70			112.3		
VPH (µg/kg)																																					
C5-C8 Aliphatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																			19,000	U		21,000	U		23,000		
C9-C12 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																			12,000			18,000			36,000		
C9-C10 Aromatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																			11,000	U		12,000	U		14,000		
Total VPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS																			12,000			18,000			73,000		
EPH (µg/kg)																																					
C9-C18 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																			12,000			30,000			13,000		
C19-C36 Aliphatic	2,500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																			44,000			130,000			52,000		
C11-C22 Aromatic	800,000	NS	NS	NS	NS	NS	NS	NS	NS	NS																			170,000			140,000			190,000		
Total EPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS																			226,000			300,000			255,000		

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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Human Health		Ecological								UST-2 / S-3-4 / 04-05-01			UST-3 / S-1-2 / 04-04-01			UST-3 / S-3-4 / 04-04-01			UST-4 / S-1-2 / 12-11-00			UST-4 / S-3-4 / 12-11-00			UST-5 / S-1-2 / 12-12-00			UST-5 / S-3-4 / 12-13-00			UST-6 / S-1-2 / 12-13-00			UST-6 / S-3-4 / 12-13-00		
			ORNL Toxicological Benchmarks				USEPA Eco. Soil Screening Levels				Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area East of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.			Industrial Area West of South St.		
	MCP Method 2 S-1 Soil	USEPA Region IX Res. Soil PRG	Phyto-toxicity	Earth-worm	Avian	Mammal	Plant	Inverte-brate	Mammal	Avian	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
											Concentrations in µg/kg																										
AVOCs (µg/kg)																																					
Benzene	40,000	640	NS	NS	NS	**52,200**	NS	NS	NS	NS	5.0			1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	J	L	2.0	U		2.0	J	L
Ethylbenzene	500,000	190,000	NS	NS	NS	NS	NS	NS	NS	NS	3.0	J	H	1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Styrene	20,000	440,000	**300,000**	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Toluene	500,000	66,000	200,000	NS	NS	**51,500**	NS	NS	NS	NS	1.1	J		2.4	J	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	1.0	J	L	2.0	U		13	J	L
Xylene (m,p-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	1.1	J	H	1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Xylene (o-)	NS	27,000	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Xylenes (total)	500,000	27,000	NS	NS	NS	**4,162**	NS	NS	NS	NS	1.1			-			-			-			-			-			-			-			-		
Total AVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	10.2			2.4			-			-			-			-			3.0			-			15		
CVOCs (µg/kg)																																					
Carbon tetrachloride	7,000	220	NS	NS	NS	**58,600**	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Chlorobenzene	500,000	15,000	NS	**40,000**	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Chloroethane	NS	3,000	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Chloroform	200,000	220	NS	NS	NS	**55,000**	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U	H	2.0	U	H	2.0	UJ	L	2.0	UJ	L	2.0	U		1.0	J	L
Chloromethane	NS	4,700	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Dichloroethane (1,1-)	100,000	51,000	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Dichloroethane (1,2-)	10,000	280	NS	NS	**14,200**	103,000	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Dichloroethene (1,1-)	2,000	12,000	NS	NS	NS	**109,900**	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Dichloroethene (cis-1,2-)	NS	4,300	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Dichloroethene (trans-1,2-)	500,000	6,900	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Dichloropropane (1,2-)	8,000	340	NS	**700,000**	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Dichloropropene (cis-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Dichloropropene (trans-1,3-)†	3,000	780	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Methylene chloride	100,000	9,100	NS	NS	NS	**21,400**	NS	NS	NS	NS	20	U		4.7	UJ	L	5.7	U		6.0	U	H	5.0	U	H	5.0	UJ	I	14	UJ	I	11	U	H	5.0	UJ	I
Tetrachloroethane (1,1,2,2-)	500	410	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Tetrachloroethene	20,000	480	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Trichloroethane (1,1,1-)	100,000	200,000	NS	NS	NS	**2,060,000**	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Trichloroethane (1,1,2-)	2,000	730	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Trichloroethene	70,000	53	NS	NS	NS	**1,387**	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Vinyl chloride	300	79	NS	NS	NS	**623**	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Total CVOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			-			-			-			-			-			1.0		
Other VOCs (µg/kg)																																					
Acetone	500,000	1,400,000	NS	NS	NS	**36,600**	NS	NS	NS	NS	24	EB		9.6	JEB	L	9.4	EB		7.0	U	H	6.0	U	H	7.0	UJ	I	26	JEB	I	15	EB	H	25	JEB	I
Bromochloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Bromodichloromethane	20,000	820	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Bromoform	100,000	62,000	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Bromomethane	50,000	390	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Butanone (2-)	500,000	2,200,000	NS	NS	NS	**6,487,000**	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Carbon disulfide	NS	36,000	NS	NS	NS	NS	NS	NS	NS	NS	4.1			1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Chloroethylvinyl ether (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Dibromochloromethane	10,000	1,100	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Hexanone (2-)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Methyl-2-pentanone (4-)	100,000	530,000	NS	NS	NS	**91,600**	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Methyl-tert Butyl Ether	100,000	17,000	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Trichlorofluoromethane	NS	39,000	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0			7.0	J	L	2.0	J	L	3.0			2.0	UJ	L
Vinyl acetate	NS	43,000	NS	NS	NS	NS	NS	NS	NS	NS	1.8	U		1.9	UJ	L	1.8	U		2.0	U		2.0	U		2.0	UJ	L	2.0	UJ	L	2.0	U		2.0	UJ	L
Total Other VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	28.1			9.6			9.4			-			2.0			7.0			28			18			25		
Total VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	38.3			12			9.4			-			2.0			7.0			31			18			41		
VPH (µg/kg)																																					
C5-C8 Aliphatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	19,000	U		19,000	U		19,000	U		21,000	U		20,000	U		18,000	U		20,000	U		20,000	U		20,000	U	
C9-C12 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	5,500	U		5,600	U		5,500	U		6,100	U		5,800	U		5,300	U		5,700	U		5,800	U		5,900		
C9-C10 Aromatic	100,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	11,000	U		11,000	U		11,000	U		12,000	U		12,000	U		11,000	U		11,000	U		12,000	U		11,000	U	
Total VPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-			-			-			-			-			-			-			-			5,900		
EPH (µg/kg)																																					
C9-C18 Aliphatic	1,000,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	3,100			210,000			65,000			3,400	UJ	L	3,600	UJ	L	3,300	UJ	L	3,100	UJ	L	3,100	UJ		1,300,000	J	L
C19-C36 Aliphatic	2,500,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	4,200			290,000			130,000			11,000			4,900	U		10,000			10,000			4,100	U		2,000,000		
C11-C22 Aromatic	800,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	15,000			82,000			17,000			11,000			10,000	U		9,400	U		8,900	U		8,700	U		1,800,000		
Total EPH	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	22,300			582,000			212,000			22,000			-			10,000			10,000			-			5,100,000		

TABLE 5
Summary of Lower Soil Data - Volatile Organic Compounds and VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. (SHA) on the dates indicated; see Table 1A for the identity of sample delivery groups (SDGs).

2. For samples collected in 2000 and 2001, Woods Hole Group Environmental Laboratories (WHGEL) of Raynham, Massachusetts, performed analyses for volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260B; and extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH) by Massachusetts Department of Environmental Protection (MADEP) methods MADEP-EPH-98-1 and MADEP-VPH-98-1, respectively.

For samples collected in 2006, Alpha Woods Hole Laboratories (formerly WHGEL) of Raynham, Massachusetts, performed analyses for VOCs (including 2-methylnaphthalene and naphthalene which had previously been analyzed by USEPA Method 8270C) by USEPA Method 8260B. Results for 2-methylnaphthalene and naphthalene are presented in Table 5.

3. Data validation and data usability assessment performed by SHA and New Environmental Horizons, Inc. (NEH). Results are presented in the Data Usability Report (SHA, 2002), the Phase 1B RI Data Usability Report (SHA, 2004), and in Appendix C of this Report.

4. All concentrations are presented in micrograms per kilogram (µg/kg), which are equivalent to parts per billion (ppb).

5. "COPC Screening Levels" indicates contaminants of potential concern (COPC) screening levels used to determine inclusion of an analyte in the human health or ecological risk assessments. Analyte detections which exceed the lower of the human health screening levels (shaded value) are shaded. Analyte detections which exceed the lowest of the ecological screening levels (**bold** value) are in **bold**.

"MCP Method 2 S-1" indicates Massachusetts Contingency Plan (MCP) Method 2 S-1 Soil Standards for Direct Contact Exposure (310 CMR 40.0000). These values were obtained from the Massachusetts Department of Environmental Protection website www.state.ma.us/dep/bwsc/files/mcp/0975_6a.htm, on April 30, 2004.

"USEPA Region IX Res. Soil PRG" indicates USEPA Region IX Residential Soil Preliminary Remediation Goals (PRGs), dated October 1, 2004. PRGs based on non-cancer effects are multiplied by 0.1 per USEPA Guidance (USEPA Region 1, Risk Update Number 5, September 1999).

"ORNL Toxicological Benchmarks" indicates ecological toxicological benchmarks established by the Oak Ridge National Laboratory (ORNL), as noted below.
"Phytotoxicity" indicates data are from the ORNL paper, "Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision," by Efroymson, R.A., et al.
"Earthworm" indicates data are from the ORNL paper, "Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision," by Efroymson, R.A., et al.
"Avian" indicates data are from the ORNL paper, "Toxicological Benchmarks for Wildlife: 1996 Revision," by Sample, B.E., et al. Values presented are NOAEL-Based benchmarks for food ingestions for the American Robin.
"Mammal" indicates data are from the ORNL paper, "Toxicological Benchmarks for Wildlife: 1996 Revision," by Sample, B.E., et al. Values presented are NOAEL-Based benchmarks for food ingestions for the Short-tailed Shrew.

"USEPA Ecological Soil Screening Levels" indicates data for plants, soil invertebrates, mammals, and avian (birds) are USEPA Ecological Soil Screening Levels (ESSLs) from the USEPA website www.epa.gov/ecotox/ecossl/, last updated 01/30/04.

6. "†" indicates the MCP Method 2 S-1 standards and PRGs are for 1,3-dichloropropene.

7. Total concentrations listed (e.g. Total AVOCs, CVOCs) are the sum of detected concentrations of the relevant suite of compounds. "AVOCs" are non-chlorinated aromatic volatile organic compounds. "CVOCs" are chlorinated volatile organic compounds. "Other VOCs" are non-AVOC and non-CVOC volatile organic compounds. "VPH" are volatile petroleum hydrocarbons. "EPH" are extractable petroleum hydrocarbons.

8. The following qualifiers and biases were assigned during data validation by NEH. Refer to NEH's Data Usability Reports (included in Appendix A.2 of the Data Usability Report [SHA, 2002], Appendix B.7 of the Phase 1B RI Data Usability Report [SHA, 2004], and in Appendix C of this Report) for additional detail regarding qualifiers and bias.

Qualifiers:
"J" The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"U" The compound was analyzed for, but was not detected. The associated numerical value is the sample-specific reporting limit. The value is usable for project decisions as a non-detect result at the reporting limit.
"UJ" The compound was analyzed for, but was not detected. The sample-specific quantitation (reporting) limit is estimated. The non-detect result is usable for project objectives with documentation of the bias or uncertainty in the result.
"R" Indicates data rejected during validation.
"EB" The compound was detected in an associated equipment blank. The result is usable with possible uncertainty due to the potential for contamination.
"JEB" The associated numerical value is an estimated quantity due to quality control criteria exceedance(s) and detection in an associated equipment blank. The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision, with possible uncertainty due to the potential for contamination.

Bias:
"L" Low
"I" Indeterminate
"H" High

TABLE 6
Summary of Groundwater Data - Field Screening Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Monitoring Location	Temperature (˚C)				Specific Conductance (µS/cm)				Dissolved Oxygen (mg/l)				ORP (mV)				Turbidity (NTU)			
	Sep-01	May-02	Oct/Nov-03	Sept/Oct-06	Sep-01	May-02	Oct/Nov-03	Sept/Oct-06	Sep-01	May-02	Oct/Nov-03	Sept/Oct-06	Sep-01	May-02	Oct/Nov-03	Sept/Oct-06	Sep-01	May-02	Oct/Nov-03	Sept/Oct-06
SH-01D	11.8	12.7	14.0	16.9	120,000	120,000	99,000	96,000	0.0	0.0	0.0	0.0	-514	-565	-518	-511	6.8	6.7	8.0	5.3
SH-01R	15.2	12.4	12.3	15.8	75,000	64,000	66,000	66,000	0.0	0.5	0.0	0.1	-476	-416	-365	-408	2.6	12	3.8	9.4
SH-01S	12.7	9.9	13.5	12.4	590	850	1,500	1,300	1.3	0.4	0.2	0.4	-137	-44	-92	-132	14	10	40	13
SH-02D	14.7	14.5	12.9	NM	5,500	17,000	3,800	NM	0.0	0.0	2.1	NM	-266	-490	-38	NM	120	470	5.7	NM
SH-02R	15.5	13.1	10.8	13.4	1,000	1,200	780	960	0.6	1.2	4.9	0.6	-56	-103	-59	-1	11	3.9	2.1	1.1
SH-02S	13.6	10.9	13.4	NM	920	760	930	NM	0.4	1.9	18.2	NM	-116	-43	-116	NM	2.1	1.9	1.0	NM
SH-03D	17.6	13.9	13.9	14.9	350	270	210	230	1.2	0.8	4.3	1.1	-51	62	72	70	22	650	1,000	450
SH-03S	17.9	10.9	16.0	15.8	1,200	1,100	690	990	5.5	0.7	9.6	0.2	-148	-116	-79	-107	0.91	2.0	2.5	0.77
SH-04D	14.9	11.8	10.3	NM	170	190	200	NM	2.4	1.3	1.6	NM	74	82	152	NM	85	24	97	NM
SH-04S	13.5	10.1	12.5	13.6	3,900	2,200	2,600	1,500	0.6	0.1	0.2	0.3	-189	-57	-212	-136	33	11	9.0	3.6
SH-05D	14.8	12.2	11.4	13.0	330	330	340	410	2.0	0.8	3.5	0.4	153	185	209	140	9.8	7.9	25	13
SH-05R-A	NI	NI	11.6	15.9	NI	NI	110	120	NI	NI	2.5	1.3	NI	NI	165	-67	NI	NI	12	13
SH-05R-B	NI	NI	10.9	12.8	NI	NI	100	120	NI	NI	2.8	1.9	NI	NI	117	-4	NI	NI	5.3	4.5
SH-05S	13.7	10.7	13.6	15.5	3,200	2,200	790	1,300	2.8	0.0	3.1	3.3	-47	-150	-122	-86	52	8.0	5.6	5.2
SH-06D	13.9	11.5	13.3	NM	24,000	19,000	27,000	NM	0.1	0.0	0.4	NM	-334	-247	-198	NM	5.2	13	14	NM
SH-06R-A	NI	NI	11.4	14.1	NI	NI	1,100	1,100	NI	NI	2.6	0.7	NI	NI	190	162	NI	NI	6.1	6.4
SH-06R-B	NI	NI	12.8	13.2	NI	NI	1,300	890	NI	NI	1.6	1.4	NI	NI	217	202	NI	NI	2.4	7.0
SH-06S	14.8	11.8	14.7	NM	1,600	1,500	1,300	NM	0.1	0.0	0.4	NM	277	-210	-172	NM	180	60	5.7	NM
SH-07D	15.4	12.9	12.9	NM	53,000	58,000	68,000	NM	0.4	0.5	0.1	NM	-194	-208	-163	NM	2.4	2.1	2.6	NM
SH-07S	16.5	11.5	15.6	NM	1,900	1,600	1,700	NM	0.2	0.7	3.7	NM	-29	124	-223	NM	10	22	4.3	NM
SH-08D	14.6	11.5	15.6	NM	1,500	1,500	1,300	NM	0.2	0.3	1.6	NM	-273	28	45	NM	>1000	81	350	NM
SH-08S	23.4	13.5	16.1	NM	290	340	320	NM	NM	NM	2.4	NM	NM	NM	-6	NM	NM	NM	0.020	NM
SH-09D	13.9	13.1	12.3	NM	2,600	2,400	2,200	NM	0.2	0.6	0.4	NM	178	36	-78	NM	5.2	4.3	11	NM
SH-09S	15.8	11.0	13.6	NM	760	660	540	NM	0.3	1.3	8.3	NM	276	133	206	NM	28	29	19	NM
SH-10S	16.2	14.9	13.7	NM	430	660	580	NM	1.1	1.3	8.9	NM	103	-67	63	NM	9.4	14	36	NM
SH-11S	14.6	11.4	15.1	NM	470	830	720	NM	6.7	2.8	2.3	NM	-96	182	248	NM	1.7	12	14	NM
SH-12D	15.1	11.9	13.4	NM	270	260	250	NM	2.8	1.1	1.8	NM	-314	-47	160	NM	93	36	23	NM
SH-12S	17.9	11.9	14.3	16.1	550	720	710	660	3.9	0.6	2.1	0.2	-39	-46	-72	-38	0.72	11	4.9	1.1
SH-13S	15.6	12.5	13.7	15.8	590	610	590	660	3.8	0.1	1.6	0.4	-83	99	-70	-38	3.4	58	140	25
SH-14D	14.5	11.4	11.5	13.3	170	160	180	200	0.9	2.0	1.3	1.5	349	204	170	113	3.0	9.5	19	4.8
SH-14S	14.6	10.4	13.1	14.2	530	590	430	570	0.5	*	2.1	0.3	0	-101	62	23	4.8	5.2	38	56
SH-15D	15.8	13.0	10.5	11.9	180	190	140	220	2.2	2.3	3.9	1.4	127	182	135	154	49	74	63	120
SH-15S	16.6	9.6	12.9	14.0	1,600	1,100	1,600	920	0.1	0.6	0.2	1.8	-220	-53	-171	-214	7.8	52	7.0	3.2
SH-16S	15.5	12.0	11.4	NM	600	470	590	NM	1.4	1.3	2.0	NM	13	242	199	NM	12	20	7.8	NM
SH-17D	NI	NI	11.2	11.6	NI	NI	2,300	1,900	NI	NI	1.0	0.4	NI	NI	146	81	NI	NI	13	2.4
SH-17R	NI	NI	10.8	14.6	NI	NI	1,800	2,100	NI	NI	1.5	2.1	NI	NI	151	-44	NI	NI	4.9	3.3
SH-17S	13.1	9.1	12.0	13.5	140	430	230	160	2.8	7.6	4.1	2.4	-5	259	146	187	0.62	0.59	3.9	0.75
SH-18D	15.8	13.7	NM	13.7	400	350	NM	370	8.8	7.0	NM	6.2	137	334	NM	160	1.9	3.9	NM	9.4
SH-18S	15.0	12.3	NM	16.4	390	430	NM	350	*	0.5	NM	0.5	57	48	NM	166	0.60	1.2	NM	1.2
SH-19D	16.3	14.4	NM	16.6	390	350	NM	400	3.9	5.0	NM	5.8	10	269	NM	58	36	15	NM	7.3
SH-19R	14.3	14.9	NM	16.4	120	110	NM	100	1.7	1.7	NM	1.0	-237	140	NM	199	53	4.6	NM	7.3
SH-19S	16.9	13.0	NM	16.6	550	680	NM	480	1.7	1.9	NM	1.3	-22	69	NM	82	3.2	7.8	NM	5.2
SH-20S	14.6	10.8	NM	NM	430	570	NM	NM	0.4	1.2	NM	NM	25	46	NM	NM	0.80	2.9	NM	NM
SH-21S	14.4	11.9	NM	14.8	400	500	NM	400	7.7	7.1	NM	5.7	190	156	NM	211	0.96	27	NM	8.7
SH-22S	17.6	12.7	NM	17.1	380	440	NM	410	6.3	9.2	NM	5.7	37	218	NM	194	8.4	6.4	NM	0.86
SH-23S	17.0	10.4	11.7	14.7	530	330	380	440	7.0	7.9	13.3	5.7	-35	267	179	212	41	8.1	37	27

TABLE 6
Summary of Groundwater Data - Field Screening Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Monitoring Location	Temperature (˚C)				Specific Conductance (µS/cm)				Dissolved Oxygen (mg/l)				ORP (mV)				Turbidity (NTU)			
	Sep-01	May-02	Oct/Nov-03	Sept/Oct-06	Sep-01	May-02	Oct/Nov-03	Sept/Oct-06	Sep-01	May-02	Oct/Nov-03	Sept/Oct-06	Sep-01	May-02	Oct/Nov-03	Sept/Oct-06	Sep-01	May-02	Oct/Nov-03	Sept/Oct-06
SH-24R	NI	NI	11.8	14.1	NI	NI	90	100	NI	NI	2.0	2.5	NI	NI	164	118	NI	NI	33	2.9
SH-24S	NI	NI	13.2	14.4	NI	NI	220	250	NI	NI	5.1	5.3	NI	NI	225	180	NI	NI	4.2	3.3
SH-25D	NI	NI	10.4	13.1	NI	NI	280	240	NI	NI	4.5	1.3	NI	NI	140	191	NI	NI	9.2	62
SH-25S	NI	NI	11.9	13.6	NI	NI	400	480	NI	NI	3.8	0.7	NI	NI	165	170	NI	NI	12	3.9
SH-26S	NI	NI	12.3	13.7	NI	NI	1,400	1,100	NI	NI	0.1	0.2	NI	NI	-71	-27	NI	NI	360	99
SH-27D	NI	NI	11.9	12.5	NI	NI	510	550	NI	NI	2.1	1.2	NI	NI	172	146	NI	NI	61	74
SH-27R	NI	NI	11.5	13.8	NI	NI	540	560	NI	NI	2.4	0.4	NI	NI	-212	97	NI	NI	14	7.0
SH-27S	NI	NI	11.0	12.3	NI	NI	520	640	NI	NI	5.7	2.6	NI	NI	186	185	NI	NI	24	5.7
SH-28D	NI	NI	12.8	13.8	NI	NI	210	220	NI	NI	2.1	1.7	NI	NI	130	123	NI	NI	47	35
SH-28R	NI	NI	12.5	14.8	NI	NI	110	150	NI	NI	3.1	2.4	NI	NI	152	17	NI	NI	45	15
SH-28S	NI	NI	13.9	14.9	NI	NI	330	460	NI	NI	2.0	2.0	NI	NI	172	184	NI	NI	8.8	0.58
WP-01	NI	NI	11.2	14.6	NI	NI	310	310	NI	NI	3.7	0.7	NI	NI	-14	31	NI	NI	4.1	18
WP-02	NI	NI	11.3	NM	NI	NI	480	NM	NI	NI	7.0	NM	NI	NI	48	NM	NI	NI	2.6	NM
WP-03	NI	NI	10.8	14.1	NI	NI	150	150	NI	NI	1.8	3.2	NI	NI	201	256	NI	NI	1.5	160
WP-04	NI	NI	10.6	12.1	NI	NI	190	240	NI	NI	13.1	6.2	NI	NI	270	227	NI	NI	NM	150
WP-05	NI	NI	10.7	15.2	NI	NI	140	200	NI	NI	6.4	6.3	NI	NI	232	283	NI	NI	6.8	0.40
WP-06	NI	NI	12.6	13.3	NI	NI	440	630	NI	NI	0.4	0.3	NI	NI	189	82	NI	NI	0.13	7.6
WP-07	NI	NI	15.8	NM	NI	NI	1,200	NM	NI	NI	2.0	NM	NI	NI	-87	NM	NI	NI	38	NM

Notes:
1. Field screening was completed by Sanborn, Head & Associates, Inc. at the time of sample collection on the dates indicated.
2. Values reported above have been rounded from values measured in the field.
3. Refer to Appendix B-2 for field forms/logs for further information.
4. Unless otherwise noted, field parameters (e.g., temperature, specific conductance, dissolved oxygen, pH [presented on Table 8], oxidation/reduction potential [ORP]) were monitored using a YSI 600 multi-parameter sonde (with low flow cell) connected to a MDS 650 display unit or a YSI 556 MPS Multi-Parameter Sonde (with low flow cell); turbidity was monitored upstream and external of the flow cell using a HACH Company Model 2100P Portable Turbidimeter.
5. Monitoring well SH-08S contained suspected NAPL based on information generated during well development. Therefore, in accordance with the SOP modification approved by USEPA on September 5, 2001, the well was purged of approximately 3 well volumes prior to sample collection during the September 2001 and May 2002 groundwater sampling rounds. Field parameters were not measured with a flow cell. Groundwater was screened for pH and specific conductance using a Beckman Model 240 pH meter and a Hach Model 44600 conductivity/TDS meter.
6. "NM" indicates not measured.
"NI" indicates not installed.
"mg/L" indicates milligrams per liter, equivalent to parts per million (ppm).
"mV" indicates milliVolts.
"µS/cm" indicates microSiemens per centimeter.
"ºC" indicates degrees Celsius.
"NTU" indicates nephelometric turbidity units.
7. "*" indicates the dissolved oxygen probe was malfunctioning at the time of sample collection. The instrument was subsequently repaired.

TABLE 7
Summary of Groundwater Data - Density/Kinematic Viscosity
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Sample Location	Collection Date	Density (g/cm^3)	Kinematic Viscosity (Centipoise)
SH-01D	11/28/01	1.0674	1.3652
SH-01D	10/03/06	1.1069	1.91
SH-01R	11/28/01	1.0089	1.1134
SH-01R	10/04/06	1.0523	2.13
SH-01S	10/05/06	0.9996	1.19
SH-02R	09/29/06	0.9994	1.19
SH-03D	10/03/06	0.9992	1.17
SH-03S	09/29/06	0.9997	1.22
SH-04S	11/28/01	1.0007	1.0041
SH-04S	10/04/06	1.0001	1.47
SH-05D	10/02/06	0.9992	1.17
SH-05R-A	10/03/06	0.999	1.1
SH-05R-B	10/03/06	0.999	1.17
SH-05S	10/04/06	0.9998	1.4
SH-06D	12/13/01	1.0062	1.01566
SH-06R-A	10/02/06	0.9996	1.2
SH-06R-B	10/02/06	0.99944	1.19
SH-08D	11/28/01	1.0007	1.0041
SH-13S	09/28/06	0.9994	1.19
SH-14D	10/02/06	0.999	1.17
SH-14S	10/02/06	0.9994	1.19
SH-15D	09/27/06	0.999	1.17
SH-15S	12/11/01	1.0016	1.00791
SH-15S	10/03/06	0.9996	1.22
SH-17D	10/05/06	0.9996	1.25
SH-17R	10/04/06	1.0006	1.47
SH-17S	09/25/06	0.999	1.17
SH-18D	09/26/06	0.9991	1.17
SH-18S	09/26/06	0.9991	1.17
SH-19D	09/25/06	0.999	1.17
SH-19R	09/28/06	0.999	1.17
SH-19S	09/29/06	0.9991	1.17
SH-21S	09/26/06	0.9991	1.17
SH-22S	09/25/06	0.999	1.17
SH-23S	09/25/06	0.999	1.17
SH-24R	09/28/06	0.999	1.17
SH-24S	09/28/06	0.999	1.17
SH-25D	09/27/06	0.999	1.17
SH-25S	09/26/06	0.9991	1.17
SH-26S	10/04/06	0.9995	1.19
SH-27D	10/02/06	0.9992	1.17
SH-27R	09/29/06	0.9992	1.17

TABLE 7
Summary of Groundwater Data - Density/Kinematic Viscosity
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Sample Location	Collection Date	Density (g/cm^3)	Kinematic Viscosity (Centipoise)
SH-27S	09/25/06	0.9992	1.17
SH-28D	09/27/06	0.999	1.17
SH-28R	09/29/06	0.999	1.17
SH-28S	09/27/06	0.9991	1.17
WP-01	09/26/06	0.999	1.17
WP-03	09/28/06	0.999	1.17
WP-04	09/27/06	0.9991	1.17
WP-05	09/27/06	0.999	1.17
WP-06	10/05/06	0.9991	1.17

Notes:

1. Samples collected in 2001 were collected by SHA on the dates indicated using single use disposable bailers.

Samples collected in 2006 were collected by SHA on the dates indicated in conjunction with Phase 1B-5 groundwater sampling activities (e.g., low-flow groundwater sampling techniques).

2. Density (at 15 ºC) and kinematic viscosity (at 60 ºF) analyses were performed by Camin Cargo Control, Inc. (CCCI) of Chelsea, Massachusetts, a subcontractor to Eastern Analytical, Inc. (EAI) of Concord, New Hampshire (in 2001) or Alpha Woods Hole Laboratories of Raynham, Massachusetts (in 2006).

4. Samples were analyzed for density using American Society of Testing Materials (ASTM) Method D-4052 and for kinematic viscosity by ASTM Method D-445.

TABLE 8
Summary of Groundwater Data - pH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Monitoring Location	Collection Date	pH Value (s.u.)	pH Qualifier	pH Bias
SH-01D	9/12/2001	14.1	J	I
SH-01D	5/22/2002	14.0	J	I
SH-01D	10/29/2003	13.5	J	I
SH-01D	10/3/2006		R	
SH-01R	9/13/2001	13.2	J	I
SH-01R	5/22/2002	13.9	J	I
SH-01R	10/30/2003	13.4	J	I
SH-01R	10/4/2006	13.1	J	I
SH-01S	9/12/2001		R	
SH-01S	5/21/2002	9.4		
SH-01S	10/28/2003	11.2		
SH-01S	10/5/2006	11.1		
SH-02D	9/13/2001	11.9		
SH-02D	5/23/2002	12.6	J	I
SH-02D	10/30/2003	6.6		
SH-02R	9/12/2001	7.2		
SH-02R	5/16/2002	7.3		
SH-02R	11/4/2003	7.4		
SH-02R	9/29/2006	7.5		
SH-02S	9/12/2001	6.7		
SH-02S	5/24/2002	6.7		
SH-02S	10/29/2003	6.8		
SH-03D	9/12/2001	7.2		
SH-03D	5/23/2002	7.0		
SH-03D	11/3/2003	7.1		
SH-03D	10/3/2006	7.0		
SH-03S	9/11/2001	6.3		
SH-03S	5/16/2002	6.5		
SH-03S	11/3/2003	6.3		
SH-03S	9/29/2006	6.8		
SH-04D	9/11/2001	7.1		
SH-04D	5/21/2002	7.1		
SH-04D	11/5/2003	7.2		
SH-04S	9/11/2001	11.9		
SH-04S	5/20/2002	11.4		
SH-04S	10/28/2003	11.3		
SH-04S	10/4/2006		R	
SH-05D	9/11/2001	7.2		
SH-05D	5/21/2002	6.9		
SH-05D	11/4/2003	6.9		
SH-05D	10/2/2006	6.8		
SH-05R-A	11/10/2003	8.0		
SH-05R-A	10/3/2006	7.2		
SH-05R-B	11/11/2003	8.5		
SH-05R-B	10/3/2006	7.3		
SH-05S	9/11/2001	12.0		
SH-05S	5/21/2002	11.7		
SH-05S	10/29/2003	9.7		
SH-05S	10/4/2006	10.7		

TABLE 8
Summary of Groundwater Data - pH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Monitoring Location	Collection Date	pH Value (s.u.)	pH Qualifier	pH Bias
SH-06D	9/6/2001	12.5	J	I
SH-06D	5/22/2002	13.1	J	I
SH-06D	10/29/2003	12.8		
SH-06R-A	11/5/2003	6.7		
SH-06R-A	10/2/2006	6.2		
SH-06R-B	11/6/2003	6.8		
SH-06R-B	10/2/2006	6.2		
SH-06S	9/6/2001	9.9		
SH-06S	5/22/2002	10.0		
SH-06S	10/29/2003	9.9		
SH-07D	9/7/2001	13.2	J	I
SH-07D	5/22/2002	13.8	J	I
SH-07D	10/30/2003	13.4	J	I
SH-07S	9/7/2001	9.0		
SH-07S	5/22/2002	7.2		
SH-07S	10/29/2003	8.8		
SH-08D	9/7/2001	10.3		
SH-08D	5/20/2002	10.2		
SH-08D	10/29/2003	10.0		
SH-08S	9/6/2001	6.6		
SH-08S	5/21/2002	6.7		
SH-08S	10/28/2003	6.7		
SH-09D	9/7/2001	11.1		
SH-09D	5/23/2002	11.8		
SH-09D	10/28/2003	11.6		
SH-09S	9/7/2001	7.5		
SH-09S	5/17/2002	6.6		
SH-09S	10/31/2003	7.4		
SH-10S	9/10/2001	6.2		
SH-10S	5/23/2002	6.3		
SH-10S	10/31/2003	5.9		
SH-11S	9/7/2001	6.6		
SH-11S	5/16/2002	6.3		
SH-11S	11/3/2003	6.3		
SH-12D	9/12/2001	6.5		
SH-12D	5/17/2002	6.4		
SH-12D	11/3/2003	6.0		
SH-12S	9/11/2001	6.2		
SH-12S	5/17/2002	6.4		
SH-12S	11/3/2003	6.5		
SH-12S	10/2/2006	5.7		
SH-13S	9/11/2001	6.5		
SH-13S	5/16/2002	6.5		
SH-13S	11/3/2003	6.5		
SH-13S	9/28/2006	5.8		

TABLE 8
Summary of Groundwater Data - pH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Monitoring Location	Collection Date	pH Value (s.u.)	pH Qualifier	pH Bias
SH-14D	9/10/2001	6.2		
SH-14D	5/20/2002	6.4		
SH-14D	11/4/2003	6.7		
SH-14D	10/2/2006	6.2		
SH-14S	9/10/2001	6.4		
SH-14S	5/20/2002	7.0		
SH-14S	11/4/2003	6.6		
SH-14S	10/2/2006	6.4		
SH-15D	9/10/2001	6.0		
SH-15D	5/17/2002	5.9		
SH-15D	11/4/2003	6.1		
SH-15D	9/27/2006		R	
SH-15S	9/10/2001	10.3		
SH-15S	5/20/2002	11.9		
SH-15S	10/28/2003	10.1		
SH-15S	10/3/2006	10.4		
SH-16S	9/11/2001	7.6		
SH-16S	5/17/2002	7.3		
SH-16S	11/19/2003	7.3		
SH-17D	11/20/2003	10.9		
SH-17D	10/5/2006	10.8		
SH-17R	11/20/2003	10.0		
SH-17R	10/4/2006	10.6		
SH-17S	9/6/2001	6.0		
SH-17S	5/20/2002	6.4		
SH-17S	11/19/2003	6.3		
SH-17S	9/25/2006	5.0		
SH-18D	9/4/2001		R	
SH-18D	5/15/2002	6.1		
SH-18D	9/26/2006	5.9		
SH-18S	9/4/2001		R	
SH-18S	5/15/2002	6.0		
SH-18S	9/26/2006	5.8		
SH-19D	9/5/2001	5.8		
SH-19D	5/16/2002	5.6		
SH-19D	9/25/2006	5.7	J	I
SH-19R	9/5/2001		R	
SH-19R	5/16/2002	7.6		
SH-19R	9/28/2006	7.4		
SH-19S	9/5/2001	6.0		
SH-19S	5/21/2002	5.8		
SH-19S	9/29/2006	5.0		
SH-20S	9/5/2001	6.1		
SH-20S	5/17/2002	6.1		
SH-21S	9/6/2001	5.9		
SH-21S	5/16/2002	5.9		
SH-21S	9/26/2006	4.7	J	I

TABLE 8
Summary of Groundwater Data - pH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Monitoring Location	Collection Date	pH Value (s.u.)	pH Qualifier	pH Bias
SH-22S	9/5/2001		R	
SH-22S	5/17/2002	6.0		
SH-22S	9/25/2006	6.0		
SH-23S	9/4/2001	6.1		
SH-23S	5/15/2002	6.0		
SH-23S	11/4/2003	6.1		
SH-23S	9/25/2006	5.3		
SH-24R	11/6/2003	7.9		
SH-24R	9/28/2006	7.5		
SH-24S	11/6/2003	5.9		
SH-24S	9/28/2006	5.9		
SH-25D	11/5/2003	6.5		
SH-25D	9/27/2006		R	
SH-25S	11/5/2003	6.4		
SH-25S	9/26/2006	6.7		
SH-26S	10/28/2003	11.0		
SH-26S	10/4/2006	10.7		
SH-27D	11/19/2003	6.7		
SH-27D	10/2/2006	6.5		
SH-27R	11/20/2003	6.7		
SH-27R	9/29/2006	6.2		
SH-27S	11/21/2003	5.8		
SH-27S	9/25/2006	6.0		
SH-28D	11/6/2003	6.9		
SH-28D	9/27/2006	6.8		
SH-28R	11/7/2003	7.8		
SH-28R	9/29/2006	6.3		
SH-28S	11/6/2003	5.9		
SH-28S	9/27/2006	5.7		
WP-01	11/4/2003	6.3		
WP-01	9/26/2006	5.8	J	I
WP-02	11/4/2003	6.2		
WP-03	11/5/2003	5.3		
WP-03	9/28/2006	4.5		
WP-04	11/7/2003	5.6		
WP-04	9/27/2006	5.4		
WP-05	11/7/2003	5.2		
WP-05	9/27/2006	4.2		
WP-06	10/28/2003	10.1		
WP-06	10/5/2006	9.8		
WP-07	10/27/2003	10.8		

TABLE 8
Summary of Groundwater Data - pH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Notes:

1. Groundwater pH measurements were recorded by Sanborn, Head & Associates, Inc. (SHA) on the dates indicated.

2. Values reported above have been rounded from values measured in the field.

3. pH is reported in standard units (s.u.).

4. Refer to Appendix B-2 for field forms/logs for further information.

5. Groundwater samples were collected using low flow techniques, consistent with the SOP for Groundwater Sampling (SOP S-1669F), using a YSI 600 or 556 MPS sonde with flow through cell. Monitoring well SH-08S contained suspected NAPL based on information generated during well development. Therefore, in accordance with the SOP modification approved by USEPA on September 5, 2001, the well was purged of approximately 3 well volumes prior to sample collection during the September 2001 and May 2002 groundwater sampling rounds. Field parameters were not measured with a flow cell. Groundwater was screened for pH and specific conductance (presented on Table 6) using a Beckman Model 240 pH meter and a Hach Model 44600 conductivity/TDS meter.

6. Data validation and data usability assessment were performed by SHA; the following qualifiers and biases were assigned during data validation by SHA. Refer to SHA's Data Usability Memoranda (included in the Data Usability Report [SHA, 2002], the Phase 1B RI Data Usability Report [SHA, 2004], and in Appendix C of this Report) for additional detail regarding qualifiers and bias.

Qualifiers:
"J" - The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"R" - Indicates data rejected during validation.

Bias:
"I" - Indeterminate

TABLE 9
Summary of Groundwater Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l (except as noted)																										
	COPC Screening Levels			SH-01D												SH-01R											
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/12/01			05/22/02			10/29/03			10/03/06			09/13/01			05/22/02			10/30/03			10/04/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																											
Aluminum	NS	**3,600**	NS	**43,400**	J	I	**44,000**	J	I	**58,000**	J	H	120,000	U		**44,100**	J	I	**23,000**	J	I	**32,000**			**34,000**		
Antimony	6	**1.5**	NS	50.0	UJ	I	**42.0**	J	I	25.0	U		50.0	U		50.0	UJ	I	**20.0**	J	I	**20.0**			50.0	U	
Arsenic	10	**0.045**	NS	**812**	J	I	**650**	J	H	**57.0**	J	H	**660**			**343**	J	I	**300**	J	H	**450**	J	H	**620**		
Barium	2,000	**260**	NS	9.4	J	I	120	UJ	I	27.0			50.0	U		13.1	J	I	25.0	UJ	I	25.0			50.0	U	
Beryllium	4	**7.3**	NS	5.0	UJ	I	12.0	UJ	I	25.0	U		20.0	U		5.0	UJ	I	2.5	UJ	I	5.0	U		20.0	U	
Cadmium	5	**1.8**	NS	5.0	UJ	I	0.50	UJ	I	25.0	U		10.0	U		5.0	UJ	I	0.50	UJ	I	5.0	U		10.0	U	
Calcium	NS	NS	NS	110,000	J	I	500,000	UJ	I	27,000	J	L	230,000	J	L	109,000	J	I	100,000	UJ	I	57,000			160,000	J	L
Chromium†	100	**11**	NS	**22.1**	J	I	**21.0**	J	I	25.0	U		50.0	U		**24.0**	J	I	**15.0**	J	I	**16.0**			50.0	U	
Cobalt	NS	**73**	NS	9.0	J	I	4.1	J	I	25.0	U		20.0	U		5.5	J	I	3.6	J	I	7.4			20.0	U	
Copper‡	1,300	**150**	NS	**467**	J	I	**200**	J	I	**450**			**730**			**311**	J	I	96.0	J	I	90.0			**460**		
Iron	NS	**1,100**	NS	6,250	UJ	I	50,000	UJ	I	**4,800**			5,000	U		**8,760**	J	I	**10,000**	J	I	**2,800**			5,000	U	
Lead‡	15	NS	NS	7.8	J	I	5.1	UJ	I	25.0	U		50.0	U		5.4	J	I	17.0	J	I	62.0			50.0	U	
Magnesium	NS	NS	NS	6,250	UJ	I	250,000	UJ	I	12,000	U		25,000	U		6,250	UJ	I	50,000	J	I	25,000	U		5,000	U	
Manganese	NS	**88**	NS	**1,620**	J	I	**850**	J	I	250	U		500	U		**208**	J	I	**280**	J	I	**550**			**840**		
Mercury	2	**1.1**	*0.068*	**1.9**			**1.8**			1.0	U		1.0	U		0.44			0.37			0.25			1.0	U	
Nickel	NS	**73**	NS	**412**	J	I	**280**	J	I	**330**			**170**			**286**	J	I	**150**	J	I	**160**			**220**		
Potassium	NS	NS	NS	171,000	J	I	210,000	J	I	240,000	J	H	90,000	J	L	131,000	J	I	75,000	J	I	34,000			69,000	J	L
Selenium	50	**18**	NS	**18.6**	J	I	5.0	UJ	I	25.0	U		100	U		5.5	J	I	5.0	UJ	I	5.0	U		100	U	
Silver	NS	**18**	NS	5.0	UJ	I	6.4	J	I	25.0	U		10.0	U		5.0	UJ	I	2.8	J	I	5.0	U		10.0	U	
Sodium	NS	NS	NS	32,800,000	J	I	32,000,000	J	I	45,000,000			33,000,000			23,600,000	J	I	14,000,000	J	I	14,000,000			18,000,000		
Thallium	2	**0.24**	NS	1.5	UJ	I	3.8	UJ	I	1.9	UJ	I	10.0	U		1.5	UJ	I	0.75	UJ	I	0.38	UJ	I	10.0	U	
Vanadium	NS	**3.6**	NS	**3,750**	J	I	**3,700**	J	H	**2,600**	J	H	**2,400**	J	L	**1,390**	J	I	**1,100**	J	H	**1,400**	J	H	**2,300**	J	L
Zinc	NS	**1,100**	NS	540	J	I	610	UJ	I	**1,600**			**1,800**			278	J	I	210	UJ	I	410			500	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS		R		5.0	U									R		25.0	U							
Natural Attenuation Parameters																											
Alkalinity (mg/l)	NS	NS	NS	55,000			85,000			78,000			85,000			41,000			35,000			37,000			42,000		
Chloride (mg/l)**	NS	NS	NS	160			220			130			120			92.0			110			140			160		
Ethane (µg/l)	NS	NS	NS										1.1												0.45		
Ethene (µg/l)	NS	NS	NS										1.6												0.93		
Iron, Ferrous (mg/l)	NS	NS	NS										1.0	UJ	L										1.0	UJ	L
Methane (µg/l)	NS	NS	NS										4,200												1,200		
Nitrate (mg/l)	10,000	**10,000**	NS	1.0	UJ	L	2.2			1.0	U		2.0	U			R		1.0	U		0.50	U		2.0	U	
Sulfate (mg/l)**	NS	NS	NS	260			260			150			140			160			170			240			260		
Sulfide (mg/l)	NS	NS	NS							0.20	UJ	L	0.20	UJ	I							0.20	UJ	L	0.20	J	H
Total Dissolved Solids (mg/l)	NS	NS	NS							150,000			130,000									66,000			72,000		
TKN (mg/l)	NS	NS	NS	8.5	J	I	0.80	J	I	4.3			7.0	J	I	2.3	J	I	1.7	J	I	6.0			5.0	UJ	I
Total Organic Carbon (mg/l)	NS	NS	NS							86.0			260	J	I							78.0			86	J	I

TABLE 9
Summary of Groundwater Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l (except as noted)																							
	COPC Screening Levels			SH-01S												SH-02D								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/12/01			05/21/02			10/28/03			10/05/06			09/13/01			05/23/02			10/30/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																								
Aluminum	NS	**3,600**	NS	1,100			460	J	L	1,400			1,300			1,700			3,600	J	I	500	U	
Antimony	6	**1.5**	NS	11.1	U		**7.6**			**12.0**			**5.6**			11.1	U		5.0	UJ	I	1.0	U	
Arsenic	10	**0.045**	NS	**5.9**			**6.7**			**15.0**			**8.0**			**65.2**			**210**	J	H	**9.8**		
Barium	2,000	**260**	NS	12.5	J	I	18.0			71.0			50.0			12.1	J	I	26.0	J	I	53.0		
Beryllium	4	**7.3**	NS	1.1	U		0.56	U		1.0	U		0.20	U		1.1	U		2.5	UJ	I	1.0	U	
Cadmium	5	**1.8**	NS	1.1	U		0.11	U		1.0	U		0.13			1.1	U		0.50	UJ	I	1.0	U	
Calcium	NS	NS	NS	26,800	U		36,000			8,000			4,600	J	L	36,200	U		83,000	J	I	630,000		
Chromium†	100	**11**	NS	**20.4**	J	I	3.3			8.7			4.8			8.5	J	I	**24.0**	J	I	1.7		
Cobalt	NS	**73**	NS	1.1	U		0.70			2.7			1.4			25.9			64.0	J	I	**170**		
Copper‡	1,300	**150**	NS	53.4			47.0			120			49.0			69.9			46.0	J	I	3.2	U	
Iron	NS	**1,100**	NS	784	J	L	710	J	L	**4,600**			**3,300**			**4,960**	J	L	2,000	UJ	I	**11,000**		
Lead‡	15	NS	NS	109	J	I	110			360			70.0			95.6	J	I	9.5	UJ	I	1.0	U	
Magnesium	NS	NS	NS	19,100			20,000	J	L	1,200	JB	H	1,200			22,800			29,000	J	I	330,000	J	H
Manganese	NS	**88**	NS	35.9			22.0			**140**			82.0			**1,180**			**770**	J	I	**9,100**		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.40			0.20	U	
Nickel	NS	**73**	NS	11.3			16.0			16.0			5.9			**258**			**630**	J	I	**1,000**		
Potassium	NS	NS	NS	4,370			3,900	J	L	2,700	B	H	1,900	J	L	3,630	U		7,900	J	I	4,600		
Selenium	50	**18**	NS	1.1	U		2.4			1.0	U		1.4			10.9	J	H	**25.0**	J	I	**23.0**		
Silver	NS	**18**	NS	1.1	U		0.11	UJ	L	1.0	U		0.26			1.1	U		0.52	J	I	1.0	U	
Sodium	NS	NS	NS	176,000			160,000			360,000			240,000			1,450,000			4,400,000	J	I	250,000		
Thallium	2	**0.24**	NS	0.32	UJ	I	0.17	UJ	I	0.20			0.10	U		0.32	UJ	I	0.75	UJ	I	0.082	J	I
Vanadium	NS	**3.6**	NS	11.1	U		2.9			**22.0**			**7.9**	J	L	**234**	J	H	**550**	J	H	**6.9**		
Zinc	NS	**1,100**	NS	116	U		86.0			160			40.0	U		78.5	U		50.0	UJ	I	13.0		
Cyanide (weak acid dissociable)*	200	**0.62**	NS		R		5.0	U									R		5.0	U				
Natural Attenuation Parameters																								
Alkalinity (mg/l)	NS	NS	NS	420			420			690			540			2,900			10,000			830		
Chloride (mg/l)**	NS	NS	NS	13.0			8.7			13.0	B	H	6.8			140			140			380		
Ethane (µg/l)	NS	NS	NS										0.12											
Ethene (µg/l)	NS	NS	NS										0.11											
Iron, Ferrous (mg/l)	NS	NS	NS										1.0	U										
Methane (µg/l)	NS	NS	NS										1,200											
Nitrate (mg/l)	10,000	**10,000**	NS	0.10	U		1.1	J	L	0.050	U		0.50	U		0.10	U		0.25			0.50	U	
Sulfate (mg/l)**	NS	NS	NS	46.0			78.0			46.0			40.0			380			420			1,400		
Sulfide (mg/l)	NS	NS	NS							0.20	UJ	L	0.25	J	H							0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS							1,000			790									3,800		
TKN (mg/l)	NS	NS	NS	0.50	UJ	I	0.60			1.1			1.3			1.8	J	I	1.0	J	I	5.0	U	
Total Organic Carbon (mg/l)	NS	NS	NS							9.3			7.9									65.0		

TABLE 9
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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l (except as noted)																				
				SH-02R												SH-02S								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/12/01			05/16/02			11/04/03			09/29/06			09/12/01			05/24/02			10/29/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																								
Aluminum	NS	**3,600**	NS	235			78.0	J	L	50.0	UJ	L	50.0	U		62.2			11.0	UJ	L	50.0	UJ	L
Antimony	6	**1.5**	NS	11.1	U		1.1	U		1.0	U		0.50	U		11.1	U		1.1	U		1.0	U	
Arsenic	10	**0.045**	NS	**3.8**			**3.4**			**2.7**			**2.2**			**0.45**	J	I	**1.3**			**0.85**		
Barium	2,000	**260**	NS	9.1	J	I	9.9			8.4			6.3			32.7	J	I	94.0			130		
Beryllium	4	**7.3**	NS	1.1	U		0.56	U		1.0	U		0.20	U		1.1	U		0.56	U		1.0	U	
Cadmium	5	**1.8**	NS	1.1	U		0.11	U		1.0	U		0.10	U		1.1	U		0.11	U		1.0	U	
Calcium	NS	NS	NS	82,700			79,000			110,000			80,000			67,200			94,000			120,000		
Chromium†	100	**11**	NS	8.0	J	I	1.8			1.0	U		0.50	U		**28.4**	J	I	1.4			1.7		
Cobalt	NS	**73**	NS	1.4			1.2			2.2			1.4			1.1	U		2.7			1.0		
Copper‡	1,300	**150**	NS	3.5	U		2.2	U		1.5			2.5			4.2	U		7.4			2.9		
Iron	NS	**1,100**	NS	985	J	L	820	J	L	**1,400**			650			**11,400**	J	L	**2,000**	J	L	**18,000**		
Lead‡	15	NS	NS	1.1	UJ	I	0.86			1.0	U		0.57			1.1	UJ	I	2.4			1.9		
Magnesium	NS	NS	NS	25,600			19,000	J	L	21,000	J	L	22,000			29,800			13,000	J	L	22,000	J	L
Manganese	NS	**88**	NS	**262**			**400**			**590**			**280**			**1,320**			**1,300**			**1,700**		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	UJ	L	0.20	U		0.20	U		0.20	U		0.20	UJ	L
Nickel	NS	**73**	NS	29.0			25.0			36.0			31.0			4.8			24.0			10.0	U	
Potassium	NS	NS	NS	1,120	U		830	J	L	780	J	L	880			6,870			7,400	J	L	7,600	J	L
Selenium	50	**18**	NS	2.3	J	H	2.6			2.5			3.0			1.1	U		1.1	U		1.0	U	
Silver	NS	**18**	NS	1.1	U		0.11	UJ	L	1.0	U		0.10	U		1.1	U		0.11	UJ	L	1.0	U	
Sodium	NS	NS	NS	119,000			97,000			130,000			90,000			107,000			75,000			100,000		
Thallium	2	**0.24**	NS	0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.20	U		0.32	UJ	I	0.17	UJ	I	0.075	UJ	I
Vanadium	NS	**3.6**	NS	11.1	U		1.5			1.0	U		1.6			11.1	U		1.1	U		2.3		
Zinc	NS	**1,100**	NS	107	U		11.0	U		10.0	UJ	L	5.1	U		11.1	U		69.0			10.0	UJ	L
Cyanide (weak acid dissociable)*	200	**0.62**	NS		R		5.0	U									R		5.0	U				
Natural Attenuation Parameters																								
Alkalinity (mg/l)	NS	NS	NS	170			160			180			180			410			400			480		
Chloride (mg/l)**	NS	NS	NS	84.0			80.0			95.0			100			17.0			9.0			9.3		
Ethane (µg/l)	NS	NS	NS										0.10											
Ethene (µg/l)	NS	NS	NS										0.16											
Iron, Ferrous (mg/l)	NS	NS	NS										1.0	U										
Methane (µg/l)	NS	NS	NS										120											
Nitrate (mg/l)	10,000	**10,000**	NS	0.10	U		0.10	UJ	L	0.050	U		0.10	U		0.10	U		0.56	J	L	0.050	U	
Sulfate (mg/l)**	NS	NS	NS	240			210			47.0			160			66.0			62.0			33.0		
Sulfide (mg/l)	NS	NS	NS							0.20	U		0.20	UJ	L							0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS							660			650									610		
TKN (mg/l)	NS	NS	NS	0.50	UJ	I	0.50	U		0.50	U		0.50	U		1.9	J	I	0.80			1.9		
Total Organic Carbon (mg/l)	NS	NS	NS							4.6			3.2									13.0		

TABLE 9
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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l (except as noted)																							
				SH-03D												SH-03S											
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/12/01			05/23/02			11/03/03			10/03/06			09/11/01			05/16/02			11/03/03			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																											
Aluminum	NS	**3,600**	NS	451			**12,000**	J	L	**4,100**	J	L	850			55.6	U		56.0	UJ	L	50.0	UJ	L	50.0	U	
Antimony	6	**1.5**	NS	11.1	U		1.1	U		1.0	U		0.50	U		11.1	U		1.1	U		1.0	U		0.50	U	
Arsenic	10	**0.045**	NS	**0.41**	J	I	**3.5**			**1.2**	B	H	**0.89**			**10.0**			**3.3**			**7.8**	B	H	**10.0**		
Barium	2,000	**260**	NS	12.5	J	I	67.0			29.0	B	H	18.0			120	J	I	110			130			160		
Beryllium	4	**7.3**	NS	1.1	U		0.56	U		1.0	U		0.20	U		1.1	U		0.56	U		1.0	U		0.20	U	
Cadmium	5	**1.8**	NS	1.1	U		0.11	U		1.0	U		0.10	U		1.1	U		0.11	U		1.0	U		0.10	U	
Calcium	NS	NS	NS	49,200			23,000			24,000	B	H	23,000			82,100			58,000			56,000	B	H	96,000		
Chromium†	100	**11**	NS	1.1	UJ	I	**22.0**			7.7			2.2			3.8	J	I	3.4			2.3			2.3		
Cobalt	NS	**73**	NS	1.2			8.7			5.5	B	H	1.8			1.7			3.9			2.0	B	H	0.79		
Copper‡	1,300	**150**	NS	49.9			17.0			12.0	B	H	4.7			4.1	U		2.2	U		3.4	B	H	1.0		
Iron	NS	**1,100**	NS	1,050	J	L	**15,000**	J	L	**7,200**			**1,900**			**40,200**	J	L	**24,000**	J	L	**34,000**			**49,000**		
Lead‡	15	NS	NS	10.4	J	I	4.4			5.6			2.7			1.1	UJ	I	1.2			3.0			0.62		
Magnesium	NS	NS	NS	18,100			11,000	J	L	8,500	JB	I	8,800			33,300			17,000	J	L	12,000	JB	I	30,000		
Manganese	NS	**88**	NS	**1,720**			**1,200**			**1,000**			**500**			**4,180**			**4,000**			**2,600**			**3,300**		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	UJ	L	0.20	U		0.20	U		0.20	U		0.20	UJ	L	0.20	U	
Nickel	NS	**73**	NS	15.7			18.0			10.0	U		3.7			5.6			4.4			10.0	U		5.0		
Potassium	NS	NS	NS	2,000	U		3,500	J	L	1,300	JB	I	1,200			10,600			6,400	J	L	4,900	JB	I	8,000		
Selenium	50	**18**	NS	1.1	U		1.1	U		1.0	U		1.0	U		2.5	J	H	1.4			1.0	U		1.3		
Silver	NS	**18**	NS	1.1	U		0.11	UJ	L	1.0	U		0.10	U		1.1	U		0.11	UJ	L	1.0	U		0.10	U	
Sodium	NS	NS	NS	20,500	U		10,000			10,000	B	H	12,000			109,000			99,000			84,000			46,000		
Thallium	2	**0.24**	NS	0.32	UJ	I	0.25	J	I	0.075	UJ	I	0.20	U		0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.20	U	
Vanadium	NS	**3.6**	NS	11.1	U		**22.0**			**5.0**			1.2			11.1	U		2.1			1.8			1.1		
Zinc	NS	**1,100**	NS	85.0	U		43.0			24.0	JB	I	12.0	U		50.1	U		13.0			10.0	UJ	L	140		
Cyanide (weak acid dissociable)*	200	**0.62**	NS		R		5.0	U									R		5.0	U							
Natural Attenuation Parameters																											
Alkalinity (mg/l)	NS	NS	NS	69.0			53.0			46.0			48.0			550			330			320			480		
Chloride (mg/l)**	NS	NS	NS	45.0			28.0			25.0	B	H	34.0			41.0			46.0			34.0	B	H	13.0		
Ethane (µg/l)	NS	NS	NS										0.076												0.18		
Ethene (µg/l)	NS	NS	NS										0.37												0.13	J	H
Iron, Ferrous (mg/l)	NS	NS	NS										1.0	U											1.0	U	
Methane (µg/l)	NS	NS	NS										3.5	J	H										7,800		
Nitrate (mg/l)	10,000	**10,000**	NS	0.26			0.42	J	L	0.46	B	H	0.58			0.10	U		0.10	UJ	L	0.20	B	H	0.10	U	
Sulfate (mg/l)**	NS	NS	NS	94.0			45.0			26.0	B	H	26.0			16.0			40.0			26.0	B	H	1.0	U	
Sulfide (mg/l)	NS	NS	NS							0.20	U		0.20	UJ	L							0.20	U		0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS							150			200									490			540		
TKN (mg/l)	NS	NS	NS	0.50	UJ	I	0.50	U		0.50	U		0.50	U		7.9	J	I	3.8			4.0	B	H	5.6		
Total Organic Carbon (mg/l)	NS	NS	NS							1.0	U		1.0	U								12.0			25.0		

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Analytes	Concentrations in µg/l (except as noted)																							
	COPC Screening Levels			SH-04D									SH-04S											
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/11/01			05/21/02			11/05/03			09/11/01			05/20/02			10/28/03			10/04/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																								
Aluminum	NS	**3,600**	NS	1,820			650			1,900	J	L	1,120			480			500	U		380		
Antimony	6	**1.5**	NS	11.1	U		1.1	U		1.0	U		11.1	U		1.1			1.2			0.74		
Arsenic	10	**0.045**	NS	**0.47**	J	I	0.59	UJ	I	**0.39**			**61.4**			**38.0**			**35.0**			**17.0**		
Barium	2,000	**260**	NS	12.5			6.8	U		12.0			9.7	J	I	11.0			17.0			17.0		
Beryllium	4	**7.3**	NS	1.1	U		0.56	U		1.0	U		1.1	U		0.56	U		1.0	U		0.20	U	
Cadmium	5	**1.8**	NS	1.1	U		0.11	U		1.0	U		1.1	U		0.11	U		1.0	U		0.10	U	
Calcium	NS	NS	NS	16,400	J	H	15,000	U		18,000			6,850	U		12,000			10,000			6,800	J	L
Chromium†	100	**11**	NS	4.6	J	I	2.2			3.6			9.6	J	I	3.4			3.1			5.0		
Cobalt	NS	**73**	NS	1.3			0.51	U		1.8			1.7			0.87			1.3			1.4		
Copper‡	1,300	**150**	NS	2.3	U		1.0	U		3.5			19.9			10.0			8.8			17.0		
Iron	NS	**1,100**	NS	**2,430**			880			**3,300**			**1,240**	J	L	760			**1,600**			**1,900**		
Lead‡	15	NS	NS	1.1			0.50	U		1.5			6.2	J	I	2.2	U		6.5			8.0		
Magnesium	NS	NS	NS	8,480			7,800	U		8,000	J	L	482	U		2,800			1,300	JB	H	560		
Manganese	NS	**88**	NS	**101**			46.0	U		**150**			57.6			69.0			79.0			73.0		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	UJ	L	*0.20*			0.20	U		0.20	U		0.20	U	
Nickel	NS	**73**	NS	9.4	J	I	1.8	U		10.0	U		47.8			24.0			24.0			10.0		
Potassium	NS	NS	NS	929	U		520	U		850	J	L	2,010	U		2,000			2,000	B	H	1,300	J	L
Selenium	50	**18**	NS	1.1	U		1.1	U		1.0	U		1.1	J	H	1.4			1.4			2.4		
Silver	NS	**18**	NS	1.1	U		0.11	U		1.0	U		1.1	U		0.11	U		1.0	U		0.10	U	
Sodium	NS	NS	NS	8,370			8,000	U		9,100			899,000			560,000			710,000			390,000		
Thallium	2	**0.24**	NS	0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.10	U	
Vanadium	NS	**3.6**	NS	11.1	U		1.4			2.0			**140**	J	H	**78.0**			**84.0**	J	I	**36.0**	J	L
Zinc	NS	**1,100**	NS	37.5	UJ	I	11.0	U		10.0	UJ	L	19.5	U		11.0	U		10.0	U		6.9	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS	5.0	U		5.0	U						R		5.0	U							
Natural Attenuation Parameters																								
Alkalinity (mg/l)	NS	NS	NS	53.0			51.0	B	H	53.0			1,700			1,200			1,400			810		
Chloride (mg/l)**	NS	NS	NS	24.0			22.0	B	H	23.0			47.0			47.0			46.0			24.0		
Ethane (µg/l)	NS	NS	NS																			0.23		
Ethene (µg/l)	NS	NS	NS																			0.12		
Iron, Ferrous (mg/l)	NS	NS	NS																			1.0	UJ	L
Methane (µg/l)	NS	NS	NS																			2,800		
Nitrate (mg/l)	10,000	**10,000**	NS	0.74			0.69			0.71			0.10	U		0.10	U		0.050	U		0.50	U	
Sulfate (mg/l)**	NS	NS	NS	10.0			9.2	B	H	9.3			52.0			41.0			42.0			24.0		
Sulfide (mg/l)	NS	NS	NS							0.20	U								0.27	J	L	0.35	J	H
Total Dissolved Solids (mg/l)	NS	NS	NS							140									2,200			1,300		
TKN (mg/l)	NS	NS	NS	0.50	U		0.50	U		0.50	U		2.0	J	I	1.7			2.1			1.7		
Total Organic Carbon (mg/l)	NS	NS	NS							1.0	U								15.0			18.0		

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Analytes	COPC Screening Levels			Concentrations in µg/l (except as noted)																							
				SH-05D												SH-05R-A						SH-05R-B					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/11/01			05/21/02			11/04/03			10/02/06			11/10/03			10/03/06			11/11/03			10/03/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																											
Aluminum	NS	**3,600**	NS	66.3			220			160	J	L	50.0	U		220			100			100	U		50.0	U	
Antimony	6	**1.5**	NS	11.1	U		1.1	U		1.0	U		0.50	U		1.0	U		0.50	U		1.0	U		0.50	U	
Arsenic	10	**0.045**	NS	**0.33**	J	I	0.45	UJ	I	**0.27**			**0.74**			**20.0**	J	L	**24.0**			**22.0**	J	L	**24.0**		
Barium	2,000	**260**	NS	16.8			14.0	U		12.0			10.0			19.0			8.0			7.3			6.8		
Beryllium	4	**7.3**	NS	1.1	U		0.56	U		1.0	U		0.20	U		1.0	U		0.20	U		1.0	U		0.20	U	
Cadmium	5	**1.8**	NS	1.1	U		0.11	U		1.0	U		0.10	U		1.0	U		0.10	U		1.0	U		0.10	U	
Calcium	NS	NS	NS	37,500	J	H	29,000	U		37,000			41,000			13,000			12,000			13,000			12,000		
Chromium†	100	**11**	NS	6.3	J	I	1.1	U		1.0	U		0.66			1.0	U		0.50	U		1.0	U		0.60		
Cobalt	NS	**73**	NS	1.1	U		0.52	U		1.1			0.79			1.0	U		0.20	U		1.0	U		0.20	U	
Copper‡	1,300	**150**	NS	1.1	U		0.56	U		1.1			1.0	U		1.4	U		1.0	U		1.0	U		1.0	U	
Iron	NS	**1,100**	NS	211	U		310			560			410			240			170			140			240		
Lead‡	15	NS	NS	1.1	U		0.27	U		1.0	U		0.50	U		1.0	U		0.50	U		1.0	U		0.50	U	
Magnesium	NS	NS	NS	16,000			16,000	U		17,000	J	L	21,000			2,600			2,700			2,700			2,600		
Manganese	NS	**88**	NS	62.6			51.0	U		64.0			66.0			23.0			12.0			24.0			28.0		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	UJ	L	0.20	U		0.20	U		0.20	U		0.20	U		0.20	U	
Nickel	NS	**73**	NS	4.2	J	I	4.0	U		10.0	U		5.8			10.0	U		0.73			10.0	U		0.79		
Potassium	NS	NS	NS	834	U		730	U		760	J	L	900			860			590			500	U		400		
Selenium	50	**18**	NS	1.9			2.8			2.0			2.8			1.0	U		1.0	U		1.0	U		1.0	U	
Silver	NS	**18**	NS	1.1	U		0.11	U		1.0	U		0.10	U		1.0	U		0.10	U		1.0	U		0.10	U	
Sodium	NS	NS	NS	14,600			14,000	U		16,000			16,000			6,900			6,800			6,600			6,000		
Thallium	2	**0.24**	NS	0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.20	U		0.080	UJ	I	0.20	U		0.080	UJ	I	0.20	U	
Vanadium	NS	**3.6**	NS	11.1	U		1.1	U		1.0	U		1.0	U		1.2			1.0	U		1.0	U		1.0	U	
Zinc	NS	**1,100**	NS	28.5	UJ	I	13.0	U		10.0	UJ	L	5.8	U		10.0	U		7.3	U		10.0	U		10	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS	5.0	U		5.0	U								0.0050	U					0.0050	U				
Natural Attenuation Parameters																											
Alkalinity (mg/l)	NS	NS	NS	71.0			67.0			76.0			85.0			45.0			43.0			46.0			44.0		
Chloride (mg/l)**	NS	NS	NS	44.0			43.0	B	H	50.0			53.0			2.3			2.9			2.3			3.0		
Ethane (µg/l)	NS	NS	NS										0.025	U					0.025	U					0.025	U	
Ethene (µg/l)	NS	NS	NS										1.0						0.45						0.28		
Iron, Ferrous (mg/l)	NS	NS	NS										1.0	U					1.0	U					1.0	U	
Methane (µg/l)	NS	NS	NS										20.0						3.3	J	H				2.8	J	H
Nitrate (mg/l)	10,000	**10,000**	NS	0.72			0.77			0.76			0.75			0.30			0.30			0.30			0.31		
Sulfate (mg/l)**	NS	NS	NS	38.0			56.0			72.0			71.0			8.0			7.8			7.8			7.8		
Sulfide (mg/l)	NS	NS	NS							0.20	U		0.20	UJ	L	0.20	U		0.20	UJ	L	0.20	U		0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS							280			330			130			110			42.0			110		
TKN (mg/l)	NS	NS	NS	0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U	
Total Organic Carbon (mg/l)	NS	NS	NS							1.2			1.0	U		1.0	U		1.0	U		1.0	U		1.0	U	

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Analytes	COPC Screening Levels			Concentrations in µg/l (except as noted)																										
				SH-05S												SH-06D									SH-06R-A					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/11/01			05/21/02			10/29/03			10/04/06			09/06/01			05/22/02			10/29/03			11/05/03			10/02/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																														
Aluminum	NS	**3,600**	NS	1,190			490			500	U		840			**3,880**	J	I	5,000	UJ	I	12,000	U		100	U		50.0	U	
Antimony	6	**1.5**	NS	11.1	U		**2.8**			1.0	U		**2.2**			**14.0**	J	I	**14.0**	J	I	**20.0**			1.0	U		0.50	U	
Arsenic	10	**0.045**	NS	**27.3**			**21.0**			**6.4**			**11.0**			**539**	J	I	**520**	J	H	**800**	J	H	**1.3**	J	L	**2.0**		
Barium	2,000	**260**	NS	11.4	J	I	10.0			9.1			9.3			5.8	J	I	25.0	UJ	I	12.0			27.0			13.0		
Beryllium	4	**7.3**	NS	1.1	U		0.56	U		1.0	U		0.20	U		1.1	UJ	I	5.0	UJ	I	5.0	U		1.0	U		0.20	U	
Cadmium	5	**1.8**	NS	1.1	U		0.11	U		1.0	U		0.15			1.1	UJ	I	0.50	UJ	I	5.0	U		1.0	U		0.10	U	
Calcium	NS	NS	NS	4,650	U		6,200			30,000			2,700	J	L	19,800	J	I	100,000	UJ	I	59,000			140,000			130,000		
Chromium†	100	**11**	NS	5.9	J	I	5.2	J	I	2.5			5.4			**11.3**	J	I	9.4	J	I	10.0			1.0	U		0.79		
Cobalt	NS	**73**	NS	2.3			1.6			1.0	U		2.0			6.2	J	I	6.5	UJ	I	5.0	U		16.0			17.0		
Copper‡	1,300	**150**	NS	24.5			12.0			6.7			29.0			108	J	I	56.0	J	I	61.0			9.9	U		11.0		
Iron	NS	**1,100**	NS	**2,080**	J	L	**1,200**			920			**2,100**			231	J	I	10,000	UJ	I	**1,600**			150			850		
Lead‡	15	NS	NS	25.7	J	I	23.0			12.0			26.0			10.5	J	I	17.0	J	I	6.8			1.0	U		0.50	U	
Magnesium	NS	NS	NS	562	U		2,200	U		5,300	J	H	410			1,390	UJ	I	50,000	UJ	I	12,000	U		44,000			39,000		
Manganese	NS	**88**	NS	**90.7**			**93.0**			**170**			**150**			**205**	J	I	180	UJ	I	**140**			**120**	B	H	**220**		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U	
Nickel	NS	**73**	NS	21.2			15.0			10.0	U		8.3			**261**	J	I	200	UJ	I	**230**			72.0			68.0		
Potassium	NS	NS	NS	1,040	U		1,100	U		3,100			400	UJ	I	7,330	J	I	25,000	UJ	I	12,000	U		2,200			1800		
Selenium	50	**18**	NS	2.4	J	H	1.1	U		1.0	U		1.3			11.7	J	I	7.4	J	I	7.3			4.3			8.1		
Silver	NS	**18**	NS	1.1	U		0.11	U		1.0	U		0.13			1.1	UJ	I	0.80	J	I	5.0	U		1.0	U		0.10	U	
Sodium	NS	NS	NS	660,000			590,000			230,000			260,000			7,190,000	J	I	5,500,000	J	I	8,300,000			38,000			34,000		
Thallium	2	**0.24**	NS	0.32	UJ	I	0.21	J	I	0.075	UJ	I	0.10	U		0.32	UJ	I	0.75	UJ	I	0.38	UJ	I	0.080	UJ	I	0.20	U	
Vanadium	NS	**3.6**	NS	**96.7**	J	H	**58.0**			**15.0**	J	I	**25.0**	J	L	**2,860**	J	I	**1,700**	J	H	**2,800**	J	H	1.5			2.2		
Zinc	NS	**1,100**	NS	11.8	U		11.0	U		20.0			9.6	U		12.9	UJ	I	50.0	UJ	I	50.0	U		12.0			5.8	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS		R		5.0	U								5.0	UJ	L	5.0	U					0.0050	U				
Natural Attenuation Parameters																														
Alkalinity (mg/l)	NS	NS	NS	1,200			1,200			540			610			17,000			13,000			18,000			150			160		
Chloride (mg/l)**	NS	NS	NS	22.0			23.0			5.9			6.6			120			140			130			150			150		
Ethane (µg/l)	NS	NS	NS										0.22	J	I													0.025	U	
Ethene (µg/l)	NS	NS	NS										0.48	J	I													3.7		
Iron, Ferrous (mg/l)	NS	NS	NS										1.0	UJ	L													1.0	U	
Methane (µg/l)	NS	NS	NS										1,600															2.7	J	H
Nitrate (mg/l)	10,000	**10,000**	NS	0.10	U		0.10	U		0.050	U		0.50	U		0.32			1.0	UJ	I	0.50	U		0.54			0.49		
Sulfate (mg/l)**	NS	NS	NS	28.0			18.0			8.2			10.0			150			180	J	L	180			30.0			200		
Sulfide (mg/l)	NS	NS	NS							0.20	UJ	L	0.20	U								0.20	UJ	L	0.20	U		0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS							730			870									32,000			860			790		
TKN (mg/l)	NS	NS	NS	1.3	J	I	1.1			5.0	U		0.70			8.7			5.6	J	I	5.8			0.50	U		0.50	U	
Total Organic Carbon (mg/l)	NS	NS	NS							9.9			7.2									74.0			3.0			3.3		

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Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l (except as noted)																										
	COPC Screening Levels			SH-06R-B						SH-06S									SH-07D								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/06/03			10/02/06			09/06/01			05/22/02			10/29/03			09/07/01			05/22/02			10/30/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																											
Aluminum	NS	**3,600**	NS	100	U		50.0	U		**10,200**			1,500	J	L	660			**19,900**	J	I	**21,000**	J	I	**30,000**		
Antimony	6	**1.5**	NS	1.0	U		0.50	U		11.1	U		**5.3**			**4.8**			50.0	UJ	I	**35.0**	J	I	**42.0**		
Arsenic	10	**0.045**	NS	**1.1**	J	L	**1.2**			**14.2**			8.4	U		**7.7**			**436**	J	I	**520**	J	H	**790**	J	H
Barium	2,000	**260**	NS	120			54.0			111			39.0	U		26.0			14.8	J	I	25.0	UJ	I	26.0		
Beryllium	4	**7.3**	NS	1.0	U		0.20	U		1.1	U		1.1	U		1.0	U		5.0	UJ	I	5.0	UJ	I	5.0	U	
Cadmium	5	**1.8**	NS	1.0	U		0.10	U		1.1	U		0.20			1.0	U		5.0	UJ	I	0.50	UJ	I	5.0	U	
Calcium	NS	NS	NS	120,000			79,000			11,800			18,000	UJ	I	19,000			70,800	J	I	100,000	UJ	I	60,000		
Chromium†	100	**11**	NS	1.0	U		0.61			**25.9**	J	I	10.0	J	I	7.0			**33.6**	J	I	**39.0**	J	I	**76.0**		
Cobalt	NS	**73**	NS	17.0			5.9			7.2			3.2	U		1.9			5.5	J	I	5.7	UJ	I	14.0		
Copper‡	1,300	**150**	NS	8.9	U		5.7			96.3			33.0			20.0			**400**	J	I	130	J	I	**190**		
Iron	NS	**1,100**	NS	50.0	U		500			**8,290**			**2,100**	J	L	**1,800**			250	UJ	I	10,000	UJ	I	**22,000**		
Lead‡	15	NS	NS	1.0	U		0.50	U		575			190			140			12.0	J	I	4.0	J	I	6.3		
Magnesium	NS	NS	NS	39,000			21,000			2,130			2,500	UJ	I	2,200	J	H	6,250	UJ	I	50,000	UJ	I	25,000	U	
Manganese	NS	**88**	NS	**380**			35.0			**241**			**320**			**120**			**595**	J	I	**580**	J	I	**1,700**		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.24			0.46			1.0	U	
Nickel	NS	**73**	NS	**95.0**			45.0			29.6	J	I	16.0	U		15.0			**164**	J	I	110	UJ	I	**150**		
Potassium	NS	NS	NS	5,900			3,600			4,620			4,300	U		6,300			44,100	J	I	43,000	J	I	20,000		
Selenium	50	**18**	NS	8.0			5.0			2.4			2.4			1.2			8.5	J	I	11.0	J	I	10.0		
Silver	NS	**18**	NS	1.0	U		0.10	U		1.1	U		0.13			1.0	U		5.0	UJ	I	1.0	J	I	5.0	U	
Sodium	NS	NS	NS	130,000			43,000			427,000			410,000			410,000			11,400,000	J	I	16,000,000	J	I	18,000,000		
Thallium	2	**0.24**	NS	0.080	UJ	I	0.20	U		0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	1.5	UJ	I	0.75	UJ	I	0.38	UJ	I
Vanadium	NS	**3.6**	NS	1.6			1.2			**68.5**			**28.0**			**30.0**	J	I	**2,290**	J	I	**2,400**	J	H	**3,400**	J	H
Zinc	NS	**1,100**	NS	10.0	U		6.7	U		182	UJ	I	79.0	U		42.0			165	UJ	I	50.0	UJ	I	58.0		
Cyanide (weak acid dissociable)*	200	**0.62**	NS	0.0050	U					5.0	U		5.0	U					5.0	UJ	L	5.0	U				
Natural Attenuation Parameters																											
Alkalinity (mg/l)	NS	NS	NS	190			130			880			810			850			29,000			36,000			48,000		
Chloride (mg/l)**	NS	NS	NS	150			99.0			20.0			15.0	B	H	9.4			250			290			440		
Ethane (µg/l)	NS	NS	NS				0.025	U																			
Ethene (µg/l)	NS	NS	NS				2.8																				
Iron, Ferrous (mg/l)	NS	NS	NS				1.0	U																			
Methane (µg/l)	NS	NS	NS				2.1	J	H																		
Nitrate (mg/l)	10,000	**10,000**	NS	1.6			0.87			0.10	U		0.10	U		0.050	U		1.0	U		2.2			2.2		
Sulfate (mg/l)**	NS	NS	NS	250			140			31.0			41.0	JB	I	30.0			190			220	J	L	290		
Sulfide (mg/l)	NS	NS	NS	0.20	U		0.20	UJ	L							0.20	UJ	L							0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS	900			540									1,000									78,000		
TKN (mg/l)	NS	NS	NS	0.50	U		0.50	U		4.2			5.9			4.1			5.0			3.1	J	I	6.0		
Total Organic Carbon (mg/l)	NS	NS	NS	4.9			2.5									34.0									75.0		

TABLE 9
Summary of Groundwater Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l (except as noted)																										
				SH-07S									SH-08D									SH-08S								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/07/01			05/22/02			10/29/03			09/07/01			05/20/02			10/29/03			09/06/01			05/21/02			10/28/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																														
Aluminum	NS	**3,600**	NS	539			400	J	L	500	U		**13,800**			3,300	J	L	**8,500**			55.6	U		11.0	U		500	U	
Antimony	6	**1.5**	NS	11.1	U		**5.5**			**4.1**			11.1	U		**1.9**			**1.6**			11.1	U		1.1	U		1.0	U	
Arsenic	10	**0.045**	NS	**2.3**			2.6	U		**2.5**			**15.5**			**18.0**			0.046	UJ	I	**7.4**			**0.79**			**4.5**		
Barium	2,000	**260**	NS	16.9			19.0	U		18.0			145			44.0	U		83.0			60.6			42.0			51.0		
Beryllium	4	**7.3**	NS	1.1	U		1.1	U		1.0	U		1.1	U		1.1	U		1.0	UJ	L	1.1	U		0.56	U		1.0	U	
Cadmium	5	**1.8**	NS	1.1	U		0.13			1.0	U		1.1	U		0.11	U		1.0	U		1.1	U		0.11	U		1.0	U	
Calcium	NS	NS	NS	7,050			21,000	UJ	I	14,000			4,530			5,500	UJ	I	14,000			37,200			52,000			50,000		
Chromium†	100	**11**	NS	9.0	J	I	5.5	J	I	4.4			**21.7**	J	I	7.2	J	I	**14.0**			1.3			5.5			1.0	U	
Cobalt	NS	**73**	NS	2.7			4.7	U		2.8			13.0			2.7	U		7.9			1.8			1.1	J	I	1.4		
Copper‡	1,300	**150**	NS	45.6			20.0			30.0			71.8			16.0			45.0			1.1	U		0.99	U		1.6	U	
Iron	NS	**1,100**	NS	**1,800**			720	J	L	**2,100**			**15,300**			**3,100**	J	L	**13,000**			**5,780**			**2,400**			**4,000**		
Lead‡	15	NS	NS	67.9			22.0			48.0			13.7			3.2			9.8			1.1	U		0.24	U		1.0	U	
Magnesium	NS	NS	NS	1,870			5,200	UJ	I	2,300	J	H	3,670			1,000	UJ	I	2,500	J	H	2,810			2,600			3,600	J	H
Manganese	NS	**88**	NS	**121**			130	U		**140**			**961**			**380**			**1,700**			**1,150**			**280**			**680**		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U	
Nickel	NS	**73**	NS	7.2	J	I	6.7	U		10.0	U		22.7	J	I	5.8	U		16.0			1.4			4.0			10.0	U	
Potassium	NS	NS	NS	3,000			3,400	U		4,800			2,720			1,400	U		2,800			6,780			7,400			9,100		
Selenium	50	**18**	NS	1.1	U		12.0			1.1			1.1	U		1.1	U		1.2			1.1	U		1.1	U		1.0	U	
Silver	NS	**18**	NS	1.1	U		0.11	U		1.0	U		1.1	U		0.23			1.0	U		1.1	U		0.11	U		1.0	U	
Sodium	NS	NS	NS	491,000			440,000			560,000			432,000			400,000			360,000			12,400			7,800			15,000	B	H
Thallium	2	**0.24**	NS	0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.32	UJ	I	0.17	UJ	I	0.075	UJ	I
Vanadium	NS	**3.6**	NS	**14.1**			**7.3**			**11.0**			**44.6**			**46.0**			**100**	J	I	11.1	U		1.1	U		1.0	U	
Zinc	NS	**1,100**	NS	52.9	UJ	I	47.0	U		42.0			54.5	UJ	I	13.0	U		33.0			11.1	U		11.0	U		10.0	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS	5.0	U		5.0	U					5.0	U		5.0	U					5.0	U		5.0	U				
Natural Attenuation Parameters																														
Alkalinity (mg/l)	NS	NS	NS	1,000			880			1,000			1,100			770			770			140			150			160		
Chloride (mg/l)**	NS	NS	NS	10.0			15.0	B	H	8.1			7.5			12.0	B	H	4.8			1.0			1.5	B	H	1.0	U	
Ethane (µg/l)	NS	NS	NS																											
Ethene (µg/l)	NS	NS	NS																											
Iron, Ferrous (mg/l)	NS	NS	NS																											
Methane (µg/l)	NS	NS	NS																											
Nitrate (mg/l)	10,000	**10,000**	NS	0.10	U		1.6			0.050	U		0.10	U		0.10	U		0.050	U		0.29			0.63			0.41	B	H
Sulfate (mg/l)**	NS	NS	NS	10.0			43.0	JB	I	4.4			2.0			3.1	JB	I	2.8			3.4			20.0			3.8		
Sulfide (mg/l)	NS	NS	NS							0.20	UJ	L							0.20	UJ	L							0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS							1,200									980									190		
TKN (mg/l)	NS	NS	NS	2.0			1.2			0.50	U		1.0	U		0.50	U		0.50	U		0.80			0.50	U		0.50	U	
Total Organic Carbon (mg/l)	NS	NS	NS							18.0									13.0									3.3		

TABLE 9
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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l (except as noted)																										
				SH-09D									SH-09S									SH-10S								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/07/01			05/23/02			10/28/03			09/07/01			05/17/02			10/31/03			09/10/01			05/23/02			10/31/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																														
Aluminum	NS	**3,600**	NS	1,120			1,300			1,400			1,570			730			460	J	L	55.6	U		47.0			93.0	J	L
Antimony	6	**1.5**	NS	11.1	U		**1.6**			**1.8**			11.1	U		1.1	U		1.0	U		11.1	U		1.1	U		1.0	U	
Arsenic	10	**0.045**	NS	**72.0**			**61.0**			**76.0**	J	H	**54.3**			**23.0**			**41.0**			**0.95**			2.0	UJ	I	**1.5**		
Barium	2,000	**260**	NS	5.5			5.6	U		7.5			16.2			14.0			8.5			81.1			180			88.0		
Beryllium	4	**7.3**	NS	1.1	U		1.1	U		1.0	U		1.1	U		1.1	U		1.0	U		1.1	U		0.56	U		1.0	U	
Cadmium	5	**1.8**	NS	1.1	U		0.11	U		1.0	U		1.1	U		0.11	U		1.0	U		1.1	U		0.11	U		1.0	U	
Calcium	NS	NS	NS	2,510			1,900			3,000	B	H	556	U		2,400			650			25,200	J	H	38,000	U		25,000		
Chromium†	100	**11**	NS	**34.1**	J	I	2.0			2.0			3.0	J	I	1.9			1.0	U		2.1	J	I	1.1	U		1.0	U	
Cobalt	NS	**73**	NS	1.3			0.87			1.3			1.1	U		1.3			1.0	U		2.7			5.3	U		1.0	U	
Copper‡	1,300	**150**	NS	33.4			20.0			26.0			49.8			28.0			29.0			1.6	U		1.2	U		2.6		
Iron	NS	**1,100**	NS	**1,210**			480			940			**1,260**			650			480			**4,710**			**24,000**			**5,000**		
Lead‡	15	NS	NS	1.1	U		0.57			1.4			2.8			1.4			1.0	U		1.6			1.4	U		3.9		
Magnesium	NS	NS	NS	55.6	U		560	U		500	U		276	U		840			140	J	L	4,780			5,800	U		4,400	J	L
Manganese	NS	**88**	NS	31.5			20.0			51.0			44.4			**190**			34.0			**542**			**1,200**			**130**		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	UJ	L	0.20	U		0.20	U		0.20	UJ	L
Nickel	NS	**73**	NS	6.6	J	I	3.7			10.0	U		2.0	J	I	2.3			10.0	U		2.8	J	I	3.2	U		10.0	U	
Potassium	NS	NS	NS	334	U		290			630	B	H	438	U		460			360	J	L	2,320			2,500	U		2,300	J	L
Selenium	50	**18**	NS	1.5			2.2			1.5			1.6			1.4			1.1			1.1	U		1.4			1.0	U	
Silver	NS	**18**	NS	1.1	U		0.40			1.0	U		1.1	U		0.11	U		1.0	U		1.1	U		0.11	U		1.0	U	
Sodium	NS	NS	NS	538,000			540,000			520,000			170,000			160,000			150,000			64,000			60,000	U		88,000		
Thallium	2	**0.24**	NS	0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.32	UJ	I	0.17	UJ	I	0.075	UJ	I
Vanadium	NS	**3.6**	NS	**255**			**190**			**260**	J	H	**57.0**			**30.0**			**48.0**			11.1	U		1.1	U		1.2		
Zinc	NS	**1,100**	NS	11.1	UJ	I	11.0	U		10.0	U		62.5	UJ	I	44.0			10.0	UJ	L	101	UJ	I	250	U		68.0	J	L
Cyanide (weak acid dissociable)*	200	**0.62**	NS	5.0	U		5.0	U					5.0	U		5.0	U					**6.8**			5.0	U				
Natural Attenuation Parameters																														
Alkalinity (mg/l)	NS	NS	NS	970			810			850			180			110			140			68.0			110			47.0		
Chloride (mg/l)**	NS	NS	NS	120			140			130			22.0			20.0			14.0			110			120	B	H	160		
Ethane (µg/l)	NS	NS	NS																											
Ethene (µg/l)	NS	NS	NS																											
Iron, Ferrous (mg/l)	NS	NS	NS																											
Methane (µg/l)	NS	NS	NS																											
Nitrate (mg/l)	10,000	**10,000**	NS	0.10	U		0.10	U		0.30	B	H	4.7			4.7			4.1			0.81			0.86			0.94		
Sulfate (mg/l)**	NS	NS	NS	92.0			86.0			68.0			110			140			120			13.0			8.0	B	H	10.0		
Sulfide (mg/l)	NS	NS	NS							0.20	UJ	L							0.20	U								0.20	U	
Total Dissolved Solids (mg/l)	NS	NS	NS							1,300									410									360		
TKN (mg/l)	NS	NS	NS	1.4			0.90			1.3			1.8			0.70			0.80			0.60			0.70			0.50	U	
Total Organic Carbon (mg/l)	NS	NS	NS							18.0									8.4									1.5		

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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l (except as noted)																													
	COPC Screening Levels			SH-11S									SH-12D									SH-12S								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/07/01			05/16/02			11/03/03			09/12/01			05/17/02			11/03/03			09/11/01			05/17/02			11/03/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																														
Aluminum	NS	**3,600**	NS	55.6	U		11.0	U		50.0	UJ	L	1,550			360			220	J	L	55.6	U		140			50.0	UJ	L
Antimony	6	**1.5**	NS	11.1	U		**3.2**			**4.5**			11.1	U		1.1	U		1.0	U		11.1	U		1.1	U		1.0	U	
Arsenic	10	**0.045**	NS	**3.2**			0.66	UJ	I	**0.37**	B	H	**0.52**			0.56	UJ	I	**0.25**	B	H	**5.5**			**5.4**	J	I	**11.0**	B	H
Barium	2,000	**260**	NS	138			230			**270**			15.6			13.0	U		10.0	B	H	190			210.0			250		
Beryllium	4	**7.3**	NS	1.1	U		0.56	U		1.0	U		1.1	U		0.56	U		1.0	U		1.1	U		0.56	U		1.0	U	
Cadmium	5	**1.8**	NS	1.1	U		**2.1**			**2.8**			1.1	U		0.11	U		1.0	U		1.1	U		0.11	U		1.0	U	
Calcium	NS	NS	NS	47,600			150,000			170,000			25,500	J	H	21,000	U		23,000	B	H	64,200	J	H	76,000			110,000		
Chromium†	100	**11**	NS	1.1	UJ	I	3.5			1.0	U		4.4	J	I	1.6			1.0	U		5.0	J	I	2.0			1.0	U	
Cobalt	NS	**73**	NS	1.1	U		0.40	U		1.0	U		2.5			1.0	U		1.0	U		5.4			7.8	U		12.0		
Copper‡	1,300	**150**	NS	1.1	U		4.1	U		5.1	B	H	3.6	U		1.1	U		2.0	B	H	1.1	U		2.8	U		1.8	B	H
Iron	NS	**1,100**	NS	**21,600**			**4,900**			**5,500**			**2,610**			760			570	B	H	**25,600**			**27,000**			**47,000**		
Lead‡	15	NS	NS	1.1	U		1.7	U		1.7			1.6			0.60	U		1.1			2.1			9.9			4.6		
Magnesium	NS	NS	NS	9,320			9,400	U		7,600	JB	I	6,640			6,200	U		6,400	JB	I	8,170			8,600	U		9,600	JB	I
Manganese	NS	**88**	NS	**2,400**			6.6	U		10.0	U		**983**			**390**			**120**			**2,620**			**2,600**			**2,800**		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	UJ	L	0.20	U		0.20	U		0.20	UJ	L	0.20	U		0.20	U		0.20	UJ	L
Nickel	NS	**73**	NS	1.9	J	I	29.0	U		34.0			4.2	J	I	2.4	U		10.0	U		5.7	J	I	6.1	U		10.0	U	
Potassium	NS	NS	NS	4,020			4,200	U		5,000	JB	I	2,130			1,200	U		1,200	JB	I	4,240			3,900	U		4,500	JB	I
Selenium	50	**18**	NS	1.1	U		7.7			12.0			1.1	U		1.1	U		1.0	U		1.1	U		1.3			1.0	U	
Silver	NS	**18**	NS	1.1	U		0.11	U		1.0	U		1.1	U		0.11	U		1.0	U		1.1	U		0.11	U		1.0	U	
Sodium	NS	NS	NS	24,200			11,000	U		7,300	B	H	15,400			16,000	U		19,000	B	H	47,100			37,000	U		30,000		
Thallium	2	**0.24**	NS	0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.3	UJ	I	0.17	UJ	I	0.075	UJ	I	0.32	UJ	I	0.17	UJ	I	0.075	UJ	I
Vanadium	NS	**3.6**	NS	11.1	U		1.1	U		1.0	U		11.1	U		1.1	U		1.0	U		11.1	U		1.1	U		1.0	U	
Zinc	NS	**1,100**	NS	29.5	UJ	I	6,800			7,700	J	L	22.4	UJ	I	11.0	U		10.0	JB	I	1,050	J	I	1,100			1,800	J	L
Cyanide (weak acid dissociable)*	200	**0.62**	NS	5.0	U		5.0	U					5.0	U		5.0	U					5.0	U		5.0	U				
Natural Attenuation Parameters																														
Alkalinity (mg/l)	NS	NS	NS	180			360			360			59.0			45.0	B	H	36.0	B	H	200			210			280		
Chloride (mg/l)**	250,000	NS	NS	40.0			28.0	B	H	7.8	B	H	44.0			42.0	B	H	52.0	B	H	76.0			77.0	B	H	57.0	B	H
Ethane (µg/l)	NS	NS	NS																											
Ethene (µg/l)	NS	NS	NS																											
Iron, Ferrous (mg/l)	NS	NS	NS																											
Methane (µg/l)	NS	NS	NS																											
Nitrate (mg/l)	10,000	**10,000**	NS	0.10	U		5.6			6.9	B	H	0.69			0.73			1.4	B	H	0.10	U		0.10	U		0.050	U	
Sulfate (mg/l)**	250,000	NS	NS	1.1			39.0			35.0	B	H	12.0			10.0	B	H	10.0	B	H	13.0			15.0	B	H	10.0	B	H
Sulfide (mg/l)	NS	NS	NS							0.20	U								0.20	UJ	L							0.20	U	
Total Dissolved Solids (mg/l)	NS	NS	NS							500									200									430		
TKN (mg/l)	NS	NS	NS	1.8			0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		1.1			0.90			1.4	B	H
Total Organic Carbon (mg/l)	NS	NS	NS							4.0									1.0	U								5.8		

TABLE 9
Summary of Groundwater Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l (except as noted)																										
	COPC Screening Levels			SH-13S												SH-14D											
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/11/01			05/16/02			11/03/03			09/29/06			09/10/01			05/20/02			11/04/03			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																											
Aluminum	NS	**3,600**	NS	114	J	I	200			1,200	J	L	67.0			112			280			96.0	J	L	50.0	U	
Antimony	6	**1.5**	NS	11.1	U		1.1	U		1.0	U		0.50	U		11.1	U		1.1	U		1.0	U		0.50	U	
Arsenic	10	**0.045**	NS	**3.3**			2.6	UJ	I	**5.6**	B	H	**11.0**			**0.46**	J	I	0.81	UJ	I	**1.7**			**0.99**		
Barium	2,000	**260**	NS	188			91.0			140			190			9.1			10.0	U		5.7			4.3		
Beryllium	4	**7.3**	NS	1.1	U		0.56	U		1.0	U		0.20	U		1.1	U		0.56	U		1.0	U		0.20	U	
Cadmium	5	**1.8**	NS	1.1	U		0.11	U		1.0	U		0.41			1.1	U		0.11	U		1.0	U		0.10	U	
Calcium	NS	NS	NS	94,400	J	H	72,000			98,000			100,000			12,100	J	H	11,000	U		14,000			12,000		
Chromium†	100	**11**	NS	**35.4**	J	I	2.2			2.6			0.64			1.1	UJ	I	1.1	U		1.0	U		0.55		
Cobalt	NS	**73**	NS	1.7			0.96	U		1.9	B	H	1.8			1.1	U		0.16	U		1.0	U		0.20	U	
Copper‡	1,300	**150**	NS	2.1	U		1.2	U		11.0	B	H	6.1			1.1	U		0.88	U		1.2			1.0	U	
Iron	NS	**1,100**	NS	**26,200**			**26,000**			**36,000**			**23,000**			148	U		220			280			120		
Lead‡	15	NS	NS	8.4			15.0			160			53.0			1.1	U		0.21	U		1.0	U		0.50	U	
Magnesium	NS	NS	NS	25,300			17,000			17,000	JB	I	15,000			5,460			5,300	U		5,100	J	L	5,400		
Manganese	NS	**88**	NS	**1,520**			**1,800**			**1,500**			**820**			11.1	U		12.0	U		10.0	U		5.0	U	
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	UJ	L	0.20	U		0.20	U		0.20	U		0.20	UJ	L	0.20	U	
Nickel	NS	**73**	NS	4.1	J	I	2.7	U		10.0	U		12.0			1.1	UJ	I	1.2	U		10.0	U		0.93		
Potassium	NS	NS	NS	4,230			3,700	U		4,200	JB	I	4,800			630	U		590	U		540	J	L	660		
Selenium	50	**18**	NS	1.4			1.5			1.0	U		1.1			1.1	U		1.1	U		1.0	U		1.0	U	
Silver	NS	**18**	NS	1.1	U		0.11	U		1.0	U		0.10	U		1.1	U		0.11	U		1.0	U		0.10	U	
Sodium	NS	NS	NS	14,400			14,000	U		17,000	B	H	13,000			13,600			14,000	U		20,000			15,000		
Thallium	2	**0.24**	NS	0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.20	U		0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.20	U	
Vanadium	NS	**3.6**	NS	11.1	U		1.4			**4.3**			3.4			11.1	U		2.5			**5.9**			2.3		
Zinc	NS	**1,100**	NS	285	UJ	I	82.0	U		890.0	J	L	5,300			29.2	UJ	I	11.0	U		10.0	UJ	L	5.0	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS	5.0	U		5.0	U								**6.8**			5.0	U							
Natural Attenuation Parameters																											
Alkalinity (mg/l)	NS	NS	NS	330			280			260			320			34.0			36.0	B	H	46.0			40.0		
Chloride (mg/l)**	250,000	NS	NS	27.0			31.0	B	H	33.0	B	H	29.0			33.0			28.0	B	H	27.0			32.0		
Ethane (µg/l)	NS	NS	NS										0.043												0.025	U	
Ethene (µg/l)	NS	NS	NS										0.029	J	H										1.2		
Iron, Ferrous (mg/l)	NS	NS	NS										0.40	J	I										1.0	U	
Methane (µg/l)	NS	NS	NS										2,000												1.1	J	H
Nitrate (mg/l)	10,000	**10,000**	NS	0.10	U		0.31			0.20	B	H	0.10	U		0.30			0.40			0.45			0.44		
Sulfate (mg/l)**	250,000	NS	NS	1.0	U		4.1	B	H	3.9	B	H	5.8			8.5			8.2	B	H	10.0			7.3		
Sulfide (mg/l)	NS	NS	NS							0.20	U		0.20	UJ	L							0.20	U		0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS							370			390									120			150		
TKN (mg/l)	NS	NS	NS	1.5			1.1			1.3	B	H	1.1			0.50	U		0.50	U		0.50	U		0.50	U	
Total Organic Carbon (mg/l)	NS	NS	NS							5.5			5.3									1.0	U		1.0	U	

TABLE 9
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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l (except as noted)																							
				SH-14S												SH-15D											
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/10/01			05/20/02			11/04/03			09/29/06			09/10/01			05/17/02			11/04/03			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																											
Aluminum	NS	**3,600**	NS	85.3			78.0			97.0	J	L	50.0	U		379			520			270	J	L	730		
Antimony	6	**1.5**	NS	11.1	U		1.1	U		1.0	U		0.50	U		11.1	U		1.1	U		1.0	U		0.50	U	
Arsenic	10	**0.045**	NS	**1.4**			**4.9**			**4.6**			**2.1**			**0.50**			0.29	UJ	I	**0.18**	J	L	**0.60**		
Barium	2,000	**260**	NS	31.7			23.0			30.0			22.0			13.9			15.0	U		13.0			16.0		
Beryllium	4	**7.3**	NS	1.1	U		1.1	U		1.0	U		0.20	U		1.1	U		0.56	U		1.0	U		0.20	U	
Cadmium	5	**1.8**	NS	1.1	U		0.11	U		1.0	U		0.10	U		1.1	U		0.11	U		1.0	U		0.10	U	
Calcium	NS	NS	NS	45,800			49,000			50,000			50,000			11,900	J	H	11,000	U		13,000			13,000	J	L
Chromium†	100	**11**	NS	1.8	J	I	2.0			1.0	U		0.50	U		4.7	J	I	1.2			1.0	U		1.6		
Cobalt	NS	**73**	NS	3.1			1.3			1.3			1.0			1.2			1.4	U		1.3			1.4		
Copper‡	1,300	**150**	NS	2.0	U		4.0			3.0			2.1			1.1	U		1.2	U		1.9			2.0	U	
Iron	NS	**1,100**	NS	**2,480**			**2,500**			**12,000**			**2,800**			616	U		730			590			**1,300**		
Lead‡	15	NS	NS	1.1	U		0.36			1.0	U		0.50	U		1.1	U		0.55	U		1.0	U		1.2		
Magnesium	NS	NS	NS	26,300			27,000			23,000	J	L	24,000			5,180			4,900	U		4,800	J	L	5,400		
Manganese	NS	**88**	NS	**1,670**			**1,800**			**2,000**			**2,300**			76.8			110	U		83.0			52.0		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	UJ	L	0.20	U		0.20	U		0.20	U		0.20	UJ	L	0.20	U	
Nickel	NS	**73**	NS	4.6	J	I	7.0			10.0	U		6.0			2.3	J	I	2.2	U		10.0	U		2.5		
Potassium	NS	NS	NS	2,540			2,400			1,700	J	L	1,900			950	U		830	U		840	J	L	1,000		
Selenium	50	**18**	NS	1.1	U		1.1			1.0	U		1.0	U		1.1	U		1.1	U		1.0	U		1.0	U	
Silver	NS	**18**	NS	1.1	U		0.11	U		1.0	U		0.10	U		1.1	U		0.11	U		1.0	U		0.10	U	
Sodium	NS	NS	NS	34,700			65,000			32,000			31,000			14,300			14,000	U		16,000			16,000		
Thallium	2	**0.24**	NS	0.32	UJ	I	0.17	J	I	0.075	UJ	I	0.20	U		0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.10	U	
Vanadium	NS	**3.6**	NS	11.1	U		**7.2**			**6.1**			3.0			11.1	U		1.5			1.0	U		2.1		
Zinc	NS	**1,100**	NS	11.1	UJ	I	11.0	U		10.0	UJ	L	5.0	U		84.8	UJ	I	11.0	U		10.0	UJ	L	11.0	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS	5.0	U		5.0	U								5.0	U		5.0	U							
Natural Attenuation Parameters																											
Alkalinity (mg/l)	NS	NS	NS	240			270			220			250			33.0			28.0	B	H	18.0			30.0		
Chloride (mg/l)**	250,000	NS	NS	36.0			38.0			37.0			41.0			34.0			28.0	B	H	31.0			41.0		
Ethane (µg/l)	NS	NS	NS										0.025	U											0.025	U	
Ethene (µg/l)	NS	NS	NS										1.7	J	I										0.025	U	
Iron, Ferrous (mg/l)	NS	NS	NS										1.0	U											1.0	U	
Methane (µg/l)	NS	NS	NS										58.0												1.7	J	H
Nitrate (mg/l)	10,000	**10,000**	NS	0.20			0.32			0.40			0.40			0.58			0.66			0.71			0.72		
Sulfate (mg/l)**	250,000	NS	NS	31.0			33.0			27.0			25.0			11.0			10.0	B	H	9.7			8.9		
Sulfide (mg/l)	NS	NS	NS							0.20	U		0.20	UJ	L							0.20	U		0.23	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS							280			400									110			140		
TKN (mg/l)	NS	NS	NS	0.50			0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U	
Total Organic Carbon (mg/l)	NS	NS	NS							4.0			3.9									1.0	U		1.0	U	

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Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l (except as noted)																										
				SH-15S												SH-16S									SH-17D					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/10/01			05/20/02			10/28/03			10/03/06			09/11/01			05/17/02			11/19/03			11/20/03			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																														
Aluminum	NS	**3,600**	NS	735			2,500			500	U		1,000			1,210			1,700			630	J	L	540			1,000	U	
Antimony	6	**1.5**	NS	11.1	U		1.1	U		1.0	U		0.65			11.10	U		1.1	U		1.0	U		**3.6**			**2.1**		
Arsenic	10	**0.045**	NS	**16.5**			**19.0**			**13.0**			**12.0**			**17.4**			**4.7**	J	I	**4.0**			**69.0**			**52.0**		
Barium	2,000	**260**	NS	18.6			180			18.0			3.6			10.6			9.1	U		7.7			5.7			2.9		
Beryllium	4	**7.3**	NS	1.1	U		1.1	U		1.0	U		0.20	U		1.1	U		0.56	U		1.0	U		1.0	U		0.20	U	
Cadmium	5	**1.8**	NS	1.1	U		0.11	U		1.0	U		0.10	U		1.1	U		0.11	U		1.0	U		1.0	U		0.15		
Calcium	NS	NS	NS	9,220			56,000			12,000			3,900	J	L	5,170	J	H	1,200	U		3,200			5,200			2,800	J	L
Chromium†	100	**11**	NS	6.1	J	I	4.8			2.6			2.5	U		4.8	J	I	4.3			1.4			1.1			2.5	U	
Cobalt	NS	**73**	NS	1.1	U		0.91			1.0	U		0.32			1.3			0.70	U		1.0	U		1.8			0.81		
Copper‡	1,300	**150**	NS	14.7	U		35.0			9.8			15.0			15.1			7.3	U		12.0			38.0			41.0		
Iron	NS	**1,100**	NS	692			**1,300**			560			250	U		961	U		730			500			610			430		
Lead‡	15	NS	NS	5.1			34.0			3.5			0.92			1.6			2.1	U		2.5			5.2			2.0		
Magnesium	NS	NS	NS	224	U		560	U		500	U		94.0			1,250			290	U		440	J	L	1,000	U		200	U	
Manganese	NS	**88**	NS	28.5			36.0			22.0			25.0	U		**102**			16.0	U		24.0			61.0			30.0		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	UJ	L	0.20	U		0.20	U	
Nickel	NS	**73**	NS	10.6	J	I	9.6			10.0	U		3.0			5.5	J	I	2.7	U		10.0	U		14.0			6.2		
Potassium	NS	NS	NS	2,200			3,200			1,500	B	H	710	UJ	I	1,630			1,000	U		1,400	J	L	2,000			570	UJ	I
Selenium	50	**18**	NS	1.8			1.3			1.3			1.7			2.0			1.2			1.0	U		2.1			2.6		
Silver	NS	**18**	NS	1.1	U		0.11	U		1.0	U		0.10	U		1.1	U		0.11	U		1.0	U		1.0	U		0.47		
Sodium	NS	NS	NS	419,000			180,000			370,000			200,000			169,000			110,000	U		190,000			610,000			460,000		
Thallium	2	**0.24**	NS	0.32	UJ	I	0.20	J	I	0.075	UJ	I	0.10	U		0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.075	UJ	I	0.10	U	
Vanadium	NS	**3.6**	NS	**44.7**			**44.0**			**26.0**			**37.0**	J	L	**57.3**			**16.0**			**11.0**			**220**			**220**	J	L
Zinc	NS	**1,100**	NS	11.1	UJ	I	11.0	U		18.0	B	H	5.0	U		91.6	UJ	I	54.0	U		10.0	UJ	L	10.0	U		5.9	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS	5.0	U		5.0	U								5.0	U		5.0	U					0.0050	U				
Natural Attenuation Parameters																														
Alkalinity (mg/l)	NS	NS	NS	840			400			790			340			310			180			310			1,200			900		
Chloride (mg/l)**	250,000	NS	NS	38.0			21.0			41.0			23.0			34.0			31.0	B	H	9.5			27.0			16.0		
Ethane (µg/l)	NS	NS	NS										0.071															0.48		
Ethene (µg/l)	NS	NS	NS										0.025	U														0.033		
Iron, Ferrous (mg/l)	NS	NS	NS										1.0	UJ	L													1.0	U	
Methane (µg/l)	NS	NS	NS										1,700															3,800		
Nitrate (mg/l)	10,000	**10,000**	NS	0.10	U		0.10	U		0.050	U		0.50	U		0.10	U		1.1			0.28			0.050	U		0.50	U	
Sulfate (mg/l)**	250,000	NS	NS	18.0			13.0			15.0			9.0			38.0			16.0	B	H	21.0			69.0			33.0		
Sulfide (mg/l)	NS	NS	NS							0.36	J	L	0.20	U								0.20	U		0.20	UJ	L	0.20	U	
Total Dissolved Solids (mg/l)	NS	NS	NS							1,000			630									400			1,800			1,600		
TKN (mg/l)	NS	NS	NS	2.6			1.2			1.7			1.0			0.90			0.70			0.50	U		1.8			1.1		
Total Organic Carbon (mg/l)	NS	NS	NS							14.0			6.3									6.8			12.0			8.9		

TABLE 9
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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l (except as noted)																										
				SH-17R						SH-17S												SH-18D								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/20/03			09/29/06			09/06/01			05/20/02			11/19/03			09/29/06			09/04/01			05/15/02			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																														
Aluminum	NS	**3,600**	NS	500	U		1,000	U		55.6	U		14.0			50.0	UJ	L	50.0	U		55.6	U		13.0			50.0	U	
Antimony	6	**1.5**	NS	**1.6**			**2.0**			11.1	U		1.1	U		1.0	U		0.50	U		11.1	U		1.1	U		0.50	U	
Arsenic	10	**0.045**	NS	**48.0**			**63.0**			**0.31**	J	I	0.32	U		**0.14**	J	L	**0.24**	J	I	**0.53**			**0.78**			**1.0**		
Barium	2,000	**260**	NS	14.0			3.3			23.8			43.0			27.0			21.0			16.2			17.0			17.0		
Beryllium	4	**7.3**	NS	1.0	U		0.20	U		1.10	U		0.56	U		1.0	U		0.20	U		1.1	U		0.56	U		0.20	U	
Cadmium	5	**1.8**	NS	1.0	U		0.16			1.10	U		0.11	U		1.0	U		0.10	U		1.1	U		0.11	U		0.10	U	
Calcium	NS	NS	NS	48,000			13,000	J	L	20,100			29,000			36,000			22,000	J	L	26,500			25,000			24,000	J	L
Chromium†	100	**11**	NS	1.0	U		2.5	U		1.1	U		1.2			1.0	U		0.50	U		1.1	U		1.1	U		0.62		
Cobalt	NS	**73**	NS	6.4			2.8			1.1	U		0.26	UJ	I	1.0	U		0.20	U		1.1	U		0.13	UJ	I	5.40		
Copper‡	1,300	**150**	NS	18.0			31.0			1.1	U		1.7	U		1.4			2.0	U		1.1	U		0.56	U		2.0	U	
Iron	NS	**1,100**	NS	530			360			106			91.0			290			120			96.3			85.0			160		
Lead‡	15	NS	NS	1.9			1.2			1.1	U		0.12	U		1.0	U		0.50	U		1.10	U		0.11	U		0.64		
Magnesium	NS	NS	NS	14,000	J	H	3,200			3,120			6,800			3,500	J	L	2,400			10,700			9,600			9,200		
Manganese	NS	**88**	NS	**470**			**93.0**			29.2	U		1.4	U		11.0			5.6			**130**			24.0			5.0	U	
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	U		0.20	U		0.20	UJ	L	0.20	U		0.20	U		0.20	U		0.20	U	
Nickel	NS	**73**	NS	30.0			14.0			1.2			1.4			10.0	U		2.0	U		1.4			1.4			2.0	U	
Potassium	NS	NS	NS	2,300			670	UJ	I	1,290			1,300			860	J	L	1,000			1,320			1,200			1,200		
Selenium	50	**18**	NS	3.0			5.1			2.1			3.8			1.4			1.5			1.1	U		1.4			1.0	U	
Silver	NS	**18**	NS	1.0	U		0.39			1.10	U		0.11	U		1.0	U		0.10	U		1.1	U		0.11	U		0.10	U	
Sodium	NS	NS	NS	400,000			480,000			3,680			64,000			23,000			3,700			29,300			28,000			28,000		
Thallium	2	**0.24**	NS	0.075	UJ	I	0.10	U		0.32	UJ	I	0.17	UJ	I	0.075	UJ	I	0.10	U		**0.44**	J	I	0.17	J	I	0.10	U	
Vanadium	NS	**3.6**	NS	**170**			**240**	J	L	11.1	U		1.3			1.0	U		1.0			11.1	U		1.1	U		1.9		
Zinc	NS	**1,100**	NS	10.0	U		5.0	U		11.1	U		32.0	U		10.0	UJ	L	5.0	U		81.5	U		11.0	U		5.0	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS	0.0050	U					5.0	U		5.0	U								5.0	U		5.0	U				
Natural Attenuation Parameters																														
Alkalinity (mg/l)	NS	NS	NS	600			980			51.0			190			99.0			67.0			25.0			23.0			26.0		
Chloride (mg/l)**	250,000	NS	NS	81.0			55.0			3.6			5.9	B	H	3.1			2.8			76.0			91.0			93.0		
Ethane (µg/l)	NS	NS	NS				0.70												0.025	U								0.025	U	
Ethene (µg/l)	NS	NS	NS				0.26												0.025	U								0.025	U	
Iron, Ferrous (mg/l)	NS	NS	NS				1.0	UJ	L										1.0	U								1.0	U	
Methane (µg/l)	NS	NS	NS				2,900												0.47	J	H							2.9	J	H
Nitrate (mg/l)	10,000	**10,000**	NS	0.050	U		0.50	U		0.61			0.10	U		0.23			0.31			1.7			1.6			1.50		
Sulfate (mg/l)**	250,000	NS	NS	210			130			13.0			21.0			19.0			12.0			17.0			15.0			14.0		
Sulfide (mg/l)	NS	NS	NS	0.20	UJ	L	0.20	U								0.20	U		0.20	UJ	L							0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS	1,300			2,000									150			130									290		
TKN (mg/l)	NS	NS	NS	0.90			1.3			0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U	
Total Organic Carbon (mg/l)	NS	NS	NS	13.0			14.0									1.5			1.2									1.0	U	

TABLE 9
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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l (except as noted)																										
				SH-18S									SH-19D									SH-19R								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/04/01			05/15/02			09/29/06			09/05/01			05/16/02			09/29/06			09/05/01			05/16/02			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																														
Aluminum	NS	**3,600**	NS	55.6	U		15.0			50.0	U		326			180			50.0	U		992			170			66.0		
Antimony	6	**1.5**	NS	11.1	U		1.1	U		0.50	U		11.1	U		1.1	U		0.50	U		11.1	U		1.1	U		0.50	U	
Arsenic	10	**0.045**	NS	**0.37**	J	I	**0.67**			**0.74**			**0.68**			**0.80**			**0.97**			**13.5**			**12.0**			**13.0**		
Barium	2,000	**260**	NS	56.7			77.0			56.0			23.1			20.0			22.0			9.2			5.6	U		4.1		
Beryllium	4	**7.3**	NS	1.1	U		0.56	U		0.20	U		1.1	U		0.56	U		0.20	U		1.1	U		0.56	U		0.20	U	
Cadmium	5	**1.8**	NS	1.1	U		0.17			0.10	U		1.1	U		0.11	U		0.10	U		1.1	U		0.11	U		0.10	U	
Calcium	NS	NS	NS	23,900			33,000			20,000	J	L	23,700			20,000			20,000	J	L	12,000			12,000			12,000		
Chromium†	100	**11**	NS	1.1	U		1.1	U		0.50	U		1.8			1.2			0.69			1.3			1.1	U		0.56		
Cobalt	NS	**73**	NS	2.2			1.9	J	I	0.38			1.7			0.61	UJ	I	0.22			1.1	U		0.21	UJ	I	0.20	U	
Copper‡	1,300	**150**	NS	1.1	U		0.91	U		2.0	U		1.3	U		1.0	U		2.0	U		1.1	U		0.62	U		1.0	U	
Iron	NS	**1,100**	NS	149			110			200			675			280			160			782			190			260		
Lead‡	15	NS	NS	1.1	U		0.15	U		0.50	U		1.1	U		0.24	U		0.50	U		1.3			0.30	U		0.50	U	
Magnesium	NS	NS	NS	6,550			8,300			5,200			8,480			7,400			7,100			2,940			2,600			2,700		
Manganese	NS	**88**	NS	**456**			**420**			**95.0**			**485**			**190**			46.0			30.6	U		12.0	U		15.0		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U	
Nickel	NS	**73**	NS	3.0			2.8			2.0	U		3.5			2.3			2.0	U		1.3			0.70			0.72		
Potassium	NS	NS	NS	3,350			3,700			3,100			1,780			1,300			1,300			658	U		420	U		440		
Selenium	50	**18**	NS	1.1	U		1.8			1.0	U		1.1	U		1.2			1.0	U		1.1	U		1.1	U		1.0	U	
Silver	NS	**18**	NS	1.1	U		0.11	U		0.10	U		1.1	U		0.11	U		0.10	U		1.1	U		0.11	U		0.10	U	
Sodium	NS	NS	NS	34,700			39,000			35,000			36,100			31,000			34,000			6,690			6,100			6,000		
Thallium	2	**0.24**	NS	**0.36**	J	I	0.20	J	I	0.10	U		0.32	UJ	I	0.21	J	I	0.10	U		0.32	UJ	I	0.17	UJ	I	0.20	U	
Vanadium	NS	**3.6**	NS	11.1	U		1.1			2.4			11.1	U		1.1	U		2.3			11.1	U		1.1	U		1.0	U	
Zinc	NS	**1,100**	NS	11.1	U		170			5.0	U		90.0	U		11.0	U		6.5	U		64.2	U		41.0	U		15.0	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS	5.0	U		5.0	U					5.0	U		5.0	U					5.0	U		5.0	U				
Natural Attenuation Parameters																														
Alkalinity (mg/l)	NS	NS	NS	52.0			41.0			42.0			24.0			13.0			16.0			43.0			54.0			42.0		
Chloride (mg/l)**	250,000	NS	NS	60.0			110			77.0			83.0			83.0			99.0			2.9			2.4	B	H	2.2		
Ethane (µg/l)	NS	NS	NS							0.025	U								0.025	U								0.042		
Ethene (µg/l)	NS	NS	NS							0.029									0.025	U								0.043	J	H
Iron, Ferrous (mg/l)	NS	NS	NS							1.0	U								1.0	U								1.0	U	
Methane (µg/l)	NS	NS	NS							4.5									0.49	J	H							2.9	J	H
Nitrate (mg/l)	10,000	**10,000**	NS	0.41			0.77			0.44			1.6			1.4			1.4			0.28			0.29			0.28		
Sulfate (mg/l)**	250,000	NS	NS	21.0			15.0			15.0			18.0			16.0			14.0			9.2			7.7			7.7		
Sulfide (mg/l)	NS	NS	NS							0.20	UJ	L							0.20	UJ	L							0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS							220									320									78.0		
TKN (mg/l)	NS	NS	NS	0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U	
Total Organic Carbon (mg/l)	NS	NS	NS							1.7									1.0	U								1.0	U	

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Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l (except as noted)																										
	COPC Screening Levels			SH-19S									SH-20S						SH-21S								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/05/01			05/21/02			09/29/06			09/05/01			05/17/02			09/06/01			05/16/02			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																											
Aluminum	NS	**3,600**	NS	55.6	U		200	J	I	50.0	U		55.6	U		23.0			55.6	U		590			140		
Antimony	6	**1.5**	NS	11.1	U		1.10	U		0.50	U		11.10	U		1.1	U		11.1	U		1.1	U		0.50	U	
Arsenic	10	**0.045**	NS	**3.7**			**3.9**	J	I	**2.3**			**5.1**			**4.1**			**0.40**	J	I	**1.3**			**0.97**		
Barium	2,000	**260**	NS	45.3			46.0			18.0			77.5			85.0			52.6			61.0			50.0		
Beryllium	4	**7.3**	NS	1.1	U		0.56	U		0.20	U		1.10	U		0.56	U		1.1	U		0.56	U		0.20	U	
Cadmium	5	**1.8**	NS	1.1	U		0.25			0.10	U		1.10	U		0.11	U		1.1	U		0.11	U		0.10	U	
Calcium	NS	NS	NS	31,800			40,000			20,000	J	L	27,400			30,000			19,500			21,000			18,000	J	L
Chromium†	100	**11**	NS	**17.2**	J	I	1.6			0.50	U		1.1	U		1.1	U		1.1	U		1.8			1.0		
Cobalt	NS	**73**	NS	2.9			6.0	J	I	0.78			1.1	U		1.6	J	I	1.1	U		1.1	J	I	0.52		
Copper‡	1,300	**150**	NS	1.3	U		24.0			11.0			1.1	U		0.86	U		1.4	U		3.7	U		4.0		
Iron	NS	**1,100**	NS	**12,700**			**11,000**			**9,500**			**6,070**			**5,100**			192			710			420		
Lead‡	15	NS	NS	1.1	U		0.14	U		0.50	U		1.1	U		0.14	U		1.1	U		3.0	U		3.8		
Magnesium	NS	NS	NS	11,500			14,000			8,200			6,730			7,400			6,700			7,200			5,800		
Manganese	NS	**88**	NS	**414**			**420**			**220**			**209**			**210**			11.1	U		12.0	U		5.0	U	
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U	
Nickel	NS	**73**	NS	6.7			17.0			2.4			3.0			1.9			2.1			2.9			2.0	U	
Potassium	NS	NS	NS	4,550			5,200			4,000			3,680			4,000			1,640			1,600			1,500		
Selenium	50	**18**	NS	1.1	U		2.5			1.0	U		1.1	U		2.1			1.2			1.7			1.0	U	
Silver	NS	**18**	NS	1.1	U		0.11	U		0.10	U		1.1	U		0.11	U		1.1	U		0.11	U		0.10	U	
Sodium	NS	NS	NS	47,700			51,000			41,000			40,200			40,000			48,300			47,000			46,000		
Thallium	2	**0.24**	NS	**0.35**	J	I	0.24	J	I	0.10	U		0.32	UJ	I	0.19	J	I	0.32	UJ	I	0.19	J	I	0.10	U	
Vanadium	NS	**3.6**	NS	11.1	U		1.1	U		1.0	U		11.1	U		1.1	U		11.1	U		3.5			3.2		
Zinc	NS	**1,100**	NS	71.3	U		170			31.0	U		11.5	U		11.0	U		49.7	U		31.0	U		5.1	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS	5.0	U		5.0	U					5.0	U		5.0	U		5.0	U		5.0	U				
Natural Attenuation Parameters																											
Alkalinity (mg/l)	NS	NS	NS	64.0			40.0			56.0			48.0			42.0			13.0			26.0			34.0		
Chloride (mg/l)**	250,000	NS	NS	58.0			110			73.0			52.0			97.0			87.0			86.0			100		
Ethane (µg/l)	NS	NS	NS							0.15															0.025	U	
Ethene (µg/l)	NS	NS	NS							0.18															0.025	U	
Iron, Ferrous (mg/l)	NS	NS	NS							1.0	U														1.0	U	
Methane (µg/l)	NS	NS	NS							98.0															7.0		
Nitrate (mg/l)	10,000	**10,000**	NS	0.53			1.0			0.81			0.10	U		0.10	U		1.6			3.7			1.2		
Sulfate (mg/l)**	250,000	NS	NS	37.0			100			39.0			35.0			33.0			20.0			23.0			14.0		
Sulfide (mg/l)	NS	NS	NS							0.20	UJ	L													0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS							250															240		
TKN (mg/l)	NS	NS	NS	0.80			0.50	U		0.80			0.50	U		0.50	U		0.50	U		0.50	U		0.50	U	
Total Organic Carbon (mg/l)	NS	NS	NS							3.0															1.3		

TABLE 9
Summary of Groundwater Data - Inorganic Parameters
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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l (except as noted)																										
				SH-22S									SH-23S												SH-24R					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/05/01			05/17/02			09/25/06			09/04/01			05/15/02			11/04/03			09/29/06			11/06/03			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																														
Aluminum	NS	**3,600**	NS	55.6	U		36.0			50.0	U		519			130			690	J	L	100			410			50.0	U	
Antimony	6	**1.5**	NS	11.1	U		1.1	U		0.50	U		11.1	U		1.1	U		1.0	U		0.50	U		1.0	U		0.50	U	
Arsenic	10	**0.045**	NS	**0.36**	J	I	0.57	U		**0.83**			**0.71**			**0.73**			**0.82**			**0.76**			**0.63**	J	L	**0.75**		
Barium	2,000	**260**	NS	35.7			34.0			45.0			25.0			18.0			32.0			20.0			3.0			0.72		
Beryllium	4	**7.3**	NS	1.1	U		0.56	U		0.20	U		1.1	U		0.56	U		1.0	U		0.20	U		1.0	U		0.20	U	
Cadmium	5	**1.8**	NS	1.1	U		0.11	U		0.10	U		1.1	U		0.11	U		1.0	U		0.10	U		1.0	U		0.10	U	
Calcium	NS	NS	NS	21,200			16,000			22,000	J	L	34,800			21,000			35,000			22,000	J	L	9,000			8,700		
Chromium†	100	**11**	NS	1.1	U		1.1			0.69			1.8			1.1	U		1.6			1.0			1.0	U		0.50	U	
Cobalt	NS	**73**	NS	1.1	U		0.35	UJ	I	0.20	U		1.1	U		0.23	UJ	I	1.4			0.25			1.0	U		0.20	U	
Copper‡	1,300	**150**	NS	1.1	U		1.3	U		2.0	U		1.9	U		1.5	U		2.8			2.0	U		1.6	U		1.0	U	
Iron	NS	**1,100**	NS	79.5			84.0			120			681			160			1,100			270			400			79.0		
Lead‡	15	NS	NS	1.1	U		0.15	U		0.50	U		1.1	U		0.24	U		1.0	U		0.50	U		1.0	U		0.50	U	
Magnesium	NS	NS	NS	6,840			5,200			7,100			14,800			9,400			13,000	J	L	9,100			3,200			3,000		
Manganese	NS	**88**	NS	**270**			6.3	U		5.0	U		**102**			15.0	U		36.0			11.0			13.0			5.0	U	
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	UJ	L	0.20	U		0.20	U		0.20	U	
Nickel	NS	**73**	NS	2.7			1.1			2.0	U		2.8			1.6			10.0	U		2.0	U		10.0	U		0.50	U	
Potassium	NS	NS	NS	2,620			1,900			2,400			1,760			1,200			1,500	J	L	1,300			730			560		
Selenium	50	**18**	NS	1.1	U		1.1	U		1.0	U		1.1	U		1.1	U		1.0	U		1.0	U		1.0	U		1.0	U	
Silver	NS	**18**	NS	1.1	U		0.11	U		0.10	U		1.1	U		0.11	U		1.0	U		0.10	U		1.0	U		0.10	U	
Sodium	NS	NS	NS	30,400			37,000			32,000			43,900			28,000			47,000			35,000			6,500			6,000		
Thallium	2	**0.24**	NS	0.32	UJ	I	0.21	J	I	0.10	U		**0.56**	J	I	0.20	J	I	0.075	UJ	I	0.10	U		0.080	UJ	I	0.20	U	
Vanadium	NS	**3.6**	NS	11.1	U		1.1	U		2.3			11.1	U		1.1	U		2.4			2.3			1.5			1.0	U	
Zinc	NS	**1,100**	NS	11.1	U		45.0	U		5.0	U		11.1	U		130			10.0	UJ	L	5.8	U		10.0	U		5.0	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS	5.0	U		5.0	U					5.0	U		5.0	U		0.0050	U					0.0050	U				
Natural Attenuation Parameters																														
Alkalinity (mg/l)	NS	NS	NS	25.0			14.0			23.0			29.0			23.0			26.0			28.0			39.0			40.0		
Chloride (mg/l)**	250,000	NS	NS	66.0			78.0			100			120			82.0			130			100			3.4			4.0		
Ethane (µg/l)	NS	NS	NS							0.028												0.040						0.025	U	
Ethene (µg/l)	NS	NS	NS							0.025	U											0.025	U					0.028	J	H
Iron, Ferrous (mg/l)	NS	NS	NS							1.0	U											1.0	U					1.0	U	
Methane (µg/l)	NS	NS	NS							0.96	J	H										0.85	J	H				1.4	J	H
Nitrate (mg/l)	10,000	**10,000**	NS	1.6			1.5			1.6			1.9			1.0			1.7			1.9			0.42			0.46		
Sulfate (mg/l)**	250,000	NS	NS	11.0			14.0			11.0			26.0			18.0			23.0			23.0			3.2			4.1		
Sulfide (mg/l)	NS	NS	NS							0.20	UJ	L							0.20	U		0.20	UJ	L	0.20	U		0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS							310									380			360			77.0			69.0		
TKN (mg/l)	NS	NS	NS	0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U	
Total Organic Carbon (mg/l)	NS	NS	NS							1.0	U								1.0	U		1.0	U		1.0	U		1.0	U	

TABLE 9
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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l (except as noted)																										
	COPC Screening Levels			SH-24S						SH-25D						SH-25S						SH-26S					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/06/03			09/29/06			11/05/03			09/29/06			11/05/03			09/29/06			10/28/03			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																											
Aluminum	NS	**3,600**	NS	100	U		97.0			100	U		420			650			160			**15,000**			**6,200**		
Antimony	6	**1.5**	NS	1.0	U		0.50	U		1.0	U		0.50	U		1.0	U		0.50	U		1.2			0.70		
Arsenic	10	**0.045**	NS	**0.20**	J	L	**0.66**			**0.14**	JB	I	**0.31**	J	I	**0.48**	J	L	**0.76**			**49.0**			**31.0**		
Barium	2,000	**260**	NS	10.0			12.0			14.0			12.0			25.0			25.0			66.0			11.0		
Beryllium	4	**7.3**	NS	1.0	U		0.20	U		1.0	U		0.20	U		1.0	U		0.20	U		1.0	U		0.20	U	
Cadmium	5	**1.8**	NS	1.0	U		0.10	U		1.0	U		0.10	U		1.0	U		0.10	U		1.0	U		0.10	U	
Calcium	NS	NS	NS	13,000			13,000	J	L	24,000			16,000	J	L	12,000			13,000	J	L	5,200			1,400	J	L
Chromium†	100	**11**	NS	1.0	U		0.59			1.0	U		0.71			3.3			1.1			**30.0**			6.8		
Cobalt	NS	**73**	NS	1.0	U		0.21			1.0	U		0.62			2.2			0.61			10.0			1.8		
Copper‡	1,300	**150**	NS	1.2	U		2.0	U		1.0	U		2.0	U		11.0	U		6.5			110			54.0		
Iron	NS	**1,100**	NS	110			200			140			600			520			150			**14,000**			**3,500**		
Lead‡	15	NS	NS	1.0	U		0.70			1.0	U		0.50	U		1.1			0.50	U		31.0			2.8		
Magnesium	NS	NS	NS	4,300			3,900			11,000			7,900			3,900			4,200			2,800	J	H	800		
Manganese	NS	**88**	NS	84.0			5.0	U		76.0	B	H	34.0			**360**			**230**			**620**			**120**		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U	
Nickel	NS	**73**	NS	10.0	U		2.0	U		10.0	U		2.0	U		10.0	U		3.0			24.0			3.8		
Potassium	NS	NS	NS	1,100			1,200			1,100			920			1,500			1,800			1,500	B	H	510	UJ	I
Selenium	50	**18**	NS	1.0	U		1.0	U		1.0	U		1.0	U		1.3			1.0	U		2.2			2.0		
Silver	NS	**18**	NS	1.0	U		0.10	U		1.0	U		0.10	U		1.0	U		0.10	U		1.0	U		0.12		
Sodium	NS	NS	NS	22,000			25,000			17,000			14,000			68,000			78,000			330,000			220,000		
Thallium	2	**0.24**	NS	0.080	UJ	I	0.10	U		0.080	UJ	I	0.10	U		0.080	UJ	I	0.10	U		0.13	J	I	0.10	U	
Vanadium	NS	**3.6**	NS	1.0	U		1.1			1.0	U		1.0	U		**4.8**			**4.0**			**150**			**80.0**	J	L
Zinc	NS	**1,100**	NS	10.0	U		6.7	U		10.0	U		6.8	U		10.0	U		5.6	U		63.0			14.0	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS	0.0050	U					0.0050	U					0.0050	U					0.0050	U				
Natural Attenuation Parameters																											
Alkalinity (mg/l)	NS	NS	NS	22.0			22.0			64.0			52.0			95.0			120			640			390		
Chloride (mg/l)**	250,000	NS	NS	43.0			46.0			29.0			24.0			38.0			55.0			38.0			90.0		
Ethane (µg/l)	NS	NS	NS				0.025	U					0.025	U					0.025	U					0.025	U	
Ethene (µg/l)	NS	NS	NS				0.025	U					0.025	U					0.025	U					0.025	U	
Iron, Ferrous (mg/l)	NS	NS	NS				1.0	U					1.0	U					1.0	U					1.0	UJ	L
Methane (µg/l)	NS	NS	NS				0.66	J	H				1.3	J	H				2.4	J	H				6.3		
Nitrate (mg/l)	10,000	**10,000**	NS	1.3			1.2			0.59			0.63			0.70			0.76			0.36	B	H	1.3		
Sulfate (mg/l)**	250,000	NS	NS	9.5			11.0			39.0			29.0			35.0			27.0			39.0			26.0		
Sulfide (mg/l)	NS	NS	NS	0.20	U		0.20	UJ	L	0.20	U		0.22	UJ	L	0.20	U		0.20	UJ	L	0.20	UJ	L	0.20	U	
Total Dissolved Solids (mg/l)	NS	NS	NS	140			160			180			150			230			270			1,000			630		
TKN (mg/l)	NS	NS	NS	0.50	U		0.50	U		0.50	U		0.50	U		0.70			0.50	U		3.5			0.50	U	
Total Organic Carbon (mg/l)	NS	NS	NS	1.0	U		1.0	U		1.0	U		1.0	U		8.4			4.7			16.0			2.4		

TABLE 9
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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l (except as noted)																										
	COPC Screening Levels			SH-27D						SH-27R						SH-27S						SH-28D					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/19/03			09/29/06			11/20/03			09/29/06			11/21/03			09/29/06			11/06/03			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																											
Aluminum	NS	**3,600**	NS	560	J	I	250			170			50.0	U		100			72.0			820			240		
Antimony	6	**1.5**	NS	**2.2**			0.50	U		1.0	U		0.50	U		1.0	U		0.50	U		1.0	U		0.50	U	
Arsenic	10	**0.045**	NS	**1.6**	J	L	**1.7**			**0.40**	J	L	0.40	U		**0.55**	J	L	**1.3**			**0.40**	J	L	0.46	U	
Barium	2,000	**260**	NS	7.5			7.0			20.0			21.0			82.0			83.0			9.2			9.3		
Beryllium	4	**7.3**	NS	1.0	U		0.20	U		1.0	U		0.20	U		1.0	U		0.20	U		1.0	U		0.20	U	
Cadmium	5	**1.8**	NS	1.0	U		0.10	U		1.0	U		0.10	U		1.0	U		0.10	U		1.0	U		0.10	U	
Calcium	NS	NS	NS	30,000			32,000			58,000			48,000			27,000			24,000	J	L	20,000			21,000		
Chromium†	100	**11**	NS	1.0	U		0.71			1.0	U		0.56			1.0	U		0.54			1.4			0.63		
Cobalt	NS	**73**	NS	1.5			0.99			1.7			0.88			1.0	U		0.31			1.0	U		0.36		
Copper‡	1,300	**150**	NS	2.4	U		1.5			4.8	U		2.7			1.6	U		2.0	U		1.9	U		1.0	U	
Iron	NS	**1,100**	NS	730	J	I	480			260			340			110			160			**1,200**			430		
Lead‡	15	NS	NS	1.0	U		0.50	U		1.0	U		0.50	U		1.2			0.50	U		1.0	U		0.57		
Magnesium	NS	NS	NS	15,000			16,000			24,000			21,000			5,700			5,200			10,000			11,000		
Manganese	NS	**88**	NS	**170**			**120**			**420**			**230**			**320**			19.0			**95.0**			29.0		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U	
Nickel	NS	**73**	NS	10.0	U		2.6			10.0	U		4.9			10.0	U		2.0	U		10.0	U		1.3		
Potassium	NS	NS	NS	1,600			1,500			2,900			1,900			4,200			4,000			780			860		
Selenium	50	**18**	NS	1.0	U		1.2			1.0	U		1.0	U		1.0	U		1.0	U		1.0	U		1.1		
Silver	NS	**18**	NS	1.0	U		0.10	U		1.0	U		0.58			1.0	U		0.10	U		1.0	U		0.10	U	
Sodium	NS	NS	NS	61,000			53,000			26,000			21,000			72,000			83,000			10,000			10,000		
Thallium	2	**0.24**	NS	0.080	UJ	I	0.20	U		0.080	UJ	I	0.20	U		0.080	UJ	I	0.10	U		0.080	UJ	I	0.20	U	
Vanadium	NS	**3.6**	NS	**4.6**			3.5			1.2			1.0	U		1.3			2.6			1.9			2.0		
Zinc	NS	**1,100**	NS	10.0	U		72.0			10.0	U		5.0	U		10.0	U		5.0	U		10.0	U		5.0	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS	0.0050	U					0.0050	U					0.0050	U					0.0050	U				
Natural Attenuation Parameters																											
Alkalinity (mg/l)	NS	NS	NS	110			100			120			88.0			34.0			38.0			52.0			56.0		
Chloride (mg/l)**	250,000	NS	NS	77.0			89.0			78.0			84.0			130			160			26.0			28.0		
Ethane (µg/l)	NS	NS	NS				0.025	U					0.038						0.025	U					0.029		
Ethene (µg/l)	NS	NS	NS				1.0						0.13	J	H				0.025	U					0.068	J	H
Iron, Ferrous (mg/l)	NS	NS	NS				1.0	U					1.0	U					1.0	U					0.20	J	I
Methane (µg/l)	NS	NS	NS				3.4	J	H				8.4	J	H				0.46	J	H				86.0		
Nitrate (mg/l)	10,000	**10,000**	NS	0.72			0.60			0.29			0.56			1.1			0.74			2.4			3.1		
Sulfate (mg/l)**	250,000	NS	NS	43.0			38.0			67.0			57			24.0			20.0			16.0			17.0		
Sulfide (mg/l)	NS	NS	NS	0.20	U		0.20	UJ	L	0.20	U		0.20	UJ	L	0.20	U		0.20	UJ	L	0.20	U		0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS	290			330			400			350			330			410			160			180		
TKN (mg/l)	NS	NS	NS	0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U	
Total Organic Carbon (mg/l)	NS	NS	NS	1.5			1.2			1.4			1.3			1.2			1.3			1.0	U		1.0	U	

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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l (except as noted)																										
				SH-28R						SH-28S						WP-01						WP-02			WP-03					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/07/03			09/29/06			11/06/03			09/29/06			11/04/03			09/29/06			11/04/03			11/05/03			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																														
Aluminum	NS	**3,600**	NS	510			73.0			100	U		50.0	U		100	U		50.0	U		100	U		220			120		
Antimony	6	**1.5**	NS	1.0	U		0.50	U		1.0	U		0.50	U		**1.9**			0.50	U		1.0	U		1.0	U		0.50	U	
Arsenic	10	**0.045**	NS	**0.92**	J	L	**1.1**			**0.36**	J	L	**1.0**			**3.1**	J	L	**2.2**			**0.92**	J	L	**0.15**	JB	I	**0.33**	J	I
Barium	2,000	**260**	NS	5.9			3.8			29.0			17.0			76.0			61.0			69.0			72.0			100		
Beryllium	4	**7.3**	NS	1.0	U		0.20	U		1.0	U		0.20	U		1.0	U		0.20	U		1.0	U		1.0	U		0.20	U	
Cadmium	5	**1.8**	NS	1.0	U		0.10	U		1.0	U		0.10	U		1.0	U		0.10	U		1.0	U		1.0	U		0.10	U	
Calcium	NS	NS	NS	12,000			15,000			17,000			18,000	J	L	20,000			14,000	J	L	26,000			8,400	B	H	8100	J	L
Chromium†	100	**11**	NS	1.0	U		0.59			1.0	U		0.50	U		6.3			0.52			**21.0**			1.0	U		0.78		
Cobalt	NS	**73**	NS	1.0	U		0.20	U		1.9			0.20	U		1.4			0.73			1.1			1.3	B	H	0.56		
Copper‡	1,300	**150**	NS	1.6	U		1.0	U		2.2	U		2.0	U		1.6	U		2.0	U		1.8	U		3.0	U		2.0	U	
Iron	NS	**1,100**	NS	620			230			120			110			**7,600**			**3,600**			**2,300**			120			160		
Lead‡	15	NS	NS	1.0	U		0.50	U		1.0	U		0.50	U		1.0	U		0.50	U		1.0	U		1.0	U		0.50	U	
Magnesium	NS	NS	NS	3,800			4,400			4,600			5,100			5,900			4,200			5,000			2,900	B	H	2,700		
Manganese	NS	**88**	NS	19.0			5.8			**760**			19.0			**1,100**			**680**			**730**			**130**			46.0		
Mercury	2	**1.1**	*0.068*	0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U	
Nickel	NS	**73**	NS	10.0	U		1.5			10.0	U		2.0	U		10.0	U		2.0	U		15.0			10.0	U		2.0	U	
Potassium	NS	NS	NS	1,100			600			3,000			3,000			2,200			1,800			2,500			2,000	B	H	3,000		
Selenium	50	**18**	NS	1.0	U		1.0	U		1.0	U		1.0	U		1.0	U		1.0	U		1.0	U		1.0	U		1.0	U	
Silver	NS	**18**	NS	1.0	U		0.10	U		1.0	U		0.10	U		1.0	U		0.10	U		1.0	U		1.0	U		0.10	U	
Sodium	NS	NS	NS	7,800			8,000			40,000			62,000			43,000			33,000			92,000			12,000	B	H	15,000		
Thallium	2	**0.24**	NS	0.080	UJ	I	0.20	U		0.080	UJ	I	0.10	U		0.080	UJ	I	0.10	U		0.080	UJ	I	0.080	UJ	I	0.10	U	
Vanadium	NS	**3.6**	NS	1.2			1.0	U		1.0	U		1.6			1.7			1.7			1.7			1.0	U		1.0	U	
Zinc	NS	**1,100**	NS	10.0	U		5.0	U		17.0			14.0	U		64.0			15.0	U		10.0	U		10.0	U		6.7	U	
Cyanide (weak acid dissociable)*	200	**0.62**	NS	0.0050	U					0.0050	U					0.0050	U					0.0050	U		0.0050	U				
Natural Attenuation Parameters																														
Alkalinity (mg/l)	NS	NS	NS	46.0			47.0			37.0			28.0			31.0			40.0			62.0			5.0	B	H	7.5		
Chloride (mg/l)**	250,000	NS	NS	4.9			9.6			65.0			130			93.0			62.0			160			29.0	B	H	32.0		
Ethane (µg/l)	NS	NS	NS				0.025	U					0.025	U					0.025	U								0.025	U	
Ethene (µg/l)	NS	NS	NS				0.14						0.025	U					0.025	U								0.025	U	
Iron, Ferrous (mg/l)	NS	NS	NS				1.0	U					1.0	U					2.3									1.0	U	
Methane (µg/l)	NS	NS	NS				2.3	J	H				2.2	J	I				29.0									1.0	J	H
Nitrate (mg/l)	10,000	**10,000**	NS	0.65			1.0			1.4			1.6			0.21			0.10	U		0.20			0.24			1.2		
Sulfate (mg/l)**	250,000	NS	NS	6.8			11.0			13.0			13.0			16.0			18.0			6.8			15.0	B	H	17.0		
Sulfide (mg/l)	NS	NS	NS	0.20	U		0.20	UJ	L	0.20	U		0.23	UJ	L	0.20	U		0.20	UJ	L	0.20	U		0.20	U		0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS	79.0			110			210			320			250			180			360			84.0	B	H	110		
TKN (mg/l)	NS	NS	NS	0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U		0.50	U	
Total Organic Carbon (mg/l)	NS	NS	NS	1.0	U		1.0	U		1.9			2.2			1.6			1.5			2.2			2.4			1.3		

TABLE 9
Summary of Groundwater Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l (except as noted)																							
	COPC Screening Levels			WP-04						WP-05						WP-06						WP-07		
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/07/03			09/29/06			11/07/03			09/29/06			10/28/03			09/29/06			10/27/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals																								
Aluminum	NS	**3,600**	NS	**6,100**			1,600			100	U		74.0			500	U		380			2,200		
Antimony	6	**1.5**	NS	**5.4**			0.60			1.0	U		0.50	U		1.0	U		0.50	U		1.4		
Arsenic	10	**0.045**	NS	**12.0**	J	L	**2.7**			**0.13**	J	L	**0.30**	J	I	**13.0**			**14.0**			**59.0**		
Barium	2,000	**260**	NS	**270**			140			67.0			42.0			1.0	U		1.8			13.0		
Beryllium	4	**7.3**	NS	2.0			0.46			1.0	U		0.20	U		1.0	U		0.20	U		1.0	U	
Cadmium	5	**1.8**	NS	1.0	U		0.21			1.0	U		0.10	U		1.0	U		0.10	U		1.0	U	
Calcium	NS	NS	NS	22,000			12,000	J	L	14,000			8,600	J	L	2,600	B	H	6,400	J	L	3,800		
Chromium†	100	**11**	NS	**130**			**360**			1.0	U		0.50	U		1.1	B	H	2.7			**13.0**		
Cobalt	NS	**73**	NS	9.6			2.2			1.0	U		0.25			1.0	U		0.53			2.4		
Copper‡	1,300	**150**	NS	50.0			11.0			1.4	U		2.0	U		7.8			17.0			120		
Iron	NS	**1,100**	NS	**35,000**			**8,500**			680			**1,500**			140	B	H	660			**3,000**		
Lead‡	15	NS	NS	230			33.0			1.0	U		0.50	U		1.1			2.4			170		
Magnesium	NS	NS	NS	7,300			3,700			3,700			2,500			700	JB	H	1,400			580	J	H
Manganese	NS	**88**	NS	**3,900**			**850**			86.0			69.0			23.0			55.0			81.0		
Mercury	2	**1.1**	*0.068*	*0.33*			0.20	U		0.20	U		0.20	U		0.20	U		0.20	U		0.20	U	
Nickel	NS	**73**	NS	**81.0**			9.1			10.0	U		2.0	U		10.0	U		2.6			17.0		
Potassium	NS	NS	NS	2,800			1,800			1,600			1,400			790	B	H	720	UJ	I	1,200		
Selenium	50	**18**	NS	1.0	U		1.0	U		1.0	U		1.0	U		1.0	U		2.0			1.8		
Silver	NS	**18**	NS	1.0	U		0.11			1.0	U		0.10	U		1.0	U		0.10	U		1.0	U	
Sodium	NS	NS	NS	31,000			28,000			23,000			19,000			100,000			140,000			340,000		
Thallium	2	**0.24**	NS	0.14	J	I	0.10	U		0.080	UJ	I	0.10	U		0.075	UJ	I	0.10	U		0.11	J	I
Vanadium	NS	**3.6**	NS	**49.0**			**9.9**			1.0	U		1.0	U		**42.0**			**42.0**	J	L	**220**		
Zinc	NS	**1,100**	NS	77.0			16.0	U		10.0	U		5.0	U		10.0	U		5.0	U		18.0		
Cyanide (weak acid dissociable)*	200	**0.62**	NS	0.0050	U					0.0050	U					0.0050	U					0.0050	U	
Natural Attenuation Parameters																								
Alkalinity (mg/l)	NS	NS	NS	10.0			7.0			7.0			5.0	U		140			220			650		
Chloride (mg/l)**	250,000	NS	NS	69.0			61.0			48.0			43.0			32.0	B	H	34.0			34.0		
Ethane (µg/l)	NS	NS	NS				0.025	U					0.025	U					0.040					
Ethene (µg/l)	NS	NS	NS				0.025	U					0.025	U					0.025	U				
Iron, Ferrous (mg/l)	NS	NS	NS				1.0	U					0.50	J	I				1.0	U				
Methane (µg/l)	NS	NS	NS				3.3	J	H				2.3	J	H				610					
Nitrate (mg/l)	10,000	**10,000**	NS	2.2			2.5			2.3			1.8			0.76			0.50	U		0.050	U	
Sulfate (mg/l)**	250,000	NS	NS	20.0			9.7			18.0			22.0			14.0			15.0			20.0		
Sulfide (mg/l)	NS	NS	NS	0.20	U		0.23	UJ	L	0.20	U		0.23	UJ	L	0.20	UJ	L	0.20	U		0.20	UJ	L
Total Dissolved Solids (mg/l)	NS	NS	NS	250			160			6.0	U		120			250			410			870		
TKN (mg/l)	NS	NS	NS	1.4			0.50	U		0.50	U		0.50	U		0.50	U		0.70			1.7		
Total Organic Carbon (mg/l)	NS	NS	NS	5.8			1.6			1.0	U		1.1			1.8			6.4			19.0		

TABLE 9
Summary of Groundwater Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. (SHA) on the dates indicated; see Table 1B for identity of sample delivery groups (SDGs).

2. For samples collected in 2001, 2002, and 2003, Woods Hole Group Environmental Laboratories (WHGEL) of Raynham, Massachusetts, performed analyses for metals (except mercury) by United States Environmental Protection Agency (USEPA) Method 6010B and Method 6020; mercury by USEPA Method 7471A; weak acid dissociable cyanide (WAD cyanide) by USEPA Method 4500-CN I; and natural attenuation parameters by USEPA Method 310.1 for alkalinity, USEPA Method 351.2 for total Kjeldahl nitrogen (TKN), USEPA Method 160.1 for total dissolved solids, USEPA Method 415.1 for total organic carbon, USEPA Method 376.2 for sulfide, and USEPA Method 300.0 for the remainder (chloride, nitrate and sulfate).

For samples collected in 2006, Alpha Woods Hole Laboratories (formerly WHGEL) of Raynham, Massachusetts, performed analyses for metals (except mercury) by USEPA Method 6020A; mercury by USEPA Method 7470A; and natural attenuation parameters by USEPA Method 310.1 for alkalinity, USEPA Method 351.2 for total Kjeldahl nitrogen (TKN), USEPA Method 160.1 for total dissolved solids, USEPA Method 415.1 for total organic carbon, USEPA Method 7199 (modified) or Standard Method SM3500Fe D for ferrous iron, Method AM20GAX for methane, ethane, and ethene, USEPA Method 376.2 for sulfide, and USEPA Method 300.0 for the remainder (chloride, nitrate and sulfate).

3. Data validation and data usability assessment were performed by SHA and New Environmental Horizons, Inc. (NEH). Results are presented in the Data Usability Report (SHA, 2002), the May 2002 Groundwater Sampling Report (SHA, 2003), and the Phase 1B RI Data Usability Report (SHA, 2004), and in Appendix C of this Report.

4. Metals and WAD Cyanide concentrations are presented in micrograms per liter (µg/l), which are equivalent to parts per billion (ppb). Natural attenuation parameter concentrations are presented in milligrams per liter (mg/l), which are equivalent to parts per million (ppm).

5. "COPC Screening Levels" indicates contaminants of potential concern (COPC) screening levels used to determine inclusion of an analyte in the human health risk assessment. Analyte detections which exceed the USEPA MCL (shaded values) are shaded. Analyte detections which exceed the EPA Region IX Tap Water PRG (**bold** value) are in **bold**. Analyte detections from shallow wells which exceed the EPA Vapor Intrusion Screening Values (italic value) are in italics.

"EPA MCL" indicates the values listed are drinking water Maximum Contaminant Levels (MCLs) from the National Primary Drinking Water Standards, dated June 2003 (http://www.epa.gov/safewater/mcl.html).

"EPA Region IX Tap Water PRG" indicates the values listed are from the USEPA Region IX Preliminary Remediation Goals (PRGs) Table, dated October 1, 2004. PRGs based on non-cancer effects are multiplied by 0.1 per USEPA Guidance (USEPA Region I, Risk Update Number 5, September 1999).

"EPA Vapor Intrusion Screening" indicates values listed are from the USEPA Office of Solid Waste and Emergency Response (OSWER) Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance), Table 2C, November 29, 2002. These values apply to shallow groundwater (SH-series wells with an S after the well number, and WP-series wells). Target groundwater concentrations based on non-carcinogenic effects are multiplied by 0.1 per USEPA Guidance (USEPA Region I, Risk Update Number 5, September 1999).

6. "†" indicates the MCL presented is for total chromium and the PRG presented is for chromium VI.
"‡" indicates the MCLs presented for copper and lead are treatment technique action levels.
"*" indicates the PRG presented is for hydrogen cyanide, and the MCL presented is for free cyanide.

7. The following qualifiers and biases were assigned during data validation by NEH. Refer to NEH's Data Usability Reports (included in the Data Usability Report [SHA, 2002], the Phase 1B RI Data Usability Report [SHA, 2004], and Appendix C of this Report) for additional detail regarding qualifiers and bias.

Qualifiers:
"J" - The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"B" Indicates the analyte was detected in a non-matrix matched, associated method blank. The result is usable with possible uncertainty due to the potential of contamination.
"U" - The compound was analyzed for, but was not detected. The associated numerical value is the sample-specific reporting limit. The value is usable for project decisions as a non-detect result at the reporting limit.
"UJ" - The compound was analyzed for, but was not detected. The sample-specific quantitation (reporting) limit is estimated. The non-detect result is usable for project objectives with documentation of the bias or uncertainty in the result.
"R" - Indicates data rejected during validation.

Bias:
"L" - Low
"I" - Indeterminate
"H" - High

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Concentrations in µg/l

Analytes	COPC Screening Levels			SH-01D												SH-01R												SH-01S											
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/12/01			05/22/02			10/29/03			10/03/06			09/13/01			05/22/02			10/30/03			10/04/06			09/12/01			05/21/02			10/28/03			10/05/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																							
Acenaphthene	NS	**37**	NS	5.3			15			35			33			**99**			**80**			**50**			37			3.9			5.6			20			15		
Acenaphthylene	NS	NS	NS	11			34			33			23			98			73			65			47			4.3			2.9			7.3			4.7		
Anthracene	NS	**180**	NS	1.7			2.5	U		21	U		3.1			27			13			21	U		5.8			0.55			1.3			5.2			3.1		
Benzo(a)anthracene	NS	**0.092**	NS	1.3	U		2.5	U		21	U		**0.16**			5.2	U		2.6	U		21	U		**0.84**			0.21	U		0.10	U		0.53	U		**0.16**		
Benzo(a)pyrene	0.2	**0.0092**	NS	0.23	UJ		0.12	UJ		1.2	UJ		**0.10**			**2.7**	J	I	**0.91**			1.2	UJ		**0.41**			0.054	UJ		**0.048**	J		**0.27**	J	I	**0.062**		
Benzo(b)fluoranthene	NS	**0.092**	NS	1.3	U		2.5	U		21	U		0.026			5.2	U		2.6	U		21	U		**0.19**			0.21	U		0.10	U		0.53	U		0.040		
Benzo(g,h,i)perylene	NS	NS	NS	1.3	U		2.5	U		21	U		0.030			5.2	U		2.6	U		21	U		0.076			0.21	U		0.10	U		0.53	U		0.021		
Benzo(k)fluoranthene	NS	**0.92**	NS	1.3	U		2.5	U		21	U		0.060			5.2	U		2.6	U		21	U		0.26			0.21	U		0.10	U		0.53	U		0.040		
Chrysene	NS	**9.2**	NS	1.3	U		2.5	U		21	U		0.15			5.2	U		2.6	U		21	U		0.65			0.21	U		0.10	U		0.53	U		0.16		
Dibenz(a,h)anthracene	NS	**0.0092**	NS	**0.20**	J		0.12	UJ		0.88	UJ		0.010	U		**0.85**	J		0.13	UJ		0.90	UJ		**0.021**			**0.029**	J		0.0081	J		0.022	UJ		0.010	U	
Fluoranthene	NS	**150**	NS	1.3	U		2.5	U		21	U		1.2			18			7.6			21	U		4.4			0.50			0.60			2.1			1.5		
Fluorene	NS	**24**	NS	3.1			5.6			21	U		15			**65**			**47**			**34**			**26**			3.2			4.6			16			10		
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	1.3	U		2.5	U		21	U		0.023			5.2	U		2.6	U		21	U		0.063			0.21	U		0.10	U		0.53	U		0.018		
Methylnaphthalene (2-)	NS	NS	*330*	51			220			270			230			620			480			410			320			25			19			58			46		
Naphthalene	NS	**0.62**	*15*	**1,100**			**3,100**			**2,400**			**1,800**			**3,200**			**3,300**			**2,900**			**2,300**			***110***			***46***			***150***			***100***		
Phenanthrene	NS	NS	NS	6.2			5.8			21	U		16			120			60			39			32			4.3			6.3			27			17		
Pyrene	NS	**18**	NS	1.3	U		2.5	U		21	U		1.4			**26**			11			21	U		5.4			0.46			0.66			3.4			1.6		
Total PAHs	NS	NS	NS	1,178.5			3,380.4			2,738			2,132.749			4,276.55			4,072.51			3,498			2,796.51			152.239			87.0161			289.27			202.201		
Other SVOCs																																							
Benzoic acid	NS	**15,000**	NS	79	J	L		R									R			R									R			R							
Benzyl Alcohol	NS	**1,100**	NS	100	U			R								210	U			R								11	U		5.0	UJ	L						
bis(2-Chloroethoxy)methane	NS	NS	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	30	UJ		19	UJ								61	UJ		20	UJ								3.1	UJ		0.93	UJ							
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	30	UJ		19	UJ								61	UJ		20	UJ								3.1	UJ		0.93	UJ							
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	30	UJ		19	UJ		210	U		1.0	U		61	UJ		20	UJ		210	U		**6.4**			3.1	UJ		1.8	UJ		5.3	U		1.0	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Butylbenzylphthalate	NS	**730**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Carbazole	NS	**3.4**	NS	30	UJ		19	UJ		210	U		**9.5**			61	UJ		**22**	J		210	U		**10**			3.1	UJ		0.93	UJ		5.3	U		2.8		
Chloro-3-methylphenol (4-)	NS	NS	NS	100	U			R								210	U			R								11	U		2.0	U							
Chloroaniline (4-)	NS	**15**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Chloronaphthalene (2-)	NS	**49**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Chlorophenol (2-)	NS	**3.0**	*110*	100	U			R								210	U			R								11	U		2.0	U							
Chlorophenyl-phenylether (4-)	NS	NS	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Dibenzofuran	NS	**1.2**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Dichlorobenzene (1,2-)	600	**37**	*260*	100	U		40	U								210	U		42	U								11	U		2.0	U							
Dichlorobenzene (1,3-)	NS	**18**	*83*	30	UJ		19	UJ								61	UJ		20	UJ								3.1	UJ		0.93	UJ							
Dichlorobenzene (1,4-)	75	**0.50**	*820*	30	UJ		19	UJ								61	UJ		20	UJ								3.1	UJ		0.93	UJ							
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	30	UJ		79	UJ								61	UJ		83	UJ								3.1	UJ		4.0	UJ							
Dichlorophenol (2,4-)	NS	**11**	NS	100	U			R								210	U			R								11	U		2.0	U							
Diethylphthalate	NS	**2,900**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Dimethylphenol (2,4-)	NS	**73**	NS	32	J			R								65	J			R								11	U		5.0	U							
Dimethylphthalate	NS	**36,000**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Di-n-butylphthalate	NS	**360**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	260	U			R								520	U			R								26	U		5.0	U							
Dinitrophenol (2,4-)	NS	**7.3**	NS	100	UJ	I		R								210	UJ	I		R								11	UJ	I	5.0	UJ	I						
Dinitrotoluene (2,4-)	NS	**7.3**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Dinitrotoluene (2,6-)	NS	**3.6**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Di-n-octylphthalate	NS	**150**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Hexachlorobenzene $	1	**0.042**	*1*	30	UJ		19	UJ								61	UJ		20	UJ								3.1	UJ		0.93	UJ							
Hexachlorobutadiene	NS	**0.86**	*0.33*	30	UJ		19	UJ								61	UJ		20	UJ								3.1	UJ		0.93	UJ							
Hexachlorocyclopentadiene $	50	**22**	*50*	260	UJ	L	40	U								520	UJ	L	42	U								26	UJ	L	2.0	U							
Hexachloroethane	NS	**3.6**	*3.8*	100	UJ	L	40	U								210	UJ	L	42	U								11	UJ	L	2.0	U							
Isophorone	NS	**71**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Methylphenol (2-)	NS	**180**	NS	100	U			R								210	U			R								11	U		2.0	U							
Methylphenol (4-)	NS	**18**	NS	**43**	J			R								**92**	J			R								11	U		2.0	U							
Nitroaniline (2-)	NS	**11**	NS	30	UJ		19	UJ								61	UJ		20	UJ								3.1	UJ		0.93	UJ							
Nitroaniline (3-)	NS	**1.1**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Nitroaniline (4-)	NS	**3.2**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Nitrobenzene	NS	**0.34**	*200*	30	UJ		19	UJ								61	UJ		20	UJ								3.1	UJ		0.93	UJ							
Nitrophenol (2-)	NS	NS	NS	100	U			R								210	U			R								11	U		2.0	U							
Nitrophenol (4-)	NS	NS	NS	100	U			R								210	U			R								11	U		2.0	U							
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	30	UJ		19	UJ								61	UJ		20	UJ								3.1	UJ		0.93	UJ							
Nitrosodiphenylamine (N-)	NS	**14**	NS	100	U		40	U								210	U		42	U								11	U		2.0	U							
Pentachlorophenol	1	**0.56**	NS	30	UJ			R								61	UJ			R								3.1	UJ		0.93	UJ							
Phenol	NS	**1,100**	NS	100	U			R								210	U			R								11	U		2.0	U							
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	100	U		40	U								210	U		42	U								11	U		2.0	U							
Trichlorophenol (2,4,5-)	NS	**360**	NS	100	U			R								210	U			R								11	U		2.0	U							
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	100	U			R								210	U			R								11	U		2.0	U							
Total Other SVOCs	NS	NS	NS	154			-			-			9.5			157			22			-			16.4			-			-			-			2.8		
Total SVOCs	NS	NS	NS	1,332.5			3,380.4			2,738			2,142.249			4,433.55			4,094.51			3,498			2,813			152.239			87.0161			289.27			205.001		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																												
				SH-02D									SH-02R												SH-02S								
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/13/01			05/23/02			10/30/03			09/12/01			05/16/02			11/04/03			09/29/06			09/12/01			05/24/02			10/29/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																	
Acenaphthene	NS	**37**	NS	27			4.0			1.0			0.15			0.48			0.45			0.0024	J	I	1.0			0.13			0.46		
Acenaphthylene	NS	NS	NS	17			7.8			0.43			0.051	U		0.053	U		0.057	U		0.010	U		0.47			0.051			0.051		
Anthracene	NS	**180**	NS	2.6			1.4			0.73			0.051	U		0.053	U		0.057	U		0.010	U		0.12			0.050	U		0.050	U	
Benzo(a)anthracene	NS	**0.092**	NS	0.51	U		1.0	U		0.060	U		0.051	U		0.053	U		0.057	U		0.010	U		0.053	U		0.050	U		0.050	U	
Benzo(a)pyrene	0.2	**0.0092**	NS	**0.17**	J	I	0.20	UJ		0.0036	UJ		0.0029	UJ		0.0018	UJ		0.0034	UJ		0.010	U		0.0030	UJ		0.0019	J		0.0062	J	I
Benzo(b)fluoranthene	NS	**0.092**	NS	0.51	U		1.0	U		0.060	U		0.051	U		0.053	U		0.057	U		0.010	U		0.053	U		0.050	U		0.050	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.51	U		1.0	U		0.060	U		0.051	U		0.053	U		0.057	U		0.010	U		0.053	U		0.050	U		0.050	U	
Benzo(k)fluoranthene	NS	**0.92**	NS	0.51	U		1.0	U		0.060	U		0.051	U		0.053	U		0.057	U		0.010	U		0.053	U		0.050	U		0.050	U	
Chrysene	NS	**9.2**	NS	0.51	U		1.0	U		0.060	U		0.051	U		0.053	U		0.057	U		0.010	U		0.053	U		0.050	U		0.050	U	
Dibenz(a,h)anthracene	NS	**0.0092**	NS	**0.074**	J	I	0.052	UJ		0.0026	UJ		0.0044	UJ		0.0027	UJ		0.0024	UJ		0.0014	J	I	0.0045	UJ		0.0025	UJ		0.0021	UJ	
Fluoranthene	NS	**150**	NS	1.1			1.0	U		0.11			0.051	U		0.053	U		0.057	U		0.054			0.088			0.050	U		0.050	U	
Fluorene	NS	**24**	NS	15			1.7			0.59			0.051	U		0.15			0.057	U		0.010	U		0.54			0.050	U		0.094		
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.51	U		1.0	U		0.060	U		0.051	U		0.053	U		0.057	U		0.010	U		0.053	U		0.050	U		0.050	U	
Methylnaphthalene (2-)	NS	NS	*330*	140			60			0.23			1.4			3.8			0.11			0.010	U		1.7			0.050	U		0.050	U	
Naphthalene	NS	**0.62**	*15*	**650**			**670**			**2.7**			**8.3**			**83**			**15**			0.024			**5.2**			0.085			0.055		
Phenanthrene	NS	NS	NS	16			3.6			1.2			0.051	U		0.12			0.16			0.010	U		0.64			0.050	U		0.050	U	
Pyrene	NS	**18**	NS	1.3			1.6			0.23			0.051	U		0.053	U		0.057	U		0.059	U		0.075			0.050	U		0.050	U	
Total PAHs	NS	NS	NS	870.244			750.1			7.2			9.9			87.55			15.72			0.818			9.8			0.27			0.67		
Other SVOCs																																	
Benzoic acid	NS	**15,000**	NS		R		6.5	J	L					R		5.3	UJ	L								R			R				
Benzyl Alcohol	NS	**1,100**	NS	20	U		26	U					2.0	U		5.3	UJ	L							2.1	U		5.0	UJ	L			
bis(2-Chloroethoxy)methane	NS	NS	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	6.0	UJ		4.8	UJ					0.60	UJ		0.99	UJ								0.62	UJ		0.93	UJ				
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	6.0	UJ		4.8	UJ					0.60	UJ		0.99	UJ								0.62	UJ		0.93	UJ				
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	6.0	UJ		4.8	UJ		1.5			0.60	UJ		0.99	UJ		0.57	U		1.0	U		0.62	UJ		1.9	UJ		0.50	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Butylbenzylphthalate	NS	**730**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Carbazole	NS	**3.4**	NS	6.0	UJ		**7.6**	J		1.2			0.60	UJ		0.99	UJ		0.57	U		0.018			0.62	UJ		0.93	UJ		0.50	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Chloroaniline (4-)	NS	**15**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Chloronaphthalene (2-)	NS	**49**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Chlorophenol (2-)	NS	**3.0**	*110*	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Dibenzofuran	NS	**1.2**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Dichlorobenzene (1,2-)	600	**37**	*260*	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Dichlorobenzene (1,3-)	NS	**18**	*83*	6.0	UJ		4.8	UJ					0.60	UJ		0.99	UJ								0.62	UJ		0.93	UJ				
Dichlorobenzene (1,4-)	75	**0.50**	*820*	6.0	UJ		4.8	UJ					0.60	UJ		0.99	UJ								0.62	UJ		0.93	UJ				
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	6.0	UJ		21	UJ					0.60	UJ		4.2	UJ								0.62	UJ		4.0	UJ				
Dichlorophenol (2,4-)	NS	**11**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Diethylphthalate	NS	**2,900**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Dimethylphenol (2,4-)	NS	**73**	NS	6.2	J		21	J					2.0	U		5.3	U								2.1	U		5.0	U				
Dimethylphthalate	NS	**36,000**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Di-n-butylphthalate	NS	**360**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	51	U		26	U					5.1	U		5.3	U								5.3	U		5.0	U				
Dinitrophenol (2,4-)	NS	**7.3**	NS	20	UJ	I	26	UJ	I				2.0	UJ	I	5.3	UJ	I							2.1	UJ	I	5.0	UJ	I			
Dinitrotoluene (2,4-)	NS	**7.3**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Dinitrotoluene (2,6-)	NS	**3.6**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Di-n-octylphthalate	NS	**150**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Hexachlorobenzene $	1	**0.042**	*1*	6.0	UJ		4.8	UJ					0.60	UJ		0.99	UJ								0.62	UJ		0.93	UJ				
Hexachlorobutadiene	NS	**0.86**	*0.33*	6.0	UJ		4.8	UJ					0.60	UJ		0.99	UJ								0.62	UJ		0.93	UJ				
Hexachlorocyclopentadiene $	50	**22**	*50*	51	UJ	L	10	U					5.1	UJ	L	2.1	U								5.3	UJ	L	2.0	U				
Hexachloroethane	NS	**3.6**	*3.8*	20	UJ	L	10	U					2.0	UJ	L	2.1	U								2.1	UJ	L	2.0	U				
Isophorone	NS	**71**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Methylphenol (2-)	NS	**180**	NS	20	U		14						2.0	U		2.1	U								2.1	U		2.0	U				
Methylphenol (4-)	NS	**18**	NS	9.2	J		**33**						2.0	U		2.1	U								2.1	U		2.0	U				
Nitroaniline (2-)	NS	**11**	NS	6.0	UJ		4.8	UJ					0.60	UJ		0.99	UJ								0.62	UJ		0.93	UJ				
Nitroaniline (3-)	NS	**1.1**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Nitroaniline (4-)	NS	**3.2**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Nitrobenzene	NS	**0.34**	*200*	6.0	UJ		4.8	UJ					0.60	UJ		0.99	UJ								0.62	UJ		0.93	UJ				
Nitrophenol (2-)	NS	NS	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Nitrophenol (4-)	NS	NS	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	6.0	UJ		4.8	UJ					0.60	UJ		0.99	UJ								0.62	UJ		0.93	UJ				
Nitrosodiphenylamine (N-)	NS	**14**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Pentachlorophenol	1	**0.56**	NS	6.0	UJ		4.8	UJ					0.60	UJ		0.99	UJ								0.62	UJ		0.93	UJ				
Phenol	NS	**1,100**	NS	20	U		14						2.0	U		2.1	U								2.1	U		2.0	U				
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Trichlorophenol (2,4,5-)	NS	**360**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	20	U		10	U					2.0	U		2.1	U								2.1	U		2.0	U				
Total Other SVOCs	NS	NS	NS	15.4			96.1			2.7			-			-			-			0.018			-			-			-		
Total SVOCs	NS	NS	NS	885.644			846.2			9.9			9.9			87.55			15.72			0.836			9.8			0.27			0.67		

TABLE 10
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Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																															
				SH-03D												SH-03S												SH-04D							
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/12/01			05/23/02			11/03/03			10/03/06			09/11/01			05/16/02			11/03/03			09/29/06			09/11/01			05/21/02			11/05/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																			
Acenaphthene	NS	**37**	NS	0.051	U		0.052	U		0.052	U		0.010	U		0.17			0.21			0.23			0.17			0.050	U		0.050	U		0.052	U	
Acenaphthylene	NS	NS	NS	0.051	U		0.052	U		0.052	U		0.010	U		0.052	U		0.051	U		0.052	U		0.010	U		0.050	U		0.050	U		0.052	U	
Anthracene	NS	**180**	NS	0.051	U		0.052	U		0.052	U		0.010	U		0.052	U		0.051	U		0.052	U		0.010	U		0.050	U		0.050	U		0.052	U	
Benzo(a)anthracene	NS	**0.092**	NS	0.051	U		0.052	U		0.052	U		0.010	U		0.052	U		0.051	U		0.052	U		0.010	U		0.050	U		0.050	U		0.052	U	
Benzo(a)pyrene	0.2	**0.0092**	NS	0.0029	UJ		0.0018	UJ		0.0030	UJ		0.010	U		0.0029	UJ		0.0017	UJ		0.0030	UJ		0.010	U		0.0028	UJ		0.0017	UJ		0.0030	UJ	
Benzo(b)fluoranthene	NS	**0.092**	NS	0.051	U		0.052	U		0.052	U		0.010	U		0.052	U		0.051	U		0.052	U		0.010	U		0.050	U		0.050	U		0.052	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.051	U		0.052	U		0.052	U		0.010	UJ	L	0.052	U		0.051	U		0.052	U		0.010	U		0.050	U		0.050	U		0.052	U	
Benzo(k)fluoranthene	NS	**0.92**	NS	0.051	U		0.052	U		0.052	U		0.010	U		0.052	U		0.051	U		0.052	U		0.010	U		0.050	U		0.050	U		0.052	U	
Chrysene	NS	**9.2**	NS	0.051	U		0.052	U		0.052	U		0.010	U		0.052	U		0.051	U		0.052	U		0.010	U		0.050	U		0.050	U		0.052	U	
Dibenz(a,h)anthracene	NS	**0.0092**	NS	0.0044	UJ		0.0026	UJ		0.0022	UJ		0.010	U		0.0045	UJ		0.0026	UJ		0.0022	UJ		0.0046	J	I	0.0043	UJ		0.0025	UJ		0.0022	UJ	
Fluoranthene	NS	**150**	NS	0.051	U		0.052	U		0.052	U		0.010	U		0.052	U		0.051	U		0.052	U		0.014	U		0.050	U		0.050	U		0.052	U	
Fluorene	NS	**24**	NS	0.051	U		0.052	U		0.052	U		0.010	U		0.097			0.10			0.20			0.056			0.050	U		0.050	U		0.052	U	
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.051	U		0.052	U		0.052	U		0.010	U		0.052	U		0.051	U		0.052	U		0.010	U		0.050	U		0.050	U		0.052	U	
Methylnaphthalene (2-)	NS	NS	*330*	0.051	U		0.052	U		0.052	U		0.010	U		0.052	U		0.051	U		0.069			0.010	U		0.050	U		0.050	U		0.052	U	
Naphthalene	NS	**0.62**	*15*	0.24			0.052	U		0.064			0.010	U		0.13			0.051	U		0.40			0.010	U		0.050	U		0.050	U		0.052	U	
Phenanthrene	NS	NS	NS	0.051	U		0.052	U		0.052	U		0.010	U		0.052	U		0.051	U		0.16			0.010	U		0.050	U		0.050	U		0.052	U	
Pyrene	NS	**18**	NS	0.051	U		0.052	U		0.052	U		0.010	U		0.052	U		0.051	U		0.052	U		0.011	U		0.050	U		0.050	U		0.052	U	
Total PAHs	NS	NS	NS	0.24			-			0.064			-			0.40			0.31			1.06			0.2306			-			-			-		
Other SVOCs																																			
Benzoic acid	NS	**15,000**	NS		R			R								60	J	L	3.3	J	L								R			R				
Benzyl Alcohol	NS	**1,100**	NS	2.0	U		5.2	UJ	L							10	U		5.1	UJ	L							2.0	U		5.0	UJ	L			
bis(2-Chloroethoxy)methane	NS	NS	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	0.60	UJ		0.96	UJ								3.1	UJ		0.95	UJ								0.59	UJ		0.93	UJ				
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	0.60	UJ		0.96	UJ								3.1	UJ		0.95	UJ								0.59	UJ		0.93	UJ				
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	0.60	UJ		0.96	UJ		0.89	U		1.0	U		3.1	UJ		0.95	UJ		0.59	U		1.0	U		0.59	UJ		0.93	UJ		2.4	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Butylbenzylphthalate	NS	**730**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Carbazole	NS	**3.4**	NS	0.60	UJ		0.96	UJ		0.52	U		0.010	U		3.1	UJ		0.95	UJ		0.52	U		0.010	U		0.59	UJ		0.93	UJ		0.52	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Chloroaniline (4-)	NS	**15**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Chloronaphthalene (2-)	NS	**49**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Chlorophenol (2-)	NS	**3.0**	*110*	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Dibenzofuran	NS	**1.2**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Dichlorobenzene (1,2-)	600	**37**	*260*	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Dichlorobenzene (1,3-)	NS	**18**	*83*	0.60	UJ		0.96	UJ								3.1	UJ		0.95	UJ								0.59	UJ		0.93	UJ				
Dichlorobenzene (1,4-)	75	**0.50**	*820*	0.60	UJ		0.96	UJ								3.1	UJ		0.95	UJ								0.59	UJ		0.93	UJ				
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	0.60	UJ		4.1	UJ								3.1	UJ		4.0	UJ								0.59	UJ		4.0	UJ				
Dichlorophenol (2,4-)	NS	**11**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Diethylphthalate	NS	**2,900**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Dimethylphenol (2,4-)	NS	**73**	NS	2.0	U		5.2	U								10	U		5.1	U								2.0	U		5.0	U				
Dimethylphthalate	NS	**36,000**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Di-n-butylphthalate	NS	**360**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	5.1	U		5.2	U								26	U		5.1	U								5.0	U		5.0	U				
Dinitrophenol (2,4-)	NS	**7.3**	NS	2.0	UJ	I	5.2	UJ	I							10	UJ	I	5.1	UJ	I							2.0	UJ	I	5.0	UJ	I			
Dinitrotoluene (2,4-)	NS	**7.3**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Dinitrotoluene (2,6-)	NS	**3.6**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Di-n-octylphthalate	NS	**150**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Hexachlorobenzene $	1	**0.042**	*1*	0.60	UJ		0.96	UJ								3.1	UJ		0.95	UJ								0.59	UJ		0.93	UJ				
Hexachlorobutadiene	NS	**0.86**	*0.33*	0.60	UJ		0.96	UJ								3.1	UJ		0.95	UJ								0.59	UJ		0.93	UJ				
Hexachlorocyclopentadiene $	50	**22**	*50*	5.1	UJ	L	2.1	U								26	UJ	L	2.0	U								5.0	U		2.0	U				
Hexachloroethane	NS	**3.6**	*3.8*	2.0	UJ	L	2.1	U								10	UJ	L	2.0	U								2.0	U		2.0	U				
Isophorone	NS	**71**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Methylphenol (2-)	NS	**180**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Methylphenol (4-)	NS	**18**	NS	2.0	U		2.1	U								**94**			**21**									2.0	U		2.0	U				
Nitroaniline (2-)	NS	**11**	NS	0.60	UJ		0.96	UJ								3.1	UJ		0.95	UJ								0.59	UJ		0.93	UJ				
Nitroaniline (3-)	NS	**1.1**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Nitroaniline (4-)	NS	**3.2**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Nitrobenzene	NS	**0.34**	*200*	0.60	UJ		0.96	UJ								3.1	UJ		0.95	UJ								0.59	UJ		0.93	UJ				
Nitrophenol (2-)	NS	NS	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Nitrophenol (4-)	NS	NS	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	0.60	UJ		0.96	UJ								3.1	UJ		0.95	UJ								0.59	UJ		0.93	UJ				
Nitrosodiphenylamine (N-)	NS	**14**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Pentachlorophenol	1	**0.56**	NS	0.60	UJ		0.96	UJ								3.1	UJ		0.95	UJ								0.59	UJ		0.93	UJ				
Phenol	NS	**1,100**	NS	2.0	U		2.1	U								3.8	J		2.0	J								2.0	U		2.0	U				
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Trichlorophenol (2,4,5-)	NS	**360**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	2.0	U		2.1	U								10	U		2.0	U								2.0	U		2.0	U				
Total Other SVOCs	NS	NS	NS	-			-			-			-			157.8			26.3			-			-			-			-			-		
Total SVOCs	NS	NS	NS	0.24			-			0.064			0.000			158.197			26.61			1.06			0.23			-			-			-		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																																				
				SH-04S												SH-05D												SH-05R-A						SH-05R-B					
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/11/01			05/20/02			10/28/03			10/04/06			09/11/01			05/21/02			11/04/03			10/02/06			11/10/03			10/03/06			11/11/03			10/03/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																								
Acenaphthene	NS	**37**	NS	20			7.0			14			6.2			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Acenaphthylene	NS	NS	NS	9.2			3.7			5.8			2.2			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Anthracene	NS	**180**	NS	4.6			1.4			2.4			0.65			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Benzo(a)anthracene	NS	**0.092**	NS	**0.75**			**0.40**			1.0	U		0.052			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Benzo(a)pyrene	0.2	**0.0092**	NS	**0.49**	J	I	**0.24**	J		**0.18**	J	I	**0.036**			0.0030	UJ		0.0019	UJ		0.0031	UJ		0.010	U		0.0030	UJ		0.011	U		0.0032	UJ		0.011	U	
Benzo(b)fluoranthene	NS	**0.092**	NS	0.51	U		0.26	U		1.0	U		0.017			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.51	U		0.26	U		1.0	U		0.020			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	UJ	I	0.054	U		0.011	UJ	I
Benzo(k)fluoranthene	NS	**0.92**	NS	0.51	U		0.26	U		1.0	U		0.019			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Chrysene	NS	**9.2**	NS	0.75			0.31			1.0	U		0.054			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Dibenz(a,h)anthracene	NS	**0.0092**	NS	**0.11**	J	I	**0.021**	J		0.044	UJ		0.010	U		0.0046	UJ		0.0038	J		0.0022	UJ		0.010	U		0.0021	UJ		0.0018	J	I	0.0023	UJ		0.0032	J	I
Fluoranthene	NS	**150**	NS	3.0			1.2			1.3			0.35			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Fluorene	NS	**24**	NS	12			4.2			8.8			4.6			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.51	U		0.26	U		1.0	U		0.015			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Methylnaphthalene (2-)	NS	NS	*330*	96			35			59			16			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Naphthalene	NS	**0.62**	*15*	***310***			***140***			***200***			***71***			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Phenanthrene	NS	NS	NS	24			6.5			14			4.3			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Pyrene	NS	**18**	NS	4.0			1.9			2.1			0.45			0.053	U		0.057	U		0.053	U		0.010	U		0.050	U		0.011	U		0.054	U		0.011	U	
Total PAHs	NS	NS	NS	484.9			201.871			307.58			106.803			-			0.0038			-			-			-			0.0018			-			0.0032		
Other SVOCs																																								
Benzoic acid	NS	**15,000**	NS		R		3.7	J	L								R			R								1.0	U					1.1	U				
Benzyl Alcohol	NS	**1,100**	NS	20	U		5.2	UJ	L							2.1	U		5.7	UJ	L							0.25	U					0.27	U				
bis(2-Chloroethoxy)methane	NS	NS	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	6.0	UJ		0.96	UJ								0.63	UJ		1.1	UJ								0.25	U					0.27	U				
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	6.0	UJ		0.96	UJ								0.63	UJ		1.1	UJ								0.25	U					0.27	U				
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	6.0	UJ		0.96	UJ		10	U		1.0	U		0.63	UJ		1.1	UJ		0.71	U		1.0	U		0.43	U		1.1	U		0.59	U		1.1	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Butylbenzylphthalate	NS	**730**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Carbazole	NS	**3.4**	NS	6.0	UJ		1.4	J		10	U		0.84			0.63	UJ		1.1	UJ		0.53	U		0.010	U		0.25	U		0.011	U		0.27	U		0.011	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Chloroaniline (4-)	NS	**15**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Chloronaphthalene (2-)	NS	**49**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Chlorophenol (2-)	NS	**3.0**	*110*	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Dibenzofuran	NS	**1.2**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Dichlorobenzene (1,2-)	600	**37**	*260*	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Dichlorobenzene (1,3-)	NS	**18**	*83*	6.0	UJ		0.96	UJ								0.63	UJ		1.1	UJ								0.25	U					0.27	U				
Dichlorobenzene (1,4-)	75	**0.50**	*820*	6.0	UJ		0.96	UJ								0.63	UJ		1.1	UJ								0.25	U					0.27	U				
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	6.0	UJ		4.1	UJ								0.63	UJ		4.5	UJ								0.25	U					0.27	U				
Dichlorophenol (2,4-)	NS	**11**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Diethylphthalate	NS	**2,900**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Dimethylphenol (2,4-)	NS	**73**	NS	9.2	J		4.3	J								2.1	U		5.7	U								0.25	U					0.27	U				
Dimethylphthalate	NS	**36,000**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Di-n-butylphthalate	NS	**360**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	51	U		5.2	U								5.3	U		5.7	U								0.50	UJ	I				0.54	UJ	I			
Dinitrophenol (2,4-)	NS	**7.3**	NS	20	UJ	I	5.2	UJ	I							2.1	UJ	I	5.7	UJ	I							1.0	UJ	I				1.1	UJ	I			
Dinitrotoluene (2,4-)	NS	**7.3**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Dinitrotoluene (2,6-)	NS	**3.6**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Di-n-octylphthalate	NS	**150**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Hexachlorobenzene $	1	**0.042**	*1*	6.0	UJ		0.96	UJ								0.63	UJ		1.1	UJ								0.25	U					0.27	U				
Hexachlorobutadiene	NS	**0.86**	*0.33*	6.0	UJ		0.96	UJ								0.63	UJ		1.1	UJ								0.25	U					0.27	U				
Hexachlorocyclopentadiene $	50	**22**	*50*	51	UJ	L	2.1	U								5.3	U		2.3	U								0.25	U					0.27	U				
Hexachloroethane	NS	**3.6**	*3.8*	20	UJ	L	2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Isophorone	NS	**71**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Methylphenol (2-)	NS	**180**	NS	20	U		1.4	J								2.1	U		2.3	U								0.25	U					0.27	U				
Methylphenol (4-)	NS	**18**	NS	8.5	J		5.2									2.1	U		2.3	U								0.25	U					0.27	U				
Nitroaniline (2-)	NS	**11**	NS	6.0	UJ		0.96	UJ								0.63	UJ		1.1	UJ								0.25	U					0.27	U				
Nitroaniline (3-)	NS	**1.1**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Nitroaniline (4-)	NS	**3.2**	NS	20	U		2.1	U								2.1	U		2.3	U								0.50	U					0.54	U				
Nitrobenzene	NS	**0.34**	*200*	6.0	UJ		0.96	UJ								0.63	UJ		1.1	UJ								0.25	U					0.27	U				
Nitrophenol (2-)	NS	NS	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Nitrophenol (4-)	NS	NS	NS	20	U		2.1	U								2.1	UJ	L	2.3	U								1.0	U					1.1	U				
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	6.0	UJ		0.96	UJ								0.63	UJ		1.1	UJ								0.25	U					0.27	U				
Nitrosodiphenylamine (N-)	NS	**14**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Pentachlorophenol	1	**0.56**	NS	6.0	UJ		0.96	UJ								0.63	UJ		1.1	UJ								1.0	U					1.1	U				
Phenol	NS	**1,100**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Trichlorophenol (2,4,5-)	NS	**360**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	20	U		2.1	U								2.1	U		2.3	U								0.25	U					0.27	U				
Total Other SVOCs	NS	NS	NS	17.7			16			-			0.84			-			-			-			-			-			-			-			-		
Total SVOCs	NS	NS	NS	502.6			217.871			307.58			107.643			-			0.0038			-			-			-			0.0018			-			0.0032		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l																																			
	COPC Screening Levels			SH-05S												SH-06D									SH-06R-A						SH-06R-B					
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/11/01			05/21/02			10/29/03			10/04/06			09/06/01			05/22/02			10/29/03			11/05/03			10/02/06			11/06/03			10/02/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																				
Acenaphthene	NS	**37**	NS	11			9.1			5.6			6.8			5.1			6.1			8.2			0.053	U		0.011	U		0.053	U		0.010	U	
Acenaphthylene	NS	NS	NS	3.2			2.6			1.2			1.8			4.4			4.0			6.4			0.053	U		0.011	U		0.053	U		0.010	U	
Anthracene	NS	**180**	NS	3.0			2.9			1.7			2.0			1.4			2.4			4.1			0.053	U		0.011	U		0.053	U		0.010	U	
Benzo(a)anthracene	NS	**0.092**	NS	**0.43**			**0.51**			0.52	U		**0.32**			**0.44**			**0.83**			**1.1**			0.053	U		0.011	U		0.053	U		0.010	U	
Benzo(a)pyrene	0.2	**0.0092**	NS	**0.29**			**0.26**			**0.081**	J	I	**0.16**			**0.32**			**0.45**			**0.72**			0.012	UJ		0.011	U		0.0031	UJ		0.010	U	
Benzo(b)fluoranthene	NS	**0.092**	NS	0.21	U		**0.11**			0.52	U		0.090			**0.26**			**0.23**			0.54	U		0.053	U		0.011	U		0.053	U		0.010	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.21	U		0.10	U		0.52	U		0.046			0.075			0.15			0.54	U		0.053	U		0.011	U		0.053	U		0.010	U	
Benzo(k)fluoranthene	NS	**0.92**	NS	0.21	U		0.12			0.52	U		0.071			0.12			0.24			0.54	U		0.053	U		0.011	U		0.053	U		0.010	U	
Chrysene	NS	**9.2**	NS	0.40			0.40			0.52	U		0.30			0.43			0.67			1.2			0.053	U		0.011	U		0.053	U		0.010	U	
Dibenz(a,h)anthracene	NS	**0.0092**	NS	**0.051**	J	I	**0.026**	J		0.022	UJ		**0.018**			**0.020**	J		**0.048**	J		**0.074**	J	I	0.0022	UJ		0.011	U		0.0023	UJ		0.0020	J	I
Fluoranthene	NS	**150**	NS	2.5			2.2			1.1			1.8			2.3			3.1			4.8			0.053	U		0.019	U		0.053	U		0.010	U	
Fluorene	NS	**24**	NS	9.1			8.4			4.7			7.2			4.9			6.4			9.8			0.053	U		0.011	U		0.053	U		0.010	U	
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.21	U		0.10	U		0.52	U		0.036			0.058			**0.12**			0.54	U		0.053	U		0.011	U		0.053	U		0.010	U	
Methylnaphthalene (2-)	NS	NS	*330*	33			20			12			19			26			21			42			0.053	U		0.011	U		0.053	U		0.010	U	
Naphthalene	NS	**0.62**	*15*	***72***			***52***			***27***			***42***			**140**			**100**			**150**			0.053	U		0.011	U		0.053	U		0.010	U	
Phenanthrene	NS	NS	NS	23			18			12			16			12			16			33			0.053	U		0.011	U		0.053	U		0.010	U	
Pyrene	NS	**18**	NS	2.4			2.9			1.4			2.2			2.5			4.2			8.2			0.061			0.051	U		0.053	U		0.010	U	
Total PAHs	NS	NS	NS	160.371			119.526			66.781			100.581			200.323			165.938			269.594			0.061			-			-			0.0020		
Other SVOCs																																				
Benzoic acid	NS	**15,000**	NS		R			R								13	J	L	5.4	J	L				1.0	UJ	L				1.1	UJ	L			
Benzyl Alcohol	NS	**1,100**	NS	8.4	U		5.2	UJ	L							10	U		5.0	UJ	L				0.26	U					0.27	U				
bis(2-Chloroethoxy)methane	NS	NS	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	2.5	UJ		0.97	UJ								3.0	UJ		0.93	UJ					0.26	U					0.27	U				
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	2.5	UJ		0.97	UJ								3.0	UJ		0.93	UJ					0.26	U					0.27	U				
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	2.5	UJ		0.97	UJ		5.2	U		1.0	U		3.0	UJ	I	1.1	J		5.4	U		0.37	U		1.7	U		1.2	U		1.0	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Butylbenzylphthalate	NS	**730**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Carbazole	NS	**3.4**	NS	2.5	UJ		1.1	J		5.2	U		0.74			3.0	UJ		1.0	J		5.4	U		0.26	U		0.011	U		0.27	U		0.010	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Chloroaniline (4-)	NS	**15**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Chloronaphthalene (2-)	NS	**49**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Chlorophenol (2-)	NS	**3.0**	*110*	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Dibenzofuran	NS	**1.2**	NS	8.4	U		1.1	J								10	U		1.1	J					0.26	U					0.27	U				
Dichlorobenzene (1,2-)	600	**37**	*260*	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Dichlorobenzene (1,3-)	NS	**18**	*83*	2.5	UJ		0.97	UJ								3.0	UJ		0.93	UJ					0.26	U					0.27	U				
Dichlorobenzene (1,4-)	75	**0.50**	*820*	2.5	UJ		0.97	UJ								3.0	UJ		0.93	UJ					0.26	U					0.27	U				
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	2.5	UJ		4.1	UJ								3.0	UJ		4.0	UJ					0.26	U					0.27	U				
Dichlorophenol (2,4-)	NS	**11**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Diethylphthalate	NS	**2,900**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Dimethylphenol (2,4-)	NS	**73**	NS	8.4	U		1.1	J								7.4	J		3.0	J					0.26	U					0.27	U				
Dimethylphthalate	NS	**36,000**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Di-n-butylphthalate	NS	**360**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	21	U		5.2	U								25	U		5.0	U					0.53	UJ	I				0.53	UJ	I			
Dinitrophenol (2,4-)	NS	**7.3**	NS	8.4	UJ	I	5.2	UJ	I							10	UJ	I	5.0	UJ	I				1.0	UJ	I				1.1	UJ	I			
Dinitrotoluene (2,4-)	NS	**7.3**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Dinitrotoluene (2,6-)	NS	**3.6**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Di-n-octylphthalate	NS	**150**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Hexachlorobenzene $	1	**0.042**	*1*	2.5	UJ		0.97	UJ								3.0	UJ		0.93	UJ					0.26	U					0.27	U				
Hexachlorobutadiene	NS	**0.86**	*0.33*	2.5	UJ		0.97	UJ								3.0	UJ		0.93	UJ					0.26	U					0.27	U				
Hexachlorocyclopentadiene $	50	**22**	*50*	21	UJ	L	2.1	U								25	U		2.0	U					0.26	UJ	L				0.27	UJ	L			
Hexachloroethane	NS	**3.6**	*3.8*	8.4	UJ	L	2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Isophorone	NS	**71**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Methylphenol (2-)	NS	**180**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Methylphenol (4-)	NS	**18**	NS	8.4	U		1.3	J								7.7	J		5.3						0.26	U					0.27	U				
Nitroaniline (2-)	NS	**11**	NS	2.5	UJ		0.97	UJ								3.0	UJ		0.93	UJ					0.26	U					0.27	U				
Nitroaniline (3-)	NS	**1.1**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Nitroaniline (4-)	NS	**3.2**	NS	8.4	U		2.1	U								10	U		2.0	U					0.53	U					0.53	U				
Nitrobenzene	NS	**0.34**	*200*	2.5	UJ		0.97	UJ								3.0	UJ		0.93	UJ					0.26	U					0.27	U				
Nitrophenol (2-)	NS	NS	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Nitrophenol (4-)	NS	NS	NS	8.4	U		2.1	U								10	U		2.0	U					1.0	U					1.1	U				
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	2.5	UJ		0.97	UJ								3.0	UJ		0.93	UJ					0.26	U					0.27	U				
Nitrosodiphenylamine (N-)	NS	**14**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Pentachlorophenol	1	**0.56**	NS	2.5	UJ		0.97	UJ								3.0	UJ		0.93	UJ					1.0	U					1.1	U				
Phenol	NS	**1,100**	NS	8.4	U		2.1	U								3.8	J		2.0	U					0.26	U					0.27	U				
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Trichlorophenol (2,4,5-)	NS	**360**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	8.4	U		2.1	U								10	U		2.0	U					0.26	U					0.27	U				
Total Other SVOCs	NS	NS	NS	-			4.6			-			0.74			31.9			16.9			-			-			-			-			-		
Total SVOCs	NS	NS	NS	160.371			124.126			66.781			101.321			232.223			182.838			269.594			0.061			-			-			0.0020		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																																			
				SH-06S									SH-07D									SH-07S									SH-08D								
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/06/01			05/22/02			10/29/03			09/07/01			05/22/02			10/30/03			09/07/01			05/22/02			10/29/03			09/07/01			05/20/02			10/29/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																							
Acenaphthene	NS	**37**	NS	1.7			2.0			3.4			0.78			1.3			1.2			0.40			0.12			0.23			1.3			1.1			1.5		
Acenaphthylene	NS	NS	NS	0.33			0.41			0.43			0.051	U		0.078			0.10	U		0.085			0.054	U		0.12			0.27			0.26			0.41	U	
Anthracene	NS	**180**	NS	0.30			0.22			0.24			0.25			0.47			0.34			0.072			0.054	U		0.10	U		0.17			0.18			0.41	U	
Benzo(a)anthracene	NS	**0.092**	NS	**0.18**			**0.14**			0.23	U		0.053			0.075			0.10	U		0.050	U		0.054	U		0.10	U		0.051	U		0.050	U		0.41	U	
Benzo(a)pyrene	0.2	**0.0092**	NS	**0.19**			**0.12**			**0.10**	J	I	**0.031**	J		0.043	UJ		**0.036**	J	I	0.0056	J		0.0039	UJ		0.0061	UJ		**0.010**	J		0.0040	UJ		0.024	UJ	
Benzo(b)fluoranthene	NS	**0.092**	NS	**0.14**			0.084			0.23	U		0.051	U		0.050	U		0.10	U		0.050	U		0.054	U		0.10	U		0.051	U		0.050	U		0.41	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.12			0.076			0.23	U		0.051	U		0.050	U		0.10	U		0.050	U		0.054	U		0.10	U		0.051	U		0.050	U		0.41	U	
Benzo(k)fluoranthene	NS	**0.92**	NS	0.10			0.052			0.23	U		0.051	U		0.050	U		0.10	U		0.050	U		0.054	U		0.10	U		0.051	U		0.050	U		0.41	U	
Chrysene	NS	**9.2**	NS	0.18			0.13			0.23	U		0.053			0.067			0.10	U		0.050	U		0.054	U		0.10	U		0.051	U		0.050	U		0.41	U	
Dibenz(a,h)anthracene	NS	**0.0092**	NS	**0.029**	J		**0.023**	J		0.0098	UJ		0.0051	J		0.0077	UJ		0.0044	UJ		0.0043	UJ		0.0027	UJ		0.0044	UJ		0.0044	UJ		0.0025	UJ		0.018	UJ	
Fluoranthene	NS	**150**	NS	0.68			0.29			0.36			0.20			0.26			0.20			0.050	U		0.054	U		0.10	U		0.059			0.050	U		0.41	U	
Fluorene	NS	**24**	NS	1.1			1.2			1.8			0.74			1.1			0.93			0.62			0.16			0.46			1.0			1.2			1.5		
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.087			0.057			0.23	U		0.051	U		0.050	U		0.10	U		0.050	U		0.054	U		0.10	U		0.051	U		0.050	U		0.41	U	
Methylnaphthalene (2-)	NS	NS	*330*	7.2			8.3			8.1			8.7			11			10			23			2.7			12			62			62			62		
Naphthalene	NS	**0.62**	*15*	***34***			***28***			***36***			**9.1**			**14**			**15**			***22***			**5.7**			***16***			**70**			**73**			**73**		
Phenanthrene	NS	NS	NS	2.2			1.3			2.2			1.8			2.3			2.2			1.2			0.083			0.57			2.7			2.2			3.3		
Pyrene	NS	**18**	NS	0.60			0.35			0.58			0.16			0.28			0.28			0.050	U		0.054	U		0.10	U		0.064			0.069			0.41	U	
Total PAHs	NS	NS	NS	49.136			42.752			53.21			21.8721			30.93			30.186			47.3826			8.8			29.38			137.573			140.009			141.3		
Other SVOCs																																							
Benzoic acid	NS	**15,000**	NS	1.0	J	L	1.1	J	L				1.2	J	L	13	J	L				2.0	UJ	L		R					8.2	UJ	L	5.0	UJ	L			
Benzyl Alcohol	NS	**1,100**	NS	2.0	U		5.2	UJ	L				2.0	U		5.0	UJ	L				2.0	U		5.4	UJ	L				8.2	U		5.0	UJ	L			
bis(2-Chloroethoxy)methane	NS	NS	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	0.60	UJ		0.96	UJ					0.60	UJ		0.93	UJ					0.59	UJ		1.0	UJ					2.4	UJ		0.93	UJ				
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	0.60	UJ		0.96	UJ					0.60	UJ		0.93	UJ					0.59	UJ		1.0	UJ					2.4	UJ		0.93	UJ				
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	**12**			0.96	UJ		2.3	U		0.60	UJ		0.93	UJ		1.9			0.99	J		1.0	UJ		1.0	U		2.4	UJ		0.93	UJ		4.1	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Butylbenzylphthalate	NS	**730**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Carbazole	NS	**3.4**	NS	0.68	J		0.96	UJ		2.3	U		0.87	J		0.99	J		1.0	U		2.3			1.0	UJ		3.0			**3.9**	J		**4.1**			**5.3**		
Chloro-3-methylphenol (4-)	NS	NS	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Chloroaniline (4-)	NS	**15**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Chloronaphthalene (2-)	NS	**49**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Chlorophenol (2-)	NS	**3.0**	*110*	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Dibenzofuran	NS	**1.2**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Dichlorobenzene (1,2-)	600	**37**	*260*	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Dichlorobenzene (1,3-)	NS	**18**	*83*	0.60	UJ		0.96	UJ					0.60	UJ		0.93	UJ					0.59	UJ		1.0	UJ					2.4	UJ		0.93	UJ				
Dichlorobenzene (1,4-)	75	**0.50**	*820*	0.60	UJ		0.96	UJ					0.60	UJ		0.93	UJ					0.59	UJ		1.0	UJ					2.4	UJ		0.93	UJ				
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	0.60	UJ		4.1	UJ					0.60	UJ		4.0	UJ						R		4.3	UJ					2.4	UJ		4.0	UJ				
Dichlorophenol (2,4-)	NS	**11**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Diethylphthalate	NS	**2,900**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Dimethylphenol (2,4-)	NS	**73**	NS	2.0	U		5.2	U					0.86	J		5.0	U					2.0	U		5.4	U					8.2	U		1.8	J				
Dimethylphthalate	NS	**36,000**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Di-n-butylphthalate	NS	**360**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	5.0	U		5.2	U					5.0	U		5.0	U					5.0	U		5.4	U					20	U		5.0	U				
Dinitrophenol (2,4-)	NS	**7.3**	NS	2.0	UJ	I	5.2	UJ	I				2.0	UJ	I	5.0	UJ	I				3.0	J	I	5.4	UJ	I				8.2	UJ	I	5.0	UJ	I			
Dinitrotoluene (2,4-)	NS	**7.3**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Dinitrotoluene (2,6-)	NS	**3.6**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Di-n-octylphthalate	NS	**150**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Hexachlorobenzene $	1	**0.042**	*1*	0.60	UJ		0.96	UJ					0.60	UJ		0.93	UJ					0.59	UJ		1.0	UJ					2.4	UJ		0.93	UJ				
Hexachlorobutadiene	NS	**0.86**	*0.33*	0.60	UJ		0.96	UJ					0.60	UJ		0.93	UJ					0.59	UJ		1.0	UJ					2.4	UJ		0.93	UJ				
Hexachlorocyclopentadiene $	50	**22**	*50*	5.0	U		2.1	U					5.0	U		2.0	U					5.0	U		2.2	U					20	U		2.0	U				
Hexachloroethane	NS	**3.6**	*3.8*	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Isophorone	NS	**71**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Methylphenol (2-)	NS	**180**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Methylphenol (4-)	NS	**18**	NS	1.1	J		2.1	U					1.0	J		1.6	J					2.0	U		2.2	U					8.2	U		2.0	U				
Nitroaniline (2-)	NS	**11**	NS	0.60	UJ		0.96	UJ					0.60	UJ		0.93	UJ					0.59	UJ		1.0	UJ					2.4	UJ		0.93	UJ				
Nitroaniline (3-)	NS	**1.1**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Nitroaniline (4-)	NS	**3.2**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Nitrobenzene	NS	**0.34**	*200*	0.60	UJ		0.96	UJ					0.60	UJ		0.93	UJ					0.59	UJ		1.0	UJ					2.4	UJ		0.93	UJ				
Nitrophenol (2-)	NS	NS	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Nitrophenol (4-)	NS	NS	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	0.60	UJ		0.96	UJ					0.60	UJ		0.93	UJ					0.59	UJ		1.0	UJ					2.4	UJ		0.93	UJ				
Nitrosodiphenylamine (N-)	NS	**14**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Pentachlorophenol	1	**0.56**	NS	0.60	UJ		0.96	UJ					0.60	UJ		0.93	UJ					0.59	UJ		1.0	UJ					2.4	UJ		0.93	UJ				
Phenol	NS	**1,100**	NS	2.0	U		2.1	U					1.5	J		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Trichlorophenol (2,4,5-)	NS	**360**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	2.0	U		2.1	U					2.0	U		2.0	U					2.0	U		2.2	U					8.2	U		2.0	U				
Total Other SVOCs	NS	NS	NS	14.78			1.1			-			5.4			15.59			1.9			6.3			-			3.0			3.9			5.9			5.3		
Total SVOCs	NS	NS	NS	63.916			43.852			53.21			27.3021			46.52			32.086			53.6726			8.8			32.38			141.473			145.909			146.6		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																																			
				SH-08S									SH-09D									SH-09S									SH-10S								
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/06/01			05/21/02			10/28/03			09/07/01			05/23/02			10/28/03			09/07/01			05/17/02			10/31/03			09/10/01			05/23/02			10/31/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																							
Acenaphthene	NS	**37**	NS	0.084			0.050	U		0.055	U		0.11			0.057			0.078			0.051	U		0.052	U		0.051	U		0.052	U		0.054	U		0.053	U	
Acenaphthylene	NS	NS	NS	0.051	U		0.050	U		0.055	U		0.050	U		0.053	U		0.052	U		0.051	U		0.052	U		0.051	U		0.052	U		0.054	U		0.053	U	
Anthracene	NS	**180**	NS	0.053			0.050	U		0.055	U		0.050	U		0.053	U		0.052	U		0.051	U		0.052	U		0.051	U		0.052	U		0.054	U		0.053	U	
Benzo(a)anthracene	NS	**0.092**	NS	0.051	U		0.050	U		0.055	U		0.050	U		0.053	U		0.052	U		0.051	U		0.052	U		0.051	U		0.052	U		0.054	U		0.053	U	
Benzo(a)pyrene	0.2	**0.0092**	NS	0.0033	J		0.0017	UJ		0.0032	UJ		0.0068	J		0.0029	J		**0.017**	J	I	0.0029	UJ		0.0018	UJ		0.0030	UJ		0.0032	J		0.0018	UJ		0.0031	UJ	
Benzo(b)fluoranthene	NS	**0.092**	NS	0.051	U		0.050	U		0.055	U		0.050	U		0.053	U		0.052	U		0.051	U		0.052	U		0.051	U		0.052	U		0.054	U		0.053	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.051	U		0.050	U		0.055	U		0.050	U		0.053	U		0.052	U		0.051	U		0.052	U		0.051	U		0.052	U		0.054	U		0.053	U	
Benzo(k)fluoranthene	NS	**0.92**	NS	0.051	U		0.050	U		0.055	U		0.050	U		0.053	U		0.052	U		0.051	U		0.052	U		0.051	U		0.052	U		0.054	U		0.053	U	
Chrysene	NS	**9.2**	NS	0.051	U		0.050	U		0.055	U		0.050	U		0.053	U		0.052	U		0.051	U		0.052	U		0.051	U		0.052	U		0.054	U		0.053	U	
Dibenz(a,h)anthracene	NS	**0.0092**	NS	0.0043	UJ		0.0025	UJ		0.0024	UJ		0.0043	UJ		0.0027	UJ		0.0022	UJ		0.0044	UJ		0.0026	UJ		0.0022	UJ		0.0045	UJ		0.0027	UJ		0.0022	UJ	
Fluoranthene	NS	**150**	NS	0.074			0.050	U		0.055	U		0.063			0.053	U		0.062			0.051	U		0.052	U		0.051	U		0.052	U		0.054	U		0.053	U	
Fluorene	NS	**24**	NS	0.15			0.050	U		0.055	U		0.050	U		0.053	U		0.052	U		0.051	U		0.052	U		0.051	U		0.052	U		0.054	U		0.053	U	
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.051	U		0.050	U		0.055	U		0.050	U		0.053	U		0.052	U		0.051	U		0.052	U		0.051	U		0.052	U		0.054	U		0.053	U	
Methylnaphthalene (2-)	NS	NS	*330*	0.11			0.050	U		0.055	U		0.084			0.053	U		0.052	U		0.051	U		0.052	U		0.051	U		0.052	U		0.054	U		0.053	U	
Naphthalene	NS	**0.62**	*15*	0.094			0.050	U		0.055	U		0.26			0.14			0.23			0.051	U		0.052	U		0.073			0.052	U		0.054	U		0.29		
Phenanthrene	NS	NS	NS	0.20			0.050	U		0.055	U		0.14			0.10			0.13			0.051	U		0.052	U		0.051	U		0.052	U		0.054	U		0.053	U	
Pyrene	NS	**18**	NS	0.084			0.050	U		0.055	U		0.12			0.082			0.17			0.10			0.060			0.088			0.052	U		0.054	U		0.053	U	
Total PAHs	NS	NS	NS	0.85			-			-			0.78			0.38			0.69			0.10			0.060			0.16			0.0032			-			0.29		
Other SVOCs																																							
Benzoic acid	NS	**15,000**	NS		R		5.0	UJ	L				2.0	UJ	L		R					2.0	UJ	L	5.2	UJ	L					R			R				
Benzyl Alcohol	NS	**1,100**	NS	2.0	U		5.0	U					2.0	U		5.3	UJ	L				2.0	U		5.2	UJ	L				2.1	U		5.4	UJ	L			
bis(2-Chloroethoxy)methane	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	0.60	UJ		0.93	UJ					0.59	UJ		0.99	UJ					0.60	UJ		0.97	UJ					0.61	UJ		1.0	UJ				
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	0.60	UJ		0.93	UJ					0.59	UJ		0.99	UJ					0.60	UJ		0.97	UJ					0.61	UJ		1.0	UJ				
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	0.61	UJ		0.93	UJ		0.55	U		0.59	UJ		0.99	UJ		0.52	U		0.60	UJ		0.97	UJ		0.51	U		0.61	UJ		1.0	UJ		0.83	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Butylbenzylphthalate	NS	**730**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Carbazole	NS	**3.4**	NS	0.60	UJ		0.93	UJ		0.55	U		0.59	UJ		0.99	UJ		0.52	U		0.60	UJ		0.97	UJ		0.51	U		0.61	UJ		1.0	UJ		0.53	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Chloroaniline (4-)	NS	**15**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Chloronaphthalene (2-)	NS	**49**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Chlorophenol (2-)	NS	**3.0**	*110*	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Dibenzofuran	NS	**1.2**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Dichlorobenzene (1,2-)	600	**37**	*260*	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Dichlorobenzene (1,3-)	NS	**18**	*83*	0.60	UJ		0.93	UJ					0.59	UJ		0.99	UJ					0.60	UJ		0.97	UJ					0.61	UJ		1.0	UJ				
Dichlorobenzene (1,4-)	75	**0.50**	*820*	0.60	UJ		0.93	UJ					0.59	UJ		0.99	UJ					0.60	UJ		0.97	UJ					0.61	UJ		1.0	UJ				
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	0.60	UJ		4.0	UJ					0.59	UJ		4.2	UJ					0.60	UJ		4.1	UJ					0.61	UJ		4.3	UJ				
Dichlorophenol (2,4-)	NS	**11**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Diethylphthalate	NS	**2,900**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Dimethylphenol (2,4-)	NS	**73**	NS	2.0	U		5.0	U					2.0	U		5.3	U					2.0	U		5.2	U					2.1	U		5.4	U				
Dimethylphthalate	NS	**36,000**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Di-n-butylphthalate	NS	**360**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	5.0	U		5.0	U					5.0	U		5.3	U					5.0	U		5.2	U					5.2	U		5.4	U				
Dinitrophenol (2,4-)	NS	**7.3**	NS	2.0	UJ	I	5.0	UJ	I				2.0	UJ	I	5.3	UJ	I				2.0	UJ	I	5.2	UJ	I				2.1	UJ	I	5.4	UJ	I			
Dinitrotoluene (2,4-)	NS	**7.3**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Dinitrotoluene (2,6-)	NS	**3.6**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Di-n-octylphthalate	NS	**150**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Hexachlorobenzene $	1	**0.042**	*1*	0.60	UJ		0.93	UJ					0.59	UJ		0.99	UJ					0.60	UJ		0.97	UJ					0.61	UJ		1.0	UJ				
Hexachlorobutadiene	NS	**0.86**	*0.33*	0.60	UJ		0.93	UJ					0.59	UJ		0.99	UJ					0.60	UJ		0.97	UJ					0.61	UJ		1.0	UJ				
Hexachlorocyclopentadiene $	50	**22**	*50*	5.0	U		2.0	U					5.0	U		2.1	U					5.0	U		2.1	U					5.2	U		2.2	U				
Hexachloroethane	NS	**3.6**	*3.8*	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Isophorone	NS	**71**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Methylphenol (2-)	NS	**180**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Methylphenol (4-)	NS	**18**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Nitroaniline (2-)	NS	**11**	NS	0.60	UJ		0.93	UJ					0.59	UJ		0.99	UJ					0.60	UJ		0.97	UJ					0.61	UJ		1.0	UJ				
Nitroaniline (3-)	NS	**1.1**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Nitroaniline (4-)	NS	**3.2**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Nitrobenzene	NS	**0.34**	*200*	0.60	UJ		0.93	UJ					0.59	UJ		0.99	UJ					0.60	UJ		0.97	UJ					0.61	UJ		1.0	UJ				
Nitrophenol (2-)	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Nitrophenol (4-)	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	0.60	UJ		0.93	UJ					0.59	UJ		0.99	UJ					0.60	UJ		0.97	UJ					0.61	UJ		1.0	UJ				
Nitrosodiphenylamine (N-)	NS	**14**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Pentachlorophenol	1	**0.56**	NS	0.60	UJ		0.93	UJ					0.59	UJ		0.99	UJ					0.60	UJ		0.97	UJ					0.61	UJ		1.0	UJ				
Phenol	NS	**1,100**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Trichlorophenol (2,4,5-)	NS	**360**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	2.0	U		2.0	U					2.0	U		2.1	U					2.0	U		2.1	U					2.1	U		2.2	U				
Total Other SVOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-			-			-			-		
Total SVOCs	NS	NS	NS	0.85			-			-			0.78			0.38			0.69			0.10			0.060			0.16			0.0032			-			0.29		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l																													
	COPC Screening Levels			SH-11S									SH-12D									SH-12S								
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/07/01			05/16/02			11/03/03			09/12/01			05/17/02			11/03/03			09/11/01			05/17/02			11/03/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																														
Acenaphthene	NS	**37**	NS	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Acenaphthylene	NS	NS	NS	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Anthracene	NS	**180**	NS	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Benzo(a)anthracene	NS	**0.092**	NS	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Benzo(a)pyrene	0.2	**0.0092**	NS	0.0028	UJ		0.0017	UJ		0.0030	UJ		0.0029	UJ		0.0017	UJ		0.0033	UJ		0.0029	UJ		0.0046	UJ		0.0030	UJ	
Benzo(b)fluoranthene	NS	**0.092**	NS	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Benzo(k)fluoranthene	NS	**0.92**	NS	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Chrysene	NS	**9.2**	NS	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Dibenz(a,h)anthracene	NS	**0.0092**	NS	0.0043	UJ		0.0025	UJ		0.0022	UJ		0.0044	UJ		0.0025	UJ		0.0024	UJ		0.0045	UJ		0.0030	J		0.0022	UJ	
Fluoranthene	NS	**150**	NS	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Fluorene	NS	**24**	NS	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Methylnaphthalene (2-)	NS	NS	*330*	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Naphthalene	NS	**0.62**	*15*	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.10			0.052	U		0.050	U		0.051	U	
Phenanthrene	NS	NS	NS	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Pyrene	NS	**18**	NS	0.051	U		0.050	U		0.051	U		0.051	U		0.050	U		0.056	U		0.052	U		0.050	U		0.051	U	
Total PAHs	NS	NS	NS	-			-			-			-			-			0.10			-			0.0030			-		
Other SVOCs																														
Benzoic acid	NS	**15,000**	NS	2.0	UJ	L		R						R			R						R			R				
Benzyl Alcohol	NS	**1,100**	NS	2.0	U		5.0	UJ	L				2.0	U		5.0	UJ	L				2.1	U		5.0	UJ	L			
bis(2-Chloroethoxy)methane	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	0.60	UJ		0.93	UJ					0.60	UJ		0.93	UJ					0.61	UJ		0.93	UJ				
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	0.60	UJ		0.93	UJ					0.60	UJ		0.93	UJ					0.61	UJ		0.93	UJ				
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	0.68	J		0.93	UJ		0.51	U		0.60	UJ		0.93	UJ		0.56	U		0.61	UJ		0.93	UJ		2.4	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Butylbenzylphthalate	NS	**730**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Carbazole	NS	**3.4**	NS	0.60	UJ		0.93	UJ		0.51	U		0.60	UJ		0.93	UJ		0.56	U		0.61	UJ		0.93	UJ		0.51	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Chloroaniline (4-)	NS	**15**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Chloronaphthalene (2-)	NS	**49**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Chlorophenol (2-)	NS	**3.0**	*110*	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Dibenzofuran	NS	**1.2**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Dichlorobenzene (1,2-)	600	**37**	*260*	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Dichlorobenzene (1,3-)	NS	**18**	*83*	0.60	UJ		0.93	UJ					0.60	UJ		0.93	UJ					0.61	UJ		0.93	UJ				
Dichlorobenzene (1,4-)	75	**0.50**	*820*	0.60	UJ		0.93	UJ					0.60	UJ		0.93	UJ					0.61	UJ		0.93	UJ				
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	0.60	UJ		4.0	UJ					0.60	UJ		4.0	UJ					0.61	UJ		4.0	UJ				
Dichlorophenol (2,4-)	NS	**11**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Diethylphthalate	NS	**2,900**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Dimethylphenol (2,4-)	NS	**73**	NS	2.0	U		5.0	U					2.0	U		5.0	U					2.1	U		5.0	U				
Dimethylphthalate	NS	**36,000**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Di-n-butylphthalate	NS	**360**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	5.0	U		5.0	U					5.1	U		5.0	U					5.2	U		5.0	U				
Dinitrophenol (2,4-)	NS	**7.3**	NS	2.0	UJ	I	5.0	UJ	I				2.0	UJ	I	5.0	UJ	I				2.1	UJ	I	5.0	UJ	I			
Dinitrotoluene (2,4-)	NS	**7.3**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Dinitrotoluene (2,6-)	NS	**3.6**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Di-n-octylphthalate	NS	**150**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Hexachlorobenzene $	1	**0.042**	*1*	0.60	UJ		0.93	UJ					0.60	UJ		0.93	UJ					0.61	UJ		0.93	UJ				
Hexachlorobutadiene	NS	**0.86**	*0.33*	0.60	UJ		0.93	UJ					0.60	UJ		0.93	UJ					0.61	UJ		0.93	UJ				
Hexachlorocyclopentadiene $	50	**22**	*50*	5.0	U		2.0	U					5.1	U		2.0	U					5.2	U		2.0	U				
Hexachloroethane	NS	**3.6**	*3.8*	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Isophorone	NS	**71**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Methylphenol (2-)	NS	**180**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Methylphenol (4-)	NS	**18**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Nitroaniline (2-)	NS	**11**	NS	0.60	UJ		0.93	UJ					0.60	UJ		0.93	UJ					0.61	UJ		0.93	UJ				
Nitroaniline (3-)	NS	**1.1**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Nitroaniline (4-)	NS	**3.2**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Nitrobenzene	NS	**0.34**	*200*	0.60	UJ		0.93	UJ					0.60	UJ		0.93	UJ					0.61	UJ		0.93	UJ				
Nitrophenol (2-)	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Nitrophenol (4-)	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	0.60	UJ		0.93	UJ					0.60	UJ		0.93	UJ					0.61	UJ		0.93	UJ				
Nitrosodiphenylamine (N-)	NS	**14**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Pentachlorophenol	1	**0.56**	NS	0.60	UJ		0.93	UJ					0.60	UJ		0.93	UJ					0.61	UJ		0.93	UJ				
Phenol	NS	**1,100**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Trichlorophenol (2,4,5-)	NS	**360**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.1	U		2.0	U				
Total Other SVOCs	NS	NS	NS	0.68			-			-			-			-			-			-			-			-		
Total SVOCs	NS	NS	NS	0.68			-			-			-			-			0.10			-			0.0030			-		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l											
				SH-13S											
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/11/01			05/16/02			11/03/03			09/28/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs															
Acenaphthene	NS	**37**	NS	0.051	U		0.050	U		0.052	U		0.0017	J	I
Acenaphthylene	NS	NS	NS	0.051	U		0.050	U		0.052	U		0.011	U	
Anthracene	NS	**180**	NS	0.051	U		0.050	U		0.052	U		0.011	U	
Benzo(a)anthracene	NS	**0.092**	NS	0.051	U		0.050	U		0.052	U		0.011	U	
Benzo(a)pyrene	0.2	**0.0092**	NS	0.0029	UJ		0.0027	UJ		**0.11**			0.011	U	
Benzo(b)fluoranthene	NS	**0.092**	NS	0.051	U		0.050	U		**0.14**			0.011	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.051	U		0.050	U		0.20			0.013	U	
Benzo(k)fluoranthene	NS	**0.92**	NS	0.051	U		0.050	U		0.062			0.011	U	
Chrysene	NS	**9.2**	NS	0.051	U		0.050	U		0.077			0.011	U	
Dibenz(a,h)anthracene	NS	**0.0092**	NS	0.0044	UJ		0.0025	UJ		**0.033**			0.0029	J	I
Fluoranthene	NS	**150**	NS	0.051	U		0.050	U		0.086			0.011	U	
Fluorene	NS	**24**	NS	0.051	U		0.050	U		0.052	U		0.011	U	
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.051	U		0.050	U		**0.17**			0.011	U	
Methylnaphthalene (2-)	NS	NS	*330*	0.051	U		0.050	U		0.052	U		0.011	U	
Naphthalene	NS	**0.62**	*15*	0.051	U		0.050	U		0.052	U		0.011	U	
Phenanthrene	NS	NS	NS	0.051	U		0.050	U		0.055			0.011	U	
Pyrene	NS	**18**	NS	0.051	U		0.050	U		0.11			0.011	U	
Total PAHs	NS	NS	NS	-			-			1.04			0.0046		
Other SVOCs															
Benzoic acid	NS	**15,000**	NS		R			R							
Benzyl Alcohol	NS	**1,100**	NS	2.0	U		5.0	UJ	L						
bis(2-Chloroethoxy)methane	NS	NS	NS	2.0	U		2.0	U							
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	0.60	UJ		0.93	UJ							
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	0.60	UJ		0.93	UJ							
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	0.60	UJ		0.93	UJ		0.52	U		1.1	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	2.0	U		2.0	U							
Butylbenzylphthalate	NS	**730**	NS	2.0	U		2.0	U							
Carbazole	NS	**3.4**	NS	0.60	UJ		0.93	UJ		0.52	U		0.0022	J	I
Chloro-3-methylphenol (4-)	NS	NS	NS	2.0	U		2.0	U							
Chloroaniline (4-)	NS	**15**	NS	2.0	U		2.0	U							
Chloronaphthalene (2-)	NS	**49**	NS	2.0	U		2.0	U							
Chlorophenol (2-)	NS	**3.0**	*110*	2.0	U		2.0	U							
Chlorophenyl-phenylether (4-)	NS	NS	NS	2.0	U		2.0	U							
Dibenzofuran	NS	**1.2**	NS	2.0	U		2.0	U							
Dichlorobenzene (1,2-)	600	**37**	*260*	2.0	U		2.0	U							
Dichlorobenzene (1,3-)	NS	**18**	*83*	0.60	UJ		0.93	UJ							
Dichlorobenzene (1,4-)	75	**0.50**	*820*	0.60	UJ		0.93	UJ							
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	0.60	UJ		4.0	UJ							
Dichlorophenol (2,4-)	NS	**11**	NS	2.0	U		2.0	U							
Diethylphthalate	NS	**2,900**	NS	2.0	U		2.0	U							
Dimethylphenol (2,4-)	NS	**73**	NS	2.0	U		5.0	U							
Dimethylphthalate	NS	**36,000**	NS	2.0	U		2.0	U							
Di-n-butylphthalate	NS	**360**	NS	2.0	U		2.0	U							
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	5.1	U		5.0	U							
Dinitrophenol (2,4-)	NS	**7.3**	NS	2.0	UJ	I	5.0	UJ	I						
Dinitrotoluene (2,4-)	NS	**7.3**	NS	2.0	U		2.0	U							
Dinitrotoluene (2,6-)	NS	**3.6**	NS	2.0	U		2.0	U							
Di-n-octylphthalate	NS	**150**	NS	2.0	U		2.0	U							
Hexachlorobenzene $	1	**0.042**	*1*	0.60	UJ		0.93	UJ							
Hexachlorobutadiene	NS	**0.86**	*0.33*	0.60	UJ		0.93	UJ							
Hexachlorocyclopentadiene $	50	**22**	*50*	5.1	U		2.0	U							
Hexachloroethane	NS	**3.6**	*3.8*	2.0	U		2.0	U							
Isophorone	NS	**71**	NS	2.0	U		2.0	U							
Methylphenol (2-)	NS	**180**	NS	2.0	U		2.0	U							
Methylphenol (4-)	NS	**18**	NS	2.0	U		2.0	U							
Nitroaniline (2-)	NS	**11**	NS	0.60	UJ		0.93	UJ							
Nitroaniline (3-)	NS	**1.1**	NS	2.0	U		2.0	U							
Nitroaniline (4-)	NS	**3.2**	NS	2.0	U		2.0	U							
Nitrobenzene	NS	**0.34**	*200*	0.60	UJ		0.93	UJ							
Nitrophenol (2-)	NS	NS	NS	2.0	U		2.0	U							
Nitrophenol (4-)	NS	NS	NS	2.0	U		2.0	U							
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	0.60	UJ		0.93	UJ							
Nitrosodiphenylamine (N-)	NS	**14**	NS	2.0	U		2.0	U							
Pentachlorophenol	1	**0.56**	NS	0.60	UJ		0.93	UJ							
Phenol	NS	**1,100**	NS	2.0	U		2.0	U							
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	2.0	U		2.0	U							
Trichlorophenol (2,4,5-)	NS	**360**	NS	2.0	U		2.0	U							
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	2.0	U		2.0	U							
Total Other SVOCs	NS	NS	NS	-			-			-			0.0022		
Total SVOCs	NS	NS	NS	-			-			1.04			0.0068		

Analytes	SH-14D											
	09/10/01			05/20/02			11/04/03			10/02/06		
	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs												
Acenaphthene	0.053	U		0.051	U		0.053	U		0.010	U	
Acenaphthylene	0.053	U		0.051	U		0.053	U		0.010	U	
Anthracene	0.053	U		0.051	U		0.053	U		0.010	U	
Benzo(a)anthracene	0.053	U		0.051	U		0.053	U		0.010	U	
Benzo(a)pyrene	0.0030	UJ		0.0017	UJ		0.0031	UJ		0.010	U	
Benzo(b)fluoranthene	0.053	U		0.051	U		0.053	U		0.010	U	
Benzo(g,h,i)perylene	0.053	U		0.051	U		0.053	U		0.010	U	
Benzo(k)fluoranthene	0.053	U		0.051	U		0.053	U		0.010	U	
Chrysene	0.053	U		0.051	U		0.053	U		0.010	U	
Dibenz(a,h)anthracene	0.0046	UJ		0.0026	UJ		0.0023	UJ		0.010	U	
Fluoranthene	0.053	U		0.051	U		0.053	U		0.010	U	
Fluorene	0.053	U		0.051	U		0.053	U		0.010	U	
Indeno(1,2,3-cd)pyrene	0.053	U		0.051	U		0.053	U		0.010	U	
Methylnaphthalene (2-)	0.053	U		0.051	U		0.053	U		0.010	U	
Naphthalene	0.053	U		0.051	U		0.053	U		0.010	U	
Phenanthrene	0.053	U		0.051	U		0.053	U		0.010	U	
Pyrene	0.053	U		0.051	U		0.053	U		0.010	U	
Total PAHs	-			-			-			-		
Other SVOCs												
Benzoic acid		R		5.1	UJ	L						
Benzyl Alcohol	2.1	U		5.1	UJ	L						
bis(2-Chloroethoxy)methane	2.1	U		2.0	U							
bis(2-Chloroethyl)ether	0.63	UJ		0.95	UJ							
bis(2-Chloroisopropyl)ether	0.63	UJ		0.95	UJ							
bis(2-Ethylhexyl)phthalate	0.76	J		0.95	UJ		1.1	U		1.0	U	
Bromophenyl-phenylether (4-)	2.1	U		2.0	U							
Butylbenzylphthalate	2.1	U		2.0	U							
Carbazole	0.63	UJ		0.95	UJ		0.53	U		0.010	U	
Chloro-3-methylphenol (4-)	2.1	U		2.0	U							
Chloroaniline (4-)	2.1	U		2.0	U							
Chloronaphthalene (2-)	2.1	U		2.0	U							
Chlorophenol (2-)	2.1	U		2.0	U							
Chlorophenyl-phenylether (4-)	2.1	U		2.0	U							
Dibenzofuran	2.1	U		2.0	U							
Dichlorobenzene (1,2-)	2.1	U		2.0	U							
Dichlorobenzene (1,3-)	0.63	UJ		0.95	UJ							
Dichlorobenzene (1,4-)	0.63	UJ		0.95	UJ							
Dichlorobenzidine (3,3'-)	0.63	UJ		4.0	UJ							
Dichlorophenol (2,4-)	2.1	U		2.0	U							
Diethylphthalate	2.1	U		2.0	U							
Dimethylphenol (2,4-)	2.1	U		5.1	U							
Dimethylphthalate	2.1	U		2.0	U							
Di-n-butylphthalate	2.1	U		2.0	U							
Dinitro-2-methylphenol (4,6-)	5.3	U		5.1	U							
Dinitrophenol (2,4-)	2.1	UJ	I	5.1	UJ	I						
Dinitrotoluene (2,4-)	2.1	U		2.0	U							
Dinitrotoluene (2,6-)	2.1	U		2.0	U							
Di-n-octylphthalate	2.1	U		2.0	U							
Hexachlorobenzene $	0.63	UJ		0.95	UJ							
Hexachlorobutadiene	0.63	UJ		0.95	UJ							
Hexachlorocyclopentadiene $	5.3	U		2.0	U							
Hexachloroethane	2.1	U		2.0	U							
Isophorone	2.1	U		2.0	U							
Methylphenol (2-)	2.1	U		2.0	U							
Methylphenol (4-)	2.1	U		2.0	U							
Nitroaniline (2-)	0.63	UJ		0.95	UJ							
Nitroaniline (3-)	2.1	U		2.0	U							
Nitroaniline (4-)	2.1	U		2.0	U							
Nitrobenzene	0.63	UJ		0.95	UJ							
Nitrophenol (2-)	2.1	U		2.0	U							
Nitrophenol (4-)	2.1	U		2.0	U							
Nitroso-di-n-propylamine (N-)	0.63	UJ		0.95	UJ							
Nitrosodiphenylamine (N-)	2.1	U		2.0	U							
Pentachlorophenol	0.63	UJ		0.95	UJ							
Phenol	2.1	U		2.0	U							
Trichlorobenzene (1,2,4-)	2.1	U		2.0	U							
Trichlorophenol (2,4,5-)	2.1	U		2.0	U							
Trichlorophenol (2,4,6-)	2.1	U		2.0	U							
Total Other SVOCs	0.76			-			-			-		
Total SVOCs	0.76			-			-			-		

Analytes	SH-14S											
	09/10/01			05/20/02			11/04/03			10/02/06		
	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs												
Acenaphthene	0.14			0.53			0.057	U		0.0018	J	I
Acenaphthylene	0.051	U		0.35			0.057	U		0.010	U	
Anthracene	0.077			0.050	U		0.057	U		0.0082	J	I
Benzo(a)anthracene	0.051	U		0.050	U		0.057	U		0.017		
Benzo(a)pyrene	0.0036	J		**0.021**	J		0.010	UJ		**0.011**		
Benzo(b)fluoranthene	0.051	U		0.050	U		0.057	U		0.010	U	
Benzo(g,h,i)perylene	0.051	U		0.050	U		0.057	U		0.010	U	
Benzo(k)fluoranthene	0.051	U		0.050	U		0.057	U		0.010	U	
Chrysene	0.051	U		0.050	U		0.057	U		0.013	U	
Dibenz(a,h)anthracene	0.0044	UJ		0.0071	J		0.0024	UJ		0.0015	J	I
Fluoranthene	0.051	U		0.081			0.057	U		0.042		
Fluorene	0.10			0.27			0.057	U		0.0080	J	I
Indeno(1,2,3-cd)pyrene	0.051	U		0.050	U		0.057	U		0.010	U	
Methylnaphthalene (2-)	0.43			3.3			0.057	U		0.010	U	
Naphthalene	**0.72**			**14**			**0.86**			**0.84**		
Phenanthrene	0.31			0.070			0.057	U		0.013	U	
Pyrene	0.055			0.16			0.14			0.068		
Total PAHs	1.8			18.7891			1.0			1.0061		
Other SVOCs												
Benzoic acid	2.0	UJ	L	5.0	UJ	L						
Benzyl Alcohol	2.0	U		5.0	UJ	L						
bis(2-Chloroethoxy)methane	2.0	U		2.0	U							
bis(2-Chloroethyl)ether	0.60	UJ		0.93	UJ							
bis(2-Chloroisopropyl)ether	0.60	UJ		0.93	UJ							
bis(2-Ethylhexyl)phthalate	0.60	UJ		0.94	J		**110**	J	H	1.0	U	
Bromophenyl-phenylether (4-)	2.0	U		2.0	U							
Butylbenzylphthalate	2.0	U		2.0	U							
Carbazole	0.60	UJ		0.93	UJ		0.57	U		0.0086	J	I
Chloro-3-methylphenol (4-)	2.0	U		2.0	U							
Chloroaniline (4-)	2.0	U		2.0	U							
Chloronaphthalene (2-)	2.0	U		2.0	U							
Chlorophenol (2-)	2.0	U		2.0	U							
Chlorophenyl-phenylether (4-)	2.0	U		2.0	U							
Dibenzofuran	2.0	U		2.0	U							
Dichlorobenzene (1,2-)	2.0	U		2.0	U							
Dichlorobenzene (1,3-)	0.60	UJ		0.93	UJ							
Dichlorobenzene (1,4-)	0.60	UJ		0.93	UJ							
Dichlorobenzidine (3,3'-)	0.60	UJ	L	4.0	UJ							
Dichlorophenol (2,4-)	2.0	U		2.0	U							
Diethylphthalate	2.0	U		2.0	U							
Dimethylphenol (2,4-)	2.0	U		5.0	U							
Dimethylphthalate	2.0	U		2.0	U							
Di-n-butylphthalate	2.0	U		2.0	U							
Dinitro-2-methylphenol (4,6-)	5.0	U		5.0	U							
Dinitrophenol (2,4-)	2.0	UJ	I	5.0	UJ	I						
Dinitrotoluene (2,4-)	2.0	U		2.0	U							
Dinitrotoluene (2,6-)	2.0	U		2.0	U							
Di-n-octylphthalate	2.0	U		2.0	U							
Hexachlorobenzene $	0.60	UJ		0.93	UJ							
Hexachlorobutadiene	0.60	UJ		0.93	UJ							
Hexachlorocyclopentadiene $	5.0	U		2.0	U							
Hexachloroethane	2.0	U		2.0	U							
Isophorone	2.0	U		2.0	U							
Methylphenol (2-)	2.0	U		2.0	U							
Methylphenol (4-)	2.0	U		2.0	U							
Nitroaniline (2-)	0.60	UJ		0.93	UJ							
Nitroaniline (3-)	2.0	U		2.0	U							
Nitroaniline (4-)	2.0	U		2.0	U							
Nitrobenzene	0.60	UJ		0.93	UJ							
Nitrophenol (2-)	2.0	U		2.0	U							
Nitrophenol (4-)	2.0	U		2.0	U							
Nitroso-di-n-propylamine (N-)	0.60	UJ		0.93	UJ							
Nitrosodiphenylamine (N-)	2.0	U		2.0	U							
Pentachlorophenol	0.60	UJ		0.93	UJ							
Phenol	2.0	U		2.0	U							
Trichlorobenzene (1,2,4-)	2.0	U		2.0	U							
Trichlorophenol (2,4,5-)	2.0	U		2.0	U							
Trichlorophenol (2,4,6-)	2.0	U		2.0	U							
Total Other SVOCs	-			0.94			110			0.0086		
Total SVOCs	1.8			19.7291			111			1.0147		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l											
				SH-15D											
				09/10/01			05/17/02			11/04/03			09/27/06		
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs															
Acenaphthene	NS	**37**	NS	0.053	U		0.053	U		0.052	U		0.010	U	
Acenaphthylene	NS	NS	NS	0.053	U		0.053	U		0.052	U		0.010	U	
Anthracene	NS	**180**	NS	0.053	U		0.053	U		0.052	U		0.010	U	
Benzo(a)anthracene	NS	**0.092**	NS	0.053	U		0.053	U		0.052	U		0.0020	J	I
Benzo(a)pyrene	0.2	**0.0092**	NS	0.0042	J		0.0018	UJ		0.0030	UJ		0.010	U	
Benzo(b)fluoranthene	NS	**0.092**	NS	0.053	U		0.053	U		0.052	U		0.010	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.053	U		0.053	U		0.052	U		0.0063	J	I
Benzo(k)fluoranthene	NS	**0.92**	NS	0.053	U		0.053	U		0.052	U		0.010	U	
Chrysene	NS	**9.2**	NS	0.053	U		0.053	U		0.052	U		0.0022	J	I
Dibenz(a,h)anthracene	NS	**0.0092**	NS	0.0053	J		0.0037	J		0.0022	UJ		0.010	U	
Fluoranthene	NS	**150**	NS	0.053	U		0.053	U		0.052	U		0.010	U	
Fluorene	NS	**24**	NS	0.053	U		0.053	U		0.052	U		0.010	U	
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.053	U		0.053	U		0.052	U		0.010	U	
Methylnaphthalene (2-)	NS	NS	*330*	0.053	U		0.053	U		0.052	U		0.010	U	
Naphthalene	NS	**0.62**	*15*	0.053	U		0.053	U		0.052	U		0.010	U	
Phenanthrene	NS	NS	NS	0.053	U		0.053	U		0.052	U		0.010	U	
Pyrene	NS	**18**	NS	0.053	U		0.053	U		0.052	U		0.0020	J	I
Total PAHs	NS	NS	NS	0.0095			0.0037			-			0.0125		
Other SVOCs															
Benzoic acid	NS	**15,000**	NS		R			R							
Benzyl Alcohol	NS	**1,100**	NS	2.1	U		5.3	UJ	L						
bis(2-Chloroethoxy)methane	NS	NS	NS	2.1	U		2.1	U							
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	0.62	UJ		0.99	UJ							
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	0.62	UJ		0.99	UJ							
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	3.8			0.99	UJ		0.52	U		1.0	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	2.1	U		2.1	U							
Butylbenzylphthalate	NS	**730**	NS	2.1	U		2.1	U							
Carbazole	NS	**3.4**	NS	0.62	UJ		0.99	UJ		0.52	U		0.010	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	2.1	U		2.1	U							
Chloroaniline (4-)	NS	**15**	NS	2.1	U		2.1	U							
Chloronaphthalene (2-)	NS	**49**	NS	2.1	U		2.1	U							
Chlorophenol (2-)	NS	**3.0**	*110*	2.1	U		2.1	U							
Chlorophenyl-phenylether (4-)	NS	NS	NS	2.1	U		2.1	U							
Dibenzofuran	NS	**1.2**	NS	2.1	U		2.1	U							
Dichlorobenzene (1,2-)	600	**37**	*260*	2.1	U		2.1	U							
Dichlorobenzene (1,3-)	NS	**18**	*83*	0.62	UJ		0.99	UJ							
Dichlorobenzene (1,4-)	75	**0.50**	*820*	0.62	UJ		0.99	UJ							
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	0.62	UJ		4.2	UJ							
Dichlorophenol (2,4-)	NS	**11**	NS	2.1	U		2.1	U							
Diethylphthalate	NS	**2,900**	NS	2.1	U		2.1	U							
Dimethylphenol (2,4-)	NS	**73**	NS	2.1	U		5.3	U							
Dimethylphthalate	NS	**36,000**	NS	2.1	U		2.1	U							
Di-n-butylphthalate	NS	**360**	NS	2.1	U		2.1	U							
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	5.3	U		5.3	U							
Dinitrophenol (2,4-)	NS	**7.3**	NS	2.1	UJ	I	5.3	UJ	I						
Dinitrotoluene (2,4-)	NS	**7.3**	NS	2.1	U		2.1	U							
Dinitrotoluene (2,6-)	NS	**3.6**	NS	2.1	U		2.1	U							
Di-n-octylphthalate	NS	**150**	NS	2.1	U		2.1	U							
Hexachlorobenzene $	1	**0.042**	*1*	0.62	UJ		0.99	UJ							
Hexachlorobutadiene	NS	**0.86**	*0.33*	0.62	UJ		0.99	UJ							
Hexachlorocyclopentadiene $	50	**22**	*50*	5.3	U		2.1	U							
Hexachloroethane	NS	**3.6**	*3.8*	2.1	U		2.1	U							
Isophorone	NS	**71**	NS	2.1	U		2.1	U							
Methylphenol (2-)	NS	**180**	NS	2.1	U		2.1	U							
Methylphenol (4-)	NS	**18**	NS	2.1	U		2.1	U							
Nitroaniline (2-)	NS	**11**	NS	0.62	UJ		0.99	UJ							
Nitroaniline (3-)	NS	**1.1**	NS	2.1	U		2.1	U							
Nitroaniline (4-)	NS	**3.2**	NS	2.1	U		2.1	U							
Nitrobenzene	NS	**0.34**	*200*	0.62	UJ		0.99	UJ							
Nitrophenol (2-)	NS	NS	NS	2.1	U		2.1	U							
Nitrophenol (4-)	NS	NS	NS	2.1	U		2.1	U							
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	0.62	UJ		0.99	UJ							
Nitrosodiphenylamine (N-)	NS	**14**	NS	2.1	U		2.1	U							
Pentachlorophenol	1	**0.56**	NS	0.62	UJ		0.99	UJ							
Phenol	NS	**1,100**	NS	2.1	U		2.1	U							
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	2.1	U		2.1	U							
Trichlorophenol (2,4,5-)	NS	**360**	NS	2.1	U		2.1	U							
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	2.1	U		2.1	U							
Total Other SVOCs	NS	NS	NS	3.8			-			-			-		
Total SVOCs	NS	NS	NS	3.8			0.0037			-			0.0125		

Analytes	SH-15S												SH-16S								
	09/10/01			05/20/02			10/28/03			10/03/06			09/11/01			05/17/02			11/19/03		
	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																					
Acenaphthene	5.3			0.75			6.2			1.1			0.051	U		0.052	U		0.053	U	
Acenaphthylene	2.0			0.20			1.7			0.24			0.051	U		0.052	U		0.053	U	
Anthracene	0.84			0.20			0.75			0.23			0.051	U		0.052	U		0.053	U	
Benzo(a)anthracene	0.071			0.067			0.21	U		0.026			0.051	U		0.052	U		0.053	U	
Benzo(a)pyrene	**0.043**	J		**0.034**	J		**0.048**	J	I	**0.013**			0.0029	UJ		0.0018	UJ		0.0031	UJ	
Benzo(b)fluoranthene	0.050	U		0.056	U		0.21	U		0.0059	J	I	0.051	U		0.052	U		0.053	U	
Benzo(g,h,i)perylene	0.050	U		0.056	U		0.21	U		0.010	U		0.051	U		0.052	U		0.053	U	
Benzo(k)fluoranthene	0.050	U		0.056	U		0.21	U		0.0062	J	I	0.051	U		0.052	U		0.053	U	
Chrysene	0.065			0.057			0.21	U		0.026			0.051	U		0.052	U		0.053	U	
Dibenz(a,h)anthracene	0.0061	J		0.0033	J		0.0091	UJ		0.010	U		0.0044	UJ		0.0026	UJ		0.0022	UJ	
Fluoranthene	0.50			0.30			0.28			0.24			0.051	U		0.052	U		0.053	U	
Fluorene	3.2			0.46			3.9			0.70			0.051	U		0.052	U		0.053	U	
Indeno(1,2,3-cd)pyrene	0.050	U		0.056	U		0.21	U		0.010	U		0.051	U		0.052	U		0.053	U	
Methylnaphthalene (2-)	21			3.3			17			2.7			0.051	U		0.052	U		0.053	U	
Naphthalene	***59***			**10**			***55***			**8.3**			0.051	U		0.052	U		0.053	U	
Phenanthrene	5.5			1.1			5.2			1.6			0.051	U		0.052	U		0.053	U	
Pyrene	0.66			0.45			0.46			0.29			0.051	U		0.052	U		0.053	U	
Total PAHs	98.1851			16.9213			90.538			15.6371			-			-			-		
Other SVOCs																					
Benzoic acid	2.0	UJ	L	5.6	UJ	L								R			R				
Benzyl Alcohol	2.0	U		5.6	UJ	L							2.0	U		5.2	UJ	L			
bis(2-Chloroethoxy)methane	2.0	U		2.2	U								2.0	U		2.1	U				
bis(2-Chloroethyl)ether	0.59	UJ		1.0	UJ								0.60	UJ		0.97	UJ				
bis(2-Chloroisopropyl)ether	0.59	UJ		1.0	UJ								0.60	UJ		0.97	UJ				
bis(2-Ethylhexyl)phthalate	0.59	UJ		1.0	UJ		2.1	U		1.0	U		0.60	UJ		0.97	UJ		0.53	U	
Bromophenyl-phenylether (4-)	2.0	U		2.2	U								2.0	U		2.1	U				
Butylbenzylphthalate	2.0	U		2.2	U								2.0	U		2.1	U				
Carbazole	0.70	J		1.0	UJ		2.1	U		0.16			0.60	UJ		0.97	UJ		0.53	U	
Chloro-3-methylphenol (4-)	2.0	U		2.2	U								2.0	U		2.1	U				
Chloroaniline (4-)	2.0	U		2.2	U								2.0	U		2.1	U				
Chloronaphthalene (2-)	2.0	U		2.2	U								2.0	U		2.1	U				
Chlorophenol (2-)	2.0	U		2.2	U								2.0	U		2.1	U				
Chlorophenyl-phenylether (4-)	2.0	U		2.2	U								2.0	U		2.1	U				
Dibenzofuran	0.72	J		2.2	U								2.0	U		2.1	U				
Dichlorobenzene (1,2-)	2.0	U		2.2	U								2.0	U		2.1	U				
Dichlorobenzene (1,3-)	0.59	UJ		1.0	UJ								0.60	UJ		0.97	UJ				
Dichlorobenzene (1,4-)	0.59	UJ		1.0	UJ								0.60	UJ		0.97	UJ				
Dichlorobenzidine (3,3'-)	0.59	UJ	L	4.4	UJ								0.60	UJ		4.1	UJ				
Dichlorophenol (2,4-)	2.0	U		2.2	U								2.0	U		2.1	U				
Diethylphthalate	2.0	U		2.2	U								2.0	U		2.1	U				
Dimethylphenol (2,4-)	1.1	J		5.6	U								2.0	U		5.2	U				
Dimethylphthalate	2.0	U		2.2	U								2.0	U		2.1	U				
Di-n-butylphthalate	2.0	U		2.2	U								2.0	U		2.1	U				
Dinitro-2-methylphenol (4,6-)	5.0	U		5.6	U								5.1	U		5.2	U				
Dinitrophenol (2,4-)	2.0	UJ	I	5.6	UJ	I							2.0	UJ	I	5.2	UJ	I			
Dinitrotoluene (2,4-)	2.0	U		2.2	U								2.0	U		2.1	U				
Dinitrotoluene (2,6-)	2.0	U		2.2	U								2.0	U		2.1	U				
Di-n-octylphthalate	2.0	U		2.2	U								2.0	U		2.1	U				
Hexachlorobenzene $	0.59	UJ		1.0	UJ								0.60	UJ		0.97	UJ				
Hexachlorobutadiene	0.59	UJ		1.0	UJ								0.60	UJ		0.97	UJ				
Hexachlorocyclopentadiene $	5.0	U		2.2	U								5.1	U		2.1	U				
Hexachloroethane	2.0	U		2.2	U								2.0	U		2.1	U				
Isophorone	2.0	U		2.2	U								2.0	U		2.1	U				
Methylphenol (2-)	0.60	J		2.2	U								2.0	U		2.1	U				
Methylphenol (4-)	2.0	U		2.2	U								2.0	U		2.1	U				
Nitroaniline (2-)	0.59	UJ		1.0	UJ								0.60	UJ		0.97	UJ				
Nitroaniline (3-)	2.0	U		2.2	U								2.0	U		2.1	U				
Nitroaniline (4-)	2.0	U		2.2	U								2.0	U		2.1	U				
Nitrobenzene	0.59	UJ		1.0	UJ								0.60	UJ		0.97	UJ				
Nitrophenol (2-)	2.0	U		2.2	U								2.0	U		2.1	U				
Nitrophenol (4-)	2.0	U		2.2	U								2.0	U		2.1	U				
Nitroso-di-n-propylamine (N-)	0.59	UJ		1.0	UJ								0.60	UJ		0.97	UJ				
Nitrosodiphenylamine (N-)	2.0	U		2.2	U								2.0	U		2.1	U				
Pentachlorophenol	0.59	UJ		1.0	UJ								0.60	UJ		0.97	UJ				
Phenol	0.67	J		2.2	U								2.0	U		2.1	U				
Trichlorobenzene (1,2,4-)	2.0	U		2.2	U								2.0	U		2.1	U				
Trichlorophenol (2,4,5-)	2.0	U		2.2	U								2.0	U		2.1	U				
Trichlorophenol (2,4,6-)	2.0	U		2.2	U								2.0	U		2.1	U				
Total Other SVOCs	3.8			-			-			0.16			-			-			-		
Total SVOCs	101.9751			16.9213			90.538			15.7971			-			-			-		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																															
				SH-17D						SH-17R						SH-17S												SH-18D							
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/20/03			10/05/06			11/20/03			10/04/06			09/06/01			05/20/02			11/19/03			09/25/06			09/04/01			05/15/02			09/26/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																			
Acenaphthene	NS	**37**	NS	0.11			0.10			0.053	U		0.073			0.050	U		0.050	U		0.052	U		0.010	U		0.051	U		0.052	U		0.011	U	
Acenaphthylene	NS	NS	NS	0.051	U		0.010	U		0.053	U		0.010	U		0.050	U		0.050	U		0.052	U		0.010	U		0.051	U		0.052	U		0.011	U	
Anthracene	NS	**180**	NS	0.051	U		0.035			0.053	U		0.011	U		0.15			0.050	U		0.052	U		0.010	U		0.051	U		0.052	U		0.011	U	
Benzo(a)anthracene	NS	**0.092**	NS	0.051	U		0.0057	J	I	0.053	U		0.0048	J	I	0.050	U		0.050	U		0.052	U		0.010	U		0.051	U		0.052	U		0.011	U	
Benzo(a)pyrene	0.2	**0.0092**	NS	0.0057	J	I	0.010	U		0.0037	J	I	0.010	U		**0.021**			0.0020	J		0.0030	UJ		0.010	U		0.0028	UJ		0.0045	UJ		0.011	U	
Benzo(b)fluoranthene	NS	**0.092**	NS	0.051	U		0.010	U		0.053	U		0.010	U		0.050	U		0.050	U		0.052	U		0.010	U		0.051	U		0.052	U		0.011	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.051	U		0.010	U		0.053	U		0.010	U		0.050	U		0.050	U		0.052	U		0.010	U		0.051	U		0.052	U		0.011	U	
Benzo(k)fluoranthene	NS	**0.92**	NS	0.051	U		0.010	U		0.053	U		0.010	U		0.050	U		0.050	U		0.052	U		0.010	U		0.051	U		0.052	U		0.011	U	
Chrysene	NS	**9.2**	NS	0.051	U		0.011			0.053	U		0.0084	J	I	0.050	U		0.050	U		0.052	U		0.010	U		0.051	U		0.052	U		0.0011	J	I
Dibenz(a,h)anthracene	NS	**0.0092**	NS	0.0022	UJ		0.010	U		0.0032	J	I	0.010	U		0.0043	UJ		0.0025	UJ		0.0024	J		0.010	U		0.0043	UJ		0.0026	UJ		0.011	U	
Fluoranthene	NS	**150**	NS	0.051	U		0.045			0.053	U		0.042			0.050	U		0.050	U		0.052	U		0.037			0.051	U		0.052	U		0.011	U	
Fluorene	NS	**24**	NS	0.13			0.17			0.053	U		0.080			0.050	U		0.050	U		0.052	U		0.010	U		0.051	U		0.052	U		0.011	U	
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.051	U		0.010	U		0.053	U		0.010	U		0.050	U		0.050	U		0.052	U		0.010	U		0.051	U		0.052	U		0.011	U	
Methylnaphthalene (2-)	NS	NS	*330*	3.8			2.7			1.5			2.4			0.050	U		0.050	U		0.052	U		0.010	U		0.051	U		0.052	U		0.011	U	
Naphthalene	NS	**0.62**	*15*	**3.2**			**3.6**			**1.5**			**2.7**			0.050	U		0.050	U		0.052	U		0.010	U		0.051	U		0.052	U		0.011	U	
Phenanthrene	NS	NS	NS	0.33			0.33			0.12			0.22			0.074			0.050	U		0.052	U		0.040			0.051	U		0.052	U		0.011	U	
Pyrene	NS	**18**	NS	0.083			0.066			0.090			0.078			0.050	U		0.050	U		0.052	U		0.20			0.051	U		0.052	U		0.0012	J	I
Total PAHs	NS	NS	NS	7.7			7.0627			3.2			5.6062			0.25			0.0020			0.0024			0.277			-			-			0.0023		
Other SVOCs																																			
Benzoic acid	NS	**15,000**	NS	1.0	UJ	L				1.1	UJ	L					R		5.0	UJ	L								R			R				
Benzyl Alcohol	NS	**1,100**	NS	0.26	U					0.27	U					2.0	U		5.0	U								2.0	U		5.2	U				
bis(2-Chloroethoxy)methane	NS	NS	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	0.26	U					0.27	U					0.59	UJ		0.93	UJ								0.60	UJ		0.96	UJ				
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	0.26	U					0.27	U					0.59	UJ		0.93	UJ								0.60	UJ		0.96	UJ				
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	1.1	U		1.0	U		0.66	U		1.0	U		0.86	UJ		0.93	UJ		0.52	U		**6.9**			0.80	UJ		0.96	UJ		1.1	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Butylbenzylphthalate	NS	**730**	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Carbazole	NS	**3.4**	NS	0.68			0.74			0.30			0.41			0.59	UJ		0.93	UJ		0.52	U		0.010	U		0.60	UJ		0.96	UJ		0.011	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Chloroaniline (4-)	NS	**15**	NS	0.26	U					0.27	UJ	L				2.0	U		2.0	U								2.0	U		2.1	U				
Chloronaphthalene (2-)	NS	**49**	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Chlorophenol (2-)	NS	**3.0**	*110*	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Dibenzofuran	NS	**1.2**	NS	0.19	J	I				0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Dichlorobenzene (1,2-)	600	**37**	*260*	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Dichlorobenzene (1,3-)	NS	**18**	*83*	0.26	U					0.27	U					0.59	UJ		0.93	UJ								0.60	UJ		0.96	UJ				
Dichlorobenzene (1,4-)	75	**0.50**	*820*	0.26	U					0.27	U					0.59	UJ		0.93	UJ								0.60	UJ		0.96	UJ				
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	0.26	U						R					0.59	UJ		4.0	UJ								0.60	UJ		4.1	UJ				
Dichlorophenol (2,4-)	NS	**11**	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Diethylphthalate	NS	**2,900**	NS	0.13	J	I				0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Dimethylphenol (2,4-)	NS	**73**	NS	0.26	U					0.27	U					2.0	U		5.0	U								2.0	U		5.2	U				
Dimethylphthalate	NS	**36,000**	NS	0.26	U					0.27	UJ	L				2.0	U		2.0	U								2.0	U		2.1	U				
Di-n-butylphthalate	NS	**360**	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	0.51	UJ	I				0.53	UJ	I				5.0	U		5.0	U								5.0	U		5.2	U				
Dinitrophenol (2,4-)	NS	**7.3**	NS	1.0	UJ	I				1.1	UJ	I				2.0	UJ	I	5.0	UJ	I							2.0	UJ	I	5.2	UJ	I			
Dinitrotoluene (2,4-)	NS	**7.3**	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Dinitrotoluene (2,6-)	NS	**3.6**	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Di-n-octylphthalate	NS	**150**	NS	0.16	J	I				0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Hexachlorobenzene $	1	**0.042**	*1*	0.26	U					0.27	U					0.59	UJ		0.93	UJ								0.60	UJ		0.96	UJ				
Hexachlorobutadiene	NS	**0.86**	*0.33*	0.26	U					0.27	U					0.59	UJ		0.93	UJ								0.60	UJ		0.96	UJ				
Hexachlorocyclopentadiene $	50	**22**	*50*	0.26	U					0.27	U					5.0	U		2.0	U								5.0	U		2.1	U				
Hexachloroethane	NS	**3.6**	*3.8*	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Isophorone	NS	**71**	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Methylphenol (2-)	NS	**180**	NS	0.15	J	I				0.12	J	I				2.0	U		2.0	U								2.0	U		2.1	U				
Methylphenol (4-)	NS	**18**	NS	0.15	J	I				0.11	J	I				2.0	U		2.0	U								2.0	U		2.1	U				
Nitroaniline (2-)	NS	**11**	NS	0.26	U					0.27	U					0.59	UJ		0.93	UJ								0.60	UJ		0.96	UJ				
Nitroaniline (3-)	NS	**1.1**	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Nitroaniline (4-)	NS	**3.2**	NS	0.51	U					0.53	U					2.0	U		2.0	U								2.0	U		2.1	U				
Nitrobenzene	NS	**0.34**	*200*	0.26	U					0.27	U					0.59	UJ		0.93	UJ								0.60	UJ		0.96	UJ				
Nitrophenol (2-)	NS	NS	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Nitrophenol (4-)	NS	NS	NS	1.0	U					1.1	U					2.0	U		2.0	U								2.0	U		2.1	U				
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	0.26	U					0.27	U					0.59	UJ		0.93	UJ								0.60	UJ		0.96	UJ				
Nitrosodiphenylamine (N-)	NS	**14**	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Pentachlorophenol	1	**0.56**	NS	1.0	U					1.1	U					0.59	UJ		0.93	UJ								0.60	UJ		0.96	UJ				
Phenol	NS	**1,100**	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Trichlorophenol (2,4,5-)	NS	**360**	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	0.26	U					0.27	U					2.0	U		2.0	U								2.0	U		2.1	U				
Total Other SVOCs	NS	NS	NS	1.5			0.74			0.53			0.41			-			-			-			6.9			-			-			-		
Total SVOCs	NS	NS	NS	9.1			7.8027			3.7			6.0162			0.25			0.0020			0.0024			7.177			-			-			0.0023		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																																			
				SH-18S									SH-19D									SH-19R									SH-19S								
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/04/01			05/15/02			09/26/06			09/05/01			05/16/02			09/25/06			09/05/01			05/16/02			09/28/06			09/05/01			05/21/02			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																							
Acenaphthene	NS	**37**	NS	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.24			0.097			0.15		
Acenaphthylene	NS	NS	NS	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.064			0.051	U		0.018		
Anthracene	NS	**180**	NS	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.057			0.051	U		0.029	U	
Benzo(a)anthracene	NS	**0.092**	NS	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.050	U		0.051	U		0.010	U	
Benzo(a)pyrene	0.2	**0.0092**	NS	0.0029	UJ	L	0.0019	UJ		0.010	U		0.0029	UJ		0.0024	UJ		0.011	U		0.0045	J		0.0024	UJ		0.010	U		0.0028	UJ		0.0017	UJ		0.010	U	
Benzo(b)fluoranthene	NS	**0.092**	NS	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.050	U		0.051	U		0.010	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.050	U		0.051	U		0.010	UJ	I
Benzo(k)fluoranthene	NS	**0.92**	NS	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.050	U		0.051	U		0.010	U	
Chrysene	NS	**9.2**	NS	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.050	U		0.051	U		0.010	U	
Dibenz(a,h)anthracene	NS	**0.0092**	NS	0.0044	UJ	L	0.0076	J		0.010	U		0.0044	UJ		0.0027	UJ		0.011	U		0.0043	UJ		0.0027	UJ		0.010	U		0.0043	UJ		0.0026	UJ		0.010	U	
Fluoranthene	NS	**150**	NS	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.050	U		0.051	U		0.011	U	
Fluorene	NS	**24**	NS	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.21			0.089			0.12		
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.050	U		0.051	U		0.010	U	
Methylnaphthalene (2-)	NS	NS	*330*	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.050	U		0.051	U		0.010	U	
Naphthalene	NS	**0.62**	*15*	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.050	U		0.051	U		0.013	U	
Phenanthrene	NS	NS	NS	0.052	UJ	L	0.052	U		0.010	U		0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.050	U		0.051	U		0.010	U	
Pyrene	NS	**18**	NS	0.052	UJ	L	0.052	U		0.0067	J	I	0.051	U		0.054	U		0.011	U		0.051	U		0.054	U		0.010	U		0.050	U		0.051	U		0.013	U	
Total PAHs	NS	NS	NS	-			0.0076			0.0067			-			-			-			0.0045			-			-			0.57			0.19			0.288		
Other SVOCs																																							
Benzoic acid	NS	**15,000**	NS		R			R						R			R						R			R						R		5.1	UJ	L			
Benzyl Alcohol	NS	**1,100**	NS	2.1	UJ	L	5.2	U					2.0	U		5.4	U					2.0	U		5.4	U					2.0	U		5.1	U				
bis(2-Chloroethoxy)methane	NS	NS	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	0.61	UJ	L	0.96	UJ					0.60	UJ		1.0	UJ					0.60	UJ		1.0	UJ					0.59	UJ		0.95	UJ				
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	0.61	UJ	L	0.96	UJ					0.60	UJ		1.0	UJ					0.60	UJ		1.0	UJ					0.59	UJ		0.95	UJ				
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	1.3	UJ	L	0.96	UJ		1.0	U		3.4	U		1.0	UJ		1.1	U		0.60	UJ		1.0	UJ		1.0	U		0.59	UJ		0.95	UJ		1.0	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Butylbenzylphthalate	NS	**730**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Carbazole	NS	**3.4**	NS	0.61	UJ	L	0.96	UJ		0.010	U		0.60	UJ		1.0	UJ		0.011	U		0.60	UJ		1.0	UJ		0.0010	J	I	0.59	UJ		0.95	UJ		0.055		
Chloro-3-methylphenol (4-)	NS	NS	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Chloroaniline (4-)	NS	**15**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Chloronaphthalene (2-)	NS	**49**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Chlorophenol (2-)	NS	**3.0**	*110*	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Dibenzofuran	NS	**1.2**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Dichlorobenzene (1,2-)	600	**37**	*260*	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Dichlorobenzene (1,3-)	NS	**18**	*83*	0.61	UJ	L	0.96	UJ					0.60	UJ		1.0	UJ					0.60	UJ		1.0	UJ					0.59	UJ		0.95	UJ				
Dichlorobenzene (1,4-)	75	**0.50**	*820*	0.61	UJ	L	0.96	UJ					0.60	UJ		1.0	UJ					0.60	UJ		1.0	UJ					0.59	UJ		0.95	UJ				
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	0.61	UJ	L	4.1	UJ					0.60	UJ		4.3	UJ					0.60	UJ		4.3	UJ					0.59	UJ		4.0	UJ				
Dichlorophenol (2,4-)	NS	**11**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Diethylphthalate	NS	**2,900**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Dimethylphenol (2,4-)	NS	**73**	NS	2.1	UJ	L	5.2	U					2.0	U		5.4	U					2.0	U		5.4	U					2.0	U		5.1	U				
Dimethylphthalate	NS	**36,000**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Di-n-butylphthalate	NS	**360**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	5.2	UJ	L	5.2	U					5.1	U		5.4	U					5.0	U		5.4	U					5.0	U		5.1	U				
Dinitrophenol (2,4-)	NS	**7.3**	NS	2.1	UJ	I	5.2	UJ	I				2.0	UJ	I	5.4	UJ	I				2.0	UJ	I	5.4	UJ	I				2.0	UJ	I	5.1	UJ	I			
Dinitrotoluene (2,4-)	NS	**7.3**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Dinitrotoluene (2,6-)	NS	**3.6**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Di-n-octylphthalate	NS	**150**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Hexachlorobenzene $	1	**0.042**	*1*	0.61	UJ	L	0.96	UJ					0.60	UJ		1.0	UJ					0.60	UJ		1.0	UJ					0.59	UJ		0.95	UJ				
Hexachlorobutadiene	NS	**0.86**	*0.33*	0.61	UJ	L	0.96	UJ					0.60	UJ		1.0	UJ					0.60	UJ		1.0	UJ					0.59	UJ		0.95	UJ				
Hexachlorocyclopentadiene $	50	**22**	*50*	5.2	UJ	L	2.1	U					5.1	U		2.2	U					5.0	U		2.2	U					5.0	U		2.0	U				
Hexachloroethane	NS	**3.6**	*3.8*	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Isophorone	NS	**71**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Methylphenol (2-)	NS	**180**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Methylphenol (4-)	NS	**18**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Nitroaniline (2-)	NS	**11**	NS	0.61	UJ	L	0.96	UJ					0.60	UJ		1.0	UJ					0.60	UJ		1.0	UJ					0.59	UJ		0.95	UJ				
Nitroaniline (3-)	NS	**1.1**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Nitroaniline (4-)	NS	**3.2**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Nitrobenzene	NS	**0.34**	*200*	0.61	UJ	L	0.96	UJ					0.60	UJ		1.0	UJ					0.60	UJ		1.0	UJ					0.59	UJ		0.95	UJ				
Nitrophenol (2-)	NS	NS	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Nitrophenol (4-)	NS	NS	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	0.61	UJ	L	0.96	UJ					0.60	UJ		1.0	UJ					0.60	UJ		1.0	UJ					0.59	UJ		0.95	UJ				
Nitrosodiphenylamine (N-)	NS	**14**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Pentachlorophenol	1	**0.56**	NS	0.61	UJ	L	0.96	UJ					0.60	UJ		1.0	UJ					0.60	UJ		1.0	UJ					0.59	UJ		0.95	UJ				
Phenol	NS	**1,100**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Trichlorophenol (2,4,5-)	NS	**360**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	2.1	UJ	L	2.1	U					2.0	U		2.2	U					2.0	U		2.2	U					2.0	U		2.0	U				
Total Other SVOCs	NS	NS	NS	-			-			-			-			-			-			-			-			0.0010			-			-			0.055		
Total SVOCs	NS	NS	NS	-			0.0076			0.0067			-			-			-			0.0045			-			0.0010			0.57			0.19			0.343		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																																		
				SH-20S						SH-21S									SH-22S									SH-23S											
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/05/01			05/17/02			09/06/01			05/16/02			09/26/06			09/05/01			05/17/02			09/25/06			09/04/01			05/15/02			11/04/03			09/25/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																						
Acenaphthene	NS	**37**	NS	0.053	U		0.052	U		2.8			1.9			1.2			0.053	U		0.052	U		0.010	U		0.054	U		0.052	U		0.053	U		0.011	U	
Acenaphthylene	NS	NS	NS	0.053	U		0.052	U		0.14			0.30			0.42			0.053	U		0.052	U		0.010	U		0.054	U		0.052	U		0.053	U		0.011	U	
Anthracene	NS	**180**	NS	0.053	U		0.052	U		0.57			0.61			1.0			0.053	U		0.052	U		0.010	U		0.054	U		0.052	U		0.053	U		0.011	U	
Benzo(a)anthracene	NS	**0.092**	NS	0.053	U		0.052	U		**0.30**			**0.83**			**1.6**			0.053	U		0.052	U		0.0016	J	I	0.054	U		0.052	U		0.053	U		0.0020	J	I
Benzo(a)pyrene	0.2	**0.0092**	NS	0.0030	UJ		0.0018	UJ		**0.25**			**0.87**			**1.8**			0.0030	UJ		0.0021	UJ		0.010	U		0.0030	UJ		0.013	UJ		0.0031	UJ		0.011	U	
Benzo(b)fluoranthene	NS	**0.092**	NS	0.053	U		0.052	U		**0.22**			**0.59**			**1.4**			0.053	U		0.052	U		0.010	U		0.054	U		0.052	U		0.053	U		0.011	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.053	U		0.052	U		0.13			0.45			1.0			0.053	U		0.052	U		0.010	U		0.054	U		0.052	U		0.053	U		0.011	U	
Benzo(k)fluoranthene	NS	**0.92**	NS	0.053	U		0.052	U		**0.15**			**0.57**			**1.3**			0.053	U		0.052	U		0.010	U		0.054	U		0.052	U		0.053	U		0.011	U	
Chrysene	NS	**9.2**	NS	0.053	U		0.052	U		0.25			0.64			1.6			0.053	U		0.052	U		0.0014	J	I	0.054	U		0.052	U		0.053	U		0.0020	J	I
Dibenz(a,h)anthracene	NS	**0.0092**	NS	0.0045	UJ		0.0026	UJ		**0.032**			**0.15**			**0.4**			0.0045	UJ		0.0026	UJ		0.010	U		0.0047	UJ		**0.053**			0.0023	UJ		0.011	U	
Fluoranthene	NS	**150**	NS	0.053	U		0.052	U		0.88			1.5			3.1			0.053	U		0.052	U		0.010	U		0.054	U		0.052	U		0.053	U		0.011	U	
Fluorene	NS	**24**	NS	0.053	U		0.052	U		2.1			0.91			0.20			0.053	U		0.052	U		0.010	U		0.054	U		0.052	U		0.053	U		0.011	U	
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.053	U		0.052	U		**0.12**			**0.45**			**1.1**			0.053	U		0.052	U		0.010	U		0.054	U		0.052	U		0.053	U		0.011	U	
Methylnaphthalene (2-)	NS	NS	*330*	0.053	U		0.052	U		0.40			0.17			0.17			0.053	U		0.052	U		0.010	U		0.054	U		0.052	U		0.053	U		0.011	U	
Naphthalene	NS	**0.62**	*15*	0.053	U		0.052	U		**1.1**			0.47			0.38			0.053	U		0.052	U		0.010	U		0.054	U		0.052	U		0.053	U		0.011	U	
Phenanthrene	NS	NS	NS	0.053	U		0.052	U		2.9			1.5			1.5			0.053	U		0.052	U		0.010	U		0.054	U		0.052	U		0.053	U		0.011	U	
Pyrene	NS	**18**	NS	0.053	U		0.16			0.68			1.4			2.8			0.053	U		0.052	U		0.010	U		0.054	U		0.052	U		0.053	U		0.0016	J	I
Total PAHs	NS	NS	NS	-			0.16			13.022			13.31			21.032			-			-			0.003			-			0.053			-			0.0056		
Other SVOCs																																						
Benzoic acid	NS	**15,000**	NS		R			R			R			R						R			R						R			R							
Benzyl Alcohol	NS	**1,100**	NS	2.1	U		5.2	U		2.1	U		5.4	U					2.1	U		5.2	U					2.2	U		5.2	U							
bis(2-Chloroethoxy)methane	NS	NS	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	0.62	UJ		0.97	UJ		0.61	UJ		1.0	UJ					0.62	UJ		0.96	UJ					0.64	UJ		0.97	UJ							
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	0.62	UJ		0.97	UJ		0.61	UJ		1.0	UJ					0.62	UJ		0.96	UJ					0.64	UJ		0.97	UJ							
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	1.1	UJ		0.97	UJ		0.61	UJ		1.0	UJ		1.0	U		0.62	UJ		0.96	UJ		1.0	U		0.64	UJ		0.99	UJ		0.53	U		1.1	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Butylbenzylphthalate	NS	**730**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Carbazole	NS	**3.4**	NS	0.62	UJ		0.97	UJ		0.61	UJ		1.0	UJ		0.062			0.62	UJ		0.96	UJ		0.010	U		0.64	UJ		0.97	UJ		0.53	U		0.011	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Chloroaniline (4-)	NS	**15**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Chloronaphthalene (2-)	NS	**49**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Chlorophenol (2-)	NS	**3.0**	*110*	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Chlorophenyl-phenylether (4-)	NS	NS	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Dibenzofuran	NS	**1.2**	NS	2.1	U		2.1	U		0.76	J		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Dichlorobenzene (1,2-)	600	**37**	*260*	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Dichlorobenzene (1,3-)	NS	**18**	*83*	0.62	UJ		0.97	UJ		0.61	UJ		1.0	UJ					0.62	UJ		0.96	UJ					0.64	UJ		0.97	UJ							
Dichlorobenzene (1,4-)	75	**0.50**	*820*	0.62	UJ		0.97	UJ		0.61	UJ		1.0	UJ					0.62	UJ		0.96	UJ					0.64	UJ		0.97	UJ							
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	0.62	UJ		4.1	UJ		0.61	UJ		4.3	UJ					0.62	UJ		4.1	UJ					0.64	UJ		4.1	UJ							
Dichlorophenol (2,4-)	NS	**11**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Diethylphthalate	NS	**2,900**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Dimethylphenol (2,4-)	NS	**73**	NS	2.1	U		5.2	U		2.1	U		5.4	U					2.1	U		5.2	U					2.2	U		5.2	U							
Dimethylphthalate	NS	**36,000**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Di-n-butylphthalate	NS	**360**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	5.3	U		5.2	U		5.2	U		5.4	U					5.1	U		5.2	U					5.4	U		5.2	U							
Dinitrophenol (2,4-)	NS	**7.3**	NS	2.1	UJ	I	5.2	UJ	I	2.1	UJ	I	5.4	UJ	I				2.1	UJ	I	5.2	UJ	I				2.2	UJ	I	5.2	UJ	I						
Dinitrotoluene (2,4-)	NS	**7.3**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Dinitrotoluene (2,6-)	NS	**3.6**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Di-n-octylphthalate	NS	**150**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Hexachlorobenzene $	1	**0.042**	*1*	0.62	UJ		0.97	UJ		0.61	UJ		1.0	UJ					0.62	UJ		0.96	UJ					0.64	UJ		0.97	UJ							
Hexachlorobutadiene	NS	**0.86**	*0.33*	0.62	UJ		0.97	UJ		0.61	UJ		1.0	UJ					0.62	UJ		0.96	UJ					0.64	UJ		0.97	UJ							
Hexachlorocyclopentadiene $	50	**22**	*50*	5.3	U		2.1	U		5.2	U		2.2	U					5.1	U		2.1	U					5.4	U		2.1	U							
Hexachloroethane	NS	**3.6**	*3.8*	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Isophorone	NS	**71**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Methylphenol (2-)	NS	**180**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Methylphenol (4-)	NS	**18**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Nitroaniline (2-)	NS	**11**	NS	0.62	UJ		0.97	UJ		0.61	UJ		1.0	UJ					0.62	UJ		0.96	UJ					0.64	UJ		0.97	UJ							
Nitroaniline (3-)	NS	**1.1**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Nitroaniline (4-)	NS	**3.2**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Nitrobenzene	NS	**0.34**	*200*	0.62	UJ		0.97	UJ		0.61	UJ		1.0	UJ					0.62	UJ		0.96	UJ					0.64	UJ		0.97	UJ							
Nitrophenol (2-)	NS	NS	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Nitrophenol (4-)	NS	NS	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	0.62	UJ		0.97	UJ		0.61	UJ		1.0	UJ					0.62	UJ		0.96	UJ					0.64	UJ		0.97	UJ							
Nitrosodiphenylamine (N-)	NS	**14**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Pentachlorophenol	1	**0.56**	NS	0.62	UJ		0.97	UJ		0.61	UJ		1.0	UJ					0.62	UJ		0.96	UJ					0.64	UJ		0.97	UJ							
Phenol	NS	**1,100**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Trichlorophenol (2,4,5-)	NS	**360**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	2.1	U		2.1	U		2.1	U		2.2	U					2.1	U		2.1	U					2.2	U		2.1	U							
Total Other SVOCs	NS	NS	NS	-			-			0.76			-			0.062			-			-			-			-			-			-			-		
Total SVOCs	NS	NS	NS	-			0.16			13.782			13.31			21.094			-			-			0.003			-			0.053			-			0.0056		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																													
				SH-24R						SH-24S						SH-25D						SH-25S						SH-26S					
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/06/03			09/28/06			11/06/03			09/28/06			11/05/03			09/27/06			11/05/03			09/26/06			10/28/03			10/04/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																	
Acenaphthene	NS	**37**	NS	0.052	U		0.0016	J	I	0.054	U		0.011	U		0.052	U		0.010	U		0.053	U		0.010	U		3.5			0.046		
Acenaphthylene	NS	NS	NS	0.052	U		0.011	U		0.054	U		0.011	U		0.052	U		0.010	U		0.053	U		0.010	U		0.55			0.010	U	
Anthracene	NS	**180**	NS	0.052	U		0.011	U		0.054	U		0.011	U		0.052	U		0.010	U		0.053	U		0.010	U		0.82			0.11		
Benzo(a)anthracene	NS	**0.092**	NS	0.052	U		0.011	U		0.054	U		0.011	U		0.052	U		0.010	U		0.053	U		0.0014	J	I	0.21	U		0.024		
Benzo(a)pyrene	0.2	**0.0092**	NS	0.0030	UJ		0.011	U		0.0098	UJ		0.011	U		0.0031	UJ		0.010	U		0.0049	UJ		0.010	U		**0.069**	J	I	0.0075	J	I
Benzo(b)fluoranthene	NS	**0.092**	NS	0.052	U		0.011	U		0.054	U		0.011	U		0.052	U		0.010	U		0.053	U		0.010	U		0.21	U		0.0066	J	I
Benzo(g,h,i)perylene	NS	NS	NS	0.052	U		0.011	U		0.054	U		0.011	UJ	I	0.052	U		0.0076	J	I	0.053	U		0.010	U		0.21	U		0.010	U	
Benzo(k)fluoranthene	NS	**0.92**	NS	0.052	U		0.011	U		0.054	U		0.011	U		0.052	U		0.010	U		0.053	U		0.010	U		0.21	U		0.010	U	
Chrysene	NS	**9.2**	NS	0.052	U		0.011	U		0.054	U		0.011	U		0.052	U		0.0011	J	I	0.053	U		0.0015	J	I	0.21	U		0.026		
Dibenz(a,h)anthracene	NS	**0.0092**	NS	0.0022	UJ		0.0012	J	I	0.0027	UJ		0.011	U		0.0022	UJ		0.010	U		0.0024	UJ		0.010	U		0.0090	UJ		0.010	U	
Fluoranthene	NS	**150**	NS	0.052	U		0.011	U		0.054	U		0.011	U		0.052	U		0.010	U		0.053	U		0.0081	J	I	1.1			0.26		
Fluorene	NS	**24**	NS	0.052	U		0.011	U		0.054	U		0.011	U		0.052	U		0.010	U		0.053	U		0.010	U		2.2			0.046		
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.052	U		0.011	U		0.054	U		0.011	U		0.052	U		0.010	U		0.053	U		0.010	U		0.21	U		0.010	U	
Methylnaphthalene (2-)	NS	NS	*330*	0.052	U		0.011	U		0.054	U		0.011	U		0.052	U		0.010	U		0.053	U		0.010	U		11			0.087	U	
Naphthalene	NS	**0.62**	*15*	0.052	U		0.011	U		0.054	U		0.011	U		0.052	U		0.010	U		0.053	U		0.010	U		***29***			0.23	U	
Phenanthrene	NS	NS	NS	0.052	U		0.011	U		0.054	U		0.011	U		0.052	U		0.010	U		0.053	U		0.010	U		6.8			0.47		
Pyrene	NS	**18**	NS	0.052	U		0.011	U		0.054	U		0.011	U		0.052	U		0.0015	J	I	0.053	U		0.012			1.9			0.37		
Total PAHs	NS	NS	NS	-			0.0028			-			-			-			0.0102			-			0.023			56.939			1.3811		
Other SVOCs																																	
Benzoic acid	NS	**15,000**	NS	1.0	UJ	L				1.1	UJ	L				1.0	UJ	L				1.1	UJ	L				2.1	J	I			
Benzyl Alcohol	NS	**1,100**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
bis(2-Chloroethoxy)methane	NS	NS	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	1.9	U		1.1	U		0.85	U		1.1	U		2.5	U		1.0	U		1.9	U		1.0	U		3.8	U		1.0	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Butylbenzylphthalate	NS	**730**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Carbazole	NS	**3.4**	NS	0.26	U		0.011	U		0.27	U		0.011	U		0.26	U		0.010	U		0.27	U		0.010	U		0.67	J	I	0.015		
Chloro-3-methylphenol (4-)	NS	NS	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Chloroaniline (4-)	NS	**15**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Chloronaphthalene (2-)	NS	**49**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Chlorophenol (2-)	NS	**3.0**	*110*	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Dibenzofuran	NS	**1.2**	NS	0.26	U					0.27	U					0.26	U					0.27	U					0.55	J	I			
Dichlorobenzene (1,2-)	600	**37**	*260*	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Dichlorobenzene (1,3-)	NS	**18**	*83*	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Dichlorobenzene (1,4-)	75	**0.50**	*820*	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Dichlorophenol (2,4-)	NS	**11**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Diethylphthalate	NS	**2,900**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Dimethylphenol (2,4-)	NS	**73**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Dimethylphthalate	NS	**36,000**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Di-n-butylphthalate	NS	**360**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	0.52	UJ	I				0.54	UJ	I				0.52	UJ	I				0.53	UJ	I				2.1	UJ	I			
Dinitrophenol (2,4-)	NS	**7.3**	NS	1.0	UJ	I				1.1	UJ	I				1.0	UJ	I				1.1	UJ	I				4.2	UJ	I			
Dinitrotoluene (2,4-)	NS	**7.3**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Dinitrotoluene (2,6-)	NS	**3.6**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Di-n-octylphthalate	NS	**150**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Hexachlorobenzene $	1	**0.042**	*1*	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Hexachlorobutadiene	NS	**0.86**	*0.33*	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Hexachlorocyclopentadiene $	50	**22**	*50*	0.26	UJ	L				0.27	UJ	L				0.26	UJ	L				0.27	UJ	L				1.0	U				
Hexachloroethane	NS	**3.6**	*3.8*	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Isophorone	NS	**71**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Methylphenol (2-)	NS	**180**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Methylphenol (4-)	NS	**18**	NS	0.26	U					0.27	U					0.26	U					0.27	U					0.59	J	I			
Nitroaniline (2-)	NS	**11**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Nitroaniline (3-)	NS	**1.1**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Nitroaniline (4-)	NS	**3.2**	NS	0.52	U					0.54	U					0.52	U					0.53	U					2.1	U				
Nitrobenzene	NS	**0.34**	*200*	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Nitrophenol (2-)	NS	NS	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Nitrophenol (4-)	NS	NS	NS	1.0	U					1.1	U					1.0	U					1.1	U					4.2	U				
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Nitrosodiphenylamine (N-)	NS	**14**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Pentachlorophenol	1	**0.56**	NS	1.0	U					1.1	U					1.0	U					1.1	U					4.2	U				
Phenol	NS	**1,100**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Trichlorophenol (2,4,5-)	NS	**360**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	0.26	U					0.27	U					0.26	U					0.27	U					1.0	U				
Total Other SVOCs	NS	NS	NS	-			-			-			-			-			-			-			-			3.9			0.015		
Total SVOCs	NS	NS	NS	-			0.0028			-			-			-			0.0102			-			0.023			60.849			1.3961		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l																																
	COPC Screening Levels			SH-27D						SH-27R						SH-27S						SH-28D						SH-28R					
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/19/03			10/02/06			11/20/03			09/29/06			11/21/03			09/25/06			11/06/03			09/27/06			11/07/03			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																	
Acenaphthene	NS	**37**	NS	0.050	U		0.011	U		0.050	U		0.010	U		0.053	U		0.011	U		0.054	U		0.0014	J	I	0.054	U		0.011	U	
Acenaphthylene	NS	NS	NS	0.050	U		0.011	U		0.050	U		0.010	U		0.053	U		0.011	U		0.054	U		0.010	U		0.054	U		0.011	U	
Anthracene	NS	**180**	NS	0.050	U		0.011	U		0.050	U		0.010	U		0.053	U		0.011	U		0.054	U		0.010	U		0.054	U		0.011	U	
Benzo(a)anthracene	NS	**0.092**	NS	0.050	U		0.011	U		0.050	U		0.010	U		0.053	U		0.0025	J	I	0.054	U		0.010	U		0.054	U		0.011	U	
Benzo(a)pyrene	0.2	**0.0092**	NS	**0.0096**	J	I	0.011	U		0.0030	UJ		0.010	U		**0.014**	J	I	0.011	U		0.0032	UJ		0.010	U		0.0032	UJ		0.011	U	
Benzo(b)fluoranthene	NS	**0.092**	NS	0.050	U		0.011	U		0.050	U		0.010	U		0.053	U		0.011	U		0.054	U		0.010	U		0.054	U		0.011	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.050	U		0.011	U		0.050	U		0.010	U		0.053	U		0.011	U		0.054	U		0.010	U		0.054	U		0.011	U	
Benzo(k)fluoranthene	NS	**0.92**	NS	0.050	U		0.011	U		0.050	U		0.010	U		0.053	U		0.011	U		0.054	U		0.010	U		0.054	U		0.011	U	
Chrysene	NS	**9.2**	NS	0.050	U		0.011	U		0.050	U		0.010	U		0.053	U		0.0027	J	I	0.054	U		0.010	U		0.054	U		0.011	U	
Dibenz(a,h)anthracene	NS	**0.0092**	NS	0.0081	J	I	0.0021	J	I	0.0021	UJ		0.010	U		0.0047	J	I	0.011	U		0.0023	UJ		0.0025	J	I	0.0023	UJ		0.011	U	
Fluoranthene	NS	**150**	NS	0.050	U		0.011	U		0.050	U		0.010	U		0.053	U		0.0073	J	I	0.054	U		0.010	U		0.054	U		0.011	U	
Fluorene	NS	**24**	NS	0.050	U		0.011	U		0.050	U		0.010	U		0.053	U		0.011	U		0.054	U		0.010	U		0.054	U		0.011	U	
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.050	U		0.011	U		0.050	U		0.010	U		0.053	U		0.011	U		0.054	U		0.010	U		0.054	U		0.011	U	
Methylnaphthalene (2-)	NS	NS	*330*	0.050	U		0.011	U		0.060			0.010	U		0.053	U		0.011	U		0.054	U		0.010	U		0.054	U		0.011	U	
Naphthalene	NS	**0.62**	*15*	0.050	U		0.011	U		0.053			0.010	U		0.053	U		0.011	U		0.054	U		0.010	U		0.054	U		0.011	U	
Phenanthrene	NS	NS	NS	0.050	U		0.011	U		0.050	U		0.010	U		0.053	U		0.011	U		0.054	U		0.010	U		0.054	U		0.011	U	
Pyrene	NS	**18**	NS	0.050	U		0.011	U		0.050	U		0.010	U		0.053	U		0.0049	J	I	0.054	U		0.010	U		0.054	U		0.011	U	
Total PAHs	NS	NS	NS	0.018			0.0021			0.11			-			0.019			0.0174			-			0.0039			-			-		
Other SVOCs																																	
Benzoic acid	NS	**15,000**	NS	1.0	UJ	L				0.35	J	I				0.37	J	I				1.1	UJ	L				1.1	U				
Benzyl Alcohol	NS	**1,100**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
bis(2-Chloroethoxy)methane	NS	NS	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	0.59	U		1.1	U		0.80	U		1.0	U		0.87	U		1.2	U		0.27	U		1.0	U		0.27	U		1.1	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Butylbenzylphthalate	NS	**730**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Carbazole	NS	**3.4**	NS	0.25	U		0.011	U		0.25	U		0.010	U		0.26	U		0.011	U		0.27	U		0.0014	J	I	0.27	U		0.011	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Chloroaniline (4-)	NS	**15**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Chloronaphthalene (2-)	NS	**49**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Chlorophenol (2-)	NS	**3.0**	*110*	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Dibenzofuran	NS	**1.2**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Dichlorobenzene (1,2-)	600	**37**	*260*	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Dichlorobenzene (1,3-)	NS	**18**	*83*	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Dichlorobenzene (1,4-)	75	**0.50**	*820*	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Dichlorophenol (2,4-)	NS	**11**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Diethylphthalate	NS	**2,900**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Dimethylphenol (2,4-)	NS	**73**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Dimethylphthalate	NS	**36,000**	NS	0.25	U					0.19	J	I				0.26	U					0.42						0.27	U				
Di-n-butylphthalate	NS	**360**	NS	0.25	U					1.4	U					0.26	U					0.30	U					0.27	U				
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	0.50	UJ	I				0.50	UJ	I				0.53	UJ	I				0.54	UJ	I				0.54	UJ	I			
Dinitrophenol (2,4-)	NS	**7.3**	NS	1.0	UJ	I				1.0	UJ	I				1.0	UJ	I				1.1	UJ	I				1.1	UJ	I			
Dinitrotoluene (2,4-)	NS	**7.3**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Dinitrotoluene (2,6-)	NS	**3.6**	NS	0.25	U					0.18	J	I				0.26	U					0.27	U					0.27	U				
Di-n-octylphthalate	NS	**150**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Hexachlorobenzene $	1	**0.042**	*1*	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Hexachlorobutadiene	NS	**0.86**	*0.33*	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Hexachlorocyclopentadiene $	50	**22**	*50*	0.25	U					0.25	U					0.26	U					0.27	UJ	L				0.27	U				
Hexachloroethane	NS	**3.6**	*3.8*	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Isophorone	NS	**71**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Methylphenol (2-)	NS	**180**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Methylphenol (4-)	NS	**18**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Nitroaniline (2-)	NS	**11**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Nitroaniline (3-)	NS	**1.1**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Nitroaniline (4-)	NS	**3.2**	NS	0.50	U					0.50	U					0.53	U					0.54	U					0.54	U				
Nitrobenzene	NS	**0.34**	*200*	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Nitrophenol (2-)	NS	NS	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Nitrophenol (4-)	NS	NS	NS	1.0	U					0.10	J	I				1.0	U					1.1	U					1.1	U				
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Nitrosodiphenylamine (N-)	NS	**14**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Pentachlorophenol	1	**0.56**	NS	1.0	U					1.0	U					1.0	U					1.1	U					1.1	U				
Phenol	NS	**1,100**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Trichlorophenol (2,4,5-)	NS	**360**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	0.25	U					0.25	U					0.26	U					0.27	U					0.27	U				
Total Other SVOCs	NS	NS	NS	-			-			0.82			-			0.37			-			0.42			0.0014			-			-		
Total SVOCs	NS	NS	NS	0.018			0.0021			0.93			-			0.39			0.0174			0.42			0.0053			-			-		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																																
				SH-28S						WP-01						WP-02			WP-03						WP-04						WP-05					
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/06/03			09/27/06			11/04/03			09/26/06			11/04/03			11/05/03			09/28/06			11/07/03			09/27/06			11/07/03			09/27/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																				
Acenaphthene	NS	**37**	NS	0.054	U		0.011	U		2.2			0.17			0.052	U		0.054	U		0.011	U		0.052	U		0.011	U		0.053	U		0.011	U	
Acenaphthylene	NS	NS	NS	0.054	U		0.011	U		0.14			0.016			0.052	U		0.054	U		0.011	U		0.052	U		0.014			0.053	U		0.011	U	
Anthracene	NS	**180**	NS	0.054	U		0.011	U		0.052	U		0.011	U		0.052	U		0.054	U		0.011	U		0.052	U		0.014	U		0.053	U		0.011	U	
Benzo(a)anthracene	NS	**0.092**	NS	0.054	U		0.011	U		0.052	U		0.035			0.052	U		0.054	U		0.011	U		**0.093**			0.073			0.053	U		0.011	U	
Benzo(a)pyrene	0.2	**0.0092**	NS	0.0032	UJ		0.011	U		0.0031	UJ		0.011	U		0.0030	UJ		0.0032	UJ		0.011	U		**0.088**			**0.069**			0.0031	UJ		0.011	U	
Benzo(b)fluoranthene	NS	**0.092**	NS	0.054	U		0.011	U		0.052	U		0.011	U		0.052	U		0.054	U		0.011	U		**0.095**			0.061			0.053	U		0.011	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.054	U		0.011	U		0.052	U		0.011	U		0.052	U		0.054	U		0.011	UJ	I	0.056			0.051			0.053	U		0.011	U	
Benzo(k)fluoranthene	NS	**0.92**	NS	0.054	U		0.011	U		0.052	U		0.011	U		0.052	U		0.054	U		0.011	U		0.052	U		0.054			0.053	U		0.011	U	
Chrysene	NS	**9.2**	NS	0.054	U		0.011	U		0.052	U		0.023			0.052	U		0.054	U		0.011	U		0.10			0.086			0.053	U		0.011	U	
Dibenz(a,h)anthracene	NS	**0.0092**	NS	0.0023	UJ		0.011	U		0.0022	UJ		0.011	U		0.0022	UJ		0.0023	UJ		0.011	U		**0.017**	J	I	**0.017**			0.0023	UJ		0.011	U	
Fluoranthene	NS	**150**	NS	0.054	U		0.011	U		1.3			0.55			0.052	U		0.054	U		0.011	U		0.18			0.14			0.053	U		0.011	U	
Fluorene	NS	**24**	NS	0.054	U		0.011	U		1.4			0.17			0.052	U		0.054	U		0.011	U		0.052	U		0.011	U		0.053	U		0.011	U	
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.054	U		0.011	U		0.052	U		0.011	U		0.052	U		0.054	U		0.011	U		0.052	U		0.044			0.053	U		0.011	U	
Methylnaphthalene (2-)	NS	NS	*330*	0.054	U		0.011	U		0.052	U		0.011	U		0.052	U		0.054	U		0.011	U		0.052	U		0.011	U		0.053	U		0.011	U	
Naphthalene	NS	**0.62**	*15*	0.054	U		0.011	U		0.052	U		0.011	U		0.052	U		0.054	U		0.011	U		0.052	U		0.011	U		0.053	U		0.011	U	
Phenanthrene	NS	NS	NS	0.054	U		0.011	U		0.052	U		0.011	U		0.052	U		0.054	U		0.011	U		0.11			0.070			0.053	U		0.011	U	
Pyrene	NS	**18**	NS	0.054	U		0.011	U		1.7			0.81			0.052	U		0.054	U		0.011	U		0.23			0.16			0.053	U		0.011	U	
Total PAHs	NS	NS	NS	-			-			6.7			1.774			-			-			-			0.97			0.839			-			-		
Other SVOCs																																				
Benzoic acid	NS	**15,000**	NS	1.1	UJ	L				1.0	UJ	L				1.0	UJ	L	1.1	UJ	L				0.25	J	I				1.1	U				
Benzyl Alcohol	NS	**1,100**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
bis(2-Chloroethoxy)methane	NS	NS	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	0.38	U		1.1	U		0.61	U		1.1	U		0.45	U		0.40	U		**5.4**			0.76	U		1.1	U		0.27	U		1.1	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Butylbenzylphthalate	NS	**730**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Carbazole	NS	**3.4**	NS	0.27	U		0.011	U		0.26	U		0.011	U		0.26	U		0.27	U		0.011	U		0.26	U		0.011	U		0.27	U		0.011	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Chloroaniline (4-)	NS	**15**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Chloronaphthalene (2-)	NS	**49**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Chlorophenol (2-)	NS	**3.0**	*110*	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Dibenzofuran	NS	**1.2**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Dichlorobenzene (1,2-)	600	**37**	*260*	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Dichlorobenzene (1,3-)	NS	**18**	*83*	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Dichlorobenzene (1,4-)	75	**0.50**	*820*	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Dichlorophenol (2,4-)	NS	**11**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Diethylphthalate	NS	**2,900**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Dimethylphenol (2,4-)	NS	**73**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Dimethylphthalate	NS	**36,000**	NS	0.17	J	I				0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Di-n-butylphthalate	NS	**360**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	0.54	UJ	I				0.52	UJ	I				0.52	UJ	I	0.54	UJ	I				0.52	UJ	I				0.53	UJ	I			
Dinitrophenol (2,4-)	NS	**7.3**	NS	1.1	UJ	I				1.0	UJ	I				1.0	UJ	I	1.1	UJ	I				1.0	UJ	I				1.1	UJ	I			
Dinitrotoluene (2,4-)	NS	**7.3**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Dinitrotoluene (2,6-)	NS	**3.6**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Di-n-octylphthalate	NS	**150**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.34	J	H				0.27	U				
Hexachlorobenzene $	1	**0.042**	*1*	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Hexachlorobutadiene	NS	**0.86**	*0.33*	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Hexachlorocyclopentadiene $	50	**22**	*50*	0.27	UJ	L				0.26	UJ	L				0.26	UJ	L	0.27	UJ	L				0.26	U					0.27	U				
Hexachloroethane	NS	**3.6**	*3.8*	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Isophorone	NS	**71**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Methylphenol (2-)	NS	**180**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Methylphenol (4-)	NS	**18**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Nitroaniline (2-)	NS	**11**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Nitroaniline (3-)	NS	**1.1**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Nitroaniline (4-)	NS	**3.2**	NS	0.54	U					0.52	U					0.52	U		0.54	U					0.52	U					0.53	U				
Nitrobenzene	NS	**0.34**	*200*	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Nitrophenol (2-)	NS	NS	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Nitrophenol (4-)	NS	NS	NS	1.1	U					1.0	U					1.0	U		1.1	U					1.0	U					1.1	U				
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Nitrosodiphenylamine (N-)	NS	**14**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Pentachlorophenol	1	**0.56**	NS	1.1	U					1.0	U					1.0	U		1.1	U					1.0	U					1.1	U				
Phenol	NS	**1,100**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Trichlorophenol (2,4,5-)	NS	**360**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	0.27	U					0.26	U					0.26	U		0.27	U					0.26	U					0.27	U				
Total Other SVOCs	NS	NS	NS	0.17			-			-			-			-			-			5.4			0.59			-			-			-		
Total SVOCs	NS	NS	NS	0.17			-			6.7			1.774			-			-			5.4			1.6			0.839			-			-		

TABLE 10
Summary of Groundwater Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l											
	COPC Screening Levels			WP-06						WP-07		
	EPA MCLs	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	10/28/03			10/05/06			10/27/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs												
Acenaphthene	NS	**37**	NS	0.46			0.69			2.6		
Acenaphthylene	NS	NS	NS	0.070			0.12			0.38		
Anthracene	NS	**180**	NS	0.057	U		0.059			0.30		
Benzo(a)anthracene	NS	**0.092**	NS	0.057	U		0.0046	J	I	0.11	U	
Benzo(a)pyrene	0.2	**0.0092**	NS	0.0054	J	I	0.011	U		**0.077**	J	I
Benzo(b)fluoranthene	NS	**0.092**	NS	0.057	U		0.011	U		0.11	U	
Benzo(g,h,i)perylene	NS	NS	NS	0.057	U		0.011	U		0.11	U	
Benzo(k)fluoranthene	NS	**0.92**	NS	0.057	U		0.011	U		0.11	U	
Chrysene	NS	**9.2**	NS	0.057	U		0.011	U		0.11	U	
Dibenz(a,h)anthracene	NS	**0.0092**	NS	0.0024	UJ		0.011	U		**0.025**	J	I
Fluoranthene	NS	**150**	NS	0.057	U		0.044			0.41		
Fluorene	NS	**24**	NS	0.27			0.36			1.4		
Indeno(1,2,3-cd)pyrene	NS	**0.092**	NS	0.057	U		0.011	U		0.11	U	
Methylnaphthalene (2-)	NS	NS	*330*	1.2			1.5			7.7		
Naphthalene	NS	**0.62**	*15*	**3.1**			**5.8**			***18***		
Phenanthrene	NS	NS	NS	0.47			0.53			2.8		
Pyrene	NS	**18**	NS	0.057	U		0.080			0.93		
Total PAHs	NS	NS	NS	5.6			9.1876			34.622		
Other SVOCs												
Benzoic acid	NS	**15,000**	NS	1.1	UJ	L				1.1	J	I
Benzyl Alcohol	NS	**1,100**	NS	0.28	U					0.57	U	
bis(2-Chloroethoxy)methane	NS	NS	NS	0.28	U					0.57	U	
bis(2-Chloroethyl)ether	NS	**0.01**	*10*	0.28	U					0.57	U	
bis(2-Chloroisopropyl)ether	NS	**0.27**	*51*	0.28	U					0.57	U	
bis(2-Ethylhexyl)phthalate	6	**4.8**	NS	0.28	U		1.1	U		0.75	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	0.28	U					0.57	U	
Butylbenzylphthalate	NS	**730**	NS	0.28	U					0.57	U	
Carbazole	NS	**3.4**	NS	0.28	U		0.076			0.64		
Chloro-3-methylphenol (4-)	NS	NS	NS	0.28	U					0.57	U	
Chloroaniline (4-)	NS	**15**	NS	0.28	U					0.57	U	
Chloronaphthalene (2-)	NS	**49**	NS	0.28	U					0.57	U	
Chlorophenol (2-)	NS	**3.0**	*110*	0.28	U					0.57	U	
Chlorophenyl-phenylether (4-)	NS	NS	NS	0.28	U					0.57	U	
Dibenzofuran	NS	**1.2**	NS	0.28	U					0.36	J	I
Dichlorobenzene (1,2-)	600	**37**	*260*	0.28	U					0.57	U	
Dichlorobenzene (1,3-)	NS	**18**	*83*	0.28	U					0.57	U	
Dichlorobenzene (1,4-)	75	**0.50**	*820*	0.28	U					0.57	U	
Dichlorobenzidine (3,3'-)	NS	**0.15**	NS	0.28	U					0.57	U	
Dichlorophenol (2,4-)	NS	**11**	NS	0.28	U					0.57	U	
Diethylphthalate	NS	**2,900**	NS	0.28	U					0.57	U	
Dimethylphenol (2,4-)	NS	**73**	NS	0.28	U					0.50	J	I
Dimethylphthalate	NS	**36,000**	NS	0.28	U					0.57	U	
Di-n-butylphthalate	NS	**360**	NS	0.28	U					0.57	U	
Dinitro-2-methylphenol (4,6-)	NS	**0.36**	NS	0.57	UJ	I				1.1	UJ	I
Dinitrophenol (2,4-)	NS	**7.3**	NS	1.1	UJ	I				2.3	UJ	I
Dinitrotoluene (2,4-)	NS	**7.3**	NS	0.28	U					0.57	U	
Dinitrotoluene (2,6-)	NS	**3.6**	NS	0.28	U					0.57	U	
Di-n-octylphthalate	NS	**150**	NS	0.28	U					0.30	J	I
Hexachlorobenzene $	1	**0.042**	*1*	0.28	U					0.57	U	
Hexachlorobutadiene	NS	**0.86**	*0.33*	0.28	U					0.57	U	
Hexachlorocyclopentadiene $	50	**22**	*50*	0.28	U					0.57	U	
Hexachloroethane	NS	**3.6**	*3.8*	0.28	U					0.57	U	
Isophorone	NS	**71**	NS	0.28	U					0.57	U	
Methylphenol (2-)	NS	**180**	NS	0.28	U					0.43	J	I
Methylphenol (4-)	NS	**18**	NS	0.28	U					0.61		
Nitroaniline (2-)	NS	**11**	NS	0.28	U					0.57	U	
Nitroaniline (3-)	NS	**1.1**	NS	0.28	U					0.57	U	
Nitroaniline (4-)	NS	**3.2**	NS	0.57	U					1.1	U	
Nitrobenzene	NS	**0.34**	*200*	0.28	U					0.57	U	
Nitrophenol (2-)	NS	NS	NS	0.28	U					0.57	U	
Nitrophenol (4-)	NS	NS	NS	1.1	U					2.3	U	
Nitroso-di-n-propylamine (N-)	NS	**0.0096**	NS	0.28	U					0.57	U	
Nitrosodiphenylamine (N-)	NS	**14**	NS	0.28	U					0.57	U	
Pentachlorophenol	1	**0.56**	NS	1.1	U					2.3	U	
Phenol	NS	**1,100**	NS	0.28	U					0.57	U	
Trichlorobenzene (1,2,4-)	NS	**0.72**	*340*	0.28	U					0.57	U	
Trichlorophenol (2,4,5-)	NS	**360**	NS	0.28	U					0.57	U	
Trichlorophenol (2,4,6-)	NS	**0.36**	NS	0.28	U					0.57	U	
Total Other SVOCs	NS	NS	NS	-			0.076			3.9		
Total SVOCs	NS	NS	NS	5.6			9.2636			38.562		

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. (SHA) on the dates indicated; see Table 1B for identity of sample delivery groups (SDGs).

2. For samples collected in 2001, 2002, and 2003, Woods Hole Group Environmental Laboratories (WHGEL) of Raynham, Massachusetts, performed analyses for semi-volatile organic compounds (SVOCs) by United States Environmental Protection Agency (USEPA) Method 8270C-EI; and polycyclic aromatic hydrocarbons (PAHs) by USEPA Method 8270C using selective ion monitoring (SIM) (when required to achieve Project Action Levels).

For samples collected in 2006, Alpha Woods Hole Laboratories (formerly WHGEL) of Raynham, Massachusetts, performed analyses for PAHs plus bis(2-ethylhexyl)phthalate and carbazole by USEPA Method 8270C using SIM.

3. Data validation and data usability assessment were performed by SHA and New Environmental Horizons, Inc. (NEH). Results are presented in the Data Usability Report (SHA, 2002), the May 2002 Groundwater Sampling Report (SHA, 2003), the Phase 1B RI Data Usability Report (SHA, 2004), and in Appendix C of this Report.

4. All concentrations are presented in micrograms per liter (µg/l), which are equivalent to parts per billion (ppb).

5. "COPC Screening Levels" indicates contaminants of potential concern (COPC) screening levels used to determine inclusion of an analyte in the human health risk assessment. Analyte detections which exceed the USEPA MCL (shaded values) are shaded. Analyte detections which exceed the EPA Region IX Tap Water PRG (**bold** value) are in **bold**. Analyte detections from shallow wells which exceed the EPA Vapor Intrusion Screening Values (*italic* value) are in *italics*.

"EPA MCL" indicates the values listed are drinking water Maximum Contaminant Levels (MCLs) from the National Primary Drinking Water Standards, dated June 2003 (http://www.epa.gov/safewater/mcl.html).

"EPA Region IX Tap Water PRG" indicates the values listed are from the USEPA Region IX Preliminary Remediation Goals (PRGs) Table, dated October 1, 2004. PRGs based on non-cancer effects are multiplied by 0.1 per USEPA Guidance (USEPA Region I, Risk Update Number 5, September 1999).

"EPA Vapor Intrusion Screening" indicates values listed are from the USEPA Office of Solid Waste and Emergency Response (OSWER) Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance), Table 2C, November 29, 2002. These values apply to shallow groundwater (SH-series wells with an S after t well number, and WP-series wells). Target groundwater concentrations based on non-carcinogenic effects are multiplied by 0.1 per USEPA Guidance (USEPA Region I, Risk Update Number 5, September 1999).

6. Total concentrations listed (e.g. Total PAHs) are the sum of detected concentrations of the relevant suite of compounds. "PAHs" are polycyclic aromatic hydrocarbons. "Other SVOCs" are non-PAH semi-volatile organic compounds.
"$" indicates the Vapor Intrusion Screening Value guidance document indicates the MCL is used as the Vapor Intrusion Screening Value because the calculated value is less than the MCL.

7. The following qualifiers and biases were assigned during data validation by NEH. Refer to NEH's Data Usability Reports (included in the Data Usability Report [SHA, 2002], the Phase 1B RI Data Usability Report [SHA, 2004], and Appendix C of this Report) for additional detail regarding qualifiers and bias.

Qualifiers:
"J" The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"U" The compound was analyzed for, but was not detected. The associated numerical value is the sample-specific reporting limit. The value is usable for project decisions as a non-detect result at the reporting limit.
"UJ" The compound was analyzed for, but was not detected. The sample-specific quantitation (reporting) limit is estimated. The non-detect result is usable for project objectives with documentation of the bias or uncertainty in the result.
"R" Indicates data rejected during validation.

Bias:
"L" Low
"I" Indeterminate
"H" High

TABLE 11
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Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																							
				SH-01D												SH-01R											
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/12/01			05/22/02			10/29/2003			10/03/06			09/13/01			05/22/02			10/30/2003			10/04/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																											
Benzene $	5	**0.35**	*5*	**810**	J	L	**340**	J	L	**130**	J	L	**41**	J	I	**660**			**690**	J	L	**390**			**270**	J	I
Toluene	1,000	**72**	*150*	**1,200**	J	L	**670**	J	L	**420**	J	L	**160**	J	I	**920**			**1,000**	J	L	**770**			**590**	J	I
Ethylbenzene	700	**130**	*700*	**350**	J	L	**400**	J	L	**310**	J	L	**200**	J	I	**280**			**380**	J	L	**260**			**160**	J	I
Xylene (m,p-) †	10,000	**21**	*2,200*	**420**	J	L	**420**	J	L	**330**	J	L	**170**	J	I	**390**			**560**	J	L	**430**			**260**	J	I
Xylene (o-) †	10,000	**21**	*3,300*	**230**	J	L	**200**	J	L	**160**	J	L	**75**	J	I	**190**			**260**	J	L	**200**			**120**	J	I
Styrene	100	**160**	*890*	**280**	J	L	130	J	L	82	J	L	26	J	I	**240**			**320**	J	L	**240**			140	J	I
Total AVOCs	NS	NS	NS	3,290			2,160			1,432			672			2,680			3,210			2,290			1,540		
CVOCs																											
Carbon tetrachloride $	5	**0.17**	*5*	9.0	UJ	L	26	UJ	L		R		40	UJ	I	22	UJ		26	UJ	L	36	UJ		40	UJ	L
Chlorobenzene	100	**11**	*39*	40	UJ	L	100	UJ	L		R		40	UJ	I	100	U		100	UJ	L	100	U		40	UJ	L
Chloroethane	NS	**4.6**	*2,800*	40	UJ	L	100	UJ	L		R		40	UJ	I	100	U		100	UJ	L	100	U		40	UJ	L
Chloroform $	NS	**0.17**	*80*	150	UJ	I	14	UJ	L		R		40	UJ	I	310	U		14	UJ	L	7.0	UJ		40	UJ	L
Chloromethane	NS	**16**	*6.7*	11	UJ	L	14	UJ	L		R		40	UJ	I	28	UJ		14	UJ	L	40	UJ		40	UJ	L
Dichloroethane (1,1-)	NS	**81**	*220*	40	UJ	L	100	UJ	L		R		40	UJ	I	100	U		100	UJ	L	100	U		40	UJ	L
Dichloroethane (1,2-) $	5	**0.12**	*5*	3.6	UJ	L	14	UJ	L		R		40	UJ	I	9.0	UJ		14	UJ	L	5.0	UJ		40	UJ	L
Dichloroethene (1,1-)	7	**34**	*19*	8.6	UJ	L	9.5	UJ	L		R		40	UJ	I	22	UJ		9.5	UJ	L	11	UJ		40	UJ	L
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	40	UJ	L	100	UJ	L		R		40	UJ	I	100	U		100	UJ	L	100	U		40	UJ	L
Dichloroethene (trans-1,2-)	100	**12**	*18*	40	UJ	L	100	UJ	L		R		40	UJ	I	100	U		100	UJ	L	100	U		40	UJ	L
Dichloropropane (1,2-)	5	**0.16**	*3.5*	3.0	UJ	L	12	UJ	L		R		40	UJ	I	7.5	UJ		12	UJ	L	8.5	UJ		40	UJ	L
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	4.6	UJ	L	11	UJ	L		R		40	UJ	I	12	UJ		11	UJ	L	10	UJ		40	UJ	L
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	4.2	UJ	L	12	UJ	L		R		40	UJ	I	10	UJ		12	UJ	L	5.5	UJ		40	UJ	L
Methylene chloride	5	**4.3**	*58*	7.0	UJ	L	26	UJ	L		R		40	UJ	I	**14**	J		20	UJ	L	78	UJ		40	UJ	L
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	3.2	UJ	L	6.0	UJ	L		R		40	UJ	I	8.0	UJ		6.0	UJ	L	16	UJ		40	UJ	L
Tetrachloroethene $	5	**0.1**	*5*	6.4	UJ	L	10	UJ	L		R		40	UJ	I	16	UJ		10	UJ	L	7.5	UJ		40	UJ	L
Trichloroethane (1,1,1-)	200	**320**	*310*	40	UJ	L	100	UJ	L		R		40	UJ	I	100	U		100	UJ	L	100	U		40	UJ	L
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	5.2	UJ	L	12	UJ	L		R		40	UJ	I	13	UJ		12	UJ	L	6.0	UJ		40	UJ	L
Trichloroethene $	5	**0.028**	*5*	5.2	UJ	L	13	UJ	L		R		40	UJ	I	13	UJ		13	UJ	L	9.0	UJ		40	UJ	L
Vinyl chloride $	2	**0.020**	*2*	15	UJ	L	29	UJ	L		R		40	UJ	I	38	UJ		29	UJ	L	16	UJ		40	UJ	L
Total CVOCs	NS	NS	NS	-			-			-			-			14			-			-			ND		
Other VOCs																											
Acetone	NS	**550**	*22,000*	400	UJ	L	200	J	L		R		180	J	I	1,000	UJ	L	150	J	L	250	U		150	UJ	I
Bromochloromethane	NS	NS	NS	40	UJ	L	100	UJ	L		R		40	UJ	I	100	U		100	UJ	L	100	U		40	UJ	L
Bromodichloromethane	NS	**0.18**	*2.1*	43	UJ	I	11	UJ	L		R		40	UJ	I	110	U		11	UJ	L	12	UJ		40	UJ	L
Bromoform	NS	**8.5**	*0.0083*	40	UJ	L	100	UJ	L		R		40	UJ	I	100	U		100	UJ	L	100	U		40	UJ	L
Bromomethane	NS	**0.87**	*2.0*	21	UJ	I	8.0	UJ	L		R		40	UJ	I	54	UJ	I	8.0	UJ	L	77	UJ	I	40	UJ	I
Butanone (2-)	NS	**700**	*44,000*	40	UJ	L	100	UJ	L		R		40	UJ	I	100	U		100	UJ	L	100	U		20	J	I
Carbon disulfide	NS	**100**	*56*	40	UJ	L	100	UJ	L		R		40	UJ	I	100	U		100	UJ	L	100	U		40	UJ	L
Chloroethylvinyl ether (2-)	NS	NS	NS		R		100	UJ	L		R		40	UJ	I		R		100	UJ	L	100	U		40	UJ	L
Dibromochloromethane	NS	**0.13**	*3.2*	15	UJ	L	10	UJ	L		R		40	UJ	I	32	UJ		10	UJ	L	7.5	UJ		40	UJ	I
Hexanone (2-)	NS	NS	NS	180	J	L	250	UJ	L	72	J	L	40	UJ	I	330			140	J	L	99	J	I	49	J	I
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	40	UJ	L	100	UJ	L		R		40	UJ	I	100	U		100	UJ	L	100	U		40	UJ	L
Methyl-tert Butyl Ether	NS	**11**	*12,000*	40	UJ	L	100	UJ	L		R		40	UJ	I	100	U		100	UJ	L	100	U		40	UJ	L
Trichlorofluoromethane	NS	**130**	*18*	40	UJ	L	100	UJ	L		R		40	UJ	I	100	U		100	UJ	L	100	U		40	UJ	L
Vinyl acetate	NS	**41**	*960*	100	UJ	L	100	UJ	L		R		40	UJ	I	250	UJ	L	100	UJ	L	100	U		40	UJ	L
Total Other VOCs	NS	NS	NS	180			200			72			180			330			290			99			69		
Total VOCs	NS	NS	NS	3,470			2,360			1,504			852			3,024			3,500			2,389			1,609		
VPH																											
C5-C8 Aliphatic	NS	NS	NS																								
C9-C12 Aliphatic	NS	NS	NS																								
C9-C10 Aromatic	NS	NS	NS																								
Total VPH	NS	NS	NS																								
EPH																											
C9-C18 Aliphatic	NS	NS	NS																								
C19-C36 Aliphatic	NS	NS	NS																								
C11-C22 Aromatic	NS	NS	NS																								
Total EPH	NS	NS	NS																								

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Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l																							
	COPC Screening Levels			SH-01S												SH-02D								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/12/01			05/21/02			10/28/2003			10/05/06			09/13/01			05/23/02			10/30/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																								
Benzene $	5	**0.35**	*5*	***16***			**1.3**	J		**2.2**	J	I	**2.2**			**83**			**180**			**3.8**	J	I
Toluene	1,000	**72**	*150*	24			4.5			19			9.2			**130**			**270**			40	U	
Ethylbenzene	700	**130**	*700*	7.0			1.7	J		10	U		3.4			47			58	J		40	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	**22**			3.2			8.0	J	I	6.4			**74**			**98**	J		40	U	
Xylene (o-) †	10,000	**21**	*3,300*	11			1.7	J		10	U		4.1			**35**	J		100	U		40	U	
Styrene	100	**160**	*890*	9.3			2.0	U		10	U		2.0	U		38	J		69	J		40	U	
Total AVOCs	NS	NS	NS	89.3			12.4			29.2			25.3			407			675			3.8		
CVOCs																								
Carbon tetrachloride $	5	**0.17**	*5*	0.45	UJ		0.53	UJ		3.6	UJ		2.0	U		9.0	UJ		26	UJ		15	UJ	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		10	U		2.0	U		40	U		100	U		40	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		10	U		2.0	U		40	U		100	U		40	U	
Chloroform $	NS	**0.17**	*80*	0.37	UJ		0.27	UJ		0.70	UJ		2.0	U		120	U		14	UJ		2.8	UJ	
Chloromethane	NS	**16**	*6.7*	0.57	UJ		0.29	UJ		4.0	UJ		2.0	U		11	UJ		14	UJ		16	UJ	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		10	U		2.0	U		40	U		100	U		40	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.18	UJ		0.29	UJ		0.50	UJ		2.0	U		3.6	UJ		14	UJ		2.0	UJ	
Dichloroethene (1,1-)	7	**34**	*19*	0.43	UJ		0.19	UJ		1.1	UJ		2.0	U		8.6	UJ		9.5	UJ		4.4	UJ	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		10	U		2.0	U		40	U		100	U		40	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		10	U		2.0	U		40	U		100	U		40	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.15	UJ		0.24	UJ		0.85	UJ		2.0	U		3.0	UJ		12	UJ		3.4	UJ	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.23	UJ		0.22	UJ		1.0	UJ		2.0	U		4.6	UJ		11	UJ		4.2	UJ	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.21	UJ		0.23	UJ		0.55	UJ		2.0	U		4.2	UJ		12	UJ		2.2	UJ	
Methylene chloride	5	**4.3**	*58*	0.20	UJ		0.21	UJ		7.8	UJ		2.0	U		4.0	UJ		10	UJ		31	UJ	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.16	UJ		0.12	UJ		1.6	UJ		2.0	U		3.2	UJ		6.0	UJ		6.2	UJ	
Tetrachloroethene $	5	**0.1**	*5*	0.32	UJ		0.21	UJ		0.75	UJ		2.0	U		6.4	UJ		10	UJ		3.0	UJ	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		10	U		2.0	U		40	U		100	U		40	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.26	UJ		0.24	UJ		0.60	UJ		2.0	U		5.2	UJ		12	UJ		2.4	UJ	
Trichloroethene $	5	**0.028**	*5*	0.26	UJ		0.26	UJ		0.90	UJ		2.0	U		5.2	UJ		13	UJ		3.6	UJ	
Vinyl chloride $	2	**0.020**	*2*	0.75	UJ		0.58	UJ		1.6	UJ		2.0	U		15	UJ		29	UJ		6.4	UJ	
Total CVOCs	NS	NS	NS	-			-			-			ND			-			-			-		
Other VOCs																								
Acetone	NS	**550**	*22,000*	20	UJ	L	6.9			23	J	I	5.1	U		400	UJ	L	250	U		100	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		10	U		2.0	U		40	U		100	U		40	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.23	UJ		0.22	UJ		1.2	UJ		2.0	U		47	UJ		11	UJ		4.8	UJ	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		2.0	U		10	U		2.0	U		40	U		100	U		40	U	
Bromomethane	NS	**0.87**	*2.0*	1.1	UJ	I	0.16	UJ		7.7	UJ	I	2.0	UJ	I	21	UJ	I	30	UJ	I	31	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.9			26			2.0	U		40	U		100	U		40	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		10	U		2.0	U		40	U		100	U		40	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		2.0	U		10	U		2.0	U			R		100	U		40	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.15	UJ		0.20	UJ		0.75	UJ		2.0	UJ	I	15	UJ		10	UJ		3.0	UJ	
Hexanone (2-)	NS	NS	NS	3.3			1.5	J		25	U		2.0	U		40	U		60	J		100	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		10	U		2.0	U		40	U		100	U		40	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		10	U		2.0	U		40	U		100	U		40	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		10	U		2.0	U		40	U		100	U		40	U	
Vinyl acetate	NS	**41**	*960*	5.0	UJ	L	2.0	U		10	U		2.0	U		100	UJ	L	100	U		40	U	
Total Other VOCs	NS	NS	NS	3.3			11.3			49			-			-			60			-		
Total VOCs	NS	NS	NS	92.6			23.7			78.2			25.3			407			735			3.8		
VPH																								
C5-C8 Aliphatic	NS	NS	NS																					
C9-C12 Aliphatic	NS	NS	NS																					
C9-C10 Aromatic	NS	NS	NS																					
Total VPH	NS	NS	NS																					
EPH																								
C9-C18 Aliphatic	NS	NS	NS																					
C19-C36 Aliphatic	NS	NS	NS																					
C11-C22 Aromatic	NS	NS	NS																					
Total EPH	NS	NS	NS																					

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Walpole, Massachusetts

Analytes	Concentrations in µg/l																							
	COPC Screening Levels			SH-02R												SH-02S								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/12/01			05/16/02			11/04/03			09/29/06			09/12/01			05/24/02			10/29/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																								
Benzene $	5	**0.35**	*5*	**8.4**			**6.9**			**2.1**	J	L	2.0	U		**0.96**	J		**0.84**	J		0.75	UJ	
Toluene	1,000	**72**	*150*	12			2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Ethylbenzene	700	**130**	*700*	2.7			2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	3.2			4.1			2.0	U		4.0	U		2.0	U		2.0	U		10	U	
Xylene (o-) †	10,000	**21**	*3,300*	1.8	J		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Styrene	100	**160**	*890*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Total AVOCs	NS	NS	NS	28.1			11			2.1			-			0.96			0.84			-		
CVOCs																								
Carbon tetrachloride $	5	**0.17**	*5*	0.45	UJ		0.53	UJ		0.33	UJ		2.0	U		0.45	UJ		0.53	UJ		3.6	UJ	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Chloroform $	NS	**0.17**	*80*	0.31	UJ		0.27	UJ		0.11	UJ		2.0	U		0.24	UJ		0.27	UJ		0.70	UJ	
Chloromethane	NS	**16**	*6.7*	0.57	UJ		0.29	UJ		0.20	UJ		2.0	U		0.57	UJ		0.29	UJ		4.0	UJ	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.18	UJ		0.29	UJ		0.17	UJ		2.0	U		0.18	UJ		0.29	UJ		0.50	UJ	
Dichloroethene (1,1-)	7	**34**	*19*	0.43	UJ		0.19	UJ		0.30	UJ		2.0	U		0.43	UJ		0.19	UJ		1.1	UJ	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.15	UJ		0.24	UJ		0.14	UJ		2.0	U		0.15	UJ		0.24	UJ		0.85	UJ	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.23	UJ		0.22	UJ		0.14	UJ		2.0	U		0.23	UJ		0.22	UJ		1.0	UJ	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.21	UJ		0.23	UJ		0.10	UJ		2.0	U		0.21	UJ		0.23	UJ		0.55	UJ	
Methylene chloride	5	**4.3**	*58*	0.20	UJ		0.21	UJ		0.25	UJ		2.0	U		0.20	UJ		0.21	UJ		7.8	UJ	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.16	UJ		0.12	UJ		0.090	UJ		2.0	U		0.16	UJ		0.12	UJ		1.6	UJ	
Tetrachloroethene $	5	**0.1**	*5*	0.32	UJ		0.21	UJ		0.23	UJ		2.0	U		0.32	UJ		0.21	UJ		0.75	UJ	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.26	UJ		0.24	UJ		0.10	UJ		2.0	U		0.26	UJ		0.24	UJ		0.60	UJ	
Trichloroethene $	5	**0.028**	*5*	**1.0**	J		**0.99**	J		**0.81**	J	I	2.0	U		0.26	UJ		0.26	UJ		0.90	UJ	
Vinyl chloride $	2	**0.020**	*2*	0.75	UJ		0.58	UJ		0.32	UJ		2.0	U		0.75	UJ		0.58	UJ		1.6	UJ	
Total CVOCs	NS	NS	NS	1.0			0.99			0.81			-			-			-			-		
Other VOCs																								
Acetone	NS	**550**	*22,000*	20	UJ	L	5.0	U		2.0	U		5.0	U		20	UJ	L	3.4	J		25	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.23	UJ		0.22	UJ		0.060	UJ		2.0	U		0.23	UJ		0.22	UJ		1.2	UJ	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Bromomethane	NS	**0.87**	*2.0*	1.1	UJ	I	0.32	UJ	I	0.78	UJ	I	2.0	UJ	I	1.1	UJ	I	0.47	UJ	I	7.7	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U			R		10	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.15	UJ		0.20	UJ		0.090	UJ		2.0	U		0.15	UJ		0.20	UJ		0.75	UJ	
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		25	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U	
Vinyl acetate	NS	**41**	*960*	5.0	UJ	L	2.0	U		2.0	U		2.0	U		5.0	UJ	L	2.0	U		10	U	
Total Other VOCs	NS	NS	NS	-			-			-			-			-			3.4			-		
Total VOCs	NS	NS	NS	29.1			11.99			2.9			-			0.96			4.2			-		
VPH																								
C5-C8 Aliphatic	NS	NS	NS																					
C9-C12 Aliphatic	NS	NS	NS																					
C9-C10 Aromatic	NS	NS	NS																					
Total VPH	NS	NS	NS																					
EPH																								
C9-C18 Aliphatic	NS	NS	NS																					
C19-C36 Aliphatic	NS	NS	NS																					
C11-C22 Aromatic	NS	NS	NS																					
Total EPH	NS	NS	NS																					

TABLE 11
Summary of Groundwater Data - Volatile Organic Compounds & VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																							
				SH-03D												SH-03S											
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/12/01			05/23/02			11/03/03			10/03/06			09/11/01			05/16/02			11/03/03			09/29/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																											
Benzene $	5	**0.35**	*5*	0.25	UJ		0.22	UJ		0.15	UJ		2.0	U		0.25	UJ		0.22	UJ		0.15	UJ		2.0	U	
Toluene	1,000	**72**	*150*	2.0	U		2.0	U		2.0	U		2.0	U		8.8			28			4.6			2.0	U	
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		2.0	U		2.0	U		4.0	U		2.0	U		2.0	U		2.0	U		4.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	-			-			-			-			8.8			28			4.6			-		
CVOCs																											
Carbon tetrachloride $	5	**0.17**	*5*	0.45	UJ		0.53	UJ		0.33	UJ		2.0	U		0.45	UJ		0.53	UJ		0.33	UJ		2.0	U	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	0.29	UJ		0.27	UJ		0.11	UJ		2.0	U		0.22	UJ		0.27	UJ		0.11	UJ		2.0	U	
Chloromethane	NS	**16**	*6.7*	0.57	UJ		0.29	UJ		0.20	UJ		2.0	U		0.57	UJ		0.29	UJ		0.20	UJ		2.0	U	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.18	UJ		0.29	UJ		0.17	UJ		2.0	U		0.18	UJ		0.29	UJ		0.17	UJ		2.0	U	
Dichloroethene (1,1-)	7	**34**	*19*	0.43	UJ		0.19	UJ		0.30	UJ		2.0	U		0.43	UJ		0.19	UJ		0.30	UJ		2.0	U	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.15	UJ		0.24	UJ		0.14	UJ		2.0	U		0.15	UJ		0.24	UJ		0.14	UJ		2.0	U	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.23	UJ		0.22	UJ		0.14	UJ		2.0	U		0.23	UJ		0.22	UJ		0.14	UJ		2.0	U	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.21	UJ		0.23	UJ		0.10	UJ		2.0	U		0.21	UJ		0.23	UJ		0.10	UJ		2.0	U	
Methylene chloride	5	**4.3**	*58*	0.20	UJ		0.21	UJ		0.25	UJ		2.0	U		0.20	UJ		0.21	UJ		0.25	UJ		2.0	U	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.16	UJ		0.12	UJ		0.090	UJ		2.0	U		0.16	UJ		0.12	UJ		0.090	UJ		2.0	U	
Tetrachloroethene $	5	**0.1**	*5*	0.32	UJ		0.21	UJ		0.23	UJ		2.0	U		0.32	UJ		0.21	UJ		0.23	UJ		2.0	U	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.26	UJ		0.24	UJ		0.10	UJ		2.0	U		0.26	UJ		0.24	UJ		0.10	UJ		2.0	U	
Trichloroethene $	5	**0.028**	*5*	**0.41**	J		**0.45**	J		**0.38**	J	I	2.0	U		0.26	UJ		0.26	UJ		0.18	UJ		2.0	U	
Vinyl chloride $	2	**0.020**	*2*	0.75	UJ		0.58	UJ		0.32	UJ		2.0	U		0.75	UJ		0.58	UJ		0.32	UJ		2.0	U	
Total CVOCs	NS	NS	NS	0.41			0.45			0.38			-			-			-			-			-		
Other VOCs																											
Acetone	NS	**550**	*22,000*	20	UJ	L	5.0	U		2.0	U		5.0	U		20	UJ	L	5.0	J		2.0	U		5.4	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.23	UJ		0.22	UJ		0.060	UJ		2.0	U		0.23	UJ		0.22	UJ		0.060	UJ		2.0	U	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromomethane	NS	**0.87**	*2.0*	1.1	UJ	I	0.43	UJ	I	0.78	UJ	I	2.0	UJ	I	1.1	UJ	I	0.16	UJ	I	0.78	UJ	I	2.0	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		2.0	U		2.0	U		16			6.8			2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U			R		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.15	UJ		0.20	UJ		0.090	UJ		2.0	U		0.15	UJ		0.20	UJ		0.090	UJ		2.0	U	
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	5.0	UJ	L	2.0	U		2.0	U		2.0	U		5.0	UJ	L	2.0	U		2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	-			-			-			-			16			11.8			-			-		
Total VOCs	NS	NS	NS	0.41			0.45			0.38			-			24.8			39.8			4.6			-		
VPH																											
C5-C8 Aliphatic	NS	NS	NS																								
C9-C12 Aliphatic	NS	NS	NS																								
C9-C10 Aromatic	NS	NS	NS																								
Total VPH	NS	NS	NS																								
EPH																											
C9-C18 Aliphatic	NS	NS	NS																								
C19-C36 Aliphatic	NS	NS	NS																								
C11-C22 Aromatic	NS	NS	NS																								
Total EPH	NS	NS	NS																								

TABLE 11
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Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l																							
	COPC Screening Levels			SH-04D									SH-04S											
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/11/01			05/21/02			11/05/03			09/11/01			05/20/02			10/28/03			10/04/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																								
Benzene $	5	**0.35**	*5*	0.25	UJ		0.22	UJ		0.15	UJ	L	***43***			***17***	J		***17***			***12***	J	L
Toluene	1,000	**72**	*150*	2.0	U		2.0	U		2.0	U		57			22			23			11	J	L
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		2.0	U		23			20	U		9.2	J	I	5.0	J	I
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		2.0	U		2.0	U		**33**			11	J		13			20	UJ	L
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		2.0	U		17			20	U		7.0	J	I	10	UJ	L
Styrene	100	**160**	*890*	2.0	U		2.0	U		2.0	U		13			20	U		6.2	J	I	10	UJ	L
Total AVOCs	NS	NS	NS	-			-			-			186			50			75.4			28		
CVOCs																								
Carbon tetrachloride $	5	**0.17**	*5*	0.45	UJ		0.53	UJ		0.33	UJ		2.2	UJ		5.3	UJ		3.6	UJ		10	UJ	L
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		2.0	U		10	U		20	U		10	U		10	UJ	L
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		2.0	U		10	U		20	U		10	U		10	UJ	L
Chloroform $	NS	**0.17**	*80*	0.25	UJ		0.27	UJ		0.11	UJ		28	U		2.7	UJ		0.70	UJ		10	UJ	L
Chloromethane	NS	**16**	*6.7*	0.57	UJ		0.29	UJ		0.20	UJ		2.8	UJ		2.9	UJ		4.0	UJ		10	UJ	L
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		2.0	U		10	U		20	U		10	U		10	UJ	L
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.18	UJ		0.29	UJ		0.17	UJ		0.90	UJ		2.9	UJ		0.50	UJ		10	UJ	L
Dichloroethene (1,1-)	7	**34**	*19*	0.43	UJ		0.19	UJ		0.30	UJ		2.2	UJ		1.9	UJ		1.1	UJ		10	UJ	L
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		2.0	U		10	U		20	U		10	U		10	UJ	L
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		2.0	U		10	U		20	U		10	U		10	UJ	L
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.15	UJ		0.24	UJ		0.14	UJ		0.75	UJ		2.4	UJ		0.85	UJ		10	UJ	L
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.23	UJ		0.22	UJ		0.14	UJ		1.2	UJ		2.2	UJ		1.0	UJ		10	UJ	L
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.21	UJ		0.23	UJ		0.10	UJ		1.0	UJ		2.3	UJ		0.55	UJ		10	UJ	L
Methylene chloride	5	**4.3**	*58*	0.20	UJ		0.21	UJ		0.25	UJ		1.4	UJ		6.6	UJ		7.8	UJ		10	UJ	L
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.16	UJ		0.12	UJ		0.090	UJ		0.80	UJ			R		1.6	UJ		10	UJ	L
Tetrachloroethene $	5	**0.1**	*5*	0.32	UJ		0.21	UJ		0.23	UJ		1.6	UJ		2.1	UJ		0.75	UJ		10	UJ	L
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		2.0	U		10	U		20	U		10	U		10	UJ	L
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.26	UJ		0.24	UJ		0.10	UJ		1.3	UJ		2.4	UJ		0.60	UJ		10	UJ	L
Trichloroethene $	5	**0.028**	*5*	0.26	UJ		0.26	UJ		0.18	UJ		1.3	UJ		2.6	UJ		0.90	UJ		10	UJ	L
Vinyl chloride $	2	**0.020**	*2*	0.75	UJ		0.58	UJ		0.32	UJ		3.8	UJ		5.8	UJ		1.6	UJ		10	UJ	L
Total CVOCs	NS	NS	NS	-			-			-			-			-			-			-		
Other VOCs																								
Acetone	NS	**550**	*22,000*	20	UJ	L	5.0	U		2.0	U		100	UJ	L	50	U		25	U		25	UJ	I
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		2.0	U		10	U		20	U		10	U		10	UJ	L
Bromodichloromethane	NS	**0.18**	*2.1*	0.23	UJ		0.22	UJ		0.060	UJ		9.2	UJ		2.2	UJ		1.2	UJ		10	UJ	L
Bromoform	NS	**8.5**	*0.0083*	2.0	U		2.0	U		2.0	U		10	U		20	U		10	U		10	UJ	L
Bromomethane	NS	**0.87**	*2.0*	1.1	UJ	I	0.45	UJ	I	0.78	UJ	I	5.4	UJ	I	2.1	UJ	I	7.7	UJ	I	10	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		2.0	U		10	U		20	U		10	U		10	UJ	L
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		2.0	U		10	U		20	U		10	U		10	UJ	L
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U			R		20	U		10	U		10	UJ	L
Dibromochloromethane	NS	**0.13**	*3.2*	0.15	UJ		0.20	UJ		0.090	UJ		2.7	UJ		2.0	UJ		0.75	UJ		10	UJ	I
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		18			20	U		8.0	J	I	10	UJ	L
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		2.0	U		10	U		20	U		10	U		10	UJ	L
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		2.0	U		10	U		20	U		10	U		10	UJ	L
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		2.0	U		10	U		20	U		10	U		10	UJ	L
Vinyl acetate	NS	**41**	*960*	5.0	UJ	L	2.0	U		2.0	U		25	UJ	L		R		10	U		10	UJ	I
Total Other VOCs	NS	NS	NS	-			-			-			18			-			8.0			-		
Total VOCs	NS	NS	NS	-			-			-			204			50			83.4			28		
VPH																								
C5-C8 Aliphatic	NS	NS	NS																					
C9-C12 Aliphatic	NS	NS	NS																					
C9-C10 Aromatic	NS	NS	NS																					
Total VPH	NS	NS	NS																					
EPH																								
C9-C18 Aliphatic	NS	NS	NS																					
C19-C36 Aliphatic	NS	NS	NS																					
C11-C22 Aromatic	NS	NS	NS																					
Total EPH	NS	NS	NS																					

TABLE 11
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Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																							
				SH-05D												SH-05R-A						SH-05R-B					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/11/01			05/21/02			11/04/03			10/02/06			11/10/03			10/03/06			11/11/03			10/04/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																											
Benzene $	5	**0.35**	*5*	0.25	UJ		0.22	UJ		0.15	UJ	L	2.0	U		0.15	UJ		2.0	U		0.15	UJ		2.0	U	
Toluene	1,000	**72**	*150*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		2.0	U		2.0	U		4.0	U		2.0	U		4.0	U		2.0	U		4.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	-			-			-			-			-			-			-			-		
CVOCs																											
Carbon tetrachloride $	5	**0.17**	*5*	0.45	UJ		0.53	UJ		0.33	UJ		2.0	U		0.33	UJ		2.0	U		0.33	UJ		2.0	U	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	0.33	UJ		0.27	UJ		0.11	UJ		2.0	U		0.11	UJ		2.0	U		0.11	UJ		2.0	U	
Chloromethane	NS	**16**	*6.7*	0.57	UJ		0.29	UJ		0.20	UJ		2.0	U		0.20	UJ		2.0	U		0.20	UJ		2.0	U	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.18	UJ		0.29	UJ		0.17	UJ		2.0	U		0.17	UJ		2.0	U		0.17	UJ		2.0	U	
Dichloroethene (1,1-)	7	**34**	*19*	0.43	UJ		0.19	UJ		0.30	UJ		2.0	U		0.30	UJ		2.0	U		0.30	UJ		2.0	U	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.15	UJ		0.24	UJ		0.14	UJ		2.0	U		0.14	UJ		2.0	U		0.14	UJ		2.0	U	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.23	UJ		0.22	UJ		0.14	UJ		2.0	U		0.14	UJ		2.0	U		0.14	UJ		2.0	U	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.21	UJ		0.23	UJ		0.10	UJ		2.0	U		0.10	UJ		2.0	U		0.10	UJ		2.0	U	
Methylene chloride	5	**4.3**	*58*	0.20	UJ		0.21	UJ		0.25	UJ		2.0	U		0.25	UJ		2.0	U		0.25	UJ		2.0	U	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.16	UJ		0.12	UJ		0.090	UJ		2.0	U		0.090	UJ		2.0	U		0.090	UJ		2.0	U	
Tetrachloroethene $	5	**0.1**	*5*	0.32	UJ		0.21	UJ		0.23	UJ		2.0	U		0.23	UJ		2.0	U		0.23	UJ		2.0	U	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.26	UJ		0.24	UJ		0.10	UJ		2.0	U		0.10	UJ		2.0	U		0.10	UJ		2.0	U	
Trichloroethene $	5	**0.028**	*5*	**2.2**			**2.2**			**3.2**			**2.1**	J	H	0.18	UJ		2.0	U		0.18	UJ		2.0	U	
Vinyl chloride $	2	**0.020**	*2*	0.75	UJ		0.58	UJ		0.32	UJ		2.0	U		0.32	UJ		2.0	U		0.32	UJ		2.0	U	
Total CVOCs	NS	NS	NS	2.2			2.2			-			2.1			-			-			-			-		
Other VOCs																											
Acetone	NS	**550**	*22,000*	20	UJ	L	5.0	U		2.0	U		5.0	U		5.0	U		5.0	U		5.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.23	UJ		0.22	UJ		0.060	UJ		2.0	U		0.060	UJ		2.0	U		0.060	UJ		2.0	U	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromomethane	NS	**0.87**	*2.0*	1.1	UJ	I	0.51	UJ	I	0.78	UJ	I	2.0	UJ	I	0.78	UJ	I	2.0	UJ	I	0.78	UJ	I	2.0	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U			R		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.15	UJ		0.20	UJ		0.090	UJ		2.0	U		0.090	UJ		2.0	U		0.090	UJ		2.0	U	
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	5.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	-			-			-			-			-			-			-			-		
Total VOCs	NS	NS	NS	2.2			2.2			-			2.1			-			-			-			-		
VPH																											
C5-C8 Aliphatic	NS	NS	NS																								
C9-C12 Aliphatic	NS	NS	NS																								
C9-C10 Aromatic	NS	NS	NS																								
Total VPH	NS	NS	NS																								
EPH																											
C9-C18 Aliphatic	NS	NS	NS																								
C19-C36 Aliphatic	NS	NS	NS																								
C11-C22 Aromatic	NS	NS	NS																								
Total EPH	NS	NS	NS																								

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Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																										
				SH-05S												SH-06D									SH-06R-A					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/11/01			05/21/02			10/29/2003			10/04/06			09/06/01			05/22/02			10/29/03			11/05/03			10/02/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																														
Benzene $	5	**0.35**	*5*	***7.4***	J		***12***			**2.0**	J	I	10	U		**3.7**	J		**3.0**	J		**5.1**	J	L	0.15	UJ	L	0.2	U	
Toluene	1,000	**72**	*150*	7.0	J		6.6	J		10	U		10	U		20	U		7.4	J		10	J	L	2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	5.0	J		10	U		10	U		10	U		11	J		12			12	J	L	2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	11			12			10	U		20	U		**48**			**49**	J	I	**50**	J	L	2.0	U		4.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	7.2	J		7.4	J		10	U		10	U		**45**			**48**	J	I	**48**	J	L	2.0	U		2.0	U	
Styrene	100	**160**	*890*	10	U		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	37.6			38			2.0			-			107.7			119.4			125.1			-			-		
CVOCs																														
Carbon tetrachloride $	5	**0.17**	*5*	2.2	UJ		2.6	UJ		3.6	UJ		10	U		4.5	UJ		2.6	UJ		3.6	UJ	L	0.33	UJ		2.0	U	
Chlorobenzene	100	**11**	*39*	10	U		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	10	U		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	27	U		1.4	UJ		0.70	UJ		10	U		4.1	UJ		1.4	UJ		0.70	UJ	L	0.11	UJ		0.20	U	
Chloromethane	NS	**16**	*6.7*	2.8	UJ		1.4	UJ		4.0	UJ		10	U		5.7	UJ		1.4	UJ		4.0	UJ	L	0.20	UJ		2.0	U	
Dichloroethane (1,1-)	NS	**81**	*220*	10	U		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.90	UJ		1.4	UJ		0.50	UJ		10	U		1.8	UJ		1.4	UJ		0.50	UJ	L	0.17	UJ		0.20	U	
Dichloroethene (1,1-)	7	**34**	*19*	2.2	UJ		0.95	UJ		1.1	UJ		10	U		4.3	UJ		0.95	UJ		1.1	UJ	L	0.30	UJ		2.0	U	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	10	U		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	10	U		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	UJ	I	2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.75	UJ		1.2	UJ		0.85	UJ		10	U		1.5	UJ		1.2	UJ		0.85	UJ	L	0.14	UJ		0.50	U	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	1.2	UJ		1.1	UJ		1.0	UJ		10	U		2.3	UJ		1.1	UJ		1.0	UJ	L	0.14	UJ		0.50	U	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	1.0	UJ		1.2	UJ		0.55	UJ		10	U		2.1	UJ		1.2	UJ		0.55	UJ	L	0.10	UJ		0.50	U	
Methylene chloride	5	**4.3**	*58*	1.4	UJ		1.0	UJ		7.8	UJ		10	U		2.3	UJ		3.5	UJ		7.8	UJ	L	0.25	UJ		2.0	U	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.80	UJ		0.60	UJ		1.6	UJ		10	U		1.6	UJ		0.60	UJ		1.6	UJ	L	0.090	UJ		0.20	U	
Tetrachloroethene $	5	**0.1**	*5*	1.6	UJ		1.0	UJ		0.75	UJ		10	U		3.2	UJ		1.0	UJ		0.75	UJ	L	0.23	UJ		0.20	U	
Trichloroethane (1,1,1-)	200	**320**	*310*	10	U		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	1.3	UJ		1.2	UJ		0.60	UJ		10	U		2.6	UJ		1.2	UJ		0.60	UJ	L	0.10	UJ		0.20	U	
Trichloroethene $	5	**0.028**	*5*	1.3	UJ		1.3	UJ		0.90	UJ		10	U		2.6	UJ		1.3	UJ		0.90	UJ	L	**1.9**	J	I	**1.2**		
Vinyl chloride $	2	**0.020**	*2*	3.8	UJ		2.9	UJ		1.6	UJ		10	U		7.5	UJ		2.9	UJ		1.6	UJ	L	0.32	UJ		0.50	U	
Total CVOCs	NS	NS	NS	-			-			-			-			-			-			-			1.9			1.2		
Other VOCs																														
Acetone	NS	**550**	*22,000*	100	UJ	L	25	J		25	U		25	U		50	J	I	69			84	J	L	2.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	10	U		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	9.0	UJ		1.1	UJ		1.2	UJ		10	U		2.3	UJ		1.1	UJ		1.2	UJ	L	0.060	UJ		0.20	U	
Bromoform	NS	**8.5**	*0.0083*	10	U		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	U		0.50	U	
Bromomethane	NS	**0.87**	*2.0*	5.4	UJ	I	0.80	UJ		7.7	UJ	I	10	UJ	I	11	UJ	I	0.80	UJ		7.7	UJ	I	0.78	UJ	I	0.20	UJ	I
Butanone (2-)	NS	**700**	*44,000*	10	U		10	U		10	U		10	U		20	U		10	U		9.2	J	L	2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	10	U		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS		R		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	2.8	UJ		1.0	UJ		0.75	UJ		10	UJ	I	1.5	UJ		1.0	UJ		0.75	UJ	L	0.090	UJ		0.20	U	
Hexanone (2-)	NS	NS	NS	10	U		25	U		25	U		10	U		20	U		25	U		25	UJ	L	2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	10	U		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	10	U		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	10	U		10	U		10	U		10	U		20	U		10	U		10	UJ	L	2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	25	UJ	L	10	U		10	U		10	U		50	UJ	L	10	U		10	UJ	L	2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	-			25			-			-			50			69			93.2			-			-		
Total VOCs	NS	NS	NS	37.6			63			2.0			-			157.7			188.4			218.3			1.9			1.2		
VPH																														
C5-C8 Aliphatic	NS	NS	NS																											
C9-C12 Aliphatic	NS	NS	NS																											
C9-C10 Aromatic	NS	NS	NS																											
Total VPH	NS	NS	NS																											
EPH																														
C9-C18 Aliphatic	NS	NS	NS																											
C19-C36 Aliphatic	NS	NS	NS																											
C11-C22 Aromatic	NS	NS	NS																											
Total EPH	NS	NS	NS																											

TABLE 11
Summary of Groundwater Data - Volatile Organic Compounds & VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l																										
	COPC Screening Levels			SH-06R-B						SH-06S									SH-07D								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/06/03			10/02/06			09/06/01			05/22/02			10/29/2003			09/07/01			05/22/02			10/30/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																											
Benzene $	5	**0.35**	*5*	0.15	UJ	L	0.20	U		**3.8**	J		**4.6**	J		**2.6**	J	I	**13**	J	L	**9.2**	J		**8.2**	J	L
Toluene	1,000	**72**	*150*	2.0	U		2.0	U		6.6	J		5.3	J		5.2	J	I	12	J	L	40	U		40	UJ	L
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		10	U		10	U		10	U		10	J	L	40	U		40	UJ	L
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		4.0	U		5.2	J		10	U		8.2	J	I	**27**	J	L	40	U		40	UJ	L
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		10	U		10	U		5.9	J	I	16	J	L	40	U		40	UJ	L
Styrene	100	**160**	*890*	2.0	U		2.0	U		10	U		10	U		10	U		20	UJ	L	40	U		40	UJ	L
Total AVOCs	NS	NS	NS	-			-			15.6			9.9			21.9			78			9.2			8.2		
CVOCs																											
Carbon tetrachloride $	5	**0.17**	*5*	0.33	UJ		2.0	U		2.2	UJ		2.6	UJ		3.6	UJ		4.5	UJ	L	11	UJ		15	UJ	L
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		10	U		10	U		10	U		20	UJ	L	40	U		40	UJ	L
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		10	U		10	U		10	U		20	UJ	L	40	U		40	UJ	L
Chloroform $	NS	**0.17**	*80*	0.11	UJ		0.20	U		1.9	UJ		1.4	UJ		0.70	UJ		3.3	UJ	L	5.4	UJ		2.8	UJ	L
Chloromethane	NS	**16**	*6.7*	0.20	UJ		2.0	U		2.8	UJ		1.4	UJ		4.0	UJ		5.7	UJ	L	5.8	UJ		16	UJ	L
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		10	U		10	U		10	U		20	UJ	L	40	U		40	UJ	L
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.17	UJ		0.20	U		0.90	UJ		1.4	UJ		0.50	UJ		1.8	UJ	L	5.8	UJ		2.0	UJ	L
Dichloroethene (1,1-)	7	**34**	*19*	0.30	UJ		2.0	U		2.2	UJ		0.95	UJ		1.1	UJ		4.3	UJ	L	3.8	UJ		4.4	UJ	L
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		10	U		10	U		10	U		20	UJ	L	40	U		40	UJ	L
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	UJ	I	2.0	U		10	U		10	U		10	U		20	UJ	L	40	U		40	UJ	L
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.14	UJ		0.50	U		0.75	UJ		1.2	UJ		0.85	UJ		1.5	UJ	L	4.8	UJ		3.4	UJ	L
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.14	UJ		0.50	U		1.2	UJ		1.1	UJ		1.0	UJ		2.3	UJ	L	4.4	UJ		4.2	UJ	L
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.10	UJ		0.50	U		1.0	UJ		1.2	UJ		0.55	UJ		2.1	UJ	L	4.6	UJ		2.2	UJ	L
Methylene chloride	5	**4.3**	*58*	0.25	UJ		2.0	U		1.2	UJ		1.0	UJ		7.8	UJ		2.0	UJ	L	4.2	UJ		31	UJ	L
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.090	UJ		0.20	U		0.80	UJ		0.60	UJ		1.6	UJ		1.6	UJ	L	2.4	UJ		6.2	UJ	L
Tetrachloroethene $	5	**0.1**	*5*	0.23	UJ		0.20	U		1.6	UJ		1.0	UJ		0.75	UJ		3.2	UJ	L	4.2	UJ		3.0	UJ	L
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		10	U		10	U		10	U		20	UJ	L	40	U		40	UJ	L
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.10	UJ		0.20	U		1.3	UJ		1.2	UJ		0.60	UJ		2.6	UJ	L	4.8	UJ		2.4	UJ	L
Trichloroethene $	5	**0.028**	*5*	**1.5**	J	I	**0.44**			1.3	UJ		1.3	UJ		0.90	UJ		2.6	UJ	L	5.2	UJ		3.6	UJ	L
Vinyl chloride $	2	**0.020**	*2*	0.32	UJ		0.50	U		3.8	UJ		2.9	UJ		1.6	UJ		7.5	UJ	L	12	UJ		6.4	UJ	L
Total CVOCs	NS	NS	NS	1.5			0.44			-			-			-			-			-			-		
Other VOCs																											
Acetone	NS	**550**	*22,000*	2.0	U		5.0	U		25	UJ	I	14	J		25	U		86	J	I	110			87	J	L
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		10	U		10	U		10	U		20	UJ	L	40	U		40	UJ	L
Bromodichloromethane	NS	**0.18**	*2.1*	0.060	UJ		0.20	U		1.2	UJ		1.1	UJ		1.2	UJ		2.3	UJ	L	4.4	UJ		4.8	UJ	L
Bromoform	NS	**8.5**	*0.0083*	2.0	U		0.50	U		10	U		10	U		10	U		20	UJ	L	40	U		40	UJ	L
Bromomethane	NS	**0.87**	*2.0*	0.78	UJ	I	0.20	UJ	I	5.4	UJ	I	3.2	UJ	I	7.7	UJ	I	11	UJ	I	8.2	UJ	I	31	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		10	U		6.4	J		10	U		20	UJ	L	40	U		40	UJ	L
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		10	U		10	U		10	U		20	UJ	L	40	U		40	UJ	L
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		2.0	U		10	U		10	U		10	U		20	UJ	L	40	U		40	UJ	L
Dibromochloromethane	NS	**0.13**	*3.2*	0.090	UJ		0.20	U		0.75	UJ		1.0	UJ		0.75	UJ		1.5	UJ	L	4.0	UJ		3.0	UJ	L
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		10	U		10	U		25	U		20	UJ	L	40	U		100	UJ	L
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		10	U		10	U		10	U		20	UJ	L	40	U		40	UJ	L
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		10	U		10	U		10	U		20	UJ	L	**22**	J		40	UJ	L
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		10	U		10	U		10	U		20	UJ	L	40	U		40	UJ	L
Vinyl acetate	NS	**41**	*960*	2.0	U		2.0	U		25	UJ	L	10	U		10	U		50	UJ	L	40	U		40	UJ	L
Total Other VOCs	NS	NS	NS	-			-			-			20.4			-			86			132			87		
Total VOCs	NS	NS	NS	1.5			0.44			15.6			30.3			21.9			164			141.2			95.2		
VPH																											
C5-C8 Aliphatic	NS	NS	NS																								
C9-C12 Aliphatic	NS	NS	NS																								
C9-C10 Aromatic	NS	NS	NS																								
Total VPH	NS	NS	NS																								
EPH																											
C9-C18 Aliphatic	NS	NS	NS																								
C19-C36 Aliphatic	NS	NS	NS																								
C11-C22 Aromatic	NS	NS	NS																								
Total EPH	NS	NS	NS																								

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Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																										
				SH-07S									SH-08D									SH-08S								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/07/01			05/22/02			10/29/2003			09/07/01			05/20/02			10/29/2003			09/06/01			05/21/02			10/28/2003		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																														
Benzene $	5	**0.35**	*5*	**3.6**	J		**0.43**	J		**3.2**	J	I	**77**			**49**			**46**			0.25	UJ		0.22	UJ		0.15	UJ	
Toluene	1,000	**72**	*150*	10	U		2.0	U		10	U		**99**			57			55			2.0	U		2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	13			2.0	U		11			47			34			30			2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	21			1.4	J		20			**160**			**100**			**95**			2.0	U		2.0	U		2.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	12			2.0	U		9.5	J	I	**87**			**67**			**55**			2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	10	U		2.0	U		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	49.6			1.8			43.7			470			307			281			-			-			-		
CVOCs																														
Carbon tetrachloride $	5	**0.17**	*5*	2.2	UJ		0.53	UJ		3.6	UJ		2.2	UJ		0.53	UJ		3.6	UJ		0.45	UJ		0.53	UJ		0.73	UJ	
Chlorobenzene	100	**11**	*39*	10	U		2.0	U		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	10	U		2.0	U		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	1.6	UJ		0.27	UJ		0.70	UJ		2.0	UJ		0.27	UJ		0.70	UJ		0.22	UJ		0.27	UJ		0.14	UJ	
Chloromethane	NS	**16**	*6.7*	2.8	UJ		0.29	UJ		4.0	UJ		2.8	UJ		0.93	J		4.0	UJ		0.57	UJ		0.29	UJ		0.79	UJ	
Dichloroethane (1,1-)	NS	**81**	*220*	10	U		2.0	U		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.90	UJ		0.29	UJ		0.50	UJ		0.90	UJ		0.29	UJ		0.50	UJ		0.18	UJ		0.29	UJ		0.10	UJ	
Dichloroethene (1,1-)	7	**34**	*19*	2.2	UJ		0.19	UJ		1.1	UJ		2.2	UJ		0.19	UJ		1.1	UJ		0.43	UJ		0.19	UJ		0.22	UJ	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	10	U		2.0	U		10	U		10	U		1.2	J		10	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	10	U		2.0	U		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.75	UJ		0.24	UJ		0.85	UJ		0.75	UJ		0.24	UJ		0.85	UJ		0.15	UJ		0.24	UJ		0.17	UJ	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	1.2	UJ		0.22	UJ		1.0	UJ		1.2	UJ		0.22	UJ		1.0	UJ		0.23	UJ		0.22	UJ		0.21	UJ	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	1.0	UJ		0.23	UJ		0.55	UJ		1.0	UJ		0.23	UJ		0.55	UJ		0.21	UJ		0.23	UJ		0.11	UJ	
Methylene chloride	5	**4.3**	*58*	1.0	UJ		0.21	UJ		7.8	UJ		1.2	UJ		0.21	UJ		7.8	UJ		0.30	UJ		0.21	UJ		1.6	UJ	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.80	UJ		0.12	UJ		1.6	UJ		0.80	UJ		0.12	UJ		1.6	UJ		0.16	UJ		0.12	UJ		0.31	UJ	
Tetrachloroethene $	5	**0.1**	*5*	1.6	UJ		0.21	UJ		0.75	UJ		1.6	UJ		0.21	UJ		0.75	UJ		0.32	UJ		0.21	UJ		0.15	UJ	
Trichloroethane (1,1,1-)	200	**320**	*310*	10	U		2.0	U		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	1.3	UJ		0.24	UJ		0.60	UJ		1.3	UJ		0.24	UJ		0.60	UJ		0.26	UJ		0.24	UJ		0.12	UJ	
Trichloroethene $	5	**0.028**	*5*	1.3	UJ		0.26	UJ		0.90	UJ		1.3	UJ		0.26	UJ		0.90	UJ		0.26	UJ		0.26	UJ		0.18	UJ	
Vinyl chloride $	2	**0.020**	*2*	3.8	UJ		0.58	UJ		1.6	UJ		3.8	UJ		0.58	UJ		1.6	UJ		0.75	UJ		0.58	UJ		0.32	UJ	
Total CVOCs	NS	NS	NS	-			-			-			-			2.1			-			-			-			-		
Other VOCs																														
Acetone	NS	**550**	*22,000*	25	UJ	I	5.0	U		25	U		25	UJ	I	5.0	U		25	U		20	UJ	L	5.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	10	U		2.0	U		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	1.2	UJ		0.22	UJ		1.2	UJ		1.2	UJ		0.22	UJ		1.2	UJ		0.23	UJ		0.22	UJ		0.24	UJ	
Bromoform	NS	**8.5**	*0.0083*	10	U		2.0	U		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Bromomethane	NS	**0.87**	*2.0*	5.4	UJ	I	0.16	UJ		7.7	UJ	I	5.4	UJ	I	0.30	UJ	I	7.7	UJ	I	1.1	UJ	I	0.22	UJ	I	1.5	UJ	I
Butanone (2-)	NS	**700**	*44,000*	10	U		2.0	U		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	10	U		2.0	U		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	10	U			R		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.75	UJ		0.20	UJ		0.75	UJ		0.75	UJ		0.20	UJ		0.75	UJ		0.15	UJ		0.20	UJ		0.15	UJ	
Hexanone (2-)	NS	NS	NS	10	U		5.0	U		25	U		10	U		2.0	U		25	U		2.0	U		2.0	U		5.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	10	U		2.0	U		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	10	U		2.0	U		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	10	U		2.0	U		10	U		10	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	25	UJ	L	2.0	U		10	U		25	UJ	L	2.0	U		10	U		5.0	UJ	L	2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Total VOCs	NS	NS	NS	49.6			1.8			43.7			470			309.13			281			-			-			-		
VPH																														
C5-C8 Aliphatic	NS	NS	NS	240	U		240	U														240	U		240	U				
C9-C12 Aliphatic	NS	NS	NS	350	J	L	110	J	L													100	U		100	U				
C9-C10 Aromatic	NS	NS	NS	200	J	L	70	U														70	U		70	U				
Total VPH	NS	NS	NS	550			110															-			410					
EPH																														
C9-C18 Aliphatic	NS	NS	NS	31	UJ	L	33	UJ	L													31	U		30	U				
C19-C36 Aliphatic	NS	NS	NS	42	U		43	UJ	L													41	U		40	U				
C11-C22 Aromatic	NS	NS	NS	94			92	UJ	L													87	U		85	U				
Total EPH	NS	NS	NS	94			-															-			-					

TABLE 11
Summary of Groundwater Data - Volatile Organic Compounds & VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																										
				SH-09D									SH-09S									SH-10S								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/07/01			05/23/02			10/28/03			09/07/01			05/17/02			10/31/03			09/10/01			05/23/02			10/31/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																														
Benzene $	5	**0.35**	*5*	1.2	UJ		0.22	UJ		0.15	UJ		0.25	UJ		0.22	UJ		0.15	UJ		0.25	UJ		0.22	UJ		0.15	UJ	
Toluene	1,000	**72**	*150*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
CVOCs																														
Carbon tetrachloride $	5	**0.17**	*5*	2.2	UJ		0.53	UJ		0.73	UJ		0.45	UJ		0.53	UJ		0.73	UJ		0.45	UJ		0.53	UJ		0.73	UJ	
Chlorobenzene	100	**11**	*39*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	2.0	UJ		0.27	UJ		0.14	UJ		0.22	UJ		0.27	UJ		0.14	UJ		0.36	UJ		0.27	UJ		0.14	UJ	
Chloromethane	NS	**16**	*6.7*	2.8	UJ		0.29	UJ		0.79	UJ		0.57	UJ		0.29	UJ		0.79	UJ		0.57	UJ		0.29	UJ		0.79	UJ	
Dichloroethane (1,1-)	NS	**81**	*220*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.90	UJ		0.29	UJ		0.10	UJ		0.18	UJ		0.29	UJ		0.10	UJ		0.18	UJ		0.29	UJ		0.10	UJ	
Dichloroethene (1,1-)	7	**34**	*19*	2.2	UJ		0.19	UJ		0.22	UJ		0.43	UJ		0.19	UJ		0.22	UJ		0.43	UJ		0.19	UJ		0.22	UJ	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.75	UJ		0.24	UJ		0.17	UJ		0.15	UJ		0.24	UJ		0.17	UJ		0.15	UJ		0.24	UJ		0.17	UJ	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	1.2	UJ		0.22	UJ		0.21	UJ		0.23	UJ		0.22	UJ		0.21	UJ		0.23	UJ		0.22	UJ		0.21	UJ	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	1.0	UJ		0.23	UJ		0.11	UJ		0.21	UJ		0.23	UJ		0.11	UJ		0.21	UJ		0.23	UJ		0.11	UJ	
Methylene chloride	5	**4.3**	*58*	1.0	UJ		0.21	UJ		1.6	UJ		0.20	UJ		0.21	UJ		1.6	UJ		0.20	UJ		0.21	UJ		1.6	UJ	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.80	UJ		0.12	UJ		0.31	UJ		0.16	UJ		0.12	UJ		0.31	UJ		0.16	UJ		0.12	UJ		0.31	UJ	
Tetrachloroethene $	5	**0.1**	*5*	1.6	UJ		0.21	UJ		0.15	UJ		0.32	UJ		0.21	UJ		0.15	UJ		0.32	UJ		0.21	UJ		0.15	UJ	
Trichloroethane (1,1,1-)	200	**320**	*310*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	1.3	UJ		0.24	UJ		0.12	UJ		0.26	UJ		0.24	UJ		0.12	UJ		0.26	UJ		0.24	UJ		0.12	UJ	
Trichloroethene $	5	**0.028**	*5*	1.3	UJ		0.26	UJ		0.18	UJ		0.26	UJ		0.26	UJ		0.18	UJ		0.26	UJ		0.26	UJ		0.18	UJ	
Vinyl chloride $	2	**0.020**	*2*	3.8	UJ		0.58	UJ		0.32	UJ		0.75	UJ		0.58	UJ		0.32	UJ		0.75	UJ		0.58	UJ		0.32	UJ	
Total CVOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Other VOCs																														
Acetone	NS	**550**	*22,000*	25	UJ	I	5.3			7.4			5.0	UJ	I	5.0	U		5.0	U		20	UJ	L	3.5	J		5.0	U	
Bromochloromethane	NS	NS	NS	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	1.2	UJ		0.22	UJ		0.24	UJ		0.23	UJ		0.22	UJ		0.24	UJ		0.23	UJ		0.22	UJ		0.24	UJ	
Bromoform	NS	**8.5**	*0.0083*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromomethane	NS	**0.87**	*2.0*	5.4	UJ	I	0.46	UJ	I	1.5	UJ	I	1.1	UJ	I	0.16	UJ	I	1.5	UJ	I	1.1	UJ	I	0.82	UJ	I	1.5	UJ	I
Butanone (2-)	NS	**700**	*44,000*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	10	U		2.0	U		2.0	U		2.0	U			R		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.75	UJ		0.20	UJ		0.15	UJ		0.15	UJ		0.20	UJ		0.15	UJ		0.15	UJ		0.20	UJ		0.15	UJ	
Hexanone (2-)	NS	NS	NS	10	U		2.0	U		5.0	U		2.0	U		2.0	U		5.0	U		2.0	U		2.0	U		5.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	10	U		2.0	U		2.0	U		**40**			**31**			2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	25	UJ	L	2.0	U		2.0	U		5.0	UJ	L	2.0	U		2.0	U		5.0	UJ	L	2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	-			5.3			7.4			40			31			-			-			3.5			-		
Total VOCs	NS	NS	NS	-			5.3			7.4			40			31			-			-			3.5			-		
VPH																														
C5-C8 Aliphatic	NS	NS	NS																											
C9-C12 Aliphatic	NS	NS	NS																											
C9-C10 Aromatic	NS	NS	NS																											
Total VPH	NS	NS	NS																											
EPH																														
C9-C18 Aliphatic	NS	NS	NS																											
C19-C36 Aliphatic	NS	NS	NS																											
C11-C22 Aromatic	NS	NS	NS																											
Total EPH	NS	NS	NS																											

TABLE 11
Summary of Groundwater Data - Volatile Organic Compounds & VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																										
				SH-11S									SH-12D									SH-12S								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/07/01			05/16/02			11/03/2003			09/12/01			05/17/02			11/03/2003			09/11/01			05/17/02			11/03/2003		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																														
Benzene $	5	**0.35**	*5*	0.25	UJ		0.22	UJ		0.15	UJ		0.25	UJ		0.22	UJ		0.15	UJ		0.25	UJ		**0.39**	J		**0.53**	J	I
Toluene	1,000	**72**	*150*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	-			-			-			-			-			-			-			0.39			0.53		
CVOCs																														
Carbon tetrachloride $	5	**0.17**	*5*	0.45	UJ		0.53	UJ		0.33	UJ		0.45	UJ		0.53	UJ		0.33	UJ		0.45	UJ		0.53	UJ		0.33	UJ	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	0.22	UJ		0.27	UJ		0.11	UJ		0.22	UJ		0.27	UJ		0.11	UJ		0.22	UJ		0.27	UJ		0.11	UJ	
Chloromethane	NS	**16**	*6.7*	0.57	UJ		0.29	UJ		0.20	UJ		0.57	UJ		0.29	UJ		0.20	UJ		0.57	UJ		0.29	UJ		0.20	UJ	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.18	UJ		0.29	UJ		0.17	UJ		0.18	UJ		0.29	UJ		0.17	UJ		0.18	UJ		0.29	UJ		0.17	UJ	
Dichloroethene (1,1-)	7	**34**	*19*	0.43	UJ		0.19	UJ		0.30	UJ		0.43	UJ		0.19	UJ		0.30	UJ		0.43	UJ		0.19	UJ		0.30	UJ	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.15	UJ		0.24	UJ		0.14	UJ		0.15	UJ		0.24	UJ		0.14	UJ		0.15	UJ		0.24	UJ		0.14	UJ	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.23	UJ		0.22	UJ		0.14	UJ		0.23	UJ		0.22	UJ		0.14	UJ		0.23	UJ		0.22	UJ		0.14	UJ	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.21	UJ		0.23	UJ		0.10	UJ		0.21	UJ		0.23	UJ		0.10	UJ		0.21	UJ		0.23	UJ		0.10	UJ	
Methylene chloride	5	**4.3**	*58*	0.20	UJ		0.21	UJ		0.25	UJ		0.20	UJ		0.21	UJ		0.25	UJ		0.20	UJ		0.21	UJ		0.25	UJ	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.16	UJ		0.12	UJ		0.090	UJ		0.16	UJ		0.12	UJ		0.090	UJ		0.16	UJ		0.12	UJ		0.090	UJ	
Tetrachloroethene $	5	**0.1**	*5*	0.32	UJ		0.21	UJ		0.23	UJ		0.32	UJ		0.21	UJ		0.23	UJ		0.32	UJ		0.21	UJ		0.23	UJ	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.26	UJ		0.24	UJ		0.10	UJ		0.26	UJ		0.24	UJ		0.10	UJ		0.26	UJ		0.24	UJ		0.10	UJ	
Trichloroethene $	5	**0.028**	*5*	0.26	UJ		0.26	UJ		0.18	UJ		0.26	UJ		0.26	UJ		0.18	UJ		0.26	UJ		0.26	UJ		0.18	UJ	
Vinyl chloride $	2	**0.020**	*2*	0.75	UJ		0.58	UJ		0.32	UJ		0.75	UJ		0.58	UJ		0.32	UJ		0.75	UJ		0.58	UJ		0.32	UJ	
Total CVOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Other VOCs																														
Acetone	NS	**550**	*22,000*	5.0	UJ	I	5.0	U		2.0	U		20	UJ	L	5.0	U		2.0	U		20	UJ	L	4.5	J		2.0	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.23	UJ		0.22	UJ		0.060	UJ		0.23	UJ		0.22	UJ		0.060	UJ		0.23	UJ		0.22	UJ		0.060	UJ	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromomethane	NS	**0.87**	*2.0*	1.1	UJ	I	0.16	UJ	I	0.78	UJ	I	1.1	UJ	I	0.16	UJ	I	0.78	UJ	I	1.1	UJ	I	0.16	UJ	I	0.78	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.15	UJ		0.20	UJ		0.090	UJ		0.15	UJ		0.20	UJ		0.090	UJ		0.15	UJ		0.20	UJ		0.090	UJ	
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	5.0	UJ	L	2.0	U		2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	UJ	L	2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	-			-			-			-			-			-			-			4.5			-		
Total VOCs	NS	NS	NS	-			-			-			-			-			-			-			4.9			0.53		
VPH																														
C5-C8 Aliphatic	NS	NS	NS																											
C9-C12 Aliphatic	NS	NS	NS																											
C9-C10 Aromatic	NS	NS	NS																											
Total VPH	NS	NS	NS																											
EPH																														
C9-C18 Aliphatic	NS	NS	NS																											
C19-C36 Aliphatic	NS	NS	NS																											
C11-C22 Aromatic	NS	NS	NS																											
Total EPH	NS	NS	NS																											

TABLE 11
Summary of Groundwater Data - Volatile Organic Compounds & VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/l																										
	COPC Screening Levels			SH-13S												SH-14D											
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/11/01			05/16/02			11/03/03			09/28/06			09/10/01			05/20/02			11/04/03			10/02/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																											
Benzene $	5	**0.35**	*5*	0.25	UJ		0.22	UJ		0.15	UJ		2.0	U		0.25	UJ		0.22	UJ		0.15	UJ	L	0.20	U	
Toluene	1,000	**72**	*150*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		2.0	U		2.0	U		4.0	U		2.0	U		2.0	U		2.0	U		4.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	2.0	U		2.0	U		2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	-			-			-			-			-			-			-			-		
CVOCs																											
Carbon tetrachloride $	5	**0.17**	*5*	0.45	UJ		0.53	UJ		0.33	UJ		2.0	U		0.45	UJ		0.53	UJ		0.33	UJ		2.0	U	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	0.22	UJ		0.27	UJ		0.11	UJ		2.0	U		0.63	UJ		0.27	UJ		0.11	UJ		0.20	U	
Chloromethane	NS	**16**	*6.7*	0.57	UJ		0.29	UJ		0.20	UJ		2.0	U		0.57	UJ		0.29	UJ		0.20	UJ		2.0	U	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.18	UJ		0.29	UJ		0.17	UJ		2.0	U		0.18	UJ		0.29	UJ		0.17	UJ		0.20	U	
Dichloroethene (1,1-)	7	**34**	*19*	0.43	UJ		0.19	UJ		0.30	UJ		2.0	U		0.43	UJ		0.19	UJ		0.30	UJ		2.0	U	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.15	UJ		0.24	UJ		0.14	UJ		2.0	U		0.15	UJ		0.24	UJ		0.14	UJ		0.50	U	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.23	UJ		0.22	UJ		0.14	UJ		2.0	U		0.23	UJ		0.22	UJ		0.14	UJ		0.50	U	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.21	UJ		0.23	UJ		0.10	UJ		2.0	U		0.21	UJ		0.23	UJ		0.10	UJ		0.50	U	
Methylene chloride	5	**4.3**	*58*	0.20	UJ		0.21	UJ		0.25	UJ		2.0	U		0.20	UJ		0.21	UJ		0.25	UJ		2.0	U	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.16	UJ		0.12	UJ		0.090	UJ		2.0	U		0.16	UJ		0.12	UJ		0.090	UJ		0.20	U	
Tetrachloroethene $	5	**0.1**	*5*	0.32	UJ		0.21	UJ		0.23	UJ		2.0	U		0.32	UJ		0.21	UJ		0.23	UJ		0.20	U	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.26	UJ		0.24	UJ		0.10	UJ		2.0	U		0.26	UJ		0.24	UJ		0.10	UJ		0.20	U	
Trichloroethene $	5	**0.028**	*5*	0.26	UJ		0.26	UJ		0.18	UJ		2.0	U		0.26	UJ		0.26	UJ		0.18	UJ		0.20	U	
Vinyl chloride $	2	**0.020**	*2*	0.75	UJ		0.58	UJ		0.32	UJ		2.0	U		0.75	UJ		0.58	UJ		0.32	UJ		0.50	U	
Total CVOCs	NS	NS	NS	-			-			-			-			-			-			-			-		
Other VOCs																											
Acetone	NS	**550**	*22,000*	20	UJ	L	5.0	U		2.0	U		5.0	U		20	UJ	L	5.0	U		2.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.23	UJ		0.22	UJ		0.060	UJ		2.0	U		0.23	UJ		0.22	UJ		0.060	UJ		0.20	U	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		0.50	U	
Bromomethane	NS	**0.87**	*2.0*	1.1	UJ	I	0.16	UJ	I	0.78	UJ	I	2.0	UJ	I	1.1	UJ	I	0.16	UJ	I	0.78	UJ	I	0.20	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U			R		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.15	UJ		0.20	UJ		0.090	UJ		2.0	U		0.15	UJ		0.20	UJ		0.090	UJ		0.20	U	
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	2.0	UJ	L	2.0	U		2.0	U		2.0	UJ	L	5.0	UJ	L	2.0	U		2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	-			-			-			-			-			-			-			-		
Total VOCs	NS	NS	NS	-			-			-			-			-			-			-			-		
VPH																											
C5-C8 Aliphatic	NS	NS	NS																								
C9-C12 Aliphatic	NS	NS	NS																								
C9-C10 Aromatic	NS	NS	NS																								
Total VPH	NS	NS	NS																								
EPH																											
C9-C18 Aliphatic	NS	NS	NS																								
C19-C36 Aliphatic	NS	NS	NS																								
C11-C22 Aromatic	NS	NS	NS																								
Total EPH	NS	NS	NS																								

TABLE 11
Summary of Groundwater Data - Volatile Organic Compounds & VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																							
				SH-14S												SH-15D											
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/10/01			05/20/02			11/04/03			10/02/06			09/10/01			05/17/02			11/04/03			09/27/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																											
Benzene $	5	**0.35**	*5*	0.25	UJ		**1.5**	J		0.15	UJ	L	**0.61**			0.25	UJ		0.22	UJ		0.15	UJ	L	0.20	U	
Toluene	1,000	**72**	*150*	2.0	U		1.7	J		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		2.0	U		2.0	U		4.0	U		2.0	U		2.0	U		2.0	U		4.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	-			3.2			-			0.61			-			-			-			-		
CVOCs																											
Carbon tetrachloride $	5	**0.17**	*5*	0.45	UJ		0.53	UJ		0.33	UJ		2.0	U		0.45	UJ		0.53	UJ		0.33	UJ		2.0	U	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	0.22	UJ		0.27	UJ		0.11	UJ		0.20	U		0.29	UJ		0.27	UJ		0.11	UJ		0.20	U	
Chloromethane	NS	**16**	*6.7*	0.57	UJ		0.29	UJ		0.20	UJ		2.0	U		0.57	UJ		0.29	UJ		0.20	UJ		2.0	U	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.18	UJ		0.29	UJ		0.17	UJ		0.20	U		0.18	UJ		0.29	UJ		0.17	UJ		0.20	U	
Dichloroethene (1,1-)	7	**34**	*19*	0.43	UJ		0.19	UJ		0.30	UJ		2.0	U		0.43	UJ		0.19	UJ		0.30	UJ		2.0	U	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.15	UJ		0.24	UJ		0.14	UJ		0.50	U		0.15	UJ		0.24	UJ		0.14	UJ		0.50	U	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.23	UJ		0.22	UJ		0.14	UJ		0.50	U		0.23	UJ		0.22	UJ		0.14	UJ		0.50	U	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.21	UJ		0.23	UJ		0.10	UJ		0.50	U		0.21	UJ		0.23	UJ		0.10	UJ		0.50	U	
Methylene chloride	5	**4.3**	*58*	0.20	UJ		0.21	UJ		0.25	UJ		2.0	U		0.20	UJ		0.21	UJ		0.25	UJ		2.0	U	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.16	UJ		0.12	UJ		0.090	UJ		0.20	U		0.16	UJ		0.12	UJ		0.090	UJ		0.20	U	
Tetrachloroethene $	5	**0.1**	*5*	0.32	UJ		0.21	UJ		0.23	UJ		0.20	U		0.32	UJ		0.21	UJ		0.23	UJ		0.20	U	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.26	UJ		0.24	UJ		0.10	UJ		0.20	U		0.26	UJ		0.24	UJ		0.10	UJ		0.20	U	
Trichloroethene $	5	**0.028**	*5*	0.26	UJ		0.26	UJ		0.18	UJ		0.20	U		0.26	UJ		0.26	UJ		0.18	UJ		0.20	U	
Vinyl chloride $	2	**0.020**	*2*	0.75	UJ		0.58	UJ		0.32	UJ		0.50	U		0.75	UJ		0.58	UJ		0.32	UJ		0.50	U	
Total CVOCs	NS	NS	NS	-			-			-			-			-			-			-			-		
Other VOCs																											
Acetone	NS	**550**	*22,000*	5.0	UJ	I	5.0	U		2.2	U		5.0	U		20	UJ	L	5.0	U		2.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.23	UJ		0.22	UJ		0.060	UJ		0.20	U		0.23	UJ		0.22	UJ		0.060	UJ		0.20	U	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		2.0	U		0.50	U	
Bromomethane	NS	**0.87**	*2.0*	1.1	UJ	I	0.16	UJ	I	0.78	UJ	I	0.20	UJ	I	1.1	UJ	I	0.16	UJ	I	0.78	UJ	I	0.20	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.15	UJ		0.20	UJ		0.090	UJ		0.20	U		0.15	UJ		0.20	UJ		0.090	UJ		0.20	U	
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	5.0	UJ	L	2.0	U		2.0	U		2.0	U		5.0	UJ	L	2.0	U		2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	-			-			-			-			-			-			-			-		
Total VOCs	NS	NS	NS	-			3.2			-			0.61			-			-			-			-		
VPH																											
C5-C8 Aliphatic	NS	NS	NS																								
C9-C12 Aliphatic	NS	NS	NS																								
C9-C10 Aromatic	NS	NS	NS																								
Total VPH	NS	NS	NS																								
EPH																											
C9-C18 Aliphatic	NS	NS	NS																								
C19-C36 Aliphatic	NS	NS	NS																								
C11-C22 Aromatic	NS	NS	NS																								
Total EPH	NS	NS	NS																								

TABLE 11
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Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																										
				SH-15S												SH-16S									SH-17D					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/10/01			05/20/02			10/28/03			10/03/06			09/11/01			05/17/02			11/19/03			11/20/03			10/05/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																														
Benzene $	5	**0.35**	*5*	***7.6***	J		**1.7**	J		**4.4**	J	I	10	U		0.25	UJ		0.22	UJ		0.15	UJ		**2.9**			**3.4**		
Toluene	1,000	**72**	*150*	7.8	J		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		1.6	J	I	2.1		
Ethylbenzene	700	**130**	*700*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		1.2	J	I
Xylene (m,p-) †	10,000	**21**	*2,200*	5.4	J		10	U		10	U		20	U		2.0	U		2.0	U		2.0	U		2.9			3.2	J	I
Xylene (o-) †	10,000	**21**	*3,300*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.4			3.3		
Styrene	100	**160**	*890*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	20.8			1.7			4.4			-			-			-			-			9.8			13.2		
CVOCs																														
Carbon tetrachloride $	5	**0.17**	*5*	2.2	UJ		2.6	UJ		3.6	UJ		10	U		0.45	UJ		0.53	UJ		0.33	UJ		0.33	UJ		2.0	U	
Chlorobenzene	100	**11**	*39*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	1.6	UJ		1.4	UJ		0.70	UJ		10	U		0.28	UJ		0.27	UJ		0.11	UJ		0.11	UJ		2.0	U	
Chloromethane	NS	**16**	*6.7*	2.8	UJ		1.4	UJ		4.0	UJ		10	U		0.57	UJ		0.29	UJ		0.20	UJ		0.20	UJ		2.0	U	
Dichloroethane (1,1-)	NS	**81**	*220*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.90	UJ		1.4	UJ		0.50	UJ		10	U		0.18	UJ		0.29	UJ		0.17	UJ		0.17	UJ		2.0	U	
Dichloroethene (1,1-)	7	**34**	*19*	2.2	UJ		0.95	UJ		1.1	UJ		10	U		0.43	UJ		0.19	UJ		0.30	UJ		0.30	UJ		2.0	U	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.75	UJ		1.2	UJ		0.85	UJ		10	U		0.15	UJ		0.24	UJ		0.14	UJ		0.14	UJ		2.0	U	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	1.2	UJ		1.1	UJ		1.0	UJ		10	U		0.23	UJ		0.22	UJ		0.14	UJ		0.14	UJ		2.0	U	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	1.0	UJ		1.2	UJ		0.55	UJ		10	U		0.21	UJ		0.23	UJ		0.10	UJ		0.10	UJ		2.0	U	
Methylene chloride	5	**4.3**	*58*	1.0	UJ		1.0	UJ		7.8	UJ		10	U		0.20	UJ		0.21	UJ		0.25	UJ		0.25	UJ		2.0	U	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.80	UJ		0.60	UJ		1.6	UJ		10	U		0.16	UJ		0.12	UJ		0.090	UJ		0.090	UJ		2.0	U	
Tetrachloroethene $	5	**0.1**	*5*	1.6	UJ		1.0	UJ		0.75	UJ		10	U		0.32	UJ		0.21	UJ		0.23	UJ		0.23	UJ		2.0	U	
Trichloroethane (1,1,1-)	200	**320**	*310*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	1.3	UJ		1.2	UJ		0.60	UJ		10	U		0.26	UJ		0.24	UJ		0.10	UJ		0.10	UJ		2.0	U	
Trichloroethene $	5	**0.028**	*5*	1.3	UJ		1.3	UJ		0.90	UJ		10	U		0.26	UJ		0.26	UJ		0.18	UJ		0.18	UJ		2.0	U	
Vinyl chloride $	2	**0.020**	*2*	3.8	UJ		2.9	UJ		1.6	UJ		10	U		0.75	UJ		0.58	UJ		0.32	UJ		0.32	UJ		2.0	U	
Total CVOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Other VOCs																														
Acetone	NS	**550**	*22,000*	25	UJ	I	25	U		25	U		25	U		20	UJ	L	5.0	U		5.0	U		5.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	1.2	UJ		1.1	UJ		1.2	UJ		10	U		0.23	UJ		0.22	UJ		0.060	UJ		0.060	UJ		2.0	U	
Bromoform	NS	**8.5**	*0.0083*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromomethane	NS	**0.87**	*2.0*	5.4	UJ	I	1.0	UJ	I	7.7	UJ	I	10	UJ	I	1.1	UJ	I	0.16	UJ	I	0.78	UJ	I	0.78	UJ	I	2.0	UJ	I
Butanone (2-)	NS	**700**	*44,000*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.75	UJ		1.0	UJ		0.75	UJ		10	UJ	I	0.15	UJ		0.20	UJ		0.090	UJ		0.090	UJ		2.0	UJ	I
Hexanone (2-)	NS	NS	NS	10	U		10	U		25	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	10	U		10	U		10	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	25	UJ	L	10	U		10	U		10	U		5.0	UJ	L	2.0	U		2.0	U		2.0	UJ	I	2.0	U	
Total Other VOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Total VOCs	NS	NS	NS	20.8			1.7			4.4			-			-			-			-			9.8			13.2		
VPH																														
C5-C8 Aliphatic	NS	NS	NS																											
C9-C12 Aliphatic	NS	NS	NS																											
C9-C10 Aromatic	NS	NS	NS																											
Total VPH	NS	NS	NS																											
EPH																														
C9-C18 Aliphatic	NS	NS	NS																											
C19-C36 Aliphatic	NS	NS	NS																											
C11-C22 Aromatic	NS	NS	NS																											
Total EPH	NS	NS	NS																											

TABLE 11
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Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																										
				SH-17R						SH-17S												SH-18D								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/20/03			10/04/06			09/06/01			05/20/02			11/19/03			09/25/06			09/04/01			05/15/02			09/26/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																														
Benzene $	5	**0.35**	*5*	**2.0**			10	U		0.25	UJ		0.22	UJ		0.15	UJ		0.20	U		0.25	UJ		0.22	UJ		0.20	U	
Toluene	1,000	**72**	*150*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	1.1	J	I	20	U		2.0	U		2.0	U		2.0	U		4.0	U		2.0	U		2.0	U		4.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	1.3	J	I	10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	4.4			-			-			-			-			-			-			-			-		
CVOCs																														
Carbon tetrachloride $	5	**0.17**	*5*	0.33	UJ		10	U		0.45	UJ		0.53	UJ		0.33	UJ		2.0	U		0.45	UJ		0.53	UJ		2.0	U	
Chlorobenzene	100	**11**	*39*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	0.11	UJ		10	U		0.22	UJ		0.27	UJ		0.11	UJ		0.20	U		0.22	UJ		0.27	UJ		**0.32**		
Chloromethane	NS	**16**	*6.7*	0.20	UJ		10	U		0.57	UJ		0.29	UJ		0.20	UJ		2.0	U		0.57	UJ		0.29	UJ		2.0	U	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.17	UJ		10	U		0.18	UJ		0.29	UJ		0.17	UJ		0.20	U		0.18	UJ		0.29	UJ		0.20	U	
Dichloroethene (1,1-)	7	**34**	*19*	0.30	UJ		10	U		0.43	UJ		0.19	UJ		0.30	UJ		2.0	U		0.43	UJ		0.19	UJ		2.0	U	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.14	UJ		10	U		0.15	UJ		0.24	UJ		0.14	UJ		0.50	U		0.15	UJ		0.24	UJ		0.50	U	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.14	UJ		10	U		0.23	UJ		0.22	UJ		0.14	UJ		0.50	U		0.23	UJ		0.22	UJ		0.50	U	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.10	UJ		10	U		0.21	UJ		0.23	UJ		0.10	UJ		0.50	U		0.21	UJ		0.23	UJ		0.50	U	
Methylene chloride	5	**4.3**	*58*	0.25	UJ		10	U		0.28	UJ		0.21	UJ		0.25	UJ		2.0	U		0.20	UJ		0.21	UJ		2.0	U	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.090	UJ	L	10	U		0.16	UJ		0.12	UJ		0.090	UJ		0.20	U		0.16	UJ		0.12	UJ		0.20	U	
Tetrachloroethene $	5	**0.1**	*5*	0.23	UJ		10	U		0.32	UJ		0.21	UJ		0.23	UJ		0.20	U		0.32	UJ		0.21	UJ		0.20	U	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.10	UJ		10	U		0.26	UJ		0.24	UJ		0.10	UJ		0.20	U		0.26	UJ		0.24	UJ		0.20	U	
Trichloroethene $	5	**0.028**	*5*	0.18	UJ		10	U		0.26	UJ		0.26	UJ		0.18	UJ		0.20	U		0.26	UJ		0.26	UJ		0.20	U	
Vinyl chloride $	2	**0.020**	*2*	0.32	UJ		10	U		0.75	UJ		0.58	UJ		0.32	UJ		0.50	U		0.75	UJ		0.58	UJ		0.50	U	
Total CVOCs	NS	NS	NS	-			-			-			-			-			-			-			-			0.32		
Other VOCs																														
Acetone	NS	**550**	*22,000*	5.0	U		25	U		20	UJ	L	5.0	U		5.0	U		5.0	U		20	UJ	L	5.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.060	UJ		10	U		0.23	UJ		0.22	UJ		0.060	UJ		0.20	U		0.23	UJ		0.22	UJ		0.20	U	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		0.50	U	
Bromomethane	NS	**0.87**	*2.0*	0.78	UJ	I	10	UJ	I	1.1	UJ	I	0.16	UJ	I	0.78	UJ	I	0.20	UJ	I	1.1	UJ	I	0.16	UJ	I	0.20	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.090	UJ		10	UJ	I	0.15	UJ		0.20	UJ		0.090	UJ		0.20	U		0.15	UJ		0.20	UJ		0.20	U	
Hexanone (2-)	NS	NS	NS	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		10	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	2.0	UJ	I	10	U		5.0	UJ	L	2.0	U		2.0	U		2.0	U		5.0	UJ	L	2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Total VOCs	NS	NS	NS	4.4			-			-			-			-			-			-			-			0.32		
VPH																														
C5-C8 Aliphatic	NS	NS	NS							240	U		240	U																
C9-C12 Aliphatic	NS	NS	NS							100	U		100	U																
C9-C10 Aromatic	NS	NS	NS							70	U		70	U																
Total VPH	NS	NS	NS							-			-																	
EPH																														
C9-C18 Aliphatic	NS	NS	NS							30	U		30	U																
C19-C36 Aliphatic	NS	NS	NS							40	U		40	U																
C11-C22 Aromatic	NS	NS	NS							85	U		85	U																
Total EPH	NS	NS	NS							-			-																	

TABLE 11
Summary of Groundwater Data - Volatile Organic Compounds & VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																										
				SH-18S									SH-19D									SH-19R								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/04/01			05/15/02			09/26/06			09/05/01			05/16/02			09/25/06			09/05/01			05/16/02			09/28/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																														
Benzene $	5	**0.35**	*5*	0.25	UJ		0.22	UJ		0.20	U		0.25	UJ		0.22	UJ		0.20	U		0.25	UJ		0.22	UJ		2.0	U	
Toluene	1,000	**72**	*150*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		2.0	U		4.0	U		2.0	U		2.0	U		4.0	U		2.0	U		2.0	U		4.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
CVOCs																														
Carbon tetrachloride $	5	**0.17**	*5*	0.45	UJ		0.53	UJ		2.0	U		0.45	UJ		0.53	UJ		2.0	U		0.45	UJ		0.53	UJ		2.0	U	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	0.22	UJ		0.27	UJ		0.20	U		0.36	UJ		0.27	UJ		**0.26**			0.22	UJ		0.27	UJ		2.0	U	
Chloromethane	NS	**16**	*6.7*	0.57	UJ		0.29	UJ		2.0	U		0.57	UJ		0.29	UJ		2.0	U		0.57	UJ		0.29	UJ		2.0	U	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.18	UJ		0.29	UJ		0.20	U		0.18	UJ		0.29	UJ		0.20	U		0.18	UJ		0.29	UJ		2.0	U	
Dichloroethene (1,1-)	7	**34**	*19*	0.43	UJ		0.19	UJ		2.0	U		0.43	UJ		0.19	UJ		2.0	U		0.43	UJ		0.19	UJ		2.0	U	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.15	UJ		0.24	UJ		0.50	U		0.15	UJ		0.24	UJ		0.50	U		0.15	UJ		0.24	UJ		2.0	U	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.23	UJ		0.22	UJ		0.50	U		0.23	UJ		0.22	UJ		0.50	U		0.23	UJ		0.22	UJ		2.0	U	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.21	UJ		0.23	UJ		0.50	U		0.21	UJ		0.23	UJ		0.50	U		0.21	UJ		0.23	UJ		2.0	U	
Methylene chloride	5	**4.3**	*58*	0.20	UJ		0.21	UJ		2.0	U		0.20	UJ		0.21	UJ		2.0	U		0.20	UJ		0.21	UJ		2.0	U	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.16	UJ		0.12	UJ		0.20	U		0.16	UJ		0.12	UJ		0.20	U		0.16	UJ		0.12	UJ		2.0	U	
Tetrachloroethene $	5	**0.1**	*5*	0.32	UJ		0.21	UJ		0.20	U		0.32	UJ		0.21	UJ		0.20	U		0.32	UJ		0.21	UJ		2.0	U	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.26	UJ		0.24	UJ		0.20	U		0.26	UJ		0.24	UJ		0.20	U		0.26	UJ		0.24	UJ		2.0	U	
Trichloroethene $	5	**0.028**	*5*	0.26	UJ		0.26	UJ		0.20	U		0.26	UJ		0.26	UJ		0.20	U		0.26	UJ		0.26	UJ		2.0	U	
Vinyl chloride $	2	**0.020**	*2*	0.75	UJ		0.58	UJ		0.50	U		0.75	UJ		0.58	UJ		0.50	U		0.75	UJ		0.58	UJ		2.0	U	
Total CVOCs	NS	NS	NS	-			-			-			-			-			0.26			-			-			-		
Other VOCs																														
Acetone	NS	**550**	*22,000*	20	UJ	L	5.0	U		5.0	U		20	UJ	L	5.0	U		5.0	U		20	UJ	L	5.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.23	UJ		0.22	UJ		0.20	U		0.23	UJ		0.22	UJ		0.20	U		0.23	UJ		0.22	UJ		2.0	U	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		2.0	U	
Bromomethane	NS	**0.87**	*2.0*	1.1	UJ	I	0.16	UJ	I	0.20	UJ	I	1.1	UJ	I	0.25	UJ	I	0.20	UJ	I	1.1	UJ	I	0.16	UJ	I	2.0	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.15	UJ		0.20	UJ		0.20	U		0.15	UJ		0.20	UJ		0.20	U		0.15	UJ		0.20	UJ		2.0	U	
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	5.0	UJ	L	2.0	U		2.0	U		5.0	UJ	L	2.0	U		2.0	U		5.0	UJ	L	2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Total VOCs	NS	NS	NS	-			-			-			-			-			0.26			-			-			-		
VPH																														
C5-C8 Aliphatic	NS	NS	NS																											
C9-C12 Aliphatic	NS	NS	NS																											
C9-C10 Aromatic	NS	NS	NS																											
Total VPH	NS	NS	NS																											
EPH																														
C9-C18 Aliphatic	NS	NS	NS																											
C19-C36 Aliphatic	NS	NS	NS																											
C11-C22 Aromatic	NS	NS	NS																											
Total EPH	NS	NS	NS																											

TABLE 11
Summary of Groundwater Data - Volatile Organic Compounds & VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/l																							
				SH-19S									SH-20S						SH-21S								
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/05/01			05/21/02			09/29/06			09/05/01			05/17/02			09/06/01			05/16/02			09/26/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																											
Benzene $	5	**0.35**	*5*	0.25	UJ		0.22	UJ		0.20	U		0.25	UJ		0.22	UJ		0.25	UJ		0.22	UJ		0.20	U	
Toluene	1,000	**72**	*150*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		2.0	U		4.0	U		2.0	U		2.0	U		2.0	U		2.0	U		4.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	-			-			-			-			-			-			-			-		
CVOCs																											
Carbon tetrachloride $	5	**0.17**	*5*	0.45	UJ		0.53	UJ		2.0	U		0.45	UJ		0.53	UJ		0.45	UJ		0.53	UJ		2.0	U	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	0.22	UJ		0.27	UJ		0.20	U		0.59	UJ		0.27	UJ		0.32	UJ		**0.48**	J		**0.23**		
Chloromethane	NS	**16**	*6.7*	0.57	UJ		0.29	UJ		2.0	U		0.57	UJ		0.29	UJ		0.57	UJ		0.29	UJ		2.0	U	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.18	UJ		0.29	UJ		0.20	U		0.18	UJ		0.29	UJ		0.18	UJ		0.29	UJ		0.20	U	
Dichloroethene (1,1-)	7	**34**	*19*	0.43	UJ		0.19	UJ		2.0	U		0.43	UJ		0.19	UJ		0.43	UJ		0.19	UJ		2.0	U	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.15	UJ		0.24	UJ		0.50	U		0.15	UJ		0.24	UJ		0.15	UJ		0.24	UJ		0.50	U	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.23	UJ		0.22	UJ		0.50	U		0.23	UJ		0.22	UJ		0.23	UJ		0.22	UJ		0.50	U	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.21	UJ		0.23	UJ		0.50	U		0.21	UJ		0.23	UJ		0.21	UJ		0.23	UJ		0.50	U	
Methylene chloride	5	**4.3**	*58*	0.20	UJ		0.21	UJ		2.0	U		0.23	UJ		0.21	UJ		0.20	UJ		0.21	UJ		2.0	U	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.16	UJ		0.12	UJ		0.20	U		0.16	UJ		0.12	UJ		0.16	UJ		0.12	UJ		0.20	U	
Tetrachloroethene $	5	**0.1**	*5*	0.32	UJ		0.21	UJ		0.20	U		0.32	UJ		0.21	UJ		0.32	UJ		0.21	UJ		0.20	U	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.26	UJ		0.24	UJ		0.20	U		0.26	UJ		0.24	UJ		0.26	UJ		0.24	UJ		0.20	U	
Trichloroethene $	5	**0.028**	*5*	0.26	UJ		0.26	UJ		0.20	U		**0.31**	J		0.26	UJ		0.26	UJ		0.26	UJ		0.20	U	
Vinyl chloride $	2	**0.020**	*2*	0.75	UJ		0.58	UJ		0.50	U		0.75	UJ		0.58	UJ		0.75	UJ		0.58	UJ		0.50	U	
Total CVOCs	NS	NS	NS	-			-			-			0.31			-			-			0.48			0.23		
Other VOCs																											
Acetone	NS	**550**	*22,000*	1.1	J	L	2.0	J		5.0	U		20	UJ	L	5.0	U		20	UJ	L	5.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.23	UJ		0.22	UJ		0.20	U		0.23	UJ		0.22	UJ		0.23	UJ		0.22	UJ		0.20	U	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		2.0	U		2.0	U		0.50	U	
Bromomethane	NS	**0.87**	*2.0*	1.1	UJ	I	0.46	UJ	I	0.20	UJ	I	1.1	UJ	I	0.16	UJ	I	1.1	UJ	I	0.16	UJ	I	0.20	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.15	UJ		0.20	UJ		0.20	U		0.15	UJ		0.20	UJ		0.15	UJ		0.20	UJ		0.20	U	
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		5.0			2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	5.0	UJ	L	2.0	U		2.0	U		5.0	UJ	L	2.0	U		5.0	UJ	L	2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	1.1			2.0			-			-			-			-			5.0			-		
Total VOCs	NS	NS	NS	1.1			2.0			-			0.31			-			-			5.5			0.23		
VPH																											
C5-C8 Aliphatic	NS	NS	NS	240	U		240	U																			
C9-C12 Aliphatic	NS	NS	NS	100	U		100	U																			
C9-C10 Aromatic	NS	NS	NS	70	U		70	U																			
Total VPH	NS	NS	NS	-			-																				
EPH																											
C9-C18 Aliphatic	NS	NS	NS	31	U		31	U																			
C19-C36 Aliphatic	NS	NS	NS	41	U		40	U																			
C11-C22 Aromatic	NS	NS	NS	87	U		85	U																			
Total EPH	NS	NS	NS	-			-																				

TABLE 11
Summary of Groundwater Data - Volatile Organic Compounds & VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/L																										
				SH-22S									SH-23S												SH-24R					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	09/05/01			05/17/02			09/25/06			09/04/01			05/15/02			11/04/03			09/25/06			11/06/03			09/28/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																														
Benzene $	5	**0.35**	*5*	0.25	UJ		0.22	UJ		0.20	U		0.25	UJ		0.22	UJ		0.15	UJ	L	0.20	U		0.15	UJ	L	2.0	U	
Toluene	1,000	**72**	*150*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		2.0	U		4.0	U		2.0	U		2.0	U		2.0	U		4.0	U		2.0	U		4.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
CVOCs																														
Carbon tetrachloride $	5	**0.17**	*5*	0.45	UJ		0.53	UJ		2.0	U		0.45	UJ		0.53	UJ		0.33	UJ		2.0	U		0.33	UJ		2.0	U	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	0.40	UJ		0.27	UJ		**0.40**			0.22	UJ		0.27	UJ		0.11	UJ		0.20	U		0.11	UJ		2.0	U	
Chloromethane	NS	**16**	*6.7*	0.57	UJ		0.29	UJ		2.0	U		0.57	UJ		0.29	UJ		0.20	UJ		2.0	U		0.20	UJ		2.0	U	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.18	UJ		0.29	UJ		0.20	U		0.18	UJ		0.29	UJ		0.17	UJ		0.20	U		0.17	UJ		2.0	U	
Dichloroethene (1,1-)	7	**34**	*19*	0.43	UJ		0.19	UJ		2.0	U		0.43	UJ		0.19	UJ		0.30	UJ		2.0	U		0.30	UJ		2.0	U	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	UJ	I	2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.15	UJ		0.24	UJ		0.50	U		0.15	UJ		0.24	UJ		0.14	UJ		0.50	U		0.14	UJ		2.0	U	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.23	UJ		0.22	UJ		0.50	U		0.23	UJ		0.22	UJ		0.14	UJ		0.50	U		0.14	UJ		2.0	U	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.21	UJ		0.23	UJ		0.50	U		0.21	UJ		0.23	UJ		0.10	UJ		0.50	U		0.10	UJ		2.0	U	
Methylene chloride	5	**4.3**	*58*	0.20	UJ		0.21	UJ		2.0	U		0.20	UJ		0.21	UJ		0.25	UJ		2.0	U		0.25	UJ		2.0	U	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.16	UJ		0.12	UJ		0.20	U		0.16	UJ		0.12	UJ		0.090	UJ		0.20	U		0.090	UJ		2.0	U	
Tetrachloroethene $	5	**0.1**	*5*	0.32	UJ		0.21	UJ		0.20	U		0.32	UJ		0.21	UJ		0.23	UJ		0.20	U		0.23	UJ		2.0	U	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.26	UJ		0.24	UJ		0.20	U		0.26	UJ		0.24	UJ		0.10	UJ		0.20	U		0.10	UJ		2.0	U	
Trichloroethene $	5	**0.028**	*5*	**0.43**	J		0.26	UJ		0.20	U		0.26	UJ		0.26	UJ		0.18	UJ		0.20	U		0.18	UJ		2.0	U	
Vinyl chloride $	2	**0.020**	*2*	0.75	UJ		0.58	UJ		0.50	U		0.75	UJ		0.58	UJ		0.32	UJ		0.50	U		0.32	UJ		2.0	U	
Total CVOCs	NS	NS	NS	0.43			-			0.40			-			-			-			-			-			-		
Other VOCs																														
Acetone	NS	**550**	*22,000*	20	UJ	L	5.0	U		5.0	U		20	UJ	L	5.0	U		2.0	U		5.0	U		2.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.23	UJ		0.22	UJ		0.20	U		0.23	UJ		0.22	UJ		0.060	UJ		0.20	U		0.060	UJ		2.0	U	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		2.0	U		0.50	U		2.0	U		2.0	U	
Bromomethane	NS	**0.87**	*2.0*	1.1	UJ	I	0.16	UJ	I	0.20	UJ	I	1.1	UJ	I	0.17	UJ	I	0.78	UJ	I	0.20	UJ	I	0.78	UJ	I	2.0	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U			R		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.15	UJ		0.20	UJ		0.20	U		0.15	UJ		0.20	UJ		0.090	UJ		0.20	U		0.090	UJ		2.0	U	
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	5.0	UJ	L	2.0	U		2.0	U		5.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Total VOCs	NS	NS	NS	0.43			-			0.40			-			-			-			-			-			-		
VPH																														
C5-C8 Aliphatic	NS	NS	NS	240	U		240	U																						
C9-C12 Aliphatic	NS	NS	NS	100	U		100	U																						
C9-C10 Aromatic	NS	NS	NS	70	U		70	U																						
Total VPH	NS	NS	NS	-			-																							
EPH																														
C9-C18 Aliphatic	NS	NS	NS	31	U		32	U																						
C19-C36 Aliphatic	NS	NS	NS	41	U		42	U																						
C11-C22 Aromatic	NS	NS	NS	87	U		89	U																						
Total EPH	NS	NS	NS	-			-																							

TABLE 11
Summary of Groundwater Data - Volatile Organic Compounds & VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			SH-24S						SH-25D						SH-25S						SH-26S						SH-27D					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/06/03			09/28/06			11/05/03			09/27/06			11/05/03			09/26/06			10/28/03			10/04/06			11/19/03			10/02/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																																	
Benzene $	5	**0.35**	*5*	0.15	UJ	L	0.20	U		0.15	UJ	L	0.20	U		0.15	UJ	L	0.20	U		**2.5**	J	I	2.0	U		0.15	UJ		0.20	U	
Toluene	1,000	**72**	*150*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		4.0	U		2.0	U		4.0	U		2.0	U		4.0	U		10	U		4.0	U		2.0	U		4.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	-			-			-			-			-			-			2.5			-			-			-		
CVOCs																																	
Carbon tetrachloride $	5	**0.17**	*5*	0.33	UJ		2.0	U		0.33	UJ		2.0	U		0.33	UJ		2.0	U		3.6	UJ		2.0	U		0.33	UJ		2.0	U	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	0.12	J	I	**0.33**			0.11	UJ		0.20	U		0.11	UJ		**0.21**			0.70	UJ		2.0	U		0.11	UJ		**0.61**		
Chloromethane	NS	**16**	*6.7*	0.20	UJ		2.0	U		0.20	UJ		2.0	U		0.20	UJ		2.0	U		4.0	UJ		2.0	U		0.20	UJ		2.0	U	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	UJ	I	2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.17	UJ		0.20	U		0.17	UJ		0.20	U		0.17	UJ		0.20	U		0.50	UJ		2.0	U		0.17	UJ		0.20	U	
Dichloroethene (1,1-)	7	**34**	*19*	0.30	UJ		2.0	U		0.30	UJ		2.0	U		0.30	UJ		2.0	U		1.1	UJ		2.0	U		0.83	J	I	2.0	U	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		2.0	UJ	I	2.0	U		2.0	UJ	I	2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.14	UJ		0.50	U		0.14	UJ		0.50	U		0.14	UJ		0.50	U		0.85	UJ		2.0	U		0.14	UJ		0.50	U	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.14	UJ		0.50	U		0.14	UJ		0.50	U		0.14	UJ		0.50	U		1.0	UJ		2.0	U		0.14	UJ		0.50	U	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.10	UJ		0.50	U		0.10	UJ		0.50	U		0.10	UJ		0.50	U		0.55	UJ		2.0	U		0.10	UJ		0.50	U	
Methylene chloride	5	**4.3**	*58*	0.25	UJ		2.0	U		0.25	UJ		2.0	U		0.25	UJ		2.0	U		7.8	UJ		2.0	U		0.25	UJ		2.0	U	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.090	UJ		0.20	U		0.090	UJ		0.20	U		0.090	UJ		0.20	U		1.6	UJ		2.0	U		0.090	UJ		0.20	U	
Tetrachloroethene $	5	**0.1**	*5*	0.23	UJ		0.20	U		0.23	UJ		0.20	U		0.23	UJ		0.20	U		0.75	UJ		2.0	U		0.23	UJ		0.20	U	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		1.0	J	I	2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.10	UJ		0.20	U		0.10	UJ		0.20	U		0.10	UJ		0.20	U		0.60	UJ		2.0	U		0.10	UJ		0.20	U	
Trichloroethene $	5	**0.028**	*5*	0.18	UJ		0.20	U		**1.8**	J	I	**1.1**			**0.73**	J	I	**0.42**			0.90	UJ		2.0	U		**2.3**			**1.5**		
Vinyl chloride $	2	**0.020**	*2*	0.32	UJ		0.50	U		0.32	UJ		0.50	U		0.32	UJ		0.50	U		1.6	UJ		2.0	U		0.32	UJ		0.50	U	
Total CVOCs	NS	NS	NS	0.12			0.33			1.8			1.1			0.73			0.63			-			-			4.1			2.11		
Other VOCs																																	
Acetone	NS	**550**	*22,000*	2.0	U		5.0	U		2.0	U		5.0	U		2.0	U		5.0	U		7.5	J	I	5.0	U		5.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.060	UJ		0.20	U		0.060	UJ		0.20	U		0.060	UJ		0.20	U		1.2	UJ		2.0	U		0.060	UJ		0.20	U	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		0.50	U		2.0	U		0.50	U		2.0	U		0.50	U		10	U		2.0	U		2.0	U		0.50	U	
Bromomethane	NS	**0.87**	*2.0*	0.78	UJ	I	0.20	UJ	I	0.78	UJ	I	0.20	UJ	I	0.78	UJ	I	0.20	UJ	I	7.7	UJ	I	2.0	UJ	I	0.78	UJ	I	0.20	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS		R		2.0	R		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.090	UJ		0.20	U		0.090	UJ		0.20	U		0.090	UJ		0.20	U		0.75	UJ		2.0	UJ	I	0.090	UJ		0.20	U	
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		25	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		10	U		2.0	U		2.0	UJ	I	2.0	U	
Total Other VOCs	NS	NS	NS	-			2.0			-			-			-			-			7.5			-			-			-		
Total VOCs	NS	NS	NS	0.12			2.33			1.8			1.1			0.73			0.63			10			-			4.1			2.11		
VPH																																	
C5-C8 Aliphatic	NS	NS	NS																														
C9-C12 Aliphatic	NS	NS	NS																														
C9-C10 Aromatic	NS	NS	NS																														
Total VPH	NS	NS	NS																														
EPH																																	
C9-C18 Aliphatic	NS	NS	NS																														
C19-C36 Aliphatic	NS	NS	NS																														
C11-C22 Aromatic	NS	NS	NS																														
Total EPH	NS	NS	NS																														

TABLE 11
Summary of Groundwater Data - Volatile Organic Compounds & VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			Concentrations in µg/L																													
				SH-27R						SH-27S						SH-28D						SH-28R						SH-28S					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/20/03			09/29/06			11/21/03			09/25/06			11/06/03			09/27/06			11/07/03			09/29/06			11/06/03			09/27/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																																	
Benzene $	5	**0.35**	*5*	0.15	UJ		2.0	U		0.15	UJ		0.20	U		0.15	UJ	L	2.0	U		0.15	UJ	L	2.0	U		0.15	UJ	L	0.20	U	
Toluene	1,000	**72**	*150*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		4.0	U		2.0	U		4.0	U		2.0	U		4.0	U		2.0	U		4.0	U		2.0	U		4.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-			-		
CVOCs																																	
Carbon tetrachloride $	5	**0.17**	*5*	0.33	UJ		2.0	U		0.33	UJ		2.0	U		0.33	UJ		2.0	U		0.33	UJ		2.0	U		0.33	UJ		2.0	U	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	0.11	UJ		2.0	U		0.11	UJ		**1.0**			0.11	UJ		2.0	U		0.11	UJ		2.0	U		0.11	UJ		**0.67**		
Chloromethane	NS	**16**	*6.7*	0.20	UJ		2.0	U		0.20	UJ		2.0	U		0.20	UJ		2.0	U		0.20	UJ		2.0	U		0.20	UJ		2.0	U	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	UJ	I	2.0	U		2.0	UJ	I	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.17	UJ		2.0	U		0.17	UJ		0.2	U		0.17	UJ		2.0	U		0.17	UJ		2.0	U		0.17	UJ		0.20	U	
Dichloroethene (1,1-)	7	**34**	*19*	1.3	J	I	1.0	J	I	0.30	UJ		2.0	U		0.30	UJ		2.0	U		0.30	UJ		2.0	U		0.30	UJ		2.0	U	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	UJ	I	2.0	U		2.0	U		2.0	U		2.0	UJ	I	2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.14	UJ		2.0	U		0.14	UJ		0.50	U		0.14	UJ		2.0	U		0.14	UJ		2.0	U		0.14	UJ		0.50	U	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.14	UJ		2.0	U		0.14	UJ		0.50	U		0.14	UJ		2.0	U		0.14	UJ		2.0	U		0.14	UJ		0.50	U	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.10	UJ		2.0	U		0.10	UJ		0.50	U		0.10	UJ		2.0	U		0.10	UJ		2.0	U		0.10	UJ		0.50	U	
Methylene chloride	5	**4.3**	*58*	0.25	UJ		2.0	U		0.25	UJ		2.0	U		0.25	UJ		2.0	U		0.25	UJ		2.0	U		0.25	UJ		2.0	U	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.090	UJ		2.0	U		0.090	UJ		0.20	U		0.090	UJ		2.0	U		0.090	UJ		2.0	U		0.090	UJ		0.20	U	
Tetrachloroethene $	5	**0.1**	*5*	0.23	UJ		2.0	U		0.23	UJ		0.20	U		0.23	UJ		2.0	U		0.23	UJ		2.0	U		0.23	UJ		0.2	U	
Trichloroethane (1,1,1-)	200	**320**	*310*	1.2	J	I	2.0	U		1.1	J	I	1.1	J	I	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.10	UJ		2.0	U		0.10	UJ		0.20	U		0.10	UJ		2.0	U		0.10	UJ		2.0	U		0.10	UJ		0.20	U	
Trichloroethene $	5	**0.028**	*5*	**5.1**			**3.9**	J	H	0.18	UJ		0.20	U		0.18	UJ		2.0	U		**0.43**	J	I	**1.3**	J	I	0.18	UJ		0.20	U	
Vinyl chloride $	2	**0.020**	*2*	0.32	UJ		2.0	U		0.32	UJ		0.50	U		0.32	UJ		2.0	U		0.32	UJ		2.0	U		0.32	UJ		0.50	U	
Total CVOCs	NS	NS	NS	7.6			4.9			1.1			2.1			-			-			0.43			1.3			-			0.67		
Other VOCs																																	
Acetone	NS	**550**	*22,000*	5.0	U		5.0	U		5.0	U		5.0	U		2.0	U		5.0	U		2.0	U		5.0	U		2.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.060	UJ		2.0	U		0.060	UJ		0.20	U		0.060	UJ		2.0	U		0.060	UJ		2.0	U		0.060	UJ		0.20	U	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		0.50	U	
Bromomethane	NS	**0.87**	*2.0*	0.78	UJ	I	2.0	UJ	I	0.78	UJ	I	0.20	UJ	I	0.78	UJ	I	2.0	UJ	I	0.78	UJ	I	2.0	UJ	I	0.78	UJ	I	0.20	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.090	UJ		2.0	U		0.090	UJ		0.20	U		0.090	UJ		2.0	U		0.090	UJ		2.0	U		0.090	UJ		0.20	U	
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	2.0	UJ	I	2.0	U		2.0	UJ	I	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-			-		
Total VOCs	NS	NS	NS	7.6			4.9			1.1			2.1			-			-			0.43			1.3			-			0.67		
VPH																																	
C5-C8 Aliphatic	NS	NS	NS																														
C9-C12 Aliphatic	NS	NS	NS																														
C9-C10 Aromatic	NS	NS	NS																														
Total VPH	NS	NS	NS																														
EPH																																	
C9-C18 Aliphatic	NS	NS	NS																														
C19-C36 Aliphatic	NS	NS	NS																														
C11-C22 Aromatic	NS	NS	NS																														
Total EPH	NS	NS	NS																														

TABLE 11
Summary of Groundwater Data - Volatile Organic Compounds & VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	COPC Screening Levels			WP-01						WP-02			WP-03						WP-04						WP-05					
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	11/04/03			09/27/06			11/04/03			11/05/03			09/27/06			11/07/03			09/27/06			11/07/03			09/27/06		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																														
Benzene $	5	**0.35**	*5*	0.15	UJ	L	0.2	U		0.15	UJ	L	0.15	UJ	L	0.2	U		0.15	UJ	L	0.20	U		0.15	UJ	L	0.20	U	
Toluene	1,000	**72**	*150*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		4.0	U		2.0	U		2.0	U		4.0	U		2.0	U		4.0	U		2.0	U		4.0	U	
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	100	**160**	*890*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total AVOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
CVOCs																														
Carbon tetrachloride $	5	**0.17**	*5*	0.33	UJ		2.0	U		0.33	UJ		0.33	UJ		2.0	U		0.33	UJ		2.0	U		0.33	UJ		2.0	U	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform $	NS	**0.17**	*80*	0.11	UJ		0.2	U		0.11	UJ		0.11	UJ		0.2	U		0.11	UJ		0.20	U		0.11	UJ		0.20	U	
Chloromethane	NS	**16**	*6.7*	0.20	UJ		2.0	U		0.20	UJ		0.20	UJ		2.0	U		0.20	UJ		2.0	U		0.20	UJ		2.0	U	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.17	UJ		0.2	U		0.17	UJ		0.17	UJ		0.2	U		0.17	UJ		0.20	U		0.17	UJ		0.20	U	
Dichloroethene (1,1-)	7	**34**	*19*	0.30	UJ		2.0	U		0.30	UJ		0.30	UJ		2.0	U		0.30	UJ		2.0	U		0.30	UJ		2.0	U	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	UJ	I	2.0	U		2.0	UJ	I	2.0	UJ	I	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.14	UJ		0.5	U		0.14	UJ		0.14	UJ		0.5	U		0.14	UJ		0.50	U		0.14	UJ		0.50	U	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.14	UJ		0.5	U		0.14	UJ		0.14	UJ		0.5	U		0.14	UJ		0.50	U		0.14	UJ		0.50	U	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.10	UJ		0.5	U		0.10	UJ		0.10	UJ		0.5	U		0.10	UJ		0.50	U		0.10	UJ		0.50	U	
Methylene chloride	5	**4.3**	*58*	0.25	UJ		2.0	U		0.25	UJ		0.25	UJ		2.0	U		0.25	UJ		2.0	U		0.25	UJ		2.0	U	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.090	UJ		0.2	U		0.090	UJ		0.090	UJ		0.2	U		0.090	UJ		0.20	U		0.090	UJ		0.20	U	
Tetrachloroethene $	5	**0.1**	*5*	0.23	UJ		0.2	U		0.23	UJ		0.23	UJ		0.2	U		0.23	UJ		0.20	U		0.23	UJ		0.20	U	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.10	UJ		0.2	U		0.10	UJ		0.10	UJ		0.2	U		0.10	UJ		0.20	U		0.10	UJ		0.20	U	
Trichloroethene $	5	**0.028**	*5*	0.18	UJ		0.2	U		0.18	UJ		0.18	UJ		0.2	U		0.18	UJ		0.20	U		0.18	UJ		0.20	U	
Vinyl chloride $	2	**0.020**	*2*	0.32	UJ		0.5	U		0.32	UJ		0.32	UJ		0.5	U		0.32	UJ		0.50	U		0.32	UJ		0.50	U	
Total CVOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Other VOCs																														
Acetone	NS	**550**	*22,000*	2.0	U		5.0	U		2.0	U		2.0	U		5.0	U		2.0	U		5.0	U		2.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.060	UJ		0.2	U		0.060	UJ		0.060	UJ		0.2	U		0.060	UJ		0.20	U		0.060	UJ		0.20	U	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		0.5	U		2.0	U		2.0	U		0.5	U		2.0	U		0.50	U		2.0	U		0.50	U	
Bromomethane	NS	**0.87**	*2.0*	0.78	UJ	I	0.2	UJ	I	0.78	UJ	I	0.78	UJ	I	0.2	UJ	I	0.78	UJ	I	0.20	UJ	I	0.78	UJ	I	0.20	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.090	UJ		0.2	U		0.090	UJ		0.090	UJ		0.2	U		0.090	UJ		0.20	U		0.090	UJ		0.20	U	
Hexanone (2-)	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	NS	**41**	*960*	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
Total VOCs	NS	NS	NS	-			-			-			-			-			-			-			-			-		
VPH																														
C5-C8 Aliphatic	NS	NS	NS																											
C9-C12 Aliphatic	NS	NS	NS																											
C9-C10 Aromatic	NS	NS	NS																											
Total VPH	NS	NS	NS																											
EPH																														
C9-C18 Aliphatic	NS	NS	NS																											
C19-C36 Aliphatic	NS	NS	NS																											
C11-C22 Aromatic	NS	NS	NS																											
Total EPH	NS	NS	NS																											

TABLE 11
Summary of Groundwater Data - Volatile Organic Compounds & VPH/EPH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/L											
	COPC Screening Levels			WP-06						WP-07		
	EPA MCL	EPA Region IX Tap Water PRG	EPA Vapor Intrusion Screening	10/28/03			09/27/06			10/27/03		
				Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs												
Benzene $	5	**0.35**	*5*	0.19	J	I	2.0	U		**3.6**	J	I
Toluene	1,000	**72**	*150*	2.0	U		2.0	U		10	U	
Ethylbenzene	700	**130**	*700*	2.0	U		2.0	U		10	U	
Xylene (m,p-) †	10,000	**21**	*2,200*	2.0	U		4.0	U		10	U	
Xylene (o-) †	10,000	**21**	*3,300*	2.0	U		2.0	U		10	U	
Styrene	100	**160**	*890*	2.0	U		2.0	U		10	U	
Total AVOCs	NS	NS	NS	0.19			-			3.6		
CVOCs												
Carbon tetrachloride $	5	**0.17**	*5*	0.73	UJ		2.0	U		3.6	UJ	
Chlorobenzene	100	**11**	*39*	2.0	U		2.0	U		10	U	
Chloroethane	NS	**4.6**	*2,800*	2.0	U		2.0	U		10	U	
Chloroform $	NS	**0.17**	*80*	0.14	UJ		2.0	U		0.70	UJ	
Chloromethane	NS	**16**	*6.7*	0.79	UJ		2.0	U		4.0	UJ	
Dichloroethane (1,1-)	NS	**81**	*220*	2.0	U		2.0	U		10	U	
Dichloroethane (1,2-) $	5	**0.12**	*5*	0.10	UJ		2.0	U		0.50	UJ	
Dichloroethene (1,1-)	7	**34**	*19*	0.22	UJ		2.0	U		1.1	UJ	
Dichloroethene (cis-1,2-)	70	**6.1**	*21*	2.0	U		2.0	U		10	U	
Dichloroethene (trans-1,2-)	100	**12**	*18*	2.0	U		2.0	U		10	U	
Dichloropropane (1,2-)	5	**0.16**	*3.5*	0.17	UJ		2.0	U		0.85	UJ	
Dichloropropene (cis-1,3-) ‡	NS	**0.40**	*0.84*	0.21	UJ		2.0	U		1.0	UJ	
Dichloropropene (trans-1,3-) ‡	NS	**0.40**	*0.84*	0.11	UJ		2.0	U		1.2	UJ	
Methylene chloride	5	**4.3**	*58*	1.6	UJ		2.0	U		7.8	UJ	
Tetrachloroethane (1,1,2,2-)	NS	**0.055**	*3*	0.31	UJ		2.0	U		1.6	UJ	
Tetrachloroethene $	5	**0.1**	*5*	0.15	UJ		2.0	U		0.75	UJ	
Trichloroethane (1,1,1-)	200	**320**	*310*	2.0	U		2.0	U		10	U	
Trichloroethane (1,1,2-) $	5	**0.20**	*5*	0.12	UJ		2.0	U		0.60	UJ	
Trichloroethene $	5	**0.028**	*5*	0.18	UJ		2.0	U		0.90	UJ	
Vinyl chloride $	2	**0.020**	*2*	0.32	UJ		2.0	U		1.6	UJ	
Total CVOCs	NS	NS	NS	-			-			-		
Other VOCs												
Acetone	NS	**550**	*22,000*	5.0	U		5.0	U		25	U	
Bromochloromethane	NS	NS	NS	2.0	U		2.0	U		10	U	
Bromodichloromethane	NS	**0.18**	*2.1*	0.24	UJ		2.0	U		1.2	UJ	
Bromoform	NS	**8.5**	*0.0083*	2.0	U		2.0	U		10	U	
Bromomethane	NS	**0.87**	*2.0*	1.5	UJ	I	2.0	UJ	I	7.7	UJ	I
Butanone (2-)	NS	**700**	*44,000*	2.0	U		2.0	U		10	U	
Carbon disulfide	NS	**100**	*56*	2.0	U		2.0	U		10	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	2.0	U		2.0	U		10	U	
Dibromochloromethane	NS	**0.13**	*3.2*	0.15	UJ		2.0	UJ	I	0.75	UJ	
Hexanone (2-)	NS	NS	NS	5.0	U		2.0	U		25	U	
Methyl-2-pentanone (4-)	NS	**200**	*1,400*	2.0	U		2.0	U		10	U	
Methyl-tert Butyl Ether	NS	**11**	*12,000*	2.0	U		2.0	U		10	U	
Trichlorofluoromethane	NS	**130**	*18*	2.0	U		2.0	U		10	U	
Vinyl acetate	NS	**41**	*960*	2.0	U		2.0	U		10	U	
Total Other VOCs	NS	NS	NS	-			-			-		
Total VOCs	NS	NS	NS	0.19			-			3.6		
VPH												
C5-C8 Aliphatic	NS	NS	NS									
C9-C12 Aliphatic	NS	NS	NS									
C9-C10 Aromatic	NS	NS	NS									
Total VPH	NS	NS	NS									
EPH												
C9-C18 Aliphatic	NS	NS	NS									
C19-C36 Aliphatic	NS	NS	NS									
C11-C22 Aromatic	NS	NS	NS									
Total EPH	NS	NS	NS									

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. (SHA) on the dates indicated; see Table 1B for identity of sample delivery groups (SDGs).

2. For samples collected in 2001, 2002, and 2003, Woods Hole Group Environmental Laboratories (WHGEL) of Raynham, Massachusetts, performed analyses for volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260B; and extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH) by Massachusetts Department of Environmental Protection (MADEP) methods MADEP-EPH-98-1 and MADEP-VPH-98-1, respectively.

For samples collected in 2006, Alpha Woods Hole Laboratories (formerly WHGEL) of Raynham, Massachusetts, performed analyses for VOCs by USEPA Method 8260B.

3. Data validation and data usability assessment were performed by SHA and New Environmental Horizons, Inc. (NEH). Results are presented in the Data Usability Report (SHA, 2002), the May 2002 Groundwater Sampling Report (SHA, 2003), the Phase 1B RI Data Usability Report (SHA, 2004), and in Appendix C of this Report.

4. All concentrations are presented in micrograms per liter (µg/l), which are equivalent to parts per billion (ppb).

5. "COPC Screening Levels" indicates contaminants of potential concern (COPC) screening levels used to determine inclusion of an analyte in the human health risk assessment. Analyte detections which exceed the USEPA MCL (shaded values) are shaded. Analyte detections which exceed the EPA Region IX Tap Water PRG (**bold** value) are in **bold** Analyte detections from shallow wells which exceed the EPA Vapor Intrusion Screening Values (*italic* value) are in *italics* .

"EPA MCL" indicates the values listed are drinking water Maximum Contaminant Levels (MCLs) from the National Primary Drinking Water Standards, dated June 2003 (http://www.epa.gov/safewater/mcl.html).

"EPA Region IX Tap Water PRG" indicates the values listed are from the USEPA Region IX Preliminary Remediation Goals (PRGs) Table, dated October 1, 2004. PRGs based on non-cancer effects are multiplied by 0.1 per USEPA Guidance (USEPA Region I, Risk Update Number 5, September 1999).

"EPA Vapor Intrusion Screening" indicates values listed are from the USEPA Office of Solid Waste and Emergency Response (OSWER) Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance), Table 2C, November 29, 2002. These values apply to shallow groundwater (SH series wells with an S after the well number, and WP-series wells). Target groundwater concentrations based on non-carcinogenic effects are multiplied by 0.1 per USEPA Guidance (USEPA Region I, Risk Update Number 5, September 1999).

6. "$" indicates the Vapor Intrusion Screening Value guidance document indicates the MCL is used as the Vapor Intrusion Screening Value because the calculated value is less than the MCL.
"†" indicates the MCL and PRG values presented are for total xylenes.
"‡" indicates the Vapor Intrusion Screening Values and PRG values presented are for 1,3-dichloropropene (isomer unspecified).

7. Total concentrations listed (e.g. Total AVOCs, CVOCs) are the sum of detected concentrations of the relevant analytes. "AVOCs" are non-chlorinated aromatic volatile organic compounds. "CVOCs" are chlorinated volatile organic compounds. "Other VOCs" are non-AVOC and non-CVOC volatile organic compounds. "EPH" are extractable petroleum hydrocarbons. "VPH" are volatile petroleum hydrocarbons.

8. The following qualifiers and biases were assigned during data validation by NEH. Refer to NEH's Data Usability Reports (included in the Data Usability Report [SHA, 2002], the Phase 1B RI Data Usability Report [SHA, 2004], and Appendix C of this Report) for additional detail regarding qualifiers and bias.

Qualifiers:
"J" - The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"U" - The compound was analyzed for, but was not detected. The associated numerical value is the sample-specific reporting limit. The value is usable for project decisions as a non-detect result at the reporting limit.
"UJ" - The compound was analyzed for, but was not detected. The sample-specific quantitation (reporting) limit is estimated. The non-detect result is usable for project objectives with documentation of the bias or uncertainty in the result.
"R" - Indicates data rejected during validation.

Bias:
"L" - Low
"I" - Indeterminate
"H" - High

TABLE 12
Summary of Surface Water Data - Field Screening Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Monitoring Location	Date	Temperature (ºC)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/l)	Oxidation Reduction Potential (mV)
Neponset River Surface Water Locations					
SW-102	03/20/01	3.6	260	12.9	220
	04/05/01	5.6	280	12.4	270
	08/01/01	23.5	360	7.9	250
	09/29/06	16.8	282	9.4	62
SW-103	03/20/01	3.5	270	13.5	200
	04/04/01	6.7	260	11.6	220
	08/01/01	22.8	360	7.9	340
SW-105	03/20/01	3.4	270	12.8	180
	04/04/01	5.7	260	11.9	190
	08/01/01	21.4	370	8.7	60
	09/29/06	16.8	286	10.0	81
SW-106	03/20/01	7.1	420	8.5	190
	04/04/01	6.6	800	5.3	200
	08/01/01	23.7	1,700	5.2	90
SW-107	03/20/01	5.8	300	10.7	190
	04/04/01	6.0	320	9.5	220
	08/01/01	19.2	1,400	2.6	100
	09/29/06	15.3	950	2.8	130
SW-108	03/20/01	3.3	270	12.8	210
	04/04/01	4.6	260	12.1	250
	08/01/01	20.5	360	8.6	120
	09/29/06	16.7	286	10.8	136
Neponset River Surface Water Reference Locations					
SWR-1	03/20/01	3.8	260	12.8	230
	04/05/01	6.5	280	11.3	260
	08/02/01	23.2	390	6.7	150
SWR-2	03/20/01	3.8	260	12.6	230
	04/05/01	5.7	280	12.0	240
	08/02/01	22.7	380	6.9	180
SWR-3	03/20/01	3.7	260	12.9	230
	04/05/01	6.5	280	12.0	250
	08/02/01	22.3	380	6.9	190
SWR-4	03/20/01	3.7	260	13.6	230
	04/05/01	5.5	280	12.3	260
	08/02/01	21.9	380	7.2	210
SWR-5	03/20/01	3.7	260	13.1	230
	04/05/01	5.5	280	12.2	270
	08/01/01	23.3	360	7.3	240

Notes:

1. Field screening was completed by Sanborn, Head & Associates, Inc. personnel at the time of sample collection on the dates indicated.

2. Values reported above have been rounded from values measured in the field.

3. Refer to Appendix B-3 for field forms/logs for further information.

4. Surface water field screening parameters were measured using a YSI 600/556 MPS sonde.

5. Table 13 contains surface water pH data.

6. "mg/l" indicates milligrams per liter, which are equivalent to parts per million (ppm).
"µS/cm" indicates microSiemens per centimeter.
"ºC" indicates degrees Celsius.
"mV" indicates milliVolts.

TABLE 13
Summary of Surface Water Data - pH
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Sample Name	Measurement Date	pH Value (s.u.)	pH Qualifier	pH Bias
Neponset River Surface Water Locations				
SW-102	03/20/01	6.6	J	I
	04/05/01	6.2		
	08/01/01	7.1		
	09/29/06	7.1		
SW-103	03/20/01	6.4	J	I
	04/04/01	6.4		
	08/01/01	7.2		
SW-105	03/20/01	7.5	J	I
	04/04/01	6.9		
	08/01/01	8.4		
	09/29/06	7.0		
SW-106	03/20/01	9.6		
	04/04/01	10.0		
	08/01/01	9.3		
SW-107	03/20/01	8.2		
	04/04/01	8.2		
	08/01/01	9.0		
	09/29/06	8.6		
SW-108	03/20/01	6.6	J	I
	04/04/01	6.3		
	08/01/01	7.0		
	09/29/06	6.7		
Neponset River Surface Water Reference Locations				
SWR-1	03/20/01	6.4	J	I
	04/05/01	6.2		
	08/02/01	6.9		
SWR-2	03/20/01	6.3	J	I
	04/05/01	6.4		
	08/02/01	6.9		
SWR-3	03/20/01	6.5	J	I
	04/05/01	5.5		
	08/02/01	6.9		
SWR-4	03/20/01	6.5	J	I
	04/05/01	6.5		
	08/02/01	6.9		
SWR-5	03/20/01	6.5	J	I
	04/05/01	6.4		
	08/01/01	7.0		

Notes:
1. pH values for surface water were measured by Sanborn, Head & Associates, Inc. (SHA) on the dates indicated.
2. Values reported above have been rounded from values measured in the field.
3. Refer to Appendices B-3 for field forms/logs for further information.
4. Surface water sample pH measurements were recorded using a YSI 600/556 MPS sonde.
5. pH is reported in standard units (s.u.).
6. Data usability assessment was performed by SHA; the following qualifiers and biases were assigned during data validatio by SHA. Refer to SHA's Data Usability Memoranda (included in the Data Usability Report [SHA, 2002] and Appendix C of this Report, for additional detail regarding qualifiers and bias.

Qualifiers:

"J" The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.

Bias:

"I" Indeterminate

TABLE 14
Summary of Surface Water Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in µg/l (except as noted)																										
	COPC Screening Levels				SW-102									SW-103						SW-105							
	Human Health	Ecological			04/05/01			08/01/01			09/29/06			04/04/01			08/01/01			04/04/01			08/01/01			09/29/06		
	EPA Region IX Tap Water PRG	GLWQI Tier II Values	USEPA Aquatic SWQCs	ORNL Tier II SCVs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Dissolved Metals																											
Aluminum †	3,600	NS	**87**	NS	55.6	U		55.6	U		50.0	U		55.6	U		55.6	U		55.6	U		55.6	U		50.0	U	
Antimony	1.5	NS	NS	**30**	11.1	U		11.1	U		0.50	U		11.1	U		11.1	U		11.1	U		11.1	U		0.50	U	
Arsenic ‡$*	0.045	8.1	150	**3.1**	2.2			1.1	U		0.43	J	I	2.5			1.1	U		2.1			1.1	U		0.46	J	I
Barium	260	**3.9**	NS	4.0	**17.5**			**17.8**			**17.0**			**16.5**			**18.4**			**17.0**			**19.6**			**17.0**		
Beryllium	7.3	5.1	NS	**0.66**	1.1	U		1.1	U		0.20	U		1.1	U		1.1	U		1.1	U		1.1	U		0.20	U	
Cadmium	1.8	NS	**0.25**	NS	1.1	U		1.1	U		0.10	U		1.1	U		1.1	U		1.1	U		1.1	U		0.10	U	
Calcium	NS	NS	NS	NS	9,090			15,700			12,000			8,870			16,000			8,690			16,200			12,000		
Chromium ‡%	11	NS	**11**	NS	1.1	U		3.8			0.50	U		1.1	U		1.1	U		1.1	U		1.5			0.52		
Cobalt	73	**3.0**	NS	23	1.1	U		1.1	U		0.20	U		1.1	U		1.1	U		1.1	U		1.1	U		0.20	U	
Copper ‡	150	NS	**9.0**	NS	2.0			2.8			1.4			2.1			1.8			1.9			2.3			1.6		
Iron	1,100	NS	**1,000**	NS	118			200			310			124			157			117			**1,280**			320		
Lead ‡	NS	NS	**2.5**	NS	1.1	U		1.1	U		0.50	U		1.1	U		1.1	U		1.1	U		1.1	U		0.50	U	
Magnesium	NS	NS	NS	NS	2,210			3,840			2,900			2,230			4,050			2,340			4,110			3,100		
Manganese	88	**80**	NS	120	24.3			41.4			55			24.1			29.4			26.2			62.7			46.0		
Mercury ‡	1.1	NS	**0.77**	1.30	0.0050	U		0.0050	U		0.20	U		0.0050	U		0.0050	U		0.0050	U		0.0050	U		0.20	U	
Nickel ‡	73	NS	**52**	NS	1.1	U		3.7			1.1			1.1	U		2.3			1.1	U		1.3			1.2		
Potassium	NS	NS	NS	NS	1,670			3,160			2,100			1,700			2,950			1,680			3,010			2,200		
Selenium	18	NS	**5.0**	NS	1.1	UJ	L	1.1	U		1.0	U		1.1	UJ	L	1.5			1.1	UJ	L	1.1	U		1.0	U	
Silver	18	NS	NS	**0.36**	1.1	U		1.1	U		0.20	U		1.1	U		1.1	U		1.1	U		1.1	U		0.20	U	
Sodium	NS	NS	NS	NS	36,800			42,200	J	L	33,000			36,200			41,800	J	L	37,300			43,000	J	L	36,000		
Thallium	0.24	NS	NS	**12**	1.1	U		1.1	U		0.10	U		1.1	U		1.1	U		1.1	U		1.1	U		0.10	U	
Vanadium	3.6	**19**	NS	20	11.1	U		11.1	U		1.3			11.1	U		11.1	U		11.1	U		11.1	U		1.2		
Zinc ‡	1,100	NS	**120**	NS	11.1	U		11.1	U		5.0	U		11.1	U		11.1	U		11.1	U		11.1	U		5.0	U	
Total Metals																											
Aluminum †	3,600	NS	**87**	NS	60.5			55.6	U		50.0	U		60.7			55.6	U		68.3			55.9			50.0	U	
Antimony	1.5	NS	NS	**30**	11.1	U		11.1	U		0.50	U		11.1	U		11.1	U		11.1	U		11.1	U		0.50	U	
Arsenic ‡$*	0.045	8.1	150	**3.1**	1.1	U		1.1	U		0.69	J	I	1.1	U		1.1	U		1.1	U		1.1	U		0.62	J	I
Barium	260	**3.9**	NS	4.0	**16.6**			**18.8**			**17.0**			**14.8**			**19.7**			**15.5**			**22.7**			**17.0**		
Beryllium	7.3	5.1	NS	**0.66**	1.1	U		1.1	U		0.20	U		1.1	U		1.1	U		1.1	U		1.1	U		0.20	U	
Cadmium	1.8	NS	**0.25**	NS	1.1	U		1.1	U		0.10	U		1.1	U		1.1	U		1.1	U		1.1	U		0.10	U	
Calcium	NS	NS	NS	NS	8,220			16,000			12,000			7,830			16,600			8,220			17,100			12,000		
Chromium ‡%	11	NS	**11**	NS	1.1	U		1.1	U		0.50	U		1.1	U		1.1	U		1.1	U		1.1	U		0.50	U	
Cobalt	73	**3.0**	NS	23	1.1	U		1.1	U		0.20	U		1.1	U		1.1	U		1.1	U		1.1	U		0.20	U	
Copper ‡	150	NS	**9.0**	NS	2.0			2.0			1.5			2.1			1.9			2.2			2.2			1.6		
Iron	1,100	NS	**1,000**	NS	175			271	J	I	530			179			394	J	I	224			555	J	I	550		
Lead ‡	NS	NS	**2.5**	NS	1.1	U		1.1	U		0.61			1.1	U		1.1	U		1.1	U		1.1	U		0.54		
Magnesium	NS	NS	NS	NS	2,240			4,000			3,000			2,160			4,200			2,270			4,300			3,100		
Manganese	88	**80**	NS	120	30.0			79.0			**110**			26.3			**108**			28.5			**194**			**100**		
Mercury ‡	1.1	NS	**0.77**	1.30	0.0050	U		0.0050	U		0.20	U		0.0050	U		0.0050	U		0.0050	U		0.0050	U		0.20	U	
Nickel ‡	73	NS	**52**	NS	1.1	U		1.3			1.1			1.1	U		1.3			1.1	U		1.1			1.1		
Potassium	NS	NS	NS	NS	1,550			3,190			2,300			1,420			3,180			1,510			3,080			2,300		
Selenium	18	NS	**5.0**	NS	2.3			1.1	U		1.0	U		1.1	U		1.1	U		1.1	U		1.1	U		1.0	U	
Silver	18	NS	NS	**0.36**	1.1	U		1.1	U		0.20	U		1.1	U		1.1	U		1.1	U		1.1	U		0.20	U	
Sodium	NS	NS	NS	NS	35,200			42,800			35,000			32,600			45,500			33,700			42,700			35,000		
Thallium	0.24	NS	NS	**12**	1.1	U		1.1	U		0.10	U		1.1	U		1.1	U		1.1	U		1.1	U		0.10	U	
Vanadium	3.6	**19**	NS	20	11.1	U		11.1	U		1.8			11.1	U		11.1	U		11.1	U		11.1	U		1.7		
Zinc ‡	1,100	NS	**120**	NS	11.1	U		24.0			5.0	U		11.1	U		11.1	U		11.1	U		11.1	U		5.0	U	
Cyanide (weak acid dissociable) &	0.62	NS	**5.2**	NS	5.0	U		5.0	UJ	L				5.0	U		5.0	UJ	L	5.0	U		5.0	UJ	L			
Total Organic Carbon (mg/l)	NS	NS	**NS**	NS	3.9			5.7	J	I	5.5			4.4			5.2	J	I	4.5			5.3	J	I			

TABLE 14
Summary of Surface Water Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in µg/l (except as noted)																											
	COPC Screening Levels				SW-106						SW-107									SW-108								
	Human Health	Ecological			04/04/01			08/01/01			04/04/01			08/01/01			09/29/06			04/04/01			08/01/01			09/29/06		
	EPA Region IX Tap Water PRG	GLWQI Tier II Values	USEPA Aquatic SWQCs	ORNL Tier II SCVs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Dissolved Metals																												
Aluminum †	3,600	NS	**87**	NS	**135**			**328**			55.6	U		**535**			**130**			55.6	U		55.6	U		50.0	U	
Antimony	1.5	NS	NS	**30**	11.1	U		11.1	U		11.1	U		11.1	U		0.50	U		11.1	U		11.1	U		0.50	U	
Arsenic ‡$*	0.045	8.1	150	**3.1**	**8.2**			**24.5**			**3.6**			**11.2**			**7.3**	J	I	**3.6**			1.1	U		1.0	J	I
Barium	260	**3.9**	NS	4.0	**28.3**	J	I	**6.6**			**13.9**			**19.3**			**11.0**			**17.2**			**19.5**			**17.0**		
Beryllium	7.3	5.1	NS	**0.66**	1.1	U		1.1	U		1.1	U		1.1	U		0.20	U		1.1	U		1.1	U		0.20	U	
Cadmium	1.8	NS	**0.25**	NS	1.1	U		1.1	U		1.1	U		1.1	U		0.10	U		1.1	U		1.1	U		0.10	U	
Calcium	NS	NS	NS	NS	22,800			8,420			9,810			11,400			7,800			8,830			16,600			12,000		
Chromium ‡%	11	NS	**11**	NS	2.5			3.7			1.3			9.3			1.7			1.5			1.2			0.50	U	
Cobalt	73	**3.0**	NS	23	1.1	U		1.1	U		1.1	U		1.1	U		0.29			1.1	U		1.1	U		0.20	U	
Copper ‡	150	NS	**9.0**	NS	5.9			**16.2**			2.6			**17.8**			6.4			2.2			2.0			1.7		
Iron	1,100	NS	**1,000**	NS	183	J	I	546			132			790			290			123			214			290		
Lead ‡	NS	NS	**2.5**	NS	**7.2**	J	I	**27.9**			**3.8**			**67.4**			**32.0**			1.1	U		1.1	U		0.50	U	
Magnesium	NS	NS	NS	NS	3,250			544			2,270			1,380			970	U		2,290			4,340			3,000		
Manganese	88	**80**	NS	120	20.2			44.4			**84.4**			**125**			56.0			26.2			60.9			39.0		
Mercury ‡	1.1	NS	**0.77**	1.30	0.0090			0.0050	U		0.0050	U		0.0050	U		0.20	U		0.0050	U		0.0050	U		0.20	U	
Nickel ‡	73	NS	**52**	NS	10.1	J	I	10.8			1.2			10.5			3.8			1.3			1.4			1.1		
Potassium	NS	NS	NS	NS	2,150			1,350			2,890			3,227			1,600			1,650			2,930			2,100		
Selenium	18	NS	**5.0**	NS	1.1	UJ	L	1.1	U		1.3	J	L	2.3			1.0	U		1.2	J	L	1.1	U		1.0	U	
Silver	18	NS	NS	**0.36**	1.1	U		1.1	U		1.1	U		1.1	U		0.20	U		1.1	U		1.1	U		0.20	U	
Sodium	NS	NS	NS	NS	92,100			417,000	J	L	46,400			346,000	J	L	220,000			37,000			42,300	J	L	36,000		
Thallium	0.24	NS	NS	**12**	1.1	U		1.1	U		1.1	U		1.1	U		0.10	U		1.1	U		1.1	U		0.10	U	
Vanadium	3.6	**19**	NS	20	12.9			**29.2**			11.1	U		**43.6**			12.0			11.1	U		11.1	U		2.4		
Zinc ‡	1,100	NS	**120**	NS	40.7			23.6			11.1	U		26.9			7.1			11.1	U		11.1	U		5.0	U	
Total Metals																												
Aluminum †	3,600	NS	**87**	NS	**1,340**	J	I	**2,070**	J	I	**5,450**			**18,000**			**300**			63.3			55.6	U		50.0	U	
Antimony	1.5	NS	NS	**30**	11.1	U		11.1	U		11.1	U		11.1	U		0.50	U		11.1	U		11.1	U		0.50	U	
Arsenic ‡$*	0.045	8.1	150	**3.1**	**5.8**	J	I	**27.1**			**5.7**			**23.1**			**7.8**	J	I	1.1	U		1.1	U		1.2	J	I
Barium	260	**3.9**	NS	4.0	**42.6**	J	I	**17.5**	J	I	**125**			**219**			**14.0**			**14.7**			**20.5**			**18.0**		
Beryllium	7.3	5.1	NS	**0.66**	1.1	U		1.1	U		1.1	U		1.1	U		0.20	U		1.1	U		1.1	U		0.20	U	
Cadmium	1.8	NS	**0.25**	NS	1.1	U		1.1	U		1.1	U		**1.5**			0.10	U		1.1	U		1.1	U		0.10	U	
Calcium	NS	NS	NS	NS	25,400			9,730			16,300			24,300			8,300			8,180			16,600			12,000		
Chromium ‡%	11	NS	**11**	NS	3.2	J	I	7.5	U		**14.9**			**38.3**			2.7			1.1	U		1.1	U		0.50	U	
Cobalt	73	**3.0**	NS	23	1.1	UJ	I	1.8			**3.1**			**9.0**			0.41			1.1	U		1.1	U		0.20	U	
Copper ‡	150	NS	**9.0**	NS	8.5	J	I	**21.3**			**36.1**			**90.5**			**9.8**			2.5			2.1			1.6		
Iron	1,100	NS	**1,000**	NS	**1,050**	J	I	**1,930**	J	I	**5,420**			**13,800**	J	I	550			193			336	J	I	520		
Lead ‡	NS	NS	**2.5**	NS	**20.0**	J	I	**57.5**			**185**			**576**			**45.0**			1.1	U		1.1	U		0.52		
Magnesium	NS	NS	NS	NS	3,700			1,000			4,050			9,170			1,100			2,330			4,220			3,300		
Manganese	88	**80**	NS	120	46.8	J	I	**93.3**			**716**			**950**			69.0			28.7			**81.6**			**85.0**		
Mercury ‡	1.1	NS	**0.77**	1.30	0.020	J	I	0.018			0.044	J	H	0.0050	U		0.20	U		0.0050	U		0.0050	U		0.20	U	
Nickel ‡	73	NS	**52**	NS	4.5	J	I	14.1			12.1			**61.3**			4.5			1.1	U		1.1			1.2		
Potassium	NS	NS	NS	NS	1,980	J	I	1,730			3,290			4,670			1,700			1,360			3,040			2,200		
Selenium	18	NS	**5.0**	NS	1.8			1.2			1.6			2.9			1.1			1.9			1.1	U		1.0	U	
Silver	18	NS	NS	**0.36**	1.1	U		1.1	U		1.1	U		1.1	U		0.20	U		1.1	U		1.1	U		0.20	U	
Sodium	NS	NS	NS	NS	78,000			422,000			43,300			367,000			250,000			31,500			41,800			38,000		
Thallium	0.24	NS	NS	**12**	1.1	U		1.1	U		1.1	U		1.1	U		0.10	U		1.1	U		1.1	U		0.10	U	
Vanadium	3.6	**19**	NS	20	11.1	U		**34.1**			**22.1**			**122**			13.0			11.1	U		11.1	U		2.6		
Zinc ‡	1,100	NS	**120**	NS	78.0			33.1			**204**			**340**			17.0			11.2			11.1	U		5.0	U	
Cyanide (weak acid dissociable) &	0.62	NS	**5.2**	NS	5.0	U		5.0	UJ	L	5.0	U		5.0	UJ	L				5.0	U		5.0	UJ	L			
Total Organic Carbon (mg/l)	NS	NS	**NS**	NS	50.0			2.0	J	I	7.3			28.0	J	I	14			4.2			5.3	J	I	5.7		

TABLE 14
Summary of Surface Water Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	COPC Screening Levels				Concentrations in µg/l (except as noted)																							
					SWR-1						SWR-2						SWR-3						SWR-4					
	Human Health	Ecological			04/05/01			08/02/01			04/05/01			08/02/01			04/05/01			08/02/01			04/05/01			08/02/01		
	EPA Region IX Tap Water PRG	GLWQI Tier II Values	USEPA Aquatic SWQCs	ORNL Tier II SCVs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Dissolved Metals																												
Aluminum †	3,600	NS	**87**	NS	55.6	U		55.6	U		55.6	U		55.6	U		55.6	U		55.6	U		55.6	U		55.6	U	
Antimony	1.5	NS	NS	**30**	11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U	
Arsenic ‡$*	0.045	8.1	150	**3.1**	2.0			1.1	U		2.0			1.1	U		2.1			1.1	U		2.2			1.1	U	
Barium	260	**3.9**	NS	4.0	**18.4**			**17.6**			**17.3**			**17.7**			**17.5**			**17.0**			**17.9**			**17.6**		
Beryllium	7.3	5.1	NS	**0.66**	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Cadmium	1.8	NS	**0.25**	NS	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Calcium	NS	NS	NS	NS	9,130			15,400			9,290			15,700			8,940			15,300			9,220			15,400		
Chromium ‡%	11	NS	**11**	NS	1.1	U		2.0			1.1	U		2.9			1.1	U		1.1			1.1	U		1.1	U	
Cobalt	73	**3.0**	NS	23	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Copper ‡	150	NS	**9.0**	NS	1.8			2.3			1.8			1.9			2.2			2.1			2.0			2.3		
Iron	1,100	NS	**1,000**	NS	105			210			107			238			108			394			125			199		
Lead ‡	NS	NS	**2.5**	NS	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Magnesium	NS	NS	NS	NS	2,330			3,570			2,270			3,650			2,190			3,620			2,260			3,680		
Manganese	88	**80**	NS	120	26.4			30.2			25.7			58.3			25.4			43.1			26.3			40.2		
Mercury ‡	1.1	NS	**0.77**	1.30	0.0050	U		0.0050	U		0.0050	U		0.0050	U		0.0050	U		0.0050	U		0.0050	U		0.0050	U	
Nickel ‡	73	NS	**52**	NS	1.1	U		2.4			1.1	U		1.8			1.1	U		1.7			1.1	U		1.5		
Potassium	NS	NS	NS	NS	1,750			3,650			1,610			3,440			1,680			3,390			1,680			3,250		
Selenium	18	NS	**5.0**	NS	1.1	UJ	L	1.3			1.1	UJ	L	1.6			1.1	UJ	L	1.1	U		1.1	UJ	L	1.1	U	
Silver	18	NS	NS	**0.36**	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Sodium	NS	NS	NS	NS	37,100			44,100	J	L	37,200			43,000	J	L	37,100			42,200	J	L	38,000			41,400	J	L
Thallium	0.24	NS	NS	**12**	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Vanadium	3.6	**19**	NS	20	11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U	
Zinc ‡	1,100	NS	**120**	NS	11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		50.5	B		11.1	U		11.1	U	
Total Metals																												
Aluminum †	3,600	NS	**87**	NS	55.6	U		55.6	U		60.3			55.6	U		55.9			55.6	U		55.6	U		55.6	U	
Antimony	1.5	NS	NS	**30**	11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U	
Arsenic ‡$*	0.045	8.1	150	**3.1**	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Barium	260	**3.9**	NS	4.0	**16.6**			**20.0**			**16.5**			**18.6**			**16.0**			**18.8**			**16.4**			**21.3**		
Beryllium	7.3	5.1	NS	**0.66**	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Cadmium	1.8	NS	**0.25**	NS	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Calcium	NS	NS	NS	NS	8,280			16,000			8,370			15,600			8,570			16,100			8,500			15,900		
Chromium ‡%	11	NS	**11**	NS	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Cobalt	73	**3.0**	NS	23	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Copper ‡	150	NS	**9.0**	NS	2.0			2.2			2.0			2.2			2.2			1.8			2.0			1.9		
Iron	1,100	NS	**1,000**	NS	171			500	J	I	181			334	J	I	196			359	J	I	172			503	J	I
Lead ‡	NS	NS	**2.5**	NS	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Magnesium	NS	NS	NS	NS	2,260			3,720			2,330			3,680			2,340			3,800			2,340			3,850		
Manganese	88	**80**	NS	120	28.1			**175**			27.0			**121**			27.0			**131**			27.8			**286**		
Mercury ‡	1.1	NS	**0.77**	1.30	0.0050	U		0.0050	U		0.0050	U		0.0050	U		0.0050	U		0.0050	U		0.0050	U		0.0050	U	
Nickel ‡	73	NS	**52**	NS	1.1	U		1.1			1.1	U		1.2			1.1	U		1.1	U		1.1	U		1.1		
Potassium	NS	NS	NS	NS	1,660			3,710			1,540			3,430			1,520			3,500			1,570			3,340		
Selenium	18	NS	**5.0**	NS	1.1	U		1.1	U		1.1			1.1	U		1.1	U		1.1	U		1.4			1.2		
Silver	18	NS	NS	**0.36**	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Sodium	NS	NS	NS	NS	37,300			44,300			35,500			41,600			35,200			43,200			35,000			42,800		
Thallium	0.24	NS	NS	**12**	1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U		1.1	U	
Vanadium	3.6	**19**	NS	20	11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U	
Zinc ‡	1,100	NS	**120**	NS	11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U		11.1	U	
Cyanide (weak acid dissociable) &	0.62	NS	**5.2**	NS	5.0	U		5.0	UJ	L	5.0	U		5.0	UJ	L	5.0	U		5.0	UJ	L	5.0	U		5.0	UJ	L
Total Organic Carbon (mg/l)	NS	NS	**NS**	NS	4.4			6.1	J	I	4.2			6.0	J	I	4.3			5.9	J	I	4.3			5.3	J	I

TABLE 14
Summary of Surface Water Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in µg/l (except as noted)									
	COPC Screening Levels				SWR-5					
	Human Health	Ecological			04/05/01			08/01/01		
	EPA Region IX Tap Water PRG	GLWQI Tier II Values	USEPA Aquatic SWQCs	ORNL Tier II SCVs	Result	Qualifier	Bias	Result	Qualifier	Bias
Dissolved Metals										
Aluminum †	3,600	NS	**87**	NS	55.6	U		55.6	U	
Antimony	1.5	NS	NS	**30**	11.1	U		11.1	U	
Arsenic ‡$*	0.045	8.1	150	**3.1**	2.0			1.1	U	
Barium	260	**3.9**	NS	4.0	**17.4**			**18.1**		
Beryllium	7.3	5.1	NS	**0.66**	1.1	U		1.1	U	
Cadmium	1.8	NS	**0.25**	NS	1.1	U		1.1	U	
Calcium	NS	NS	NS	NS	9,180			15,400		
Chromium ‡%	11	NS	**11**	NS	1.1	U		1.1	U	
Cobalt	73	**3.0**	NS	23	1.1	U		1.1	U	
Copper ‡	150	NS	**9.0**	NS	2.2			1.9		
Iron	1,100	NS	**1,000**	NS	119			132		
Lead ‡	NS	NS	**2.5**	NS	1.1	U		1.1	U	
Magnesium	NS	NS	NS	NS	2,240			3,660		
Manganese	88	**80**	NS	120	24.0			34.8		
Mercury ‡	1.1	NS	**0.77**	1.30	0.0050	U		0.0050	U	
Nickel ‡	73	NS	**52**	NS	1.1	U		1.5		
Potassium	NS	NS	NS	NS	1,640			3,080		
Selenium	18	NS	**5.0**	NS	1.1	UJ	L	1.2		
Silver	18	NS	NS	**0.36**	1.1	U		1.1	U	
Sodium	NS	NS	NS	NS	36,600			41,000	J	L
Thallium	0.24	NS	NS	**12**	1.1	U		1.1	U	
Vanadium	3.6	**19**	NS	20	11.1	U		11.1	U	
Zinc ‡	1,100	NS	**120**	NS	11.1	U		11.1	U	
Total Metals										
Aluminum †	3,600	NS	**87**	NS	57.1			55.6	U	
Antimony	1.5	NS	NS	**30**	11.1	U		11.1	U	
Arsenic ‡$*	0.045	8.1	150	**3.1**	1.1	U		1.1	U	
Barium	260	**3.9**	NS	4.0	**16.6**			**19.3**		
Beryllium	7.3	5.1	NS	**0.66**	1.1	U		1.1	U	
Cadmium	1.8	NS	**0.25**	NS	1.1	U		1.1	U	
Calcium	NS	NS	NS	NS	8,360			16,100		
Chromium ‡%	11	NS	**11**	NS	1.1	U		1.1	U	
Cobalt	73	**3.0**	NS	23	1.1	U		1.1	U	
Copper ‡	150	NS	**9.0**	NS	2.1			2.1		
Iron	1,100	NS	**1,000**	NS	186			293	J	I
Lead ‡	NS	NS	**2.5**	NS	1.1	U		1.1	U	
Magnesium	NS	NS	NS	NS	2,340			3,910		
Manganese	88	**80**	NS	120	28.4			**89.9**		
Mercury ‡	1.1	NS	**0.77**	1.30	0.0050	U		0.0050	U	
Nickel ‡	73	NS	**52**	NS	1.1	U		1.1	U	
Potassium	NS	NS	NS	NS	1,600			3,310		
Selenium	18	NS	**5.0**	NS	1.1	U		1.1	U	
Silver	18	NS	NS	**0.36**	1.1	U		1.1	U	
Sodium	NS	NS	NS	NS	35,500			43,000		
Thallium	0.24	NS	NS	**12**	1.1	U		1.1	U	
Vanadium	3.6	**19**	NS	20	11.1	U		11.1	U	
Zinc ‡	1,100	NS	**120**	NS	11.1	U		11.1	U	
Cyanide (weak acid dissociable) &	0.62	NS	**5.2**	NS	5.0	U		5.0	UJ	L
Total Organic Carbon (mg/l)	NS	NS	**NS**	NS	4.5			5.4	J	I

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. (SHA) on the dates indicated; see Table 1C for identity of sample delivery groups (SDGs).

2. For samples collected in 2001, Woods Hole Group Environmental Laboratories (WHGEL) of Raynham, Massachusetts, performed analyses for metals (except mercury) by United States Environmental Protection Agency (USEPA) Method 6010B and Method 6020; mercury by USEPA Method 7471A; and weak acid dissociable cyanide (WAD cyanide) by USEPA Method 4500-CN I.

For samples collected in 2006, Alpha Woods Hole Laboratories (AWHL) of Raynham, Massachusetts (formerly WHGEL), performed analyses for metals (except mercury) by USEPA Method 6020A; and mercury by USEPA Method 7470A.

3. Data validation and data usability assessment were performed by SHA and New Environmental Horizons, Inc. (NEH). Results are presented in the Data Usability Report (SHA, 2002) and in Appendix C of this Report.

4. All concentrations are presented in micrograms per liter (µg/l), which are equivalent to parts per billion (ppb).

5. "COPC Screening Levels" indicates contaminants of potential concern (COPC) screening levels used to determine inclusion of an analyte in the human health or ecological risk assessments. Analyte detections that exceed the human health screening level (shaded value) are shaded. Analyte detections that exceed the lowest of the ecological screening levels (**bold** value) are in **bold**.

"EPA Region IX Tap Water PRG" indicates the values listed are from the USEPA Region IX Preliminary Remediation Goals (PRGs) Table, dated December 2004. PRGs based on non-cancer effects are multiplied by 0.1 per USEPA Guidance (USEPA Region I, Risk Update Number 5, September 1999).

"GLWQI Tier II Values" indicates the values listed are from the Great Lakes Water Quality Initiative (GLWQI) Tier II methodology values, as reported in Ecotox Thresholds table (USEPA, 1996).

"USEPA Aquatic SWQCs" indicates the values listed are from the USEPA National Recommended Surface Water Quality Criteria (SWQC) (314CMR 22) (USEPA, 2006; http://www.epa.gov/waterscience/criteria/wqcriteria.html) for the protection of aquatic life. The values presented are chronic freshwater criteria.

"ORNL Tier II SCVs" indicates the values listed are Oak Ridge National Laboratory (ORNL) Tier II Secondary Chronic Values (SCVs) for Aquatic Biota (Suter & Tsao, 1996; http://www.esd.ornl.gov/programs/ecorisk/documents/tm96r2.pdf).

6. A blank result field indicates sample was not analyzed for this parameter.
"†" indicates the SWQC expresses aluminum as total recoverable metal in the water column.
"‡" indicates the SWQC expresses the priority pollutant metals (arsenic, chromium, copper, lead, mercury, nickel, and zinc) in terms of dissolved metals in the water column.
"$" indicates the SWQC presented was derived from data for arsenic III, but is applied here to total arsenic.
"*" indicates the SCV presented was derived from data for arsenic V, but is applied here to total arsenic.
"%" indicates the PRG and SWQC values presented are for chromium VI.
"&" indicates the PRG value presented is for hydrogen cyanide.

7. The following qualifiers and biases were assigned during data validation by NEH. Refer to NEH's Data Usability Reports (included in the Data Usability Report [SHA, 2002], and Appendix C of this Report) for additional detail regarding qualifiers and bias.

Qualifiers:
"J" The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"U" The compound was analyzed for, but was not detected. The associated numerical value is the sample-specific reporting limit. The value is usable for project decisions as a non-detect result at the reporting limit.
"UJ" The compound was analyzed for, but was not detected. The sample-specific quantitation (reporting) limit is estimated. The non-detect result is usable for project objectives with documentation of the bias or uncertainty in the result.
"B" Indicates the analyte was detected in a non-matrix matched, associated method blank. The result is usable with possible uncertainty due to the potential of contamination.

Bias:
"L" Low
"I" Indeterminate
"H" High

TABLE 15
Summary of Surface Water Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Concentrations in µg/l.

Analyte	COPC Screening Levels				SW-102									SW-103						SW-105									SW-106					
	Human Health	Ecological			04/05/01			08/01/01			09/29/06			04/04/01			08/01/01			04/04/01			08/01/01			09/29/06			04/04/01			08/01/01		
	EPA Region IX Tap Water PRG	GLWQI Tier II Values	USEPA Aquatic SWQCs	ORNL Tier II SCVs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																		
Acenaphthene	37	NS	NS	NS	0.025	U		0.010	U		0.0030	J	I	0.025	U		0.028			0.025	U		0.025			0.0052	J	I	0.20			0.20		
Acenaphthylene	NS	NS	NS	NS	0.025	U		0.010	U		0.0015	J	I	0.025	U		0.010	U		0.025	U		0.010	U		0.0013	J	I	0.044	J	I	0.27		
Anthracene	180	NS	NS	**0.73**	0.025	U		0.010	U		0.0012	J	I	0.025	U		0.010	U		0.025	U		0.010	U		0.010	U		0.031	J	I	0.19		
Benzo(a)anthracene	0.092	NS	NS	**0.027**	0.025	U		0.010	U		0.0018	J	I	0.025	U		0.010	U		0.025	U		0.010	U		0.0014	J	I	0.027	UJ	I	**0.60**		
Benzo(a)pyrene	0.0092	**0.014**	NS	**0.014**	0.010	U		0.0043	J		0.0017	J	I	0.015	U		0.0028	J		0.010	U		0.0039	J		0.0011	J	I	**0.041**	J	I	**0.89**		
Benzo(b)fluoranthene	0.092	NS	NS	NS	0.025	U		0.0063	J	I	0.0016	J	I	0.025	U		0.0049	UJ		0.025	U		0.0060	J	I	0.0014	J	I	0.033	J	I	0.90		
Benzo(g,h,i)perylene	NS	NS	NS	NS	0.025	U		0.0062	J	I	0.010	UJ	I	0.025	U		0.0073	J	I	0.025	U		0.011			0.010	UJ	I	0.030	J	I	0.47		
Benzo(k)fluoranthene	0.92	NS	NS	NS	0.025	U		0.0048	UJ		0.0018	J	I	0.025	U		0.0048	UJ		0.025	U		0.0048	UJ		0.0014	J	I	0.027	UJ	I	0.47		
Chrysene	9.2	NS	NS	NS	0.025	U		0.0054	J	I	0.0022	J	I	0.025	U		0.0048	UJ		0.025	U		0.0048	UJ		0.0016	J	I	0.036	J	I	0.98		
Dibenz(a,h)anthracene	0.0092	NS	NS	NS	0.025	U		0.0043	UJ		0.0011	J	I	0.025	U		0.010	U		0.025	U		0.010	U		0.010	U		0.025	U		0.11		
Fluoranthene	150	NS	NS	NS	0.025	U		0.014			0.010	U		0.025	U		0.0096	J	I	0.025	U		0.0097	J	I	0.010	U		0.070	J	I	1.3		
Fluorene	24	**3.9**	NS	**3.9**	0.025	U		0.010	U		0.0018	J	I	0.025	U		0.017			0.025	U		0.013			0.0026	J	I	0.080			0.17		
Indeno(1,2,3-cd)pyrene	0.092	NS	NS	NS	0.025	U		0.010	U		0.010	U		0.025	U		0.010	U		0.025	U		0.010	U		0.010	U		0.025	UJ	I	0.43		
Methylnaphthalene (2-)	NS	NS	NS	NS	0.025	UJ	L	0.010	U		0.0015	J	I	0.025	UJ	L	0.010	U		0.025	UJ	L	0.010	U		0.0012	J	I	0.025	UJ	L	0.25		
Naphthalene	0.62	24	NS	**12**	0.025	UJ	L	0.0082	J	I	0.010	U		0.025	UJ	L	0.028			0.025	UJ	L	0.030			0.010	U		0.025	UJ	L	0.34		
Phenanthrene	NS	NS	NS	NS	0.025	U		0.012			0.010	U		0.025	U		0.028			0.025	U		0.026			0.010	U		0.12	J	I	0.96		
Pyrene	18	NS	NS	NS	0.025	U		0.011			0.0036	J	I	0.025	U		0.0061	J	I	0.025	U		0.0063	J	I	0.0018	J	I	0.11	J	I	1.6		
Total PAHs	NS	NS	NS	NS	-			0.0674			0.0228			-			0.1268			-			0.1309			0.019			0.795			10.13		
Other SVOCs																																		
Benzoic acid	15,000	NS	NS	**42**	10	UJ	L	2.0	UJ	L					R		2.0	UJ	L	10	UJ	L	2.0	UJ	L				10	UJ	L	2.0	UJ	L
Benzyl Alcohol	1,100	NS	NS	**8.6**	2.0	U		2.0	U					1.0	J		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
bis(2-Chloroethyl)ether	0.01	NS	NS	NS	0.35	UJ		0.86	UJ					0.35	UJ		0.85	UJ		0.35	UJ		0.85	UJ					0.35	UJ		0.85	UJ	
bis(2-Chloroisopropyl)ether	0.27	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
bis(2-Ethylhexyl)phthalate	4.8	32	NS	**3.0**	0.57	J		2.0	U		1.4	U		0.49	J		2.0	U		0.75	J		2.0	U		1.0	U		0.65	J		2.0	U	
Bromophenyl-phenylether (4-)	NS	**1.5**	NS	**1.5**	0.35	UJ		0.86	UJ					0.35	UJ		0.85	UJ		0.35	UJ		0.85	UJ					0.35	UJ		0.85	UJ	
Butylbenzylphthalate	730	**19**	NS	**19**	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Carbazole	3.4	NS	NS	NS	2.0	U		2.0	U		0.0011	J	I	2.0	U		2.0	U		2.0	U		2.0	U		0.010	U		2.0	U		2.0	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Chloroaniline (4-)	15	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Chloronaphthalene (2-)	49	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Chlorophenol (2-)	3	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Dibenzofuran	1.2	20	NS	**3.7**	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Dichlorobenzene (1,2-)	37	**14**	NS	**14**	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U		2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U	
Dichlorobenzene (1,3-)	18	**71**	NS	**71**	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U		2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U	
Dichlorobenzene (1,4-)	0.5	**15**	NS	**15**	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U		2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U	
Dichlorobenzidine (3,3'-)	0.15	NS	NS	NS	0.35	UJ		0.86	UJ					0.35	UJ		0.85	UJ		0.35	UJ		0.85	UJ					0.35	UJ		0.85	UJ	
Dichlorophenol (2,4-)	11	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Diethylphthalate	2,900	220	NS	**210**	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U		2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U	
Dimethylphenol (2,4-)	73	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Dimethylphthalate	36,000	NS	NS	NS		R		2.0	U						R		2.0	U			R		2.0	U						R		2.0	U	
Di-n-butylphthalate	360	**33**	NS	35	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Dinitro-2-methylphenol (4,6-)	0.36	NS	NS	NS	10	U		2.0	U					10	UJ	L	2.0	U		10	U		2.0	U					10	U		2.0	U	
Dinitrophenol (2,4-)	7.3	NS	NS	NS	10	UJ	I	5.0	U						R		5.0	U		10	UJ	I	5.0	U					10	UJ	I	5.0	U	
Dinitrotoluene (2,4-)	7.3	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Dinitrotoluene (2,6-)	3.6	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Di-n-octylphthalate	150	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Hexachlorobenzene	0.042	NS	NS	NS	0.35	UJ		0.86	UJ					0.35	UJ		0.85	UJ		0.35	UJ		0.85	UJ					0.35	UJ		0.85	UJ	
Hexachlorobutadiene	0.86	NS	NS	NS	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U		2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U	
Hexachlorocyclopentadiene	22	NS	NS	NS	10	UJ	L	2.0	U					10	UJ	L	2.0	U		10	UJ	L	2.0	U					10	UJ	L	2.0	U	
Hexachloroethane	3.6	**12**	NS	**12**	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U		2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U	
Isophorone	71	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Methylphenol (2-)	180	NS	NS	**13**	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Methylphenol (4-)	18	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Nitroaniline (2-)	11	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Nitroaniline (3-)	1.1	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Nitroaniline (4-)	3.2	NS	NS	NS	2.0	U		2.0	U					0.71	J		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Nitrobenzene	0.34	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Nitrophenol (2-)	NS	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Nitrophenol (4-)	NS	NS	NS	**300**	2.0	U		2.0	U					2.0	U		2.0	UJ	L	2.0	U		2.0	U					2.0	U		2.0	U	
Nitroso-di-n-propylamine (N-)	0.0096	NS	NS	NS	0.35	UJ		0.86	UJ					0.35	UJ		0.85	UJ		0.35	UJ		0.85	UJ					0.35	UJ		0.85	UJ	
Nitrosodiphenylamine (N-)	14	NS	NS	**210**	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Pentachlorophenol	0.56	NS	**15**	NS	5.0	U		2.0	U					5.0	UJ	I	2.0	U		5.0	U		2.0	U					5.0	U		2.0	U	
Phenol	1,100	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Trichlorobenzene (1,2,4-)	0.72	**110**	NS	**110**	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U		2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U	
Trichlorophenol (2,4,5-)	360	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Trichlorophenol (2,4,6-)	0.36	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U		2.0	U		2.0	U					2.0	U		2.0	U	
Total Other SVOCs	NS	NS	NS	NS	0.57			-			0.0011			2.2			-			0.75			-			-			0.65			-		
Total SVOCs	NS	NS	NS	NS	0.57			0.0674			0.0239			2.2			0.1268			0.75			0.1309			0.019			1.445			10.13		

TABLE 15
Summary of Surface Water Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	COPC Screening Levels				Concentrations in µg/l.																													
	Human Health	Ecological			SW-107									SW-108									SWR-1						SWR-2					
					04/04/01			08/01/01			09/29/06			04/04/01			08/01/01			09/29/06			04/05/01			08/02/01			04/05/01			08/02/01		
	EPA Region IX Tap Water PRG	GLWQI Tier II Values	USEPA Aquatic SWQCs	ORNL Tier II SCVs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																																		
Acenaphthene	37	NS	NS	NS	0.025	U		0.39			0.064			0.025	U		0.019			0.0044	J	I	0.029	U		0.010	U		0.026	U		0.010	U	
Acenaphthylene	NS	NS	NS	NS	0.054			0.21			0.023			0.025	U		0.010	U		0.0034	J	I	0.029	U		0.010	U		0.026	U		0.010	U	
Anthracene	180	NS	NS	**0.73**	0.030			0.17			0.021			0.025	U		0.010	U		0.0012	J	I	0.029	U		0.010	U		0.026	U		0.010	U	
Benzo(a)anthracene	0.092	NS	NS	**0.027**	**0.085**			**0.41**			**0.089**			0.025	U		0.010	U		0.0015	J	I	0.029	U		0.010	U		0.026	U		0.010	U	
Benzo(a)pyrene	0.0092	**0.014**	NS	**0.014**	**0.11**			**0.51**			**0.090**			0.010	U		0.0060	J	I	0.0014	J	I	0.012	U		0.0028	UJ		0.010	U		0.0029	UJ	
Benzo(b)fluoranthene	0.092	NS	NS	NS	0.11			0.57			0.084			0.025	U		0.0062	J	I	0.0016	J	I	0.029	U		0.0049	UJ		0.026	U		0.0050	UJ	
Benzo(g,h,i)perylene	NS	NS	NS	NS	0.079			0.31			0.049	J	L	0.025	U		0.012			0.010	UJ	I	0.029	U		0.010	U		0.026	U		0.010	U	
Benzo(k)fluoranthene	0.92	NS	NS	NS	0.078			0.30			0.077			0.025	U		0.0052	J	I	0.0020	J	I	0.029	U		0.0048	UJ		0.026	U		0.0049	UJ	
Chrysene	9.2	NS	NS	NS	0.11			0.62			0.11			0.025	U		0.0049	UJ		0.0019	J	I	0.029	U		0.0048	UJ		0.026	U		0.0049	UJ	
Dibenz(a,h)anthracene	0.0092	NS	NS	NS	0.025	U		0.065			0.017			0.025	U		0.013	U		0.0011	J	I	0.029	U		0.0043	UJ		0.026	U		0.0044	UJ	
Fluoranthene	150	NS	NS	NS	0.17			0.95			0.20			0.025	U		0.0076	J	I	0.010	U		0.029	U		0.0088	J	I	0.026	U		0.0074	J	I
Fluorene	24	**3.9**	NS	**3.9**	0.025	U		0.26			0.042			0.025	U		0.010			0.0026	J	I	0.029	U		0.010	U		0.026	U		0.010	U	
Indeno(1,2,3-cd)pyrene	0.092	NS	NS	NS	0.064			0.28			0.048			0.025	U		0.013	U		0.010	U		0.029	U		0.0029	UJ		0.026	U		0.0030	UJ	
Methylnaphthalene (2-)	NS	NS	NS	NS	0.025	UJ	L	0.60			0.0099	J	I	0.025	UJ	L	0.010	U		0.0014	J	I	0.029	UJ	L	0.010	U		0.026	UJ	L	0.010	U	
Naphthalene	0.62	24	NS	**12**	0.025	UJ	L	1.2			0.0095	J	I	0.025	UJ	L	0.025			0.010	U		0.029	UJ	L	0.015			0.026	UJ	L	0.0074	J	I
Phenanthrene	NS	NS	NS	NS	0.11			0.88			0.078			0.025	U		0.024			0.010	U		0.029	U		0.014			0.026	U		0.011		
Pyrene	18	NS	NS	NS	0.23			1.1			0.28			0.025	U		0.010	U		0.0029	J	I	0.029	U		0.010	U		0.026	U		0.010	U	
Total PAHs	NS	NS	NS	NS	1.23			8.825			1.2914			-			0.115			0.0254			-			0.0378			-			0.0258		
Other SVOCs																																		
Benzoic acid	15,000	NS	NS	**42**	10	UJ	L	2.0	UJ	L				10	UJ	L	2.0	UJ	L				12	UJ	L	2.0	UJ	L	10	UJ	L	2.0	UJ	L
Benzyl Alcohol	1,100	NS	NS	**8.6**	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
bis(2-Chloroethyl)ether	0.01	NS	NS	NS	0.35	UJ		0.85	UJ					0.35	UJ		0.87	UJ					0.41	UJ		0.85	UJ		0.36	UJ		0.87	UJ	
bis(2-Chloroisopropyl)ether	0.27	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
bis(2-Ethylhexyl)phthalate	4.8	32	NS	**3.0**	1.2	J		2.0	U		1.8			1.5	J		2.0	U		1.0	U		1.4	J		2.0	U		2.1	U		2.0	U	
Bromophenyl-phenylether (4-)	NS	**1.5**	NS	**1.5**	0.35	UJ		0.85	UJ					0.35	UJ		0.87	UJ					0.41	UJ		0.85	UJ		0.36	UJ		0.87	UJ	
Butylbenzylphthalate	730	**19**	NS	**19**	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Carbazole	3.4	NS	NS	NS	2.0	U		2.0	U		0.026			2.0	U		2.0	U		0.010	U		2.3	U		2.0	U		2.1	U		2.0	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Chloroaniline (4-)	15	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Chloronaphthalene (2-)	49	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Chlorophenol (2-)	3	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Dibenzofuran	1.2	20	NS	**3.7**	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Dichlorobenzene (1,2-)	37	**14**	NS	**14**	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U					2.3	UJ	L	2.0	U		2.1	UJ	L	2.0	U	
Dichlorobenzene (1,3-)	18	**71**	NS	**71**	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U					2.3	UJ	L	2.0	U		2.1	UJ	L	2.0	U	
Dichlorobenzene (1,4-)	0.5	**15**	NS	**15**	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U					2.3	UJ	L	2.0	U		2.1	UJ	L	2.0	U	
Dichlorobenzidine (3,3'-)	0.15	NS	NS	NS	0.35	UJ		0.85	UJ					0.35	UJ		0.87	UJ					0.41	UJ		0.85	UJ		0.36	UJ		0.87	UJ	
Dichlorophenol (2,4-)	11	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Diethylphthalate	2,900	220	NS	**210**	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U					2.3	UJ	L	2.0	U		2.1	UJ	L	2.0	U	
Dimethylphenol (2,4-)	73	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Dimethylphthalate	36,000	NS	NS	NS		R		2.0	U						R		2.0	U						R		2.0	U			R		2.0	U	
Di-n-butylphthalate	360	**33**	NS	35	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Dinitro-2-methylphenol (4,6-)	0.36	NS	NS	NS	10	U		2.0	U					10	U		2.0	U					12	U		2.0	U		10	U		2.0	U	
Dinitrophenol (2,4-)	7.3	NS	NS	NS	10	UJ	I	5.0	U					10	UJ	I	5.0	U					12	UJ	I	5.0	U		10	UJ	I	5.0	U	
Dinitrotoluene (2,4-)	7.3	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Dinitrotoluene (2,6-)	3.6	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Di-n-octylphthalate	150	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Hexachlorobenzene	0.042	NS	NS	NS	0.35	UJ		0.85	UJ					0.35	UJ		0.87	UJ					0.41	UJ		0.85	UJ		0.36	UJ		0.87	UJ	
Hexachlorobutadiene	0.86	NS	NS	NS	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U					2.3	UJ	L	2.0	U		2.1	UJ	L	2.0	U	
Hexachlorocyclopentadiene	22	NS	NS	NS	10	UJ	L	2.0	U					10	UJ	L	2.0	U					12	UJ	L	2.0	U		10	UJ	L	2.0	U	
Hexachloroethane	3.6	**12**	NS	**12**	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U					2.3	UJ	L	2.0	U		2.1	UJ	L	2.0	U	
Isophorone	71	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Methylphenol (2-)	180	NS	NS	**13**	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Methylphenol (4-)	18	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Nitroaniline (2-)	11	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Nitroaniline (3-)	1.1	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Nitroaniline (4-)	3.2	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Nitrobenzene	0.34	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Nitrophenol (2-)	NS	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Nitrophenol (4-)	NS	NS	NS	**300**	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Nitroso-di-n-propylamine (N-)	0.0096	NS	NS	NS	0.35	UJ		0.85	UJ					0.35	UJ		0.87	UJ					0.41	UJ		0.85	UJ		0.36	UJ		0.87	UJ	
Nitrosodiphenylamine (N-)	14	NS	NS	**210**	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Pentachlorophenol	0.56	NS	**15**	NS	5.0	U		2.0	U					5.0	U		2.0	U					5.8	U		2.0	U		5.2	U		2.0	U	
Phenol	1,100	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Trichlorobenzene (1,2,4-)	0.72	**110**	NS	**110**	2.0	UJ	L	2.0	U					2.0	UJ	L	2.0	U					2.3	UJ	L	2.0	U		2.1	UJ	L	2.0	U	
Trichlorophenol (2,4,5-)	360	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Trichlorophenol (2,4,6-)	0.36	NS	NS	NS	2.0	U		2.0	U					2.0	U		2.0	U					2.3	U		2.0	U		2.1	U		2.0	U	
Total Other SVOCs	NS	NS	NS	NS	1.2			-			1.826			1.5			-			-			1.4			-			-			-		
Total SVOCs	NS	NS	NS	NS	2.43			8.825			3.1174			1.5			0.115			0.0254			1.4			0.0378			-			0.0258		

TABLE 15
Summary of Surface Water Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in µg/l.																					
	COPC Screening Levels				SWR-3						SWR-4						SWR-5					
	Human Health	Ecological			04/05/01			08/02/01			04/05/01			08/02/01			04/05/01			08/01/01		
	EPA Region IX Tap Water PRG	GLWQI Tier II Values	USEPA Aquatic SWQCs	ORNL Tier II SCVs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																						
Acenaphthene	37	NS	NS	NS	0.026	U		0.010	U		0.026	U		0.010	U		0.025	U		0.010	U	
Acenaphthylene	NS	NS	NS	NS	0.026	U		0.010	U		0.026	U		0.010	U		0.025	U		0.010	U	
Anthracene	180	NS	NS	**0.73**	0.026	U		0.010	U		0.026	U		0.010	U		0.025	U		0.010	U	
Benzo(a)anthracene	0.092	NS	NS	**0.027**	0.026	U		0.010	U		0.026	U		0.010	U		0.025	U		0.010	U	
Benzo(a)pyrene	0.0092	**0.014**	NS	**0.014**	0.010	U		0.0029	UJ		0.010	U		0.0029	UJ		0.010	U		0.0028	UJ	
Benzo(b)fluoranthene	0.092	NS	NS	NS	0.026	U		0.0050	UJ		0.026	U		0.0050	UJ		0.025	U		0.0050	UJ	
Benzo(g,h,i)perylene	NS	NS	NS	NS	0.026	U		0.010	U		0.026	U		0.010	U		0.025	U		0.010	U	
Benzo(k)fluoranthene	0.92	NS	NS	NS	0.026	U		0.0049	UJ		0.026	U		0.0049	UJ		0.025	U		0.0048	UJ	
Chrysene	9.2	NS	NS	NS	0.026	U		0.0049	UJ		0.026	U		0.0049	UJ		0.025	U		0.0048	UJ	
Dibenz(a,h)anthracene	0.0092	NS	NS	NS	0.026	U		0.0044	UJ		0.026	U		0.0044	UJ		0.025	U		0.0043	UJ	
Fluoranthene	150	NS	NS	NS	0.026	U		0.012			0.026	U		0.0085	J	I	0.025	U		0.010	U	
Fluorene	24	**3.9**	NS	**3.9**	0.026	U		0.010	U		0.026	U		0.010	U		0.025	U		0.010	U	
Indeno(1,2,3-cd)pyrene	0.092	NS	NS	NS	0.026	U		0.0030	UJ		0.026	U		0.010	U		0.025	U		0.0029	UJ	
Methylnaphthalene (2-)	NS	NS	NS	NS	0.026	UJ	L	0.010	U		0.026	UJ	L	0.010	U		0.025	UJ	L	0.010	U	
Naphthalene	0.62	24	NS	**12**	0.026	UJ	L	0.011			0.026	UJ	L	0.0097	J	I	0.025	UJ	L	0.0089	J	I
Phenanthrene	NS	NS	NS	NS	0.026	U		0.015			0.026	U		0.011			0.025	U		0.0082	J	I
Pyrene	18	NS	NS	NS	0.026	U		0.0057	J	I	0.026	U		0.010	U		0.025	U		0.010	U	
Total PAHs	NS	NS	NS	NS	-			0.0437			-			0.0292			-			0.0171		
Other SVOCs																						
Benzoic acid	15,000	NS	NS	**42**	10	UJ	L	2.0	UJ	L	11	UJ	L	2.0	UJ	L	10	UJ	L	2.0	UJ	L
Benzyl Alcohol	1,100	NS	NS	**8.6**	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
bis(2-Chloroethyl)ether	0.01	NS	NS	NS	0.36	UJ		0.87	UJ		0.37	UJ		0.87	UJ		0.35	UJ		0.86	UJ	
bis(2-Chloroisopropyl)ether	0.27	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
bis(2-Ethylhexyl)phthalate	4.8	32	NS	**3.0**	0.36	J		2.0	U		0.77	J	H	2.0	U		2.0	U		2.0	U	
Bromophenyl-phenylether (4-)	NS	**1.5**	NS	**1.5**	0.36	UJ		0.87	UJ		0.37	UJ		0.87	UJ		0.35	UJ		0.86	UJ	
Butylbenzylphthalate	730	**19**	NS	**19**	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Carbazole	3.4	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Chloroaniline (4-)	15	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Chloronaphthalene (2-)	49	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Chlorophenol (2-)	3	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Dibenzofuran	1.2	20	NS	**3.7**	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Dichlorobenzene (1,2-)	37	**14**	NS	**14**	2.1	UJ	L	2.0	U		2.1	UJ	L	2.0	U		2.0	UJ	L	2.0	U	
Dichlorobenzene (1,3-)	18	**71**	NS	**71**	2.1	UJ	L	2.0	U		2.1	UJ	L	2.0	U		2.0	UJ	L	2.0	U	
Dichlorobenzene (1,4-)	0.5	**15**	NS	**15**	2.1	UJ	L	2.0	U		2.1	UJ	L	2.0	U		2.0	UJ	L	2.0	U	
Dichlorobenzidine (3,3'-)	0.15	NS	NS	NS	0.36	UJ		0.87	UJ		0.37	UJ		0.87	UJ		0.35	UJ		0.86	UJ	
Dichlorophenol (2,4-)	11	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Diethylphthalate	2,900	220	NS	**210**	2.1	UJ	L	2.0	U		2.1	UJ	L	2.0	U		2.0	UJ	L	2.0	U	
Dimethylphenol (2,4-)	73	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Dimethylphthalate	36,000	NS	NS	NS		R		2.0	U			R		2.0	U			R		2.0	U	
Di-n-butylphthalate	360	**33**	NS	35	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Dinitro-2-methylphenol (4,6-)	0.36	NS	NS	NS	10	U		2.0	U		11	U		2.0	U		10	U		2.0	U	
Dinitrophenol (2,4-)	7.3	NS	NS	NS	10	UJ	I	5.0	U		11	UJ	I	5.0	U		10	UJ	I	5.0	U	
Dinitrotoluene (2,4-)	7.3	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Dinitrotoluene (2,6-)	3.6	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Di-n-octylphthalate	150	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Hexachlorobenzene	0.042	NS	NS	NS	0.36	UJ		0.87	UJ		0.37	UJ		0.87	UJ		0.35	UJ		0.86	UJ	
Hexachlorobutadiene	0.86	NS	NS	NS	2.1	UJ	L	2.0	U		2.1	UJ	L	2.0	U		2.0	UJ	L	2.0	U	
Hexachlorocyclopentadiene	22	NS	NS	NS	10	UJ	L	2.0	U		11	UJ	L	2.0	U		10	UJ	L	2.0	U	
Hexachloroethane	3.6	**12**	NS	**12**	2.1	UJ	L	2.0	U		2.1	UJ	L	2.0	U		2.0	UJ	L	2.0	U	
Isophorone	71	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Methylphenol (2-)	180	NS	NS	**13**	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Methylphenol (4-)	18	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Nitroaniline (2-)	11	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Nitroaniline (3-)	1.1	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Nitroaniline (4-)	3.2	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Nitrobenzene	0.34	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Nitrophenol (2-)	NS	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Nitrophenol (4-)	NS	NS	NS	**300**	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Nitroso-di-n-propylamine (N-)	0.0096	NS	NS	NS	0.36	UJ		0.87	UJ		0.37	UJ		0.87	UJ		0.35	UJ		0.86	UJ	
Nitrosodiphenylamine (N-)	14	NS	NS	**210**	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Pentachlorophenol	0.56	NS	**15**	NS	5.2	U		2.0	U		5.3	U		2.0	U		5.0	U		2.0	U	
Phenol	1,100	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Trichlorobenzene (1,2,4-)	0.72	**110**	NS	**110**	2.1	UJ	L	2.0	U		2.1	UJ	L	2.0	U		2.0	UJ	L	2.0	U	
Trichlorophenol (2,4,5-)	360	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Trichlorophenol (2,4,6-)	0.36	NS	NS	NS	2.1	U		2.0	U		2.1	U		2.0	U		2.0	U		2.0	U	
Total Other SVOCs	NS	NS	NS	NS	0.36			-			0.77			-			-			-		
Total SVOCs	NS	NS	NS	NS	0.36			0.0437			0.77			0.0292			-			0.0171		

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. (SHA) on the dates indicated; see Table 1C for identity of sample delivery groups (SDGs).

2. For samples collected in 2001, Woods Hole Group Environmental Laboratories (WHGEL) of Raynham, Massachusetts, performed analyses for semi-volatile organic compounds (SVOCs) by United States Environmental Protection Agency (USEPA) Method 8270C-EI; and polycyclic aromatic hydrocarbons (PAHs) by USEPA Method 8270C using selective ion monitoring (SIM) (when required to achieve Project Action Levels).

For samples collected in 2006, Alpha Woods Hole Laboratories (AWHL) of Raynham, Massachusetts (formerly WHGEL), performe analyses for polycyclic aromatic hydrocarbons (PAHs) plus bis(2-ethylhexyl)phthalate and carbazole by USEPA Method 8270C using selective ion monitoring (SIM).

3. Data validation and data usability assessment were performed by SHA and New Environmental Horizons, Inc. (NEH). Results are presented in the Data Usability Report (SHA, 2002), and in Appendix C of this Report.

4. All concentrations are presented in micrograms per liter (µg/l), which are equivalent to parts per billion (ppb).

5. "COPC Screening Levels" indicates contaminants of potential concern (COPC) screening levels used to determine inclusion of an analyte in the human health or ecological risk assessments. Analyte detections that exceed the human health screening level (shaded value) are shaded. Analyte detections that exceed the lowest of the ecological screening levels (**bold** value) are in **bold**.

"EPA Region IX Tap Water PRG" indicates the values listed are from the USEPA Region IX Preliminary Remediation Goals (PRGs) Table, dated October 1, 2004. PRGs based on non-cancer effects are multiplied by 0.1 per USEPA Guidance (USEPA Region I, Risk Update Number 5, September 1999).

"GLWQI Tier II Values" indicates the values listed are from the Great Lakes Water Quality Initiative (GLWQI) Tier II methodology values, as reported in Ecotox Thresholds table (USEPA, 1998).

"USEPA Aquatic SWQCs" indicates the values listed are from the USEPA National Recommended Surface Water Quality Criteria (SWQC) (314CMR 22) (USEPA, 2006; http://www.epa.gov/waterscience/criteria/wqcriteria.html) for the protection of aquatic life. The values presented are chronic freshwater criteria.

"ORNL Tier II SCVs" indicates the values listed are Oak Ridge National Laboratory (ORNL) Tier II Secondary Chronic Values (SCVs) for Aquatic Biota (Suter & Tsao, 1996; http://www.esd.ornl.gov/programs/ecorisk/documents/tm96r2.pdf).

6. Total concentrations listed (e.g. Total PAHs) are the sum of detected concentrations of the relevant suite of compounds. "PAHs" are polycyclic aromatic hydrocarbons. "Other SVOCs" are non-PAH semi-volatile organic compounds.

7. The following qualifiers and biases were assigned during data validation by NEH. Refer to NEH's Data Usability Reports (included in the Data Usability Report [SHA, 2002] and Appendix C of this Report) for additional detail regarding qualifiers and bias.

Qualifiers:
"J" The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable fo project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"U" The compound was analyzed for, but was not detected. The associated numerical value is the sample-specific reporting limit. The value is usable for project decisions as a non-detect result at the reporting limit.
"UJ" The compound was analyzed for, but was not detected. The sample-specific quantitation (reporting) limit is estimated. The non-detect result is usable for project objectives with documentation of the bias or uncertainty in the result.
"R" Indicates data rejected during validation.

Bias:
"L" Low
"I" Indeterminate
"H" High

TABLE 16
Summary of Surface Water Data - Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in µg/l.																										
	COPC Screening Levels				SW-102									SW-103						SW-105							
	Human Health	Ecological			04/05/01			08/01/01			09/29/06			04/04/01			08/01/01			04/04/01			08/01/01			09/29/06		
	EPA Region IX Tap Water PRG	GLWQI Tier II Values	USEPA Aquatic SWQCs	ORNL Tier II SCVs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																											
Benzene	0.35	**46**	NS	130	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		2.0	U		2.0	U		0.20	U	
Ethylbenzene	130	290	NS	**7.3**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	160	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Toluene	72	130	NS	**9.8**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-)	21	**1.8**	NS	**1.8**	0.59	UJ		0.60	UJ		4.0	U		0.59	UJ		0.60	UJ		0.59	UJ		0.60	UJ		4.0	U	
Xylene (o-)	21	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylenes (total)	21	NS	NS	**13**	-			-			-			-			-			-			-			-		
Total AVOCs	NS	NS	NS	NS	-			-			-			-			-			-			-			-		
CVOCs																											
Carbon tetrachloride	0.17	240	NS	**9.8**	5.0	U		2.0	U		2.0	U		5.0	U		2.0	U		5.0	U		2.0	U		2.0	U	
Chlorobenzene	11	130	NS	**64**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	4.6	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform	0.17	NS	NS	**28**	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		2.0	U		2.0	U		0.20	U	
Chloromethane	16	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,1-)	81	**47**	NS	**47**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-)	0.12	NS	NS	**910**	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		2.0	U		2.0	U		0.20	U	
Dichloroethene (1,1-)	34	NS	NS	**25**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (cis-1,2-) †	6.1	NS	NS	**590**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-) †	12	NS	NS	**590**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	0.16	NS	NS	NS	2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		2.0	U		2.0	U		0.50	U	
Dichloropropene (cis-1,3-) ‡	0.4	NS	NS	**0.055**	2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		2.0	U		2.0	U		0.50	U	
Dichloropropene (trans-1,3-) ‡	0.4	NS	NS	**0.055**	2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		2.0	U		2.0	U		0.50	U	
Methylene chloride	4.3	NS	NS	**2,200**	5.0	U		5.0	U		2.0	U		5.0	U		5.0	U		5.0	U		5.0	U		2.0	U	
Tetrachloroethane (1,1,2,2-)	0.055	**420**	NS	610	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		2.0	U		2.0	U		0.20	U	
Tetrachloroethene	0.1	120	NS	**98**	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		2.0	U		2.0	U		0.20	U	
Trichloroethane (1,1,1-)	320	62	NS	**11**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-)	0.2	NS	NS	**1,200**	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		2.0	U		2.0	U		0.20	U	
Trichloroethene	0.028	350	NS	**47**	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		2.0	U		2.0	U		0.20	U	
Vinyl chloride	0.02	NS	NS	NS	2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		2.0	U		2.0	U		0.50	U	
Total CVOCs	NS	NS	NS	NS	-			-			-			-			-			-			-			-		
Other VOCs																											
Acetone	550	NS	NS	**1,500**	5.0	U		1.1	J		5.0	U		5.0	U		5.0	U		5.0	U		1.2	J		5.0	U	
Bromochloromethane	NS	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	0.18	NS	NS	NS	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		2.0	U		2.0	U		0.20	U	
Bromoform	8.5	**320**	NS	NS	2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		2.0	U		2.0	U		0.50	U	
Bromomethane	0.87	NS	NS	NS	2.0	UJ	L	5.0	U		0.20	UJ	I	2.0	UJ	L	5.0	U		2.0	U		5.0	U		0.20	UJ	I
Butanone (2-)	700	NS	NS	**14,000**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	100	NS	NS	**0.92**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	0.13	NS	NS	NS	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		2.0	U		2.0	U		0.20	U	
Hexanone (2-)	NS	NS	NS	**99**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	200	NS	NS	**170**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	11	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	130	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	41	NS	NS	**16**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	NS	-			1.1			-			-			-			-			1.2			-		
Total VOCs	NS	NS	NS	NS	-			1.1			-			-			-			-			1.2			-		

TABLE 16
Summary of Surface Water Data - Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	COPC Screening Levels				Concentrations in µg/l.																							
	Human Health	Ecological			SW-106						SW-107									SW-108								
					04/04/01			08/01/01			04/04/01			08/01/01			09/29/06			04/04/01			08/01/01			09/29/06		
	EPA Region IX Tap Water PRG	GLWQI Tier II Values	USEPA Aquatic SWQCs	ORNL Tier II SCVs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																												
Benzene	0.35	**46**	NS	130	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.21			2.0	U		2.0	U		0.20	U	
Ethylbenzene	130	290	NS	**7.3**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	160	NS	NS	NS	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Toluene	72	130	NS	**9.8**	2.0	U		2.0	UJ	L	2.0	U		1.2	J		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-)	21	**1.8**	NS	**1.8**	0.59	UJ		0.60	UJ	L	0.59	UJ		0.60	UJ		4.0	U		0.59	UJ		0.60	UJ		4.0	U	
Xylene (o-)	21	NS	NS	NS	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylenes (total)	21	NS	NS	**13**	-			-			-			-			-			-			-			-		
Total AVOCs	NS	NS	NS	NS	-			-			-			1.2			0.21			-			-			-		
CVOCs																												
Carbon tetrachloride	0.17	240	NS	**9.8**	5.0	U		2.0	UJ	L	5.0	U		2.0	U		2.0	U		5.0	U		2.0	U		2.0	U	
Chlorobenzene	11	130	NS	**64**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	4.6	NS	NS	NS	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform	0.17	NS	NS	**28**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		0.20	U	
Chloromethane	16	NS	NS	NS	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,1-)	81	**47**	NS	**47**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-)	0.12	NS	NS	**910**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		0.20	U	
Dichloroethene (1,1-)	34	NS	NS	**25**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (cis-1,2-) †	6.1	NS	NS	**590**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-) †	12	NS	NS	**590**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	0.16	NS	NS	NS	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		0.50	U	
Dichloropropene (cis-1,3-) ‡	0.4	NS	NS	**0.055**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		0.50	U	
Dichloropropene (trans-1,3-) ‡	0.4	NS	NS	**0.055**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		0.50	U	
Methylene chloride	4.3	NS	NS	**2,200**	5.0	U		5.0	UJ	L	5.0	U		5.0	U		2.0	U		5.0	U		5.0	U		2.0	U	
Tetrachloroethane (1,1,2,2-)	0.055	**420**	NS	610	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		0.20	U	
Tetrachloroethene	0.1	120	NS	**98**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		0.20	U	
Trichloroethane (1,1,1-)	320	62	NS	**11**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-)	0.2	NS	NS	**1,200**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		0.20	U	
Trichloroethene	0.028	350	NS	**47**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		0.20	U	
Vinyl chloride	0.02	NS	NS	NS	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		0.50	U	
Total CVOCs	NS	NS	NS	NS	-			-			-			-			-			-			-			-		
Other VOCs																												
Acetone	550	NS	NS	**1,500**	5.0	U		6.1	J	L	5.0	U		4.1	J		5.0	U		5.0	U		5.0	U		5.0	U	
Bromochloromethane	NS	NS	NS	NS	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	0.18	NS	NS	NS	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		0.20	U	
Bromoform	8.5	**320**	NS	NS	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.50	U		2.0	U		2.0	U		0.50	U	
Bromomethane	0.87	NS	NS	NS	2.0	U		5.0	UJ	L	2.0	U		5.0	U		0.20	UJ	I	2.0	U		5.0	U		0.20	UJ	I
Butanone (2-)	700	NS	NS	**14,000**	2.0	U		2.0	UJ	L	2.0	U		1.9	J		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	100	NS	NS	**0.92**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	NS	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U			R	
Dibromochloromethane	0.13	NS	NS	NS	2.0	U		2.0	UJ	L	2.0	U		2.0	U		0.20	U		2.0	U		2.0	U		0.20	U	
Hexanone (2-)	NS	NS	NS	**99**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	200	NS	NS	**170**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	11	NS	NS	NS	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	130	NS	NS	NS	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	41	NS	NS	**16**	2.0	U		2.0	UJ	L	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total Other VOCs	NS	NS	NS	NS	-			6.1			-			6.0			-			-			-			-		
Total VOCs	NS	NS	NS	NS	-			6.1			-			7.2			0.21			-			-			-		

TABLE 16
Summary of Surface Water Data - Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in µg/l.																											
	COPC Screening Levels				SWR-1						SWR-2						SWR-3						SWR-4					
	Human Health	Ecological			04/05/01			08/02/01			04/05/01			08/02/01			04/05/01			08/02/01			04/05/01			08/02/01		
	EPA Region IX Tap Water PRG	GLWQI Tier II Values	USEPA Aquatic SWQCs	ORNL Tier II SCVs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs																												
Benzene	0.35	**46**	NS	130	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Ethylbenzene	130	290	NS	**7.3**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Styrene	160	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Toluene	72	130	NS	**9.8**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylene (m,p-)	21	**1.8**	NS	**1.8**	0.59	UJ		0.60	UJ		0.59	UJ		0.60	UJ		0.59	UJ		0.60	UJ		0.59	UJ		0.60	UJ	
Xylene (o-)	21	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Xylenes (total)	21	NS	NS	**13**	-			-			-			-			-			-			-			-		
Total AVOCs	NS	NS	NS	NS	-			-			-			-			-			-			-			-		
CVOCs																												
Carbon tetrachloride	0.17	240	NS	**9.8**	5.0	U		2.0	U		5.0	U		2.0	U		5.0	U		2.0	U		5.0	U		2.0	U	
Chlorobenzene	11	130	NS	**64**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethane	4.6	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroform	0.17	NS	NS	**28**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloromethane	16	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,1-)	81	**47**	NS	**47**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethane (1,2-)	0.12	NS	NS	**910**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (1,1-)	34	NS	NS	**25**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (cis-1,2-) †	6.1	NS	NS	**590**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloroethene (trans-1,2-) †	12	NS	NS	**590**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropane (1,2-)	0.16	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropene (cis-1,3-) ‡	0.4	NS	NS	**0.055**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dichloropropene (trans-1,3-) ‡	0.4	NS	NS	**0.055**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methylene chloride	4.3	NS	NS	**2,200**	5.0	U		5.0	U		5.0	U		5.0	U		5.0	U		5.0	U		5.0	U		5.0	U	
Tetrachloroethane (1,1,2,2-)	0.055	**420**	NS	610	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Tetrachloroethene	0.1	120	NS	**98**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,1-)	320	62	NS	**11**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethane (1,1,2-)	0.2	NS	NS	**1,200**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichloroethene	0.028	350	NS	**47**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl chloride	0.02	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Total CVOCs	NS	NS	NS	NS	-			-			-			-			-			-			-			-		
Other VOCs																												
Acetone	550	NS	NS	**1,500**	5.0	U		5.0	U		5.0	U		5.0	U		5.0	U		1.1	J		5.0	U		1.4	J	
Bromochloromethane	NS	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromodichloromethane	0.18	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromoform	8.5	**320**	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Bromomethane	0.87	NS	NS	NS	2.0	UJ	L	5.0	U		2.0	UJ	L	5.0	U		2.0	UJ	L	5.0	U		2.0	UJ	L	5.0	U	
Butanone (2-)	700	NS	NS	**14,000**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Carbon disulfide	100	NS	NS	**0.92**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Dibromochloromethane	0.13	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Hexanone (2-)	NS	NS	NS	**99**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-2-pentanone (4-)	200	NS	NS	**170**	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Methyl-tert Butyl Ether	11	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Trichlorofluoromethane	130	NS	NS	NS	2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U		2.0	U	
Vinyl acetate	41	NS	NS	**16**	2.0	U		2.0	UJ	L	2.0	U		2.0	UJ	L	2.0	U		2.0	UJ	L	2.0	U		2.0	UJ	L
Total Other VOCs	NS	NS	NS	NS	-			-			-			-			-			1.1			-			1.4		
Total VOCs	NS	NS	NS	NS	-			-			-			-			-			1.1			-			1.4		

TABLE 16
Summary of Surface Water Data - Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in µg/l.									
	COPC Screening Levels				SWR-5					
	Human Health	Ecological			04/05/01			08/01/01		
	EPA Region IX Tap Water PRG	GLWQI Tier II Values	USEPA Aquatic SWQCs	ORNL Tier II SCVs	Result	Qualifier	Bias	Result	Qualifier	Bias
AVOCs										
Benzene	0.35	**46**	NS	130	2.0	U		2.0	U	
Ethylbenzene	130	290	NS	**7.3**	2.0	U		2.0	U	
Styrene	160	NS	NS	NS	2.0	U		2.0	U	
Toluene	72	130	NS	**9.8**	2.0	U		2.0	U	
Xylene (m,p-)	21	**1.8**	NS	**1.8**	0.59	UJ		0.60	UJ	
Xylene (o-)	21	NS	NS	NS	2.0	U		2.0	U	
Xylenes (total)	21	NS	NS	**13**	-			-		
Total AVOCs	NS	NS	NS	NS	-			-		
CVOCs										
Carbon tetrachloride	0.17	240	NS	**9.8**	5.0	U		2.0	U	
Chlorobenzene	11	130	NS	**64**	2.0	U		2.0	U	
Chloroethane	4.6	NS	NS	NS	2.0	U		2.0	U	
Chloroform	0.17	NS	NS	**28**	2.0	U		2.0	U	
Chloromethane	16	NS	NS	NS	2.0	U		2.0	U	
Dichloroethane (1,1-)	81	**47**	NS	**47**	2.0	U		2.0	U	
Dichloroethane (1,2-)	0.12	NS	NS	**910**	2.0	U		2.0	U	
Dichloroethene (1,1-)	34	NS	NS	**25**	2.0	U		2.0	U	
Dichloroethene (cis-1,2-) †	6.1	NS	NS	**590**	2.0	U		2.0	U	
Dichloroethene (trans-1,2-) †	12	NS	NS	**590**	2.0	U		2.0	U	
Dichloropropane (1,2-)	0.16	NS	NS	NS	2.0	U		2.0	U	
Dichloropropene (cis-1,3-) ‡	0.4	NS	NS	**0.055**	2.0	U		2.0	U	
Dichloropropene (trans-1,3-) ‡	0.4	NS	NS	**0.055**	2.0	U		2.0	U	
Methylene chloride	4.3	NS	NS	**2,200**	5.0	U		5.0	U	
Tetrachloroethane (1,1,2,2-)	0.055	**420**	NS	610	2.0	U		2.0	U	
Tetrachloroethene	0.1	120	NS	**98**	2.0	U		2.0	U	
Trichloroethane (1,1,1-)	320	62	NS	**11**	2.0	U		2.0	U	
Trichloroethane (1,1,2-)	0.2	NS	NS	**1,200**	2.0	U		2.0	U	
Trichloroethene	0.028	350	NS	**47**	2.0	U		2.0	U	
Vinyl chloride	0.02	NS	NS	NS	2.0	U		2.0	U	
Total CVOCs	NS	NS	NS	NS	-			-		
Other VOCs										
Acetone	550	NS	NS	**1,500**	5.0	U		2.4	J	
Bromochloromethane	NS	NS	NS	NS	2.0	U		2.0	U	
Bromodichloromethane	0.18	NS	NS	NS	2.0	U		2.0	U	
Bromoform	8.5	**320**	NS	NS	2.0	U		2.0	U	
Bromomethane	0.87	NS	NS	NS	2.0	U		5.0	U	
Butanone (2-)	700	NS	NS	**14,000**	2.0	U		2.0	U	
Carbon disulfide	100	NS	NS	**0.92**	2.0	U		2.0	U	
Chloroethylvinyl ether (2-)	NS	NS	NS	NS	2.0	U		2.0	U	
Dibromochloromethane	0.13	NS	NS	NS	2.0	U		2.0	U	
Hexanone (2-)	NS	NS	NS	**99**	2.0	U		2.0	U	
Methyl-2-pentanone (4-)	200	NS	NS	**170**	2.0	U		2.0	U	
Methyl-tert Butyl Ether	11	NS	NS	NS	2.0	U		2.0	U	
Trichlorofluoromethane	130	NS	NS	NS	2.0	U		2.0	U	
Vinyl acetate	41	NS	NS	**16**	2.0	U		2.0	UJ	L
Total Other VOCs	NS	NS	NS	NS	-			2.4		
Total VOCs	NS	NS	NS	NS	-			2.4		

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. (SHA) on the dates indicated; see Table 1C for identity of sample delivery groups (SDGs).

2. For samples collected in 2001, Woods Hole Group Environmental Laboratories (WHGEL) of Raynham, Massachusetts, performed analyses for volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260B.

For samples collected in 2006, Alpha Woods Hole Laboratories (AWHL) of Raynham, Massachusetts (formerly WHGEL), performed analyses for VOCs by USEPA Method 8260B.

3. Data validation and data usability assessment were performed by SHA and New Environmental Horizons, Inc. (NEH). Results are presented in the Data Usability Report (SHA, 2002) and in Appendix C of this Report.

4. All concentrations are presented in micrograms per liter (µg/l), which are equivalent to parts per billion (ppb).

5. "COPC Screening Levels" indicates contaminants of potential concern (COPC) screening levels used to determine inclusion of an analyte in the human health or ecological risk assessments. Analyte detections that exceed the human health screening level (shaded value) are shaded. Analyte detections that exceed the lowest of the ecological screening levels (**bold** value) are in **bold**.

"EPA Region IX Tap Water PRG" indicates the values listed are from the USEPA Region IX Preliminary Remediation Goals (PRGs) Table, dated December 2004. PRGs based on non-cancer effects are multiplied by 0.1 per USEPA Guidance (USEPA Region I, Risk Update Number 5, September 1999).

"GLWQI Tier II Values" indicates the values listed are from the Great Lakes Water Quality Initiative (GLWQI) Tier II methodology values, as reported in Ecotox Thresholds table (USEPA, 1998).

"USEPA Aquatic SWQCs" indicates the values listed are from the USEPA National Recommended Surface Water Quality Criteria (SWQC) (314CMR 22) (USEPA, 2006; http://www.epa.gov/waterscience/criteria/wqcriteria.html) for the protection of aquatic life. The values presented are chronic freshwater criteria.

"ORNL Tier II SCVs" indicates the values listed are Oak Ridge National Laboratory (ORNL) Tier II Secondary Chronic Values (SCVs) for Aquatic Biota (Suter & Tsao, 1996; http://www.esd.ornl.gov/programs/ecorisk/documents/tm96r2.pdf).

6. "†" indicates the SCV presented is for 1,2-dichloroethene (isomer unspecified).
"‡" indicates the PRG and SCV values presented are for 1,3-dichloropropene (isomer unspecified).

7. Total concentrations listed (e.g. Total AVOCs, CVOCs) are the sum of detected concentrations of the relevant suite of compounds. "AVOCs" are non-chlorinated aromatic volatile organic compounds. "CVOCs" are chlorinated volatile organic compounds. "Other VOCs" are non-AVOC and non-CVOC volatile organic compounds.

8. The following qualifiers and biases were assigned during data validation by NEH. Refer to NEH's Data Usability Reports (included in the Data Usability Report [SHA, 2002] and Appendix C of this Report) for additional detail regarding qualifiers and bias.

Qualifiers:
"J" The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"U" The compound was analyzed for, but was not detected. The associated numerical value is the sample-specific reporting limit. The value is usable for project decisions as a non-detect result at the reporting limit.
"UJ" The compound was analyzed for, but was not detected. The sample-specific quantitation (reporting) limit is estimated. The non-detect result is usable for project objectives with documentation of the bias or uncertainty in the result.
"R" Indicates data rejected during validation.
Bias:
"L" Low
"I" Indeterminate
"H" High

TABLE 17
Summary of Sediment Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in mg/kg (except as noted)																																												
	COPC Screening Levels								Neponset River Sediments																																				
	Human Health	Ecological							NR-1			NR-2			NR-3			NR-4			NR-5						NR-6			NR-7						NR-8					
									~0-0.3'			~0-0.2'			~0-0.2'			~0-0.5'			~0-0.2'			~0-0.5'			~0-0.3'			~0-0.1'			~0-0.5'			~0-0.2'			~0-0.5'		
									07/26/01			07/26/01			07/26/01			07/26/01			07/26/01			12/18/02			07/26/01			07/25/01			12/18/02			07/25/01			12/18/02		
	USEPA Region IX Res. Soil PRGs	1990 NOAA ER-Ls	Threshold Effects Levels (TELs)	Probable Effects Levels (PELs)	Ontario Lowest Effect Levels (LELs)	USEPA SQBs	USEPA SQCs	MADEP TECs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals (mg/kg)																																													
Aluminum	7,600	NS	NS	NS	NS	NS	NS	NS	2,090			2,800			4,220			2,150			1,700			3,500	J	H	2,590			2,200			2,800	J	H	2,700			3,700	J	H
Antimony	3.1	**2**	NS	NS	NS	NS	NS	NS	0.72	UJ	L	0.59	UJ	L	0.58	UJ	L	0.65	UJ	L	0.73	UJ	L	0.18	U		0.72	UJ	L	0.57	UJ	L	0.19	U		0.63	UJ	L	0.20		
Arsenic	0.39	33	**5.9**	17	6	NS	NS	9.79	0.93			0.71			0.78			1.2			1.3			5.9			1.1			1.4			2.1			1.6			2.9		
Barium	540	NS	NS	NS	NS	NS	NS	NS	18.6			14.1			24.2			11.3			11.7			19.0			20.0			27.8			30.0			30.8			26.0		
Beryllium	15	NS	NS	NS	NS	NS	NS	NS	0.33	U		0.27	U		0.24	U		0.26	U		0.25	U		0.24			0.30	U		0.29	U		0.13			0.29	U		0.19		
Cadmium	3.7	5	**0.596**	3.53	0.6	NS	NS	0.99	0.38			0.12			0.16			0.13			0.18			**1.3**	J	L	0.31			0.42			0.23	J	L	0.21			0.22	J	L
Calcium	NS	NS	NS	NS	NS	NS	NS	NS	680			863			1,140			724			548			1,000	JB	I	820			679			1,000	JB	I	960			1,400	JB	I
Chromium †	22	80	37.3	90	**26**	NS	NS	43.4	4.8	J	H	5.0	J	H	5.9	J	H	5.5	J	H	3.1	J	H	8.6			4.6	J	H	5.8	J	H	6.6			5.1	J	H	6.9		
Cobalt	140	NS	NS	NS	NS	NS	NS	NS	2.5			2.2			2.6			2.4			2.4			2.4	JB	I	3.0			3.6			2.7	JB	I	2.9			3.3	JB	I
Copper	310	70	35.7	197	**16**	NS	NS	31.6	6.4			4.9			9.4			4.1			3.8			15.0			6.6			7.3			13.0			**34.4**			**27.0**		
Iron	2,300	NS	NS	NS	**21,200**	NS	NS	NS	5,320			5,700			19,500			6,120			4,130			12,000			7,310			6,120			8,800			**22,200**			13,000		
Lead	400	35	35	91.3	**31**	NS	NS	35.8	17.4			8.8			11.3			10.2			12.0			**64.0**	J	I	13.5			23.9			**41.0**	J	I	**63.0**			**84.0**	J	I
Magnesium	NS	NS	NS	NS	NS	NS	NS	NS	1,030			1,630			2,190			1,290			900			1,700	B	H	1,320			1,150			1,400	B	H	1,300			2,000	B	H
Manganese	180	NS	NS	NS	**460**	NS	NS	NS	170			257			**586**			103			286			140	J	L	**502**			**692**			**700**	J	L	**680**			**590**	J	L
Mercury	2.3	**0.15**	0.174	0.486	0.2	NS	NS	0.18	0.031	U		0.032	U		0.026	U		0.028	U		0.030	U		0.040			0.031	U		0.032	U		0.0067			0.030	U		0.0078		
Nickel	160	30	18	36	**16**	NS	NS	22.7	3.6	UJ	L	3.0	J	L	5.1	J	L	3.2	UJ	L	3.7	UJ	L	3.8			3.6	UJ	L	3.1	J	L	4.9			5.2	J	L	4.7		
Potassium	NS	NS	NS	NS	NS	NS	NS	NS	114			135			156			168			134			150	B	H	188			152			160	B	H	172			230	B	H
Selenium	39	NS	NS	NS	NS	NS	NS	NS	0.11	UJ	I	0.087	UJ	I	0.079	UJ	I	0.085	UJ	I	0.080	UJ	I	0.31			0.097	UJ	I	0.093	UJ	I	0.13			0.094	UJ	I	0.11		
Silver	39	**1**	NS	NS	NS	NS	NS	NS	0.43	U		0.35	U		0.35	U		0.39	U		0.44	U		0.18	U		0.43	U		0.34	U		0.19	U		0.38	U		0.19	U	
Sodium	NS	NS	NS	NS	NS	NS	NS	NS	54.2			53.0			55.1			41.7			36.6	U		76.0	B	H	73.0			52.7			65.0	B	H	44.2			68.0	B	H
Thallium ‡	0.52	NS	NS	NS	NS	NS	NS	NS	0.049	UJ	I	0.040	UJ	I	0.036	UJ	I	0.039	UJ	I	0.037	UJ	I	0.092	U		0.045	UJ	I	0.043	UJ	I	0.080	U		0.043	UJ	I	0.084	U	
Vanadium	7.8	NS	NS	NS	NS	NS	NS	NS	8.9	J	L	9.3	J	L	18.3	J	L	8.9	J	L	6.8	J	L	17.0			10.3	J	L	8.9	J	L	12.0			13.1	J	L	17.0		
Zinc	2,300	**120**	123	315	**120**	NS	NS	121	39.4			28.1	B		44.7			22.8	B		28.9			72.0			33.5			37.2			55.0	B	H	99.9			91.0		
Cyanide (weak acid dissociable) $	1.1	NS	NS	NS	NS	NS	NS	NS	0.59	UJ	L	0.58	UJ	L	0.47	UJ	L	0.47	UJ	L	0.57	UJ	L				0.44	UJ	L	0.50	UJ	L				0.57	UJ	L			
Ammonia as Nitrogen	NS	NS	NS	NS	NS	NS	NS	NS																									20.0						10.0		
AVS/SEM (µmol/g)																																													
Cadmium - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.0054	U		0.0056	U		0.0026	U		0.0025	U		0.0026	U					0.0026	U		0.0024	U					0.0028	U				
Copper - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.036			0.038			0.014			0.052			0.036						0.048			0.059						0.29					
Lead - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.067			0.091			0.038			0.053			0.041						0.073			0.10						0.31					
Nickel - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.10	U		0.11	U		0.049	U		0.048	U		0.050	U					0.050	U		0.046	U					0.053	U				
Zinc - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.29			0.33			0.092			0.29			0.17						0.30			0.25						0.30					
SEM - AVS	NS	NS	NS	NS	NS	NS	NS	NS	0.14	J	I	0.46	J	H	0.14	J	H	-0.60	J	H	0.24	J	H				0.33	J	H	0.41	J	H				0.90	J	H			
Sulfide, AVS	NS	NS	NS	NS	NS	NS	NS	NS	0.25	J	I	0.20	UJ	L	0.090	UJ	L	1.0	J	L	0.090	UJ	L				0.095	J	L	0.084	UJ	L				0.097	UJ	L			
SEM/AVS Ratio (unitless)	NS	NS	NS	NS	NS	NS	NS	NS	1.5	J	I	2.4	J	H	1.6	J	H	0.40	J	H	2.7	J	H				4.5	J	H	4.9	J	H				9.4	J	H			

TABLE 17
Summary of Sediment Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in mg/kg (except as noted)																																												
	COPC Screening Levels								Neponset River (Upstream of the Site) Reference Sediments																			Lewis Pond Sediments																	
	Human Health	Ecological							SedRN-1			SedRN-2			SedRN-3			SedRN-4						SedRN-5			LP-01						LP-02			LP-03			LP-04			LP-05		
									~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.3'			~0-0.4'			~0-0.5'			~0-0.5'		
									05/24/02			05/24/02			05/24/02			05/24/02			12/18/02			05/24/02			07/31/01			12/18/02			07/31/01			07/31/01			07/31/01			07/30/01		
	USEPA Region IX Res. Soil PRGs	1990 NOAA ER-Ls	Threshold Effects Levels (TELs)	Probable Effects Levels (PELs)	Ontario Lowest Effect Levels (LELs)	USEPA SQBs	USEPA SQCs	MADEP TECs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals (mg/kg)																																													
Aluminum	7,600	NS	NS	NS	NS	NS	NS	NS	3,500	J	I	2,100	J	I	2,300	J	I	2,500	J	I	2,900	J	H	2,700	J	I	5,650			4,500	J	H	9,830			8,010			6,520			9,750		
Antimony	3.1	**2**	NS	NS	NS	NS	NS	NS	0.37	UJ	L	0.37	UJ	L	0.33	UJ	L	0.40	UJ	L	0.16	U		0.34	UJ	L	1.4	J	L	**13.0**			1.6	J	L	1.2	UJ	L	1.3	UJ	L	1.4	J	L
Arsenic	0.39	33	**5.9**	17	6	NS	NS	9.79	4.2			0.82			1.1			0.49	B	H	0.65			1.1			4.9			3.2			**28.2**			**7.2**			4.8			**6.6**		
Barium	540	NS	NS	NS	NS	NS	NS	NS	100			18.0			24.0			10.0			19.0			14.0			93.2			43.0			104			94.4			122			115		
Beryllium	15	NS	NS	NS	NS	NS	NS	NS	0.24			0.10			0.098			0.089			0.13			0.14			0.50	U		0.25			0.89			0.65			0.54	U		0.78		
Cadmium	3.7	5	**0.596**	3.53	0.6	NS	NS	0.99	**1.0**			0.16			0.19			0.14			0.30	J	L	0.18			**2.2**			**0.64**	J	L	**5.3**			**3.6**			**4.6**			**6.5**		
Calcium	NS	NS	NS	NS	NS	NS	NS	NS	1,300	J	I	670	BJ	I	680	BJ	I	690	BJ	I	920	JB	I	600	BJ	I	2,830	J	I	1,400	JB	I	3,400	J	I	2,490	J	I	2,000	J	I	2,780	J	I
Chromium †	22	80	37.3	90	**26**	NS	NS	43.4	6.0			4.0			5.3			9.9			6.1			7.2			**64.9**			**220**			**57.3**			**45.2**			**35.2**			**99.4**		
Cobalt	140	NS	NS	NS	NS	NS	NS	NS	5.1	J	I	2.2	J	I	2.7	J	I	2.6	J	I	3.7	JB	I	2.9	J	I	8.5			5.6	J	L	9.3			4.7			10.0			8.7		
Copper	310	70	35.7	197	**16**	NS	NS	31.6	10.0			4.8			4.1			3.6			3.4			6.6			**69.6**			**90.0**			**95.3**			**82.1**			**81.4**			**136**		
Iron	2,300	NS	NS	NS	**21,200**	NS	NS	NS	14,000	J	I	5,200			5,900			4,400			7,600			6,800			15,300			9,200			14,500			10,600			15,300			13,100		
Lead	400	35	35	91.3	**31**	NS	NS	35.8	17.0			7.2			11.0			9.0			7.4	J	I	13.0			**817**			**240**	J	I	**623**			**615**			**487**			**1,260**		
Magnesium	NS	NS	NS	NS	NS	NS	NS	NS	1,900	J	I	1,100	J	I	1,200	J	I	1,500	J	I	1,500	B	H	1,600	J	I	6,620			1,800	B	H	3,190			3,040			3,480			12,400		
Manganese	180	NS	NS	NS	**460**	NS	NS	NS	**1,900**	J	I	**620**	J	I	**850**	J	I	140	J	I	450	J	L	260	J	I	**928**	J	I	280	J	L	**539**			241			332			208		
Mercury	2.3	**0.15**	0.174	0.486	0.2	NS	NS	0.18	0.0096			0.0061	U		0.0085			0.0076			0.0069			0.0097			**0.32**	J	H	**0.17**			**0.54**	J	H	**0.47**	J	H	**0.36**	J	H	**0.67**	J	H
Nickel	160	30	18	36	**16**	NS	NS	22.7	6.7			3.1			3.5			6.1			2.6			3.9			**44.0**			8.6			**26.7**			**22.0**			**22.9**			**57.9**		
Potassium	NS	NS	NS	NS	NS	NS	NS	NS	130	B	H	73.0	BJ	H	95.0	BJ	H	71.0	BJ	H	120	B	H	130	B	H	392			200	B	H	461			282			358			360		
Selenium	39	NS	NS	NS	NS	NS	NS	NS	0.18	U		0.19	U		0.17	U		0.20	U		0.12			0.26			0.56	J	L	0.51			1.3	J	L	0.86	J	L	0.73	J	L	1.3	J	L
Silver	39	**1**	NS	NS	NS	NS	NS	NS	0.037	U		0.037	U		0.033	U		0.040	U		0.16	U		0.034	U		0.81	U		0.20	U		**1.9**			0.74	U		0.79	U		0.71		
Sodium	NS	NS	NS	NS	NS	NS	NS	NS	49.0	B	H	42.0	B	H	39.0	B	H	36.0	B	H	62.0	B	H	42.0	B	H	394			190	B	H	260			196			200			365		
Thallium ‡	0.52	NS	NS	NS	NS	NS	NS	NS	0.18	U		0.19	U		0.17	U		0.20	U		0.084	U		0.16	U		0.074	UJ	I	0.099	U		0.14	J	I	0.084	J	I	0.089	J	I	0.13	J	I
Vanadium	7.8	NS	NS	NS	NS	NS	NS	NS	13.0			7.8			8.8			8.4			18.0			9.5			29.3	J	H	18.0			84.6	J	H	55.6	J	H	35.8	J	H	49.8	J	H
Zinc	2,300	**120**	123	315	**120**	NS	NS	121	87.0			23.0			24.0			20.0			34.0	B	H	27.0			**271**	J	H	**160**			**206**	J	H	**164**	J	H	**348**	J	H	**246**	J	H
Cyanide (weak acid dissociable) $	1.1	NS	NS	NS	NS	NS	NS	NS	0.093	U		0.092	U		0.10	U		0.10	U					0.097	U		0.81	UJ	L				0.89	UJ	L	0.91	UJ	L	0.95	UJ	L	1.1	UJ	L
Ammonia as Nitrogen	NS	NS	NS	NS	NS	NS	NS	NS													10.0									31.0														
AVS/SEM (µmol/g)																																													
Cadmium - SEM	NS	NS	NS	NS	NS	NS	NS	NS																			0.010	U					0.024			0.033			0.030			0.045	J	I
Copper - SEM	NS	NS	NS	NS	NS	NS	NS	NS																			0.25						0.90			0.94			0.28			1.4	J	I
Lead - SEM	NS	NS	NS	NS	NS	NS	NS	NS																			0.56	J	I				2.1			2.6			1.7			3.7	J	I
Nickel - SEM	NS	NS	NS	NS	NS	NS	NS	NS																			0.19	U					0.22			0.32			0.22	U		0.40	J	I
Zinc - SEM	NS	NS	NS	NS	NS	NS	NS	NS																			1.3	J	I				2.0	J	L	2.8	J	L	4.0	J	L	3.4	J	L
SEM - AVS	NS	NS	NS	NS	NS	NS	NS	NS																			-0.38	J	I				5.2	J	I	4.6	J	I	-16.0	J	I	8.2	J	I
Sulfide, AVS	NS	NS	NS	NS	NS	NS	NS	NS																			2.5	J	I				0.33	UJ	I	2.2	J	I	22.0	J	I	0.74	J	I
SEM/AVS Ratio (unitless)	NS	NS	NS	NS	NS	NS	NS	NS																			0.85	J	I				16.0	J	I	3.1	J	I	0.28	J	I	12.0	J	I

TABLE 17
Summary of Sediment Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in mg/kg (except as noted)																																									
	COPC Screening Levels								Lewis Pond Sediments (cont.)																						Lower Pond (Norwood, MA) Reference Sediments												
	Human Health	Ecological							LP-06						LP-07			LP-08			LP-09						LP-10			SedRNwd-01			SedRNwd-02			SedRNwd-03			SedRNwd-04			SedRNwd-05		
									~0-0.5'						~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'		
									07/30/01			12/18/02			07/30/01			07/30/01			07/30/01			12/18/02			07/30/01			12/17/02			12/17/02			12/17/02			12/17/02			12/17/02		
	USEPA Region IX Res. Soil PRGs	1990 NOAA ER-Ls	Threshold Effects Levels (TELs)	Probable Effects Levels (PELs)	Ontario Lowest Effect Levels (LELs)	USEPA SQBs	USEPA SQCs	MADEP TECs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals (mg/kg)																																										
Aluminum	7,600	NS	NS	NS	NS	NS	NS	NS	8,780			11,000	J	H	5,070			8,420			5,310			6,800	J	H	8,840			7,000	J	I	3,500			5,400			13,000			3,600		
Antimony	3.1	**2**	NS	NS	NS	NS	NS	NS	1.2	UJ	L	**3.5**			1.6	J	L	1.3	UJ	L	1.1	UJ	L	1.0			1.4	UJ	L	0.58	J	L	0.25	J	L	0.54	J	L	1.1	J	L	0.46	J	L
Arsenic	0.39	33	**5.9**	17	6	NS	NS	9.79	5.3			**22.0**			3.9			5.6			3.5			4.7			**6.8**			**8.8**	J	I	1.8			5.1			**14.0**			2.3		
Barium	540	NS	NS	NS	NS	NS	NS	NS	127			26.0			69.0			99.0			57.8			88.0			99.5			140	J	I	35.0			91.0			250			51.0		
Beryllium	15	NS	NS	NS	NS	NS	NS	NS	0.62			0.38			0.41	U		0.55			0.42	U		0.49			0.66			0.63	J	I	0.19			0.42			1.2			0.42		
Cadmium	3.7	5	**0.596**	3.53	0.6	NS	NS	0.99	**3.7**			**0.88**	J	L	**2.7**			**4.9**			**2.1**			**3.0**	J	L	**8.0**			**2.0**	J	I	0.19	J	L	**2.3**	J	L	**4.6**	J	L	0.25	J	L
Calcium	NS	NS	NS	NS	NS	NS	NS	NS	2,140	J	I	2,200	JB	I	2,210	J	I	3,170	J	I	6,570	J	I	3,000	JB	I	3,910	J	I	2,400	J	I	1,200	J	L	2,900	J	L	6,000	J	L	1,200	J	L
Chromium †	22	80	37.3	90	**26**	NS	NS	43.4	**69.9**			**410**			**58.3**			**56.2**			**43.4**			**59.0**			**60.9**			23.0	J	I	14.0	J	I	23.0	J	I	**38.0**	J	I	11.0	J	I
Cobalt	140	NS	NS	NS	NS	NS	NS	NS	8.1			25.0	J	L	7.0			10.7			6.8			11.0	J	L	12.8			13.0	J	I	4.1			7.0			22.0			4.9		
Copper	310	70	35.7	197	**16**	NS	NS	31.6	**104**			**180**			**59.7**			**91.7**			**49.6**			**68.0**			**113**			**54.0**	J	I	16.0	J	L	**73.0**	J	L	**110**	J	L	**17.0**	J	L
Iron	2,300	NS	NS	NS	**21,200**	NS	NS	NS	19,700			18,000			11,800			16,700			11,100			17,000			16,800			16,000			9,000			10,000			**25,000**			16,000		
Lead	400	35	35	91.3	**31**	NS	NS	35.8	**784**			**7,600**	J	I	**425**			**565**			**276**			**300**	J	I	**573**			**700**	J	I	**60.0**	J	L	**240**	J	L	**840**	J	L	**57.0**	J	L
Magnesium	NS	NS	NS	NS	NS	NS	NS	NS	9,180			79,000	J	L	4,010			6,230			3,580			3,800			5,460			2,500	J	I	2,200	J	I	2,000	J	I	3,400	J	I	1,600	J	I
Manganese	180	NS	NS	NS	**460**	NS	NS	NS	313			210	J	L	365			**1,010**			**636**			**520**	J	L	**915**			**1,100**	J	I	210	J	L	290	J	L	**1,400**	J	L	**610**	J	L
Mercury	2.3	**0.15**	0.174	0.486	0.2	NS	NS	0.18	**0.51**	J	H	**0.90**			**0.25**	J	H	**0.36**	J	H	**0.20**	J	H	**0.26**			**0.39**	J	H	**0.66**	J	I	0.048	J	I	**0.26**	J	I	**1.0**	J	I	0.071	J	I
Nickel	160	30	18	36	**16**	NS	NS	22.7	**42.4**			**510**			**23.5**			**36.6**			**20.6**			**23.0**			**36.3**			16.0	J	I	9.5	J	I	12.0	J	I	**30.0**	J	I	7.0	J	I
Potassium	NS	NS	NS	NS	NS	NS	NS	NS	342			200	B	H	320			538			306			470	B	H	667			400			230			370			760			310		
Selenium	39	NS	NS	NS	NS	NS	NS	NS	0.87	J	L	1.1			0.46	J	L	0.84	J	L	0.44	J	L	0.93			0.96	J	L	0.94	J	I	0.14			0.63			2.1			0.14		
Silver	39	**1**	NS	NS	NS	NS	NS	NS	0.72	U		0.35	U		0.63	U		0.79	U		0.66	U		0.31			0.83	U		0.34			0.19	U		0.23	U		0.49			0.18	U	
Sodium	NS	NS	NS	NS	NS	NS	NS	NS	206			660	B	H	216			212			217			340	B	H	283			210	J	I	65.0			230			820			92.0		
Thallium ‡	0.52	NS	NS	NS	NS	NS	NS	NS	0.11	J	I	0.17	U		0.062	UJ	I	0.099	J	I	0.064	UJ	I	0.15	U		0.13	J	I	0.19			0.094	U		0.15	U		0.27			0.075	U	
Vanadium	7.8	NS	NS	NS	NS	NS	NS	NS	43.4	J	H	26.0			25.1	J	H	37.6	J	H	22.2	J	H	29.0			41.5	J	H	47.0	J	I	15.0			27.0			82.0			21.0		
Zinc	2,300	**120**	123	315	**120**	NS	NS	121	**210**	J	H	**390**			**235**	J	H	**362**	J	H	**208**	J	H	**320**			**477**	J	H	**250**	J	I	59.0	J	L	**190**	J	L	**540**	J	L	93.0	J	L
Cyanide (weak acid dissociable) $	1.1	NS	NS	NS	NS	NS	NS	NS	1.1	UJ	L				0.80	UJ	L	0.74	UJ	L	0.66	UJ	L				1.1	UJ	L	0.38	UJ	I	0.23	UJ	L	0.70	UJ	I	1.4	UJ	I	0.37	UJ	L
Ammonia as Nitrogen	NS	NS	NS	NS	NS	NS	NS	NS																						38.0	J	I												
AVS/SEM (µmol/g)																																										
Cadmium - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.046	J	I				0.024			0.022			0.010	U					0.039	J	I															
Copper - SEM	NS	NS	NS	NS	NS	NS	NS	NS	1.2	J	I				0.28			0.29			0.22						0.068	J	I															
Lead - SEM	NS	NS	NS	NS	NS	NS	NS	NS	3.4	J	I				1.5			1.6			0.74						1.6	J	I															
Nickel - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.41	J	I				0.24			0.24			0.20	U					0.32	UJ	I															
Zinc - SEM	NS	NS	NS	NS	NS	NS	NS	NS	4.5	J	L				3.1	J	L	3.1	J	L	2.0	J	L				5.3	J	L															
SEM - AVS	NS	NS	NS	NS	NS	NS	NS	NS	9.0	J	I				-1.3	J	I	-4.5	J	I	-3.5	J	I				-28.0	J	I															
Sulfide, AVS	NS	NS	NS	NS	NS	NS	NS	NS	0.50	J	I				6.3	J	I	9.7	J	I	6.6	J	I				35.0	J	I															
SEM/AVS Ratio (unitless)	NS	NS	NS	NS	NS	NS	NS	NS	19.0	J	I				0.80	J	I	0.54	J	I	0.46	J	I				0.20	J	I															

TABLE 17
Summary of Sediment Data - Inorganic Parameters
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Phases 1B-4 / 1B-5 Investigations
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Analyte	COPC Screening Levels								Lower Pond (Norwood, MA) Reference Sediments (cont.)															Floodplain Sediments																				
	Human Health	Ecological							SedRNwd-06			SedRNwd-07			SedRNwd-08			SedRNwd-09			SedRNwd-10			FP-01			FP-02			FP-03			FP-04			FP-05								
									~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-1'			~0-1'			~0-1'			~0-1'			~0-1'			~0-1'			~1-3'		
									12/17/02			12/17/02			12/17/02			12/17/02			12/17/02			10/10/01			10/10/01			10/10/01			10/10/01			10/10/01			08/05/03			08/05/03		
	USEPA Region IX Res. Soil PRGs	1990 NOAA ER-Ls	Threshold Effects Levels (TELs)	Probable Effects Levels (PELs)	Ontario Lowest Effect Levels (LELs)	USEPA SQBs	USEPA SQCs	MADEP TECs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals (mg/kg)																																													
Aluminum	7,600	NS	NS	NS	NS	NS	NS	NS	8,700			14,000			14,000			23,000			15,000			4,370			6,820			7,100			10,200	J	H	5,480	J	H	6,700			4,300		
Antimony	3.1	**2**	NS	NS	NS	NS	NS	NS	0.68	J	L	0.70	J	L	0.76	J	L	0.70	J	L	0.86	J	L	0.80	UJ	L	0.79	UJ	L	0.88	UJ	L	0.88	UJ	L	0.94	UJ	L	1.1	J	L	0.42	UJ	L
Arsenic	0.39	33	**5.9**	17	6	NS	NS	9.79	**9.3**			**14.0**			**16.0**			**8.5**			**17.0**			4.9			**8.9**			3.6			**6.8**	J	I	**10.5**	J	I	3.6			1.2		
Barium	540	NS	NS	NS	NS	NS	NS	NS	150			220			180			170			210			37.9	J	I	49.5			34.6			24.3			113			120			19.0		
Beryllium	15	NS	NS	NS	NS	NS	NS	NS	0.65			1.1			0.95			0.80			1.0			0.32	U		0.37			0.34	U		0.34	U		0.37			0.42			0.17		
Cadmium	3.7	5	**0.596**	3.53	0.6	NS	NS	0.99	**1.8**	J	L	**4.1**	J	L	**2.6**	J	L	**2.7**	J	L	**3.2**	J	L	0.33			0.36			0.24			0.26			**1.1**			**1.5**			0.13		
Calcium	NS	NS	NS	NS	NS	NS	NS	NS	2,500	J	L	4,300	J	L	4,400	J	L	3,600	J	L	3,900	J	L	1,460	J	I	1,860			1,220			454			1,280								
Chromium †	22	80	37.3	90	**26**	NS	NS	43.4	**29.0**	J	I	**39.0**	J	I	**33.0**	J	I	**39.0**	J	I	**38.0**	J	I	10.9			18.4			12.0			18.5			26.0			21.0			9.3		
Cobalt	140	NS	NS	NS	NS	NS	NS	NS	12.0			14.0			17.0			13.0			18.0			4.1			3.3			3.4			3.2			4.3			5.5			1.2		
Copper	310	70	35.7	197	**16**	NS	NS	31.6	**68.0**	J	L	**99.0**	J	L	**90.0**	J	L	**100**	J	L	**84.0**	J	L	**51.6**			**39.1**			**117**			14.1			**56.5**			**49.0**			6.3		
Iron	2,300	NS	NS	NS	**21,200**	NS	NS	NS	18,000			**29,000**			**25,000**			**38,000**			**25,000**			19,300	J	I	12,800			**46,800**			9,070			10,300			13,000			4,500		
Lead	400	35	35	91.3	**31**	NS	NS	35.8	**540**	J	L	**770**	J	L	**630**	J	L	**650**	J	L	**720**	J	L	**256**	J	L	**152**	J	L	**52.2**	J	L	**90.5**	J	H	**657**	J	H	**480**			**54.0**		
Magnesium	NS	NS	NS	NS	NS	NS	NS	NS	2,700	J	I	3,500	J	I	3,700	J	I	2,800	J	I	3,900	J	I	1,810			7,780			1,440			1,240			2,430								
Manganese	180	NS	NS	NS	**460**	NS	NS	NS	**860**	J	L	**880**	J	L	**810**	J	L	**1,000**	J	L	**1,200**	J	L	**657**			391			347			143			275			430	J	L	53.0	J	L
Mercury	2.3	**0.15**	0.174	0.486	0.2	NS	NS	0.18	**0.87**	J	I	**1.2**	J	I	**1.2**	J	I	**0.75**	J	I	**1.9**	J	I	**0.21**			**0.21**			0.11			**0.35**			**0.58**			**0.30**			0.043		
Nickel	160	30	18	36	**16**	NS	NS	22.7	**18.0**	J	I	**27.0**	J	I	**24.0**	J	I	**25.0**	J	I	**26.0**	J	I	7.2			**30.8**			**165**			5.1			14.1			13.0			2.8		
Potassium	NS	NS	NS	NS	NS	NS	NS	NS	470			710			700			560			720			228	J	I	213			340			114			166								
Selenium	39	NS	NS	NS	NS	NS	NS	NS	0.95			1.6			1.7			1.6			1.7			0.17	J	I	0.15	J	I	0.11	UJ	I	0.59			0.83			0.66			0.41		
Silver	39	**1**	NS	NS	NS	NS	NS	NS	0.26			0.45			0.41			0.36			0.43			0.48	U		0.48	U		0.53	U		0.53	U		0.57	U		0.46	U		0.42	U	
Sodium	NS	NS	NS	NS	NS	NS	NS	NS	180			770			390			340			330			68.6			51.3			45.7			75.8			137								
Thallium ‡	0.52	NS	NS	NS	NS	NS	NS	NS	0.13	U		0.26			0.20			0.16	U		0.23			0.066	J	I	0.070	J	I	0.071	J	I	0.098	J	I	0.10	J	I	0.47	U		0.34	U	
Vanadium	7.8	NS	NS	NS	NS	NS	NS	NS	49.0			77.0			82.0			53.0			79.0			27.6	J	H	36.5	J	H	33.6	J	H	28.3	J	H	35.9	J	H	24.0			10.0		
Zinc	2,300	**120**	123	315	**120**	NS	NS	121	**280**	J	L	**550**	J	L	**370**	J	L	**380**	J	L	**400**	J	L	70.0			98.7			50.3			47.9			**290**			**220**			34.0		
Cyanide (weak acid dissociable) $	1.1	NS	NS	NS	NS	NS	NS	NS	0.42	UJ	L	0.50	UJ	I	0.22	UJ	L	0.63	UJ	I	0.47	UJ	I	0.25	UJ	L	0.23	UJ	L	0.27	UJ	L	0.37	UJ	L	0.42	UJ	L						
Ammonia as Nitrogen	NS	NS	NS	NS	NS	NS	NS	NS																																					
AVS/SEM (µmol/g)																																													
Cadmium - SEM	NS	NS	NS	NS	NS	NS	NS	NS																0.0022	U		0.0030			0.0024	U		0.0032	U		0.0054								
Copper - SEM	NS	NS	NS	NS	NS	NS	NS	NS																1.0			0.32			1.9			0.19			0.49								
Lead - SEM	NS	NS	NS	NS	NS	NS	NS	NS																0.91	J	H	0.54	J	H	0.15	J	H	0.37	J	H	1.7	J	H						
Nickel - SEM	NS	NS	NS	NS	NS	NS	NS	NS																0.042	U		0.050	U		0.11			0.061	U		0.078	U							
Zinc - SEM	NS	NS	NS	NS	NS	NS	NS	NS																0.19			0.58			0.24			0.38			1.8								
SEM - AVS	NS	NS	NS	NS	NS	NS	NS	NS																2.11	J	H	1.44	J	H	2.38	J	H	0.93	J	H	4.01	J	H						
Sulfide, AVS	NS	NS	NS	NS	NS	NS	NS	NS																0.076	UJ	L	0.091	UJ	L	0.085	UJ	L	0.11	UJ	L	0.14	UJ	L						
SEM/AVS Ratio (unitless)	NS	NS	NS	NS	NS	NS	NS	NS																																					

Concentrations in mg/kg (except as noted)

TABLE 17
Summary of Sediment Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in mg/kg (except as noted)																																												
	COPC Screening Levels								Floodplain Sediments (cont.)																																				
	Human Health	Ecological								FP-06									FP-08			FP-09									FP-09A						FP-09B						FP-09C					
										~0-1'			~0-1'			~1-3'			~0-1'			~0-1'			~0-1'			~1-3'			~0-1'			~1-3'			~0-1'			~1-3'			~0-1'			~1-3'		
										10/10/01			08/05/03			08/05/03			10/10/01			10/10/01			08/05/03			08/05/03			10/13/06			10/13/06			10/13/06			10/13/06			10/13/06			10/13/06		
	USEPA Region IX Res. Soil PRGs	1990 NOAA ER-Ls	Threshold Effects Levels (TELs)	Probable Effects Levels (PELs)	Ontario Lowest Effect Levels (LELs)	USEPA SQBs	USEPA SQCs	MADEP TECs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals (mg/kg)																																													
Aluminum	7,600	NS	NS	NS	NS	NS	NS	NS	6,500			8,100			6,500			10,400	J	H	6,680	J	H	8,200			11,000																				
Antimony	3.1	**2**	NS	NS	NS	NS	NS	NS	0.93	UJ	L	0.37	UJ	L	0.37	UJ	L	0.85	UJ	L	**6.7**	J	L	**2.4**	J	L	0.75	J	L																	
Arsenic	0.39	33	**5.9**	17	6	NS	NS	9.79	4.3			4.5			1.6			5.7	J	I	**28.3**	J	I	**7.4**			1.4			3.5			0.98			5.5			1.6			1.4			1		
Barium	540	NS	NS	NS	NS	NS	NS	NS	116			81.0			31.0			24.1			156			84.0			23.0																				
Beryllium	15	NS	NS	NS	NS	NS	NS	NS	0.36	U		0.34			0.27			0.37	U		0.42			0.51			0.29																				
Cadmium	3.7	5	**0.596**	3.53	0.6	NS	NS	0.99	**0.66**			0.31			0.15			0.15			**2.8**			**2.2**			0.16																				
Calcium	NS	NS	NS	NS	NS	NS	NS	NS	7,240									682			1,460																										
Chromium †	22	80	37.3	90	**26**	NS	NS	43.4	21.8			23.0			14.0			25.3			**96.8**			**38.0**			**35.0**																				
Cobalt	140	NS	NS	NS	NS	NS	NS	NS	3.4			3.3			4.2			2.0			6.0			2.8			2.6																				
Copper	310	70	35.7	197	**16**	NS	NS	31.6	**21.8**			**22.0**			**18.0**			16.0			**163**			**76.0**			15.0																				
Iron	2,300	NS	NS	NS	**21,200**	NS	NS	NS	9,180			11,000			9,100			10,200			**35,700**			8,800			6,200																				
Lead	400	35	35	91.3	**31**	NS	NS	35.8	**474**	J	L	**200**			**61.0**			**77.2**	J	H	**730**	J	H	**450**			**40.0**			**73**			8.5			**55**			14			21			8.3		
Magnesium	NS	NS	NS	NS	NS	NS	NS	NS	2,480									798			2,720																										
Manganese	180	NS	NS	NS	**460**	NS	NS	NS	170			170	J	L	190	J	L	98.4			109			53.0	J	L	51.0	J	L																		
Mercury	2.3	**0.15**	0.174	0.486	0.2	NS	NS	0.18	**0.38**			**0.87**			0.063			0.13			**1.4**			**0.33**			0.076																				
Nickel	160	30	18	36	**16**	NS	NS	22.7	8.2			8.4			7.0			4.8			**26.7**			16.0			4.8																				
Potassium	NS	NS	NS	NS	NS	NS	NS	NS	317									152			225																										
Selenium	39	NS	NS	NS	NS	NS	NS	NS	0.43			0.51			0.37	U		1.1			1.5			1.6			0.39	U																				
Silver	39	**1**	NS	NS	NS	NS	NS	NS	0.56	U		0.37	U		0.37	U		0.51	U		0.54	U		0.43			0.37	U																				
Sodium	NS	NS	NS	NS	NS	NS	NS	NS	66.1									63.0			249																										
Thallium ‡	0.52	NS	NS	NS	NS	NS	NS	NS	0.063	J	I	0.38	U		0.37	U		0.12			0.15			0.35	U		0.39	U																				
Vanadium	7.8	NS	NS	NS	NS	NS	NS	NS	22.6	J	H	16.0			13.0			39.2	J	H	48.6	J	H	46.0			16.0																				
Zinc	2,300	**120**	123	315	**120**	NS	NS	121	**184**			85.0			50.0			20.4			**460**			**150**			45.0																				
Cyanide (weak acid dissociable) $	1.1	NS	NS	NS	NS	NS	NS	NS	0.28	UJ	L							0.47	UJ	L	0.44	UJ	L																								
Ammonia as Nitrogen	NS	NS	NS	NS	NS	NS	NS	NS																																					
AVS/SEM (µmol/g)																																													
Cadmium - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.0039									0.0046	U		0.010																										
Copper - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.20									0.13			1.2																										
Lead - SEM	NS	NS	NS	NS	NS	NS	NS	NS	2.4	J	H							0.17	J	H	1.3	J	H																								
Nickel - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.049	U								0.089	U		0.16																										
Zinc - SEM	NS	NS	NS	NS	NS	NS	NS	NS	1.5									0.12			2.8																										
SEM - AVS	NS	NS	NS	NS	NS	NS	NS	NS	4.16	J	H							0.41	J	H	5.51	J	H																								
Sulfide, AVS	NS	NS	NS	NS	NS	NS	NS	NS	0.089	UJ	L							0.16	UJ	L	0.13	UJ	L																								
SEM/AVS Ratio (unitless)	NS	NS	NS	NS	NS	NS	NS	NS																																					

TABLE 17
Summary of Sediment Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in mg/kg (except as noted)																																												
	COPC Screening Levels								Floodplain Sediments (cont.)																						Flood Plain Reference Sediments														
	Human Health	Ecological							FP-09D						FP-09E						FP-09F						FP-10			FPR-01			FPR-02			FPR-03			FPR-04			FPR-05			FPR-06		
									~0-1'			~1-3'			~0-1'			~1-3'			~0-1'			~1-3'			~0-1'			~0-1'			~0-1'			~0-1'			~0-1'			~0-1'			~0-1'		
									10/13/06			10/13/06			10/13/06			10/13/06			10/13/06			10/13/06			10/10/01			10/09/01			10/09/01			10/09/01			10/09/01			10/09/01			10/09/01		
	USEPA Region IX Res. Soil PRGs	1990 NOAA ER-Ls	Threshold Effects Levels (TELs)	Probable Effects Levels (PELs)	Ontario Lowest Effect Levels (LELs)	USEPA SQBs	USEPA SQCs	MADEP TECs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals (mg/kg)																																													
Aluminum	7,600	NS	NS	NS	NS	NS	NS	NS																			7,870	J	H	4,450	J	H	9,990	J	H	4,210	J	H	11,200	J	H	13,600			4,470	J	H
Antimony	3.1	**2**	NS	NS	NS	NS	NS	NS																			**4.0**	J	L	1.1	J	L	0.89	UJ	L	0.78	UJ	L	0.76	UJ	L	0.97	UJ	L	0.93	UJ	L
Arsenic	0.39	33	**5.9**	17	6	NS	NS	9.79	**14**			**9.7**			1.6			2.3			1.8			3.6			**7.6**	J	I	**9.5**	J	I	1.9	J	I	1.2	J	I	3.1	J	I	3.6			2.6	J	I
Barium	540	NS	NS	NS	NS	NS	NS	NS																			61.3			65.3			26.8			20.0			24.5			25.4			29.1		
Beryllium	15	NS	NS	NS	NS	NS	NS	NS																			0.38			0.36	U		0.38	U		0.34	U		0.36	U		0.38	U		0.36	U	
Cadmium	3.7	5	**0.596**	3.53	0.6	NS	NS	0.99																			0.19			0.35			0.11			0.14			0.24			0.18			0.23		
Calcium	NS	NS	NS	NS	NS	NS	NS	NS																			729			832			628			2,570			320			519			1,740		
Chromium †	22	80	37.3	90	**26**	NS	NS	43.4																			20.9			18.4			9.3			20.2			11.5			10.2			7.7		
Cobalt	140	NS	NS	NS	NS	NS	NS	NS																			3.3			1.8	U		2.3			1.7	U		2.0			2.1			2.1		
Copper	310	70	35.7	197	**16**	NS	NS	31.6																			**19.1**			**37.6**			5.6			1.9			7.0			11.6			**72.3**		
Iron	2,300	NS	NS	NS	**21,200**	NS	NS	NS																			12,100			14,800			7,550			4,460			10,300			14,100			5,990		
Lead	400	35	35	91.3	**31**	NS	NS	35.8	**330**			**170**			**38**			**62**			**68**			**340**			**130**	J	H	**135**	J	H	30.4	J	H	5.5	J	H	26.2	J	H	**66.7**	J	L	**96.8**	J	H
Magnesium	NS	NS	NS	NS	NS	NS	NS	NS																			1,230			384			783			755			631			821			1,110		
Manganese	180	NS	NS	NS	**460**	NS	NS	NS																			97.0			17.8			44.4			148			76.5			82.2			84.2		
Mercury	2.3	**0.15**	0.174	0.486	0.2	NS	NS	0.18																			**0.20**			**0.30**			0.094			0.027			0.057			0.082			**0.17**		
Nickel	160	30	18	36	**16**	NS	NS	22.7																			6.3			5.3			4.5	U		3.9	U		3.8	U		4.8	U		8.2		
Potassium	NS	NS	NS	NS	NS	NS	NS	NS																			164			163			109			101			82.9			155			382		
Selenium	39	NS	NS	NS	NS	NS	NS	NS																			1.0			5.0			0.60			0.71			0.93			0.79			0.62		
Silver	39	**1**	NS	NS	NS	NS	NS	NS																			0.56	U		0.54	U		0.54	U		0.47	U		0.46	U		0.58	U		0.56	U	
Sodium	NS	NS	NS	NS	NS	NS	NS	NS																			124			152			44.6	U		54.5			44.9			48.3	U		121		
Thallium ‡	0.52	NS	NS	NS	NS	NS	NS	NS																			0.13			0.18			0.087	J	I	0.051	UJ	I	0.093	J	I	0.15			0.083	J	I
Vanadium	7.8	NS	NS	NS	NS	NS	NS	NS																			45.4	J	H	44.1	J	H	24.2	J	H	15.1	J	H	28.0	J	H	32.6	J	H	37.1	J	H
Zinc	2,300	**120**	123	315	**120**	NS	NS	121																			29.1			13.4			17.2			7.1			16.3			24.8			37.7		
Cyanide (weak acid dissociable) $	1.1	NS	NS	NS	NS	NS	NS	NS																			0.34	UJ	L	0.98	UJ	L	0.35	UJ	L	0.35	UJ	L	0.39	UJ	L	0.28	UJ	L	0.59	UJ	L
Ammonia as Nitrogen	NS	NS	NS	NS	NS	NS	NS	NS																																					
AVS/SEM (µmol/g)																																													
Cadmium - SEM	NS	NS	NS	NS	NS	NS	NS	NS																			0.0028	U		0.020	J	I	0.0032	U		0.0041	U		0.0039	U		0.0031	U		0.0062	U	
Copper - SEM	NS	NS	NS	NS	NS	NS	NS	NS																			0.15			0.45	J	I	0.065			0.014	U		0.065			0.10			0.34		
Lead - SEM	NS	NS	NS	NS	NS	NS	NS	NS																			0.32	J	H	0.96	J	H	0.14	J	H	0.044	U		0.097	J	H	0.11	J	H	0.40	J	H
Nickel - SEM	NS	NS	NS	NS	NS	NS	NS	NS																			0.054	U		0.20	UJ	I	0.062	U		0.078	U		0.075	U		0.060	U		0.12	U	
Zinc - SEM	NS	NS	NS	NS	NS	NS	NS	NS																			0.12			0.50	J	I	0.13			0.070	U		0.13			0.086			0.35		
SEM - AVS	NS	NS	NS	NS	NS	NS	NS	NS																			0.59	J	H	1.92	J	H	0.34	J	H	0.0	J	H	0.30	J	H	0.30	J	H	1.09	J	H
Sulfide, AVS	NS	NS	NS	NS	NS	NS	NS	NS																			0.099	UJ	L	0.36	UJ	L	0.11	UJ	L	0.14	UJ	L	0.14	UJ	L	0.11	UJ	L	0.22	UJ	L
SEM/AVS Ratio (unitless)	NS	NS	NS	NS	NS	NS	NS	NS																																					

TABLE 17
Summary of Sediment Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in mg/kg (except as noted)								Concentrations in mg/kg (except as noted)																													
	COPC Screening Levels								Flood Plain Reference Sediments (cont.)													Former Mill Tailrace Sediments																
	Human Health	Ecological							FPR-07			FPR-08			FPR-09			FPR-10			TR-1			TR-2			TR-3						TR-4			TR-5		
									~0-1'			~0-1'			~0-1'			~0-1'			~0-0.5'			~0-0.4'			~0-0.4'			~0-0.5'			~0-0.4'			~0-0.6'		
									10/09/01			10/09/01			10/09/01			10/09/01			07/25/01			07/25/01			07/25/01			12/16/02			07/25/01			07/25/01		
	USEPA Region IX Res. Soil PRGs	1990 NOAA ER-Ls	Threshold Effects Levels (TELs)	Probable Effects Levels (PELs)	Ontario Lowest Effect Levels (LELs)	USEPA SQBs	USEPA SQCs	MADEP TECs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
Metals (mg/kg)																																						
Aluminum	7,600	NS	NS	NS	NS	NS	NS	NS	9,300	J	H	6,480	J	H	11,700	J	H	6,500	J	H	5,870			5,260			13,100			6,300	J	H	10,500			14,000		
Antimony	3.1	**2**	NS	NS	NS	NS	NS	NS	0.91	UJ	L	0.91	UJ	L	0.83	UJ	L	0.84	UJ	L	0.67	UJ	L	0.69	UJ	L	1.1	UJ	L	0.25			0.91	UJ	L	1.1	UJ	L
Arsenic	0.39	33	**5.9**	17	6	NS	NS	9.79	**7.7**	J	I	2.2	J	I	2.1	J	I	1.6	J	I	1.5			2.6			**9.3**			4.0			**8.4**			**8.7**		
Barium	540	NS	NS	NS	NS	NS	NS	NS	14.4			24.5			24.4			38.8			12.7			17.0			143			29.0			59.3			135		
Beryllium	15	NS	NS	NS	NS	NS	NS	NS	0.33	U		0.36	U		0.38			0.37	U		0.23	U		0.29	U		0.59			0.32			0.41	U		0.50		
Cadmium	3.7	5	**0.596**	3.53	0.6	NS	NS	0.99	0.16			0.23			0.49			0.45			0.058	U		0.081			**2.1**			0.17	J	L	0.58			**1.6**		
Calcium	NS	NS	NS	NS	NS	NS	NS	NS	804			1,120			1,480			2,550			578			1,800			10,700			2,800	JB	I	9,710			8,940		
Chromium †	22	80	37.3	90	**26**	NS	NS	43.4	10.6			10.9			13.7			15.1			5.7	J	H	5.7	J	H	**34.9**	J	H	9.5			**38.0**	J	H	**29.7**	J	H
Cobalt	140	NS	NS	NS	NS	NS	NS	NS	2.2			4.2			2.6			3.3			2.1			2.4			12.5			3.7	JB	I	9.1			10.1		
Copper	310	70	35.7	197	**16**	NS	NS	31.6	13.2			**19.3**			13.9			**55.8**			4.0			7.5			**53.3**			11.0			**40.7**			**47.5**		
Iron	2,300	NS	NS	NS	**21,200**	NS	NS	NS	12,500			7,930			6,670			7,700			7,320			8,030			19,100			9,200			13,600			19,000		
Lead	400	35	35	91.3	**31**	NS	NS	35.8	**78.3**	J	H	**34.2**	J	H	**50.1**	J	H	**76.0**	J	H	11.3			**40.5**			**535**			**99.0**	J	I	**850**			**419**		
Magnesium	NS	NS	NS	NS	NS	NS	NS	NS	2,790			2,140			793			1,430			920			1,490			8,740			2,300			14,500			7,520		
Manganese	180	NS	NS	NS	**460**	NS	NS	NS	138			108			103			109			85.2			143			**2,500**			180	J	L	355			**2,340**		
Mercury	2.3	**0.15**	0.174	0.486	0.2	NS	NS	0.18	0.11			0.052			0.14			**0.17**			0.028	U		0.026	U		0.14			0.037			0.11			**0.16**		
Nickel	160	30	18	36	**16**	NS	NS	22.7	9.4			7.6			4.7			6.6			3.4	J	L	6.3	J	L	**56.5**	J	L	13.0			**93.1**	J	L	**44.5**	J	L
Potassium	NS	NS	NS	NS	NS	NS	NS	NS	305			287			179			246			233			289			865			400	B	H	557			875		
Selenium	39	NS	NS	NS	NS	NS	NS	NS	0.63			0.12	J	I	0.89			0.45			0.075	UJ	I	0.095	UJ	I	0.61			0.31			0.36			0.56		
Silver	39	**1**	NS	NS	NS	NS	NS	NS	0.55	U		0.55	U		0.50	U		0.50	U		0.40	U		0.42	U		0.66	U		0.18	U		0.55	U		0.67	U	
Sodium	NS	NS	NS	NS	NS	NS	NS	NS	69.8			67.4			196			107			1,270			804			3,380			1,200	B	H	2,540			3,620		
Thallium ‡	0.52	NS	NS	NS	NS	NS	NS	NS	0.094	J	I	0.054	UJ	I	0.053	J	I	0.055	UJ	I	0.044	J	I	0.044	UJ	I	0.11	J	I	0.19			0.095	J	I	0.10	J	I
Vanadium	7.8	NS	NS	NS	NS	NS	NS	NS	52.1	J	H	23.0	J	H	34.8	J	H	23.8	J	H	12.0	J	L	12.2	J	L	49.1	J	L	13.0			32.6	J	L	48.4	J	L
Zinc	2,300	**120**	123	315	**120**	NS	NS	121	27.3			36.8			69.2			63.3			24.6	B		29.7			**264**			55.0	B	H	**143**			**219**		
Cyanide (weak acid dissociable) $	1.1	NS	NS	NS	NS	NS	NS	NS	0.42	UJ	L	0.33	UJ	L	0.35	UJ	L	0.42	UJ	L	0.49	UJ	L	0.55	UJ	L	0.90	UJ	L				1.6	UJ	L	1.7	UJ	L
Ammonia as Nitrogen	NS	NS	NS	NS	NS	NS	NS	NS																						91.0								
AVS/SEM (µmol/g)																																						
Cadmium - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.0044	U		0.0027	U		0.0032	U		0.0040	U		0.0049	U		0.0060	U		0.0099	U					0.012	UJ	I	0.021	UJ	I
Copper - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.090			0.055			0.045			0.96			0.025			0.067			0.14						0.31	J	I	0.29	J	I
Lead - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.28	J	H	0.069	J	H	0.058	J	H	0.31	J	H	0.053	U		0.27			0.75						2.1	J	I	1.7	J	I
Nickel - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.084	U		0.051	U		0.061	U		0.093			0.094	U		0.11	U		0.19	U					0.24	UJ	I	0.40	UJ	I
Zinc - SEM	NS	NS	NS	NS	NS	NS	NS	NS	0.075	U		0.075			0.30			0.86			0.085			0.38			1.2						2.1	J	I	3.5	J	I
SEM - AVS	NS	NS	NS	NS	NS	NS	NS	NS	0.37	J	H	0.20	J	H	0.40	J	H	2.22	J	H	-0.19	J	H	-5.9	J	H	-24	J	H				-3.7	J	H	-60	J	H
Sulfide, AVS	NS	NS	NS	NS	NS	NS	NS	NS	0.15	UJ	L	0.094	UJ	L	0.11	UJ	L	0.14	UJ	L	0.35	J	L	6.6	J	L	26	J	L				8.2	J	L	66	J	L
SEM/AVS Ratio (unitless)	NS	NS	NS	NS	NS	NS	NS	NS													0.071	J	H	0.11	J	H	0.081	J	H				0.55	J	H	0.083	J	H

TABLE 17
Summary of Sediment Data - Inorganic Parameters
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. (SHA) on the dates indicated; see Table 1D for identity of sample delivery groups (SDGs).

2. For samples collected in 2001, 2002, and 2003, Woods Hole Group Environmental Laboratories (WHGEL) of Raynham, Massachusetts, performed analyses for metals (except mercury) by United States Environmental Protection Agency (USEPA) Methods 6010B and 6020; mercury by USEPA Method 7471A; weak acid dissociable cyanide (WAD cyanide) by USEPA Method 4500-CN I; acid volatile sulfides and simultaneously extracted metals (AVS/SEM) by USEPA Method AVSSEM SOP v2.0 9/4/92; and ammonia as nitrogen by USEPA Method 350.1.

For samples collected in 2006, Alpha Woods Hole Laboratories (formerly WHGEL) of Raynham, Massachusetts, performed analyses for arsenic and lead by USEPA 6020A.

3. Data validation and data usability assessment were performed by SHA and New Environmental Horizons, Inc. (NEH). Results are presented in the Data Usability Report (SHA, 2002), and in Appendix C of this Report.

4. Metals, WAD cyanide, and ammonia as nitrogen concentrations are presented in milligrams per kilogram (mg/kg), which are equivalent to parts per million (ppm). AVS/SEM concentrations are presented in micromoles per gram (µmoles/g).

5. "COPC Screening Levels" indicates contaminants of potential concern (COPC) screening levels used to determine inclusion of an analyte in the human health or ecological risk assessments. Analyte detections that exceed the human health screening level (shaded value) are shaded. Analyte detections that exceed the lowest of the ecological screening levels (**bold** value) are in **bold**.

"USEPA Region IX Res. Soil PRGs" indicates the values presented are from the USEPA Region IX Residential Soil Preliminary Remediation Goals (PRGs), dated October 1, 2004. PRGs based on non-cancer effects are multiplied by 0.1 per USEPA Guidance (USEPA Region 1, Risk Update Number 5, September 1999). The soil PRGs are used as a conservative estimate of target risk levels, and some exposure pathways included in the residential soil PRG development may not be applicable for sediment exposure.

"1990 NOAA ER-Ls" indicates National Oceanic and Atmospheric Administration (NOAA) Effects Range - Low (ER-L). The values presented are from "The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program," from the National Ocean Service, Rockville, Maryland, March 1990, NOAA, page 138.

"Threshold Effects Levels (TELs)" and "Probable Effects Levels (PELs)" indicate the values presented are from "A Preliminary Evaluation of Sediment Quality Assessment Values for Freshwater Ecosystems," by Smith, et al., J. Great Lakes Res., 22(3): 624-638.

"Ontario Lowest Effect Levels (LELs)" indicates the values presented are from "Development of the Ontario Provincial Sediment Quality Guidelines for Arsenic, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, and Zinc," Ministry of Environment and Energy, Ontario, Canada, August 1993.

"USEPA SQBs" indicates the values presented are Sediment Quality Benchmarks (SQBs) from USEPA Ecotox Thresholds (1996).

"USEPA SQCs" indicates the values presented are Sediment Quality Criteria (SQC) from USEPA Ecotox Thresholds (1996). The values are the lower limit of the 95 percent confidence interval.

"MADEP TECs" indicates the values presented are from the Massachusetts Department of Environmental Protection (MADEP) "Recommended Freshwater Sediment Screening Values" (May 2002), which are based on the consensus-based threshold effect concentrations (TECs) from "Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems," by MacDonald, et al., Archives of Environmental Contamination and Toxicology, 36:20-31.

6. "†" indicates the PRG value presented is for chromium VI.
"‡" indicates the PRG value presented is for thallium chloride.
"$" indicates the PRG value presented is for hydrogen cyanide because cyanide in this form easily dissociates and becomes available for uptake as free cyanide.

7. The following qualifiers and biases were assigned during data validation by NEH. Refer to NEH's Data Usability Reports (included in Appendix A.2 of the Data Usability Report [SHA, 2002], and Appendix B.7 of the Phase 1B RI Data Usability Report [SHA, 2004], and Appendix C of this Report) for additional detail regarding qualifiers and bias.

Qualifiers:
"J" The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"U" The compound was analyzed for, but was not detected. The associated numerical value is the sample-specific reporting limit. The value is usable for project decisions as a non-detect result at the reporting limit.
"UJ" The compound was analyzed for, but was not detected. The sample-specific quantitation (reporting) limit is estimated. The non-detect result is usable for project objectives with documentation of the bias or uncertainty in the result.
"B" Indicates the analyte was detected in a non-matrix matched, associated method blank (e.g., aqueous method blank associated with sediment metals analyses). The result is usable with possible uncertainty due to the potential for contamination.

Bias:
"L" Low
"I" Intermediate
"H" High

TABLE 18
Summary of Sediment Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Concentrations in µg/kg

COPC Screening Levels

Analyte	Human Health	Ecological						
	USEPA Region IX Res. Soil PRGs	1990 NOAA ER-Ls	Threshold Effects Levels (TELs)	Probable Effects Levels (PELs)	Ontario Lowest Effect Levels (LELs)	USEPA SQBs	USEPA SQCs	MADEP TECs
PAHs								
Acenaphthene	370,000	**150**	NS	NS	NS	NS	NS	NS
Acenaphthylene	NS	NS	NS	NS	NS	NS	NS	NS
Anthracene	2,200,000	85	NS	NS	220	NS	NS	**57**
Benzo(a)anthracene	620	230	**32**	385	320	NS	NS	108
Benzo(a)pyrene	62	400	**32**	782	370	NS	NS	150
Benzo(b)fluoranthene	620	NS	NS	NS	NS	NS	NS	NS
Benzo(g,h,i)perylene	NS	NS	NS	NS	**170**	NS	NS	NS
Benzo(k)fluoranthene	6,200	NS	NS	NS	**240**	NS	NS	NS
Chrysene	62,000	400	**57**	862	340	NS	NS	166
Dibenz(a,h)anthracene	62	60	NS	NS	60	NS	NS	**33**
Fluoranthene	230,000	600	**111**	2,355	750	NS	NS	423
Fluorene	270,000	**35**	NS	NS	190	540	NS	77
Indeno(1,2,3-cd)pyrene	620	NS	NS	NS	**200**	NS	NS	NS
Methylnaphthalene (2-)	NS	**65**	NS	NS	NS	NS	NS	NS
Naphthalene	5,600	340	NS	NS	NS	480	NS	**176**
Phenanthrene	NS	225	**42**	515	560	NS	NS	204
Pyrene	230,000	350	**53**	875	490	NS	NS	195
Total PAHs	NS	NS	NS	NS	NS	NS	NS	NS
Other SVOCs								
Benzoic acid	24,000,000	NS	NS	NS	NS	NS	NS	NS
Benzyl Alcohol	1,800,000	NS	NS	NS	NS	NS	NS	NS
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS
bis(2-Chloroethyl)ether	220	NS	NS	NS	NS	NS	NS	NS
bis(2-Chloroisopropyl)ether	2,900	NS	NS	NS	NS	NS	NS	NS
bis(2-Ethylhexyl)phthalate	35,000	NS	NS	NS	NS	NS	NS	NS
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	**1,300**	NS	NS
Butylbenzylphthalate	1,200,000	NS	NS	NS	NS	**11,000**	NS	NS
Carbazole	24,000	NS	NS	NS	NS	NS	NS	NS
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS
Chloroaniline (4-)	24,000	NS	NS	NS	NS	NS	NS	NS
Chloronaphthalene (2-)	490,000	NS	NS	NS	NS	NS	NS	NS
Chlorophenol (2-)	6,300	NS	NS	NS	NS	NS	NS	NS
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS
Dibenzofuran	15,000	NS	NS	NS	NS	**2,000**	NS	NS
Dichlorobenzene (1,2-)	110,000	NS	NS	NS	NS	**340**	NS	NS
Dichlorobenzene (1,3-)	53,000	NS	NS	NS	NS	**1,700**	NS	NS
Dichlorobenzene (1,4-)	3,400	NS	NS	NS	NS	**350**	NS	NS
Dichlorobenzidine (3,3'-)	1,100	NS	NS	NS	NS	NS	NS	NS
Dichlorophenol (2,4-)	18,000	NS	NS	NS	NS	NS	NS	NS
Diethylphthalate	4,900,000	NS	NS	NS	NS	**630**	NS	NS
Dimethylphenol (2,4-)	120,000	NS	NS	NS	NS	NS	NS	NS
Dimethylphthalate	61,000,000	NS	NS	NS	NS	NS	NS	NS
Di-n-butylphthalate	610,000	NS	NS	NS	NS	**11,000**	NS	NS
Dinitro-2-methylphenol (4,6-)	610	NS	NS	NS	NS	NS	NS	NS
Dinitrophenol (2,4-)	12,000	NS	NS	NS	NS	NS	NS	NS
Dinitrotoluene (2,4-)	12,000	NS	NS	NS	NS	NS	NS	NS
Dinitrotoluene (2,6-)	6,100	NS	NS	NS	NS	NS	NS	NS
Di-n-octylphthalate	240,000	NS	NS	NS	NS	NS	NS	NS
Hexachlorobenzene	300	NS	NS	NS	**20**	NS	NS	NS
Hexachlorobutadiene	1,800	NS	NS	NS	NS	NS	NS	NS
Hexachlorocyclopentadiene	37,000	NS	NS	NS	NS	NS	NS	NS
Hexachloroethane	6,100	NS	NS	NS	NS	**1,000**	NS	NS
Isophorone	510,000	NS	NS	NS	NS	NS	NS	NS
Methylphenol (2-)	310,000	NS	NS	NS	NS	NS	NS	NS
Methylphenol (4-)	31,000	NS	NS	NS	NS	NS	NS	NS
Nitroaniline (2-)	18,000	NS	NS	NS	NS	NS	NS	NS
Nitroaniline (3-)	1,800	NS	NS	NS	NS	NS	NS	NS
Nitroaniline (4-)	18,000	NS	NS	NS	NS	NS	NS	NS
Nitrobenzene	2,000	NS	NS	NS	NS	NS	NS	NS
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS
Nitrophenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS
Nitroso-di-n-propylamine (N-)	69	NS	NS	NS	NS	NS	NS	NS
Nitrosodiphenylamine (N-)	99,000	NS	NS	NS	NS	NS	NS	NS
Pentachlorophenol	3,000	NS	NS	NS	NS	NS	NS	NS
Phenol	1,800,000	NS	NS	NS	NS	NS	NS	NS
Trichlorobenzene (1,2,4-)	6,200	NS	NS	NS	NS	**9,200**	NS	NS
Trichlorophenol (2,4,5-)	610,000	NS	NS	NS	NS	NS	NS	NS
Trichlorophenol (2,4,6-)	610	NS	NS	NS	NS	NS	NS	NS
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS

Neponset River Sediments

Analyte	NR-1 ~0-0.3' 07/26/01			NR-2 ~0-0.2' 07/26/01			NR-3 ~0-0.2' 07/26/01			NR-4 ~0-0.5' 07/26/01			NR-5 ~0-0.2' 07/26/01			NR-5 ~0-0.5' 12/18/02		
	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																		
Acenaphthene	21			6.5	U		12			18			150			19		
Acenaphthylene	98			41			31			31			18			39		
Anthracene	**78**			23			20			35			51			41		
Benzo(a)anthracene	**300**			**120**			**59**			**110**			**130**			**110**		
Benzo(a)pyrene	**230**			**99**			**61**			**110**			**88**			**120**		
Benzo(b)fluoranthene	250			96			59			120			130			92		
Benzo(g,h,i)perylene	150			63			40			33			30			74		
Benzo(k)fluoranthene	110			62			36			88			63			94		
Chrysene	**300**			**120**			**80**			**99**			**120**			**130**		
Dibenz(a,h)anthracene	**42**			16			8.8			10			9.9			20		
Fluoranthene	**540**			**190**			**130**			**270**			**270**			**240**		
Fluorene	**88**	J	I	14			18			19			**120**			24		
Indeno(1,2,3-cd)pyrene	150			59			36			35			34			69		
Methylnaphthalene (2-)	37	J	I	7.0			28			14			**240**			17		
Naphthalene	25			9.1			45			17			**730**			49		
Phenanthrene	**580**			**160**			**120**			**220**			**310**			**190**		
Pyrene	**640**			**220**			**140**			**260**			**230**			**270**		
Total PAHs	3,639			1,299.1			923.8			1,489			2,723.9			1,598		
Other SVOCs																		
Benzoic acid	54	J	L		R		41	J	L	79	J	L		R			R	
Benzyl Alcohol	200	U		260	U		230	U		230	U		240	U		200	UJ	L
bis(2-Chloroethoxy)methane	200	U		260	U		230	U		230	U		240	U				
bis(2-Chloroethyl)ether	35	UJ		45	UJ		41	UJ		40	UJ		42	UJ				
bis(2-Chloroisopropyl)ether	200	U		260	U		230	U		230	U		240	U				
bis(2-Ethylhexyl)phthalate	200	U		260	U		230	U		6,500			460			360	U	
Bromophenyl-phenylether (4-)	200	U		260	U		230	U		230	U		240	U				
Butylbenzylphthalate	200	U		260	U		230	U		230	U		240	U				
Carbazole	200	U		260	U		230	U		230	U		240	U		200	U	
Chloro-3-methylphenol (4-)	200	U		260	U		230	U		230	U		240	U				
Chloroaniline (4-)	200	U		260	U		230	U		230	U		240	U				
Chloronaphthalene (2-)	200	U		260	U		230	U		230	U		240	U				
Chlorophenol (2-)	200	U		260	U		230	U		230	U		240	U				
Chlorophenyl-phenylether (4-)	200	U		260	U		230	U		230	U		240	U				
Dibenzofuran	200	U		260	U		230	U		230	U		120	J				
Dichlorobenzene (1,2-)	200	U		260	U		230	U		230	U		240	U				
Dichlorobenzene (1,3-)	200	U		260	U		230	U		230	U		240	U				
Dichlorobenzene (1,4-)	200	U		260	U		230	U		230	U		240	U				
Dichlorobenzidine (3,3'-)	200	U		260	U		230	U		230	U		240	U				
Dichlorophenol (2,4-)	200	U		260	U		230	U		230	U		240	U				
Diethylphthalate	200	U		260	U		230	U		230	U		240	U				
Dimethylphenol (2,4-)	200	U		260	U		230	U		230	U		240	U				
Dimethylphthalate	200	U		260	U		230	U		230	U		240	U				
Di-n-butylphthalate	200	U		260	U		230	U		230	U		240	U				
Dinitro-2-methylphenol (4,6-)	200	U		260	U		230	U		230	U		240	U				
Dinitrophenol (2,4-)	500	UJ	L	650	UJ	L	580	UJ	L	570	UJ	L	600	UJ	L			
Dinitrotoluene (2,4-)	200	U		260	U		230	U		230	U		240	U				
Dinitrotoluene (2,6-)	200	U		260	U		230	U		230	U		240	U				
Di-n-octylphthalate	200	U		260	U		230	U		53	J		240	U				
Hexachlorobenzene	28	UJ		36	UJ		33	UJ		32	UJ		34	UJ				
Hexachlorobutadiene	200	U		260	U		230	U		230	U		240	U				
Hexachlorocyclopentadiene	200	UJ	L	260	U		230	U		230	U		240	U				
Hexachloroethane	200	U		260	U		230	U		230	U		240	U				
Isophorone	200	U		260	U		230	U		230	U		240	U				
Methylphenol (2-)	200	U		260	U		230	U		230	U		240	U				
Methylphenol (4-)	200	U		260	U		230	U		230	U		240	U				
Nitroaniline (2-)	200	U		260	U		230	U		230	U		240	U				
Nitroaniline (3-)	200	U		260	U		230	U		230	U		240	U				
Nitroaniline (4-)	200	U		260	U		230	U		230	U		240	U				
Nitrobenzene	200	U		260	U		230	U		230	U		240	U				
Nitrophenol (2-)	200	U		260	U		230	U		230	U		240	U				
Nitrophenol (4-)	200	U		260	U		230	U		230	U		240	U				
Nitroso-di-n-propylamine (N-)	35	UJ		45	UJ		41	UJ		40	UJ		42	UJ				
Nitrosodiphenylamine (N-)	200	U		260	U		230	U		230	U		240	U				
Pentachlorophenol	200	U		260	U		230	U		230	U		240	U				
Phenol	200	U		260	U		230	U		230	U		240	U				
Trichlorobenzene (1,2,4-)	200	U		260	U		230	U		230	U		240	U				
Trichlorophenol (2,4,5-)	200	U		260	U		230	U		230	U		240	U				
Trichlorophenol (2,4,6-)	200	U		260	U		230	U		230	U		240	U				
Total Other SVOCs	54			-			41			6,632			580			-		
Total SVOCs	3,693			1,299.1			964.8			8,121			3,303.9			1,598		

Neponset River Sediments (continued)

Analyte	NR-6 ~0-0.3' 07/26/01			NR-7 ~0-0.1' 07/25/01			NR-7 ~0-0.5' 12/18/02			NR-8 ~0-0.2' 07/25/01			NR-8 ~0-0.5' 12/18/02		
	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs															
Acenaphthene	**290**			22			50			67			19		
Acenaphthylene	110			71			43			56			98		
Anthracene	**600**			**73**			**350**			**160**			**59**		
Benzo(a)anthracene	**1,700**			**340**			**970**			**390**			**200**		
Benzo(a)pyrene	**1,900**			**290**			**950**			**290**			**200**		
Benzo(b)fluoranthene	2,200			340			900			360			160		
Benzo(g,h,i)perylene	**550**			110			**500**			150			110		
Benzo(k)fluoranthene	**890**			220			**840**			150			160		
Chrysene	**1,900**			**330**			**1,100**			**340**			**250**		
Dibenz(a,h)anthracene	**210**			**36**			**170**			**49**			29		
Fluoranthene	**2,700**			**700**			**2,900**			**820**			**440**		
Fluorene	**370**	J	H	27			**110**			**110**	J	H	**40**		
Indeno(1,2,3-cd)pyrene	**700**			120			**540**			170			100		
Methylnaphthalene (2-)	37			26			7.7	U		9.3			8.4		
Naphthalene	50			71			9.0			16			12		
Phenanthrene	**1,800**			**390**			**1,600**			**650**			**380**		
Pyrene	**2,100**			**680**			**1,900**			**730**			**440**		
Total PAHs	18,107			3,846			12,932			4,517.3			2,705.4		
Other SVOCs															
Benzoic acid	43	J	L	40	J	L		R		44	J	L		R	
Benzyl Alcohol	250	U		240	U		190	UJ	L	240	U		200	UJ	L
bis(2-Chloroethoxy)methane	250	U		240	U					240	U				
bis(2-Chloroethyl)ether	44	UJ		41	UJ					42	UJ				
bis(2-Chloroisopropyl)ether	250	U		240	U					240	U				
bis(2-Ethylhexyl)phthalate	600			310			420	U		44	J		300	U	
Bromophenyl-phenylether (4-)	250	U		240	U					240	U				
Butylbenzylphthalate	250	U		240	U					240	U				
Carbazole	340			50	J		230			110	J		200	U	
Chloro-3-methylphenol (4-)	250	U		240	U					240	U				
Chloroaniline (4-)	250	U		240	U					240	U				
Chloronaphthalene (2-)	250	U		240	U					240	U				
Chlorophenol (2-)	250	U		240	U					240	U				
Chlorophenyl-phenylether (4-)	250	U		240	U					240	U				
Dibenzofuran	120	J		240	U					240	U				
Dichlorobenzene (1,2-)	250	U		240	U					240	U				
Dichlorobenzene (1,3-)	250	U		240	U					240	U				
Dichlorobenzene (1,4-)	250	U		240	U					240	U				
Dichlorobenzidine (3,3'-)	250	U		240	U					240	U				
Dichlorophenol (2,4-)	250	U		240	U					240	U				
Diethylphthalate	250	U		240	U					240	U				
Dimethylphenol (2,4-)	250	U		240	U					240	U				
Dimethylphthalate	250	U		240	U					240	U				
Di-n-butylphthalate	250	U		240	U					240	U				
Dinitro-2-methylphenol (4,6-)	250	U		240	U					240	U				
Dinitrophenol (2,4-)	630	UJ	L	590	UJ	L				610	UJ	L			
Dinitrotoluene (2,4-)	250	U		240	U					240	U				
Dinitrotoluene (2,6-)	250	U		240	U					240	U				
Di-n-octylphthalate	250	U		240	U					240	U				
Hexachlorobenzene	35	UJ		33	UJ					34	UJ				
Hexachlorobutadiene	250	U		240	U					240	U				
Hexachlorocyclopentadiene	250	U		240	U					240	U				
Hexachloroethane	250	U		240	U					240	U				
Isophorone	250	U		240	U					240	U				
Methylphenol (2-)	250	U		240	U					240	U				
Methylphenol (4-)	250	U		240	U					240	U				
Nitroaniline (2-)	250	U		240	U					240	U				
Nitroaniline (3-)	250	U		240	U					240	U				
Nitroaniline (4-)	250	U		240	U					240	U				
Nitrobenzene	250	U		240	U					240	U				
Nitrophenol (2-)	250	U		240	U					240	U				
Nitrophenol (4-)	250	U		240	U					240	U				
Nitroso-di-n-propylamine (N-)	44	UJ		41	UJ					42	UJ				
Nitrosodiphenylamine (N-)	250	U		240	U					240	U				
Pentachlorophenol	250	U		240	U					240	U				
Phenol	250	U		240	U					240	U				
Trichlorobenzene (1,2,4-)	250	U		240	U					240	U				
Trichlorophenol (2,4,5-)	250	U		240	U					240	U				
Trichlorophenol (2,4,6-)	250	U		240	U					240	U				
Total Other SVOCs	1,103			400			230			198			-		
Total SVOCs	19,210			4,246			13,162			4,715.3			2,705.4		

Neponset River (Upstream of the Site) Reference Sediments / Lewis Pond Sediments

Analyte	SedRN-1 ~0-0.5' 05/24/02			SedRN-2 ~0-0.5' 05/24/02			SedRN-3 ~0-0.5' 05/24/02			SedRN-4 ~0-0.5' 05/24/02			SedRN-4 ~0-0.5' 12/18/02			SedRN-5 ~0-0.5' 05/24/02			LP-01 ~0-0.5' 07/31/01			LP-01 ~0-0.5' 12/18/02		
	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																								
Acenaphthene	2.8	U		3.0	U		3.1	U		3.1	U		7.8	U		3.3			**180**	J		31		
Acenaphthylene	2.8	U		3.0	U		8.7			3.6			7.8	U		51			900	J	I	470		
Anthracene	2.8	U		3.0	U		5.5			3.7			7.8	U		35			**930**	J	I	**300**		
Benzo(a)anthracene	5.2			3.0	U		27			13			7.8	U		**140**			**2,800**			**1,800**		
Benzo(a)pyrene	3.3			3.0	U		27			12			7.8	U		**120**			**2,600**			**1,800**		
Benzo(b)fluoranthene	4.7			3.5			22			11			7.9			82			2,800			1,300		
Benzo(g,h,i)perylene	2.8	U		3.0	U		17			8.7			7.8	U		75			**410**			**650**		
Benzo(k)fluoranthene	3.9			3.0	U		19			8.9			7.8	U		87			**2,600**			**1,300**		
Chrysene	5.4			3.1			22			13			8.6			**130**			**3,100**			**1,900**		
Dibenz(a,h)anthracene	2.8	U		3.0	U		5.0			3.1	U		7.8	U		23			**200**	J		**230**		
Fluoranthene	13	J	I	5.0			44			25			13			**220**			**5,100**	J	I	**2,700**		
Fluorene	2.8	UJ	L	3.0	UJ	L	3.1	UJ	L	3.1	UJ	L	7.8	U		9.8	J	L	**310**			**51**		
Indeno(1,2,3-cd)pyrene	2.8	U		3.0	U		17			7.8			7.8	U		67			**590**			**720**		
Methylnaphthalene (2-)	2.8	UJ	I	3.0	U		3.1	U		8.3			7.8	U		22			**250**	J		27		
Naphthalene	2.8	U		3.0	U		3.1	U		10			7.8	U		9.1			**760**	J	I	61		
Phenanthrene	2.8	U		3.1			14			16			7.8	U		**150**			**2,700**	J	I	**690**		
Pyrene	12	J	I	4.4			39			24			11			**230**			**4,600**			**2,100**		
Total PAHs	47.5			19.1			267.2			165			40.5			1,454.2			30,830			16,130		
Other SVOCs																								
Benzoic acid	110	UJ	L	120	UJ	L	120	UJ	L	47	J	L		R		120	UJ	L	1,200	J	L	120	J	L
Benzyl Alcohol	110	U		120	U		120	U		120	U		200	UJ	L	120	U		57	J		210	UJ	L
bis(2-Chloroethoxy)methane	110	U		120	U		120	U		120	U					120	U		300	U				
bis(2-Chloroethyl)ether	41	UJ		43	UJ		45	UJ		44	UJ					43	UJ		52	UJ				
bis(2-Chloroisopropyl)ether	110	U		120	U		120	U		120	U					120	U		300	U				
bis(2-Ethylhexyl)phthalate	110	U		120	U		120	U		120	U		330	U		120	U		380			400	U	
Bromophenyl-phenylether (4-)	110	U		120	U		120	U		120	U					120	U		300	U				
Butylbenzylphthalate	110	U		120	U		120	U		120	U					120	U		290	J				
Carbazole	110	U		120	U		120	U		120	U		200	U		120	U		210	J		210	U	
Chloro-3-methylphenol (4-)	110	U		120	U		120	U		120	U					120	U		300	U				
Chloroaniline (4-)	110	UJ	L	120	UJ	L	120	UJ	L	120	UJ	L				120	UJ	L	300	U				
Chloronaphthalene (2-)	110	U		120	U		120	U		120	U					120	U		300	U				
Chlorophenol (2-)	110	U		120	U		120	U		120	U					120	U		300	U				
Chlorophenyl-phenylether (4-)	110	U		120	U		120	U		120	U					120	U		300	U				
Dibenzofuran	110	U		120	U		120	U		120	U					120	U		150	J				
Dichlorobenzene (1,2-)	110	U		120	U		120	U		120	U					120	U		300	U				
Dichlorobenzene (1,3-)	110	U		120	U		120	U		120	U					120	U		300	U				
Dichlorobenzene (1,4-)	110	U		120	U		120	U		120	U					120	U		300	U				
Dichlorobenzidine (3,3'-)	110	UJ	L	120	UJ	L	120	UJ	L	120	UJ	L				120	UJ	L	300	U				
Dichlorophenol (2,4-)	110	U		120	U		120	U		120	U					120	U		300	U				
Diethylphthalate	110	U		120	U		120	U		120	U					120	U		300	U				
Dimethylphenol (2,4-)	110	UJ	L	120	UJ	L	120	UJ	L	120	UJ	L				120	UJ	L	120	J	H			
Dimethylphthalate	110	U		120	U		120	U		120	U					120	U		300	U				
Di-n-butylphthalate	110	U		120	U		120	U		120	U					120	U		300	U				
Dinitro-2-methylphenol (4,6-)	280	U		300	U		310	U		310	U					300	U		300	U				
Dinitrophenol (2,4-)	110	UJ	I	120	UJ	I	120	UJ	I	120	UJ	I				120	UJ	I	750	UJ	L			
Dinitrotoluene (2,4-)	110	U		120	U		120	U		120	U					120	U		300	U				
Dinitrotoluene (2,6-)	110	U		120	U		120	U		120	U					120	U		300	U				
Di-n-octylphthalate	110	U		120	U		120	U		120	U					120	U		300	U				
Hexachlorobenzene	41	UJ		43	UJ		45	UJ		44	UJ					43	UJ		42	UJ				
Hexachlorobutadiene	110	U		120	U		120	U		120	U					120	U		300	U				
Hexachlorocyclopentadiene		R			R			R			R						R		300	UJ	L			
Hexachloroethane	110	U		120	U		120	U		120	U					120	U		300	U				
Isophorone	110	U		120	U		120	U		120	U					120	U		300	U				
Methylphenol (2-)	110	U		120	U		120	U		120	U					120	U		300	U				
Methylphenol (4-)	110	U		120	U		120	U		120	U					120	U		200	J				
Nitroaniline (2-)	110	U		120	U		120	U		120	U					120	U		300	U				
Nitroaniline (3-)	110	U		120	U		120	U		120	U					120	U		300	U				
Nitroaniline (4-)	110	U		120	U		120	U		120	U					120	U		300	U				
Nitrobenzene	110	U		120	U		120	U		120	U					120	U		300	U				
Nitrophenol (2-)	110	U		120	U		120	U		120	U					120	U		300	U				
Nitrophenol (4-)	110	U		120	U		120	U		120	U					120	U		300	U				
Nitroso-di-n-propylamine (N-)	41	UJ		43	UJ		45	UJ		44	UJ					43	UJ		52	UJ				
Nitrosodiphenylamine (N-)	110	U		120	U		120	U		120	U					120	U		300	U				
Pentachlorophenol	110	U		120	U		120	U		120	U					120	U		300	U				
Phenol	110	U		120	U		120	U		120	U					120	U		81	J				
Trichlorobenzene (1,2,4-)	110	U		120	U		120	U		120	U					120	U		300	U				
Trichlorophenol (2,4,5-)	110	U		120	U		120	U		120	U					120	U		300	U				
Trichlorophenol (2,4,6-)	110	U		120	U		120	U		120	U					120	U		300	U				
Total Other SVOCs	-			-			-			47			-			-			2,688			120		
Total SVOCs	47.5			19.1			267.2			212			40.5			1,454.2			33,518			16,250		

TABLE 18
Summary of Sediment Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Concentrations in µg/kg

Analyte	COPC Screening Levels: Human Health: USEPA Region IX Res. Soil PRGs	Ecological: 1990 NOAA ER-Ls	Threshold Effects Levels (TELs)	Probable Effects Levels (PELs)	Ontario Lowest Effect Levels (LELs)	USEPA SQBs	USEPA SQCs	MADEP TECs	Lewis Pond Sediments (cont.): LP-02			LP-03			LP-04			LP-05			LP-06					
									~0-0.3'			~0-0.4'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'		
									07/31/01			07/31/01			07/31/01			07/30/01			07/30/01			12/18/02		
									Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																										
Acenaphthene	370,000	150	NS	NS	NS	NS	NS	NS	76	J		62	J		230	J		87	J		120	J		180		
Acenaphthylene	NS	NS	NS	NS	NS	NS	NS	NS	550			420			750			620			720			850		
Anthracene	2,200,000	85	NS	NS	220	NS	NS	57	440			390			830			520			580			1,100		
Benzo(a)anthracene	620	230	32	385	320	NS	NS	108	1,200			1,000			2,300			1,300			1,600			3,400		
Benzo(a)pyrene	62	400	32	782	370	NS	NS	150	1,200			1,000			2,200	J	L	1,600			1,600	J	L	3,700		
Benzo(b)fluoranthene	620	NS	NS	NS	NS	NS	NS	NS	1,400			1,400			2,800	J	L	2,200			2,100	J	L	4,000		
Benzo(g,h,i)perylene	NS	NS	NS	NS	170	NS	NS	NS	330			300			390	J	L	320			300	J	L	530	J	L
Benzo(k)fluoranthene	6,200	NS	NS	NS	240	NS	NS	NS	1,400			950			2,100	J	L	2,000			2,100	J	L	3,900		
Chrysene	62,000	400	57	862	340	NS	NS	166	1,500			1,500			2,500			1,700			2,000			4,100		
Dibenz(a,h)anthracene	62	60	NS	NS	60	NS	NS	33	150	J		120	J		140	J	L	100	J		110	J	L	250		
Fluoranthene	230,000	600	111	2,355	750	NS	NS	423	2,300			2,000			3,900			2,700			2,800			6,100		
Fluorene	270,000	35	NS	NS	190	540	NS	77	140	J		110	J		360			190	J		210	J		340		
Indeno(1,2,3-cd)pyrene	620	NS	NS	NS	200	NS	NS	NS	430			420			470	J	L	400			410	J	L	710		
Methylnaphthalene (2-)	NS	65	NS	NS	NS	NS	NS	NS	130	J		120	J		160	J		190	J		160	J		190		
Naphthalene	5,600	340	NS	NS	NS	480	NS	176	240	J		220	J		290	J		370			320			350		
Phenanthrene	NS	225	42	515	560	NS	NS	204	1,400			1,200			2,300			1,600			1,600			2,200		
Pyrene	230,000	350	53	875	490	NS	NS	195	2,100			2,000			4,500			2,500			3,000			7,300		
Total PAHs	NS	NS	NS	NS	NS	NS	NS	NS	14,986			13,212			26,220			18,397			19,730			39,200		
Other SVOCs																										
Benzoic acid	24,000,000	NS	NS	NS	NS	NS	NS	NS	1,000	J	L	990	J	L	1,600	J	L	850	J	L	1,000				R	
Benzyl Alcohol	1,800,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		100	J		260	U		240	U		370	UJ	L
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
bis(2-Chloroethyl)ether	220	NS	NS	NS	NS	NS	NS	NS	54	UJ		46	UJ		50	UJ		45	UJ		43	UJ				
bis(2-Chloroisopropyl)ether	2,900	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
bis(2-Ethylhexyl)phthalate	35,000	NS	NS	NS	NS	NS	NS	NS	220	J		300			920			360			330			710	U	
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	1,300	NS	NS	310	U		260	U		290	U		260	U		240	U				
Butylbenzylphthalate	1,200,000	NS	NS	NS	NS	11,000	NS	NS	160	J		140	J		620			220	J		290					
Carbazole	24,000	NS	NS	NS	NS	NS	NS	NS	150	J		120	J		190	J		160	J		170	J		180	J	
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Chloroaniline (4-)	24,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	UJ	L			
Chloronaphthalene (2-)	490,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Chlorophenol (2-)	6,300	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Dibenzofuran	15,000	NS	NS	NS	NS	2,000	NS	NS	71	J		61	J		140	J		110	J		120	J				
Dichlorobenzene (1,2-)	110,000	NS	NS	NS	NS	340	NS	NS	59	J		260	U		290	U		260	U		240	U				
Dichlorobenzene (1,3-)	53,000	NS	NS	NS	NS	1,700	NS	NS	310	U		260	U		290	U		260	U		240	U				
Dichlorobenzene (1,4-)	3,400	NS	NS	NS	NS	350	NS	NS	54	J		260	U		290	U		260	U		240	U				
Dichlorobenzidine (3,3'-)	1,100	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U			R				
Dichlorophenol (2,4-)	18,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Diethylphthalate	4,900,000	NS	NS	NS	NS	630	NS	NS	310	U		260	U		290	U		260	U		240	U				
Dimethylphenol (2,4-)	120,000	NS	NS	NS	NS	NS	NS	NS	62	J	H	52	J	H	65	J	H	87	J	H	97	J	H			
Dimethylphthalate	61,000,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Di-n-butylphthalate	610,000	NS	NS	NS	NS	11,000	NS	NS	310	U		260	U		62	J		56	J		43	J				
Dinitro-2-methylphenol (4,6-)	610	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U			R				
Dinitrophenol (2,4-)	12,000	NS	NS	NS	NS	NS	NS	NS	780	UJ	L	660	UJ	L	720	UJ	L	640	UJ	L		R				
Dinitrotoluene (2,4-)	12,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Dinitrotoluene (2,6-)	6,100	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Di-n-octylphthalate	240,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	UJ	L	260	U		240	UJ	L			
Hexachlorobenzene	300	NS	NS	NS	20	NS	NS	NS	43	UJ		37	UJ		40	UJ		36	UJ		34	UJ				
Hexachlorobutadiene	1,800	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Hexachlorocyclopentadiene	37,000	NS	NS	NS	NS	NS	NS	NS	310	UJ	L	260	UJ	L	290	UJ	L	260	UJ	L		R				
Hexachloroethane	6,100	NS	NS	NS	NS	1,000	NS	NS	310	U		260	U		290	U		260	U			R				
Isophorone	510,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Methylphenol (2-)	310,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Methylphenol (4-)	31,000	NS	NS	NS	NS	NS	NS	NS	82	J		96	J		210	J		120	J		140	J				
Nitroaniline (2-)	18,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Nitroaniline (3-)	1,800	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U			R				
Nitroaniline (4-)	18,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U			R				
Nitrobenzene	2,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Nitrophenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Nitroso-di-n-propylamine (N-)	69	NS	NS	NS	NS	NS	NS	NS	54	UJ		46	UJ		50	UJ		45	UJ		43	UJ				
Nitrosodiphenylamine (N-)	99,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Pentachlorophenol	3,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Phenol	1,800,000	NS	NS	NS	NS	NS	NS	NS	310	U		58	J		69	J		81	J		74	J				
Trichlorobenzene (1,2,4-)	6,200	NS	NS	NS	NS	9,200	NS	NS	310	U		260	U		290	U		260	U		240	U				
Trichlorophenol (2,4,5-)	610,000	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Trichlorophenol (2,4,6-)	610	NS	NS	NS	NS	NS	NS	NS	310	U		260	U		290	U		260	U		240	U				
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	1,858			1,817			3,976			2,044			2,264			180		
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	16,844			15,029			30,196			20,441			21,994			39,380		

Analyte	Lewis Pond Sediments (cont.): LP-07			LP-08			LP-09						LP-10		
	~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'		
	07/30/01			07/30/01			07/30/01			12/18/02			07/30/01		
	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs															
Acenaphthene	170	J		140	J		100	J		71			160	J	
Acenaphthylene	700			500			290			320			540		
Anthracene	890			610			400			360			790		
Benzo(a)anthracene	2,100			1,700			1,000			1,200			2,400		
Benzo(a)pyrene	2,000	J	L	1,800	J	L	900			1,600			2,200	J	L
Benzo(b)fluoranthene	2,500	J	L	2,800	J	L	1,300			2,100			3,900	J	L
Benzo(g,h,i)perylene	300	J	L	380	J	L	190	J		310	J	L	520	J	L
Benzo(k)fluoranthene	2,300	J	L	2,300	J	L	1,000			2,000			3,900	J	L
Chrysene	2,100			2,100			1,100			1,900			2,900		
Dibenz(a,h)anthracene	130	J	L	140	J	L	100	J		130			140	J	L
Fluoranthene	3,200			3,100			2,000			2,600			4,900		
Fluorene	300			280			170	J		130			300	J	
Indeno(1,2,3-cd)pyrene	360	J	L	480	J	L	240	J		410			540	J	L
Methylnaphthalene (2-)	150	J		130	J		94	J		71			160	J	
Naphthalene	230			250	J		180	J		130			290	J	
Phenanthrene	1,800			1,900			1,100			1,400			2,400		
Pyrene	3,200			4,100			1,900			3,100			5,200		
Total PAHs	22,430			22,710			12,064			17,832			31,240		
Other SVOCs															
Benzoic acid	930	J	L	1,100	J	L	640	J	L	690	J	L	1,200	J	L
Benzyl Alcohol	87	J		68	J		47	J		310	UJ	L	54	J	
bis(2-Chloroethoxy)methane	230	U		280	U		250	U					310	U	
bis(2-Chloroethyl)ether	40	UJ		49	UJ		43	UJ					54	UJ	
bis(2-Chloroisopropyl)ether	230	U		280	U		250	U					310	U	
bis(2-Ethylhexyl)phthalate	310			1,300			590			1,900	U		3,000		
Bromophenyl-phenylether (4-)	230	U		280	U		250	U					310	U	
Butylbenzylphthalate	91	J		650			160	J					530		
Carbazole	140	J		160	J		100	J		160	J		280	J	
Chloro-3-methylphenol (4-)	230	U		280	U		250	U					310	U	
Chloroaniline (4-)	230	U		280	U		250	U					310	U	
Chloronaphthalene (2-)	230	U		280	U		250	U					310	U	
Chlorophenol (2-)	230	U		280	U		250	U					310	U	
Chlorophenyl-phenylether (4-)	230	U		280	U		250	U					310	U	
Dibenzofuran	120	J		150	J		86	J					160	J	
Dichlorobenzene (1,2-)	230	U		280	U		250	U					310	U	
Dichlorobenzene (1,3-)	230	U		280	U		250	U					310	U	
Dichlorobenzene (1,4-)	230	U		280	U		250	U					310	U	
Dichlorobenzidine (3,3'-)	230	U		280	U		250	U					310	U	
Dichlorophenol (2,4-)	230	U		280	U		250	U					310	U	
Diethylphthalate	230	U		280	U		250	U					310	U	
Dimethylphenol (2,4-)	67	J	H	68	J	H	250	U					62	J	H
Dimethylphthalate	230	U		280	U		250	U					310	U	
Di-n-butylphthalate	230	U		58	J		72	J					61	J	
Dinitro-2-methylphenol (4,6-)	230	U		280	U		250	U					310	U	
Dinitrophenol (2,4-)	570	UJ	L	710	UJ	L	620	UJ	L				780	UJ	L
Dinitrotoluene (2,4-)	230	U		280	U		250	U					310	U	
Dinitrotoluene (2,6-)	230	U		280	U		250	U					310	U	
Di-n-octylphthalate	230	UJ	L	280	UJ	L	250	U					310	UJ	L
Hexachlorobenzene	32	UJ		39	UJ		35	UJ					43	UJ	
Hexachlorobutadiene	230	U		280	U		250	U					310	U	
Hexachlorocyclopentadiene	230	UJ	L	280	UJ	L	250	UJ	L				310	UJ	L
Hexachloroethane	230	U		280	U		250	U					310	U	
Isophorone	230	U		280	U		250	U					310	U	
Methylphenol (2-)	230	U		280	U		250	U					310	U	
Methylphenol (4-)	550			140	J		74	J					130	J	
Nitroaniline (2-)	230	U		280	U		250	U					310	U	
Nitroaniline (3-)	230	U		280	U		250	U					310	U	
Nitroaniline (4-)	230	U		280	U		250	U					310	U	
Nitrobenzene	230	U		280	U		250	U					310	U	
Nitrophenol (2-)	230	U		280	U		250	U					310	U	
Nitrophenol (4-)	230	U		280	U		250	U					310	U	
Nitroso-di-n-propylamine (N-)	40	UJ		49	UJ		43	UJ					54	UJ	
Nitrosodiphenylamine (N-)	230	U		280	U		250	U					310	U	
Pentachlorophenol	230	U		280	U		250	U					310	U	
Phenol	110	J		82	J		48	J					98	J	
Trichlorobenzene (1,2,4-)	230	U		280	U		250	U					310	U	
Trichlorophenol (2,4,5-)	230	U		280	U		250	U					310	U	
Trichlorophenol (2,4,6-)	230	U		280	U		250	U					310	U	
Total Other SVOCs	2,405			3,776			1,817			850			5,575		
Total SVOCs	24,835			26,486			13,881			18,682			36,815		

Analyte	Lower Pond (Norwood, Massachusetts) Reference Sediments: SedRNwd-01			SedRNwd-02			SedRNwd-03			SedRNwd-04			SedRNwd-05			SedRNwd-06			SedRNwd-07		
	~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'			~0-0.5'		
	12/17/02			12/17/02			12/17/02			12/17/02			12/17/02			12/17/02			12/17/02		
	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																					
Acenaphthene	200			190			450			120			82			170			240		
Acenaphthylene	210			82			540			350			81			490			800		
Anthracene	590			540			1,500			530			330			830			1,000		
Benzo(a)anthracene	2,000			830			5,900			1,900			1,000			2,700			3,400		
Benzo(a)pyrene	2,400			750			6,000			2,600			1,200			3,100			4,100		
Benzo(b)fluoranthene	2,500			620			6,100			3,600			1,200			3,400			4,900		
Benzo(g,h,i)perylene	950			310			1,700	J	L	710	J	L	470			690	J	L	900	J	L
Benzo(k)fluoranthene	2,300			720			5,400			3,000			1,100			3,400			4,700		
Chrysene	2,700			970			7,200			3,100			1,300			3,600			4,900		
Dibenz(a,h)anthracene	290			110			690			250			140			250			350		
Fluoranthene	4,600			2,000			15,000			4,600			3,000			5,100			7,400		
Fluorene	330			230			750			220			150			340			410		
Indeno(1,2,3-cd)pyrene	1,000			330			2,200			820			530			850			1,100		
Methylnaphthalene (2-)	76			61			110			73			21			120			220		
Naphthalene	88			86			160			100			30	EB		170			310		
Phenanthrene	3,300			2,000			7,100			2,500			1,900			3,800			4,500		
Pyrene	4,100			1,900			13,000			4,700			2,300			5,900			7,300		
Total PAHs	27,634			11,729			73,800			29,173			14,834			34,910			46,530		
Other SVOCs																					
Benzoic acid	220	J	L	130	J	L	950	J	L	1,500	J	L	210	J	L	590	J	L	1,100	J	L
Benzyl Alcohol	210	UJ	L	200	UJ	L	300	UJ	L	410	UJ	L	200	UJ	L	270	UJ	L	320	UJ	L
bis(2-Chloroethoxy)methane	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
bis(2-Chloroethyl)ether	85	UJ		79	UJ		120	UJ		160	UJ		79	UJ		110	UJ		130	UJ	
bis(2-Chloroisopropyl)ether	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
bis(2-Ethylhexyl)phthalate	4,100	EB		530	U		2,700	U		5,400	EB		1,600	U		2,900	U		2,300	U	
Bromophenyl-phenylether (4-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Butylbenzylphthalate	200	J		200	U		350			830			390			900			560		
Carbazole	240	J	I	210			790			290	J		250			310			400		
Chloro-3-methylphenol (4-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Chloroaniline (4-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Chloronaphthalene (2-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Chlorophenol (2-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Chlorophenyl-phenylether (4-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Dibenzofuran	160	J		170	J		320			410	U		95	J		180	J		220	J	
Dichlorobenzene (1,2-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Dichlorobenzene (1,3-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Dichlorobenzene (1,4-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Dichlorobenzidine (3,3'-)	210	U		200	UJ	L	300	U		410	U		200	U		270	U		320	U	
Dichlorophenol (2,4-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Diethylphthalate	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Dimethylphenol (2,4-)	210	UJ	L	200	UJ	L	300	UJ	L	410	UJ	L	200	UJ	L	270	UJ	L	320	UJ	L
Dimethylphthalate	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Di-n-butylphthalate	210	U		200	U		300	U		410	U		170	J		150	J		320	U	
Dinitro-2-methylphenol (4,6-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Dinitrophenol (2,4-)	210	UJ	L	200	UJ	L	300	UJ	L	410	UJ	L	200	UJ	L	270	UJ	L	320	UJ	L
Dinitrotoluene (2,4-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Dinitrotoluene (2,6-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Di-n-octylphthalate	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Hexachlorobenzene	85	UJ		79	UJ		120	UJ		160	UJ		79	UJ		110	UJ		130	UJ	
Hexachlorobutadiene	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Hexachlorocyclopentadiene	210	UJ	I		R		300	UJ	I	410	UJ	I	200	UJ	I	270	UJ	I	320	UJ	I
Hexachloroethane	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Isophorone	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Methylphenol (2-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Methylphenol (4-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Nitroaniline (2-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Nitroaniline (3-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Nitroaniline (4-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Nitrobenzene	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Nitrophenol (2-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Nitrophenol (4-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Nitroso-di-n-propylamine (N-)	85	UJ		79	UJ		120	UJ		160	UJ		79	UJ		110	UJ		130	UJ	
Nitrosodiphenylamine (N-)	210	U		200	U		300	U		410	U		200	U		140	J		320	U	
Pentachlorophenol	210	U		200	U		210	J		410	U		200	U		270	U		320	U	
Phenol	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Trichlorobenzene (1,2,4-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Trichlorophenol (2,4,5-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Trichlorophenol (2,4,6-)	210	U		200	U		300	U		410	U		200	U		270	U		320	U	
Total Other SVOCs	4,920			510			2,620			8,020			1,115			2,270			2,280		
Total SVOCs	32,554			12,239			76,420			37,193			15,949			37,180			48,810		

TABLE 18
Summary of Sediment Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Concentrations in µg/kg

COPC Screening Levels

Analyte	Human Health: USEPA Region IX Res. Soil PRGs	Ecological: 1990 NOAA ER-Ls	Threshold Effects Levels (TELs)	Probable Effects Levels (PELs)	Ontario Lowest Effect Levels (LELs)	USEPA SQBs	USEPA SQCs	MADEP TECs
PAHs								
Acenaphthene	370,000	**150**	NS	NS	NS	NS	NS	NS
Acenaphthylene	NS	NS	NS	NS	NS	NS	NS	NS
Anthracene	2,200,000	85	NS	NS	220	NS	NS	**57**
Benzo(a)anthracene	620	230	**32**	385	320	NS	NS	108
Benzo(a)pyrene	62	400	**32**	782	370	NS	NS	150
Benzo(b)fluoranthene	620	NS	NS	NS	NS	NS	NS	NS
Benzo(g,h,i)perylene	NS	NS	NS	NS	**170**	NS	NS	NS
Benzo(k)fluoranthene	6,200	NS	NS	NS	**240**	NS	NS	NS
Chrysene	62,000	400	**57**	862	340	NS	NS	166
Dibenz(a,h)anthracene	62	60	NS	NS	60	NS	NS	**33**
Fluoranthene	230,000	600	**111**	2,355	750	NS	NS	423
Fluorene	270,000	**35**	NS	NS	190	540	NS	77
Indeno(1,2,3-cd)pyrene	620	NS	NS	NS	**200**	NS	NS	NS
Methylnaphthalene (2-)	NS	**65**	NS	NS	NS	NS	NS	NS
Naphthalene	5,600	340	NS	NS	NS	480	NS	**176**
Phenanthrene	NS	225	**42**	515	560	NS	NS	204
Pyrene	230,000	350	**53**	875	490	NS	NS	195
Total PAHs	NS	NS	NS	NS	NS	NS	NS	NS
Other SVOCs								
Benzoic acid	24,000,000	NS	NS	NS	NS	NS	NS	NS
Benzyl Alcohol	1,800,000	NS	NS	NS	NS	NS	NS	NS
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS
bis(2-Chloroethyl)ether	220	NS	NS	NS	NS	NS	NS	NS
bis(2-Chloroisopropyl)ether	2,900	NS	NS	NS	NS	NS	NS	NS
bis(2-Ethylhexyl)phthalate	35,000	NS	NS	NS	NS	NS	NS	NS
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	**1,300**	NS	NS
Butylbenzylphthalate	1,200,000	NS	NS	NS	NS	**11,000**	NS	NS
Carbazole	24,000	NS	NS	NS	NS	NS	NS	NS
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS
Chloroaniline (4-)	24,000	NS	NS	NS	NS	NS	NS	NS
Chloronaphthalene (2-)	490,000	NS	NS	NS	NS	NS	NS	NS
Chlorophenol (2-)	6,300	NS	NS	NS	NS	NS	NS	NS
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS
Dibenzofuran	15,000	NS	NS	NS	NS	**2,000**	NS	NS
Dichlorobenzene (1,2-)	110,000	NS	NS	NS	NS	**340**	NS	NS
Dichlorobenzene (1,3-)	53,000	NS	NS	NS	NS	**1,700**	NS	NS
Dichlorobenzene (1,4-)	3,400	NS	NS	NS	NS	**350**	NS	NS
Dichlorobenzidine (3,3'-)	1,100	NS	NS	NS	NS	NS	NS	NS
Dichlorophenol (2,4-)	18,000	NS	NS	NS	NS	NS	NS	NS
Diethylphthalate	4,900,000	NS	NS	NS	NS	**630**	NS	NS
Dimethylphenol (2,4-)	120,000	NS	NS	NS	NS	NS	NS	NS
Dimethylphthalate	61,000,000	NS	NS	NS	NS	NS	NS	NS
Di-n-butylphthalate	610,000	NS	NS	NS	NS	**11,000**	NS	NS
Dinitro-2-methylphenol (4,6-)	610	NS	NS	NS	NS	NS	NS	NS
Dinitrophenol (2,4-)	12,000	NS	NS	NS	NS	NS	NS	NS
Dinitrotoluene (2,4-)	12,000	NS	NS	NS	NS	NS	NS	NS
Dinitrotoluene (2,6-)	6,100	NS	NS	NS	NS	NS	NS	NS
Di-n-octylphthalate	240,000	NS	NS	NS	NS	NS	NS	NS
Hexachlorobenzene	300	NS	NS	NS	**20**	NS	NS	NS
Hexachlorobutadiene	1,800	NS	NS	NS	NS	NS	NS	NS
Hexachlorocyclopentadiene	37,000	NS	NS	NS	NS	NS	NS	NS
Hexachloroethane	6,100	NS	NS	NS	NS	**1,000**	NS	NS
Isophorone	510,000	NS	NS	NS	NS	NS	NS	NS
Methylphenol (2-)	310,000	NS	NS	NS	NS	NS	NS	NS
Methylphenol (4-)	31,000	NS	NS	NS	NS	NS	NS	NS
Nitroaniline (2-)	18,000	NS	NS	NS	NS	NS	NS	NS
Nitroaniline (3-)	1,800	NS	NS	NS	NS	NS	NS	NS
Nitroaniline (4-)	18,000	NS	NS	NS	NS	NS	NS	NS
Nitrobenzene	2,000	NS	NS	NS	NS	NS	NS	NS
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS
Nitrophenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS
Nitroso-di-n-propylamine (N-)	69	NS	NS	NS	NS	NS	NS	NS
Nitrosodiphenylamine (N-)	99,000	NS	NS	NS	NS	NS	NS	NS
Pentachlorophenol	3,000	NS	NS	NS	NS	NS	NS	NS
Phenol	1,800,000	NS	NS	NS	NS	NS	NS	NS
Trichlorobenzene (1,2,4-)	6,200	NS	NS	NS	NS	**9,200**	NS	NS
Trichlorophenol (2,4,5-)	610,000	NS	NS	NS	NS	NS	NS	NS
Trichlorophenol (2,4,6-)	610	NS	NS	NS	NS	NS	NS	NS
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS

Lower Pond (Norwood, MA) Ref. Sediments

Analyte	SedRNwd-08 ~0-0.5' 12/17/02			SedRNwd-09 ~0-0.5' 12/17/02			SedRNwd-10 ~0-0.5' 12/17/02		
	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs									
Acenaphthene	**180**			130			**470**		
Acenaphthylene	550			380			920		
Anthracene	**830**			**530**			**1,600**		
Benzo(a)anthracene	**2,600**			**2,100**			**3,800**		
Benzo(a)pyrene	**3,000**			**2,800**			**4,400**		
Benzo(b)fluoranthene	3,900			3,700			3,800		
Benzo(g,h,i)perylene	**600**	J	L	**610**	J	L	**790**	J	L
Benzo(k)fluoranthene	**3,600**			**3,400**			**5,000**		
Chrysene	**3,500**			**3,200**			**5,100**		
Dibenz(a,h)anthracene	**230**			**210**			**330**		
Fluoranthene	**4,500**			**5,700**			**8,500**		
Fluorene	**310**			**220**			**1,200**		
Indeno(1,2,3-cd)pyrene	**770**			**760**			**1,000**		
Methylnaphthalene (2-)	**160**			**71**			**460**		
Naphthalene	**210**			110			**420**		
Phenanthrene	**2,600**			**2,500**			**6,300**		
Pyrene	**5,500**			**5,100**			**8,400**		
Total PAHs	33,040			31,521			52,490		
Other SVOCs									
Benzoic acid	630	J	L	1,100	J	L	640	J	L
Benzyl Alcohol	230	UJ	L	340	UJ	L	260	UJ	L
bis(2-Chloroethoxy)methane	230	U		340	U		260	U	
bis(2-Chloroethyl)ether	92	UJ		140	UJ		110	UJ	
bis(2-Chloroisopropyl)ether	230	U		340	U		260	U	
bis(2-Ethylhexyl)phthalate	1,700	U		4,000	EB		1,600	U	
Bromophenyl-phenylether (4-)	230	U		340	U		260	U	
Butylbenzylphthalate	210	J		2,000			260	U	
Carbazole	310			260	J		420		
Chloro-3-methylphenol (4-)	230	U		340	U		260	U	
Chloroaniline (4-)	230	U		340	U		260	U	
Chloronaphthalene (2-)	230	U		340	U		260	U	
Chlorophenol (2-)	230	U		340	U		260	U	
Chlorophenyl-phenylether (4-)	230	U		340	U		260	U	
Dibenzofuran	170	J		340	U		360		
Dichlorobenzene (1,2-)	230	U		340	U		260	U	
Dichlorobenzene (1,3-)	230	U		340	U		260	U	
Dichlorobenzene (1,4-)	230	U		340	U		260	U	
Dichlorobenzidine (3,3'-)	230	U		340	U		260	U	
Dichlorophenol (2,4-)	230	U		340	U		260	U	
Diethylphthalate	230	U		160	J		260	U	
Dimethylphenol (2,4-)	230	UJ	L	340	UJ	L	260	UJ	L
Dimethylphthalate	230	U		340	U		260	U	
Di-n-butylphthalate	230	U		220	J		260	U	
Dinitro-2-methylphenol (4,6-)	230	U		340	U		260	U	
Dinitrophenol (2,4-)	230	UJ	L	340	UJ	L	260	UJ	L
Dinitrotoluene (2,4-)	230	U		340	U		260	U	
Dinitrotoluene (2,6-)	230	U		340	U		260	U	
Di-n-octylphthalate	230	U		340	U		260	U	
Hexachlorobenzene	92	UJ		140	UJ		110	UJ	
Hexachlorobutadiene	230	U		340	U		260	U	
Hexachlorocyclopentadiene	230	UJ	I	340	UJ	I	260	UJ	I
Hexachloroethane	230	U		340	U		260	U	
Isophorone	230	U		340	U		260	U	
Methylphenol (2-)	230	U		340	U		260	U	
Methylphenol (4-)	230	U		340	U		260	U	
Nitroaniline (2-)	230	U		340	U		260	U	
Nitroaniline (3-)	230	U		340	U		260	U	
Nitroaniline (4-)	230	U		340	U		260	U	
Nitrobenzene	230	U		340	U		260	U	
Nitrophenol (2-)	230	U		340	U		260	U	
Nitrophenol (4-)	230	U		340	U		260	U	
Nitroso-di-n-propylamine (N-)	92	UJ		140	UJ		110	UJ	
Nitrosodiphenylamine (N-)	230	U		340	U		260	U	
Pentachlorophenol	230	U		340	U		260	U	
Phenol	230	U		340	U		260	U	
Trichlorobenzene (1,2,4-)	230	U		340	U		260	U	
Trichlorophenol (2,4,5-)	230	U		340	U		260	U	
Trichlorophenol (2,4,6-)	230	U		340	U		260	U	
Total Other SVOCs	1,320			7,740			1,420		
Total SVOCs	34,360			39,261			53,910		

Flood Plain Sediments

Analyte	FP-01 ~0-1' 10/10/01			FP-02 ~0-1' 10/10/01			FP-03 ~0-1' 10/10/01			FP-04 ~0-1' 10/10/01		
	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs												
Acenaphthene	36			11			22			17		
Acenaphthylene	230			50			160			87		
Anthracene	**150**			47			**140**			**86**		
Benzo(a)anthracene	**730**			**170**			**530**			**370**		
Benzo(a)pyrene	**660**			**170**			**610**			**420**		
Benzo(b)fluoranthene	570			200			800			430		
Benzo(g,h,i)perylene	**210**			110			**210**			130		
Benzo(k)fluoranthene	**580**			140			**530**			**400**		
Chrysene	**880**			**240**			**790**			**570**		
Dibenz(a,h)anthracene	**54**			25			**54**			**41**		
Fluoranthene	**1,200**			**320**			**1,300**			**890**		
Fluorene	**58**			18			**98**			34		
Indeno(1,2,3-cd)pyrene	**220**			96			**220**			170		
Methylnaphthalene (2-)	32			15			35			24		
Naphthalene	75			26			56			42		
Phenanthrene	**700**			**220**			**790**			**550**		
Pyrene	**1,500**			**350**			**1,200**			**810**		
Total PAHs	7,885			2,208			7,545			5,071		
Other SVOCs												
Benzoic acid	150	J		260			830			50	J	L
Benzyl Alcohol	220	U		220	U		230	U		190	U	
bis(2-Chloroethoxy)methane	220	U		220	U		230	U		190	U	
bis(2-Chloroethyl)ether	38	UJ		38	UJ		40	UJ		34	UJ	
bis(2-Chloroisopropyl)ether	220	U		220	U		230	U		190	U	
bis(2-Ethylhexyl)phthalate	220	U		92	J		72	J		51	J	
Bromophenyl-phenylether (4-)	220	U		220	U		230	U		190	U	
Butylbenzylphthalate	220	U		220	U		230	U		190	U	
Carbazole	220	U		220	U		85	J		66	J	
Chloro-3-methylphenol (4-)	220	U		220	U		230	U		190	U	
Chloroaniline (4-)	220	U		220	U		230	U		190	U	
Chloronaphthalene (2-)	220	U		220	U		230	U		190	U	
Chlorophenol (2-)	220	U		220	U		230	U		190	U	
Chlorophenyl-phenylether (4-)	220	U		220	U		230	U		190	U	
Dibenzofuran	220	U		220	U		40	J		190	U	
Dichlorobenzene (1,2-)	220	U		220	U		230	U		40	J	
Dichlorobenzene (1,3-)	220	U		220	U		230	U		190	U	
Dichlorobenzene (1,4-)	220	U		220	U		230	U		190	U	
Dichlorobenzidine (3,3'-)	220	U		220	U		230	U		190	U	
Dichlorophenol (2,4-)	220	U		220	U		230	U		190	U	
Diethylphthalate	220	U		220	U		230	U		190	U	
Dimethylphenol (2,4-)	220	U		220	U		230	U		190	U	
Dimethylphthalate	220	U		220	U		230	U		190	U	
Di-n-butylphthalate	220	U		220	U		230	U		190	U	
Dinitro-2-methylphenol (4,6-)	220	U		220	U		230	U		190	U	
Dinitrophenol (2,4-)	220	UJ	I	220	UJ	I	230	UJ	I	190	UJ	I
Dinitrotoluene (2,4-)	220	U		220	U		230	U		190	U	
Dinitrotoluene (2,6-)	220	U		220	U		230	U		190	U	
Di-n-octylphthalate	220	U		220	U		230	U		190	U	
Hexachlorobenzene	30	UJ		31	UJ		32	UJ		27	UJ	
Hexachlorobutadiene	220	U		220	U		230	U		190	U	
Hexachlorocyclopentadiene	220	U		220	U		230	UJ	I	190	U	
Hexachloroethane	220	U		220	U		230	U		190	U	
Isophorone	220	U		220	U		230	U		190	U	
Methylphenol (2-)	220	U		220	U		230	U		190	U	
Methylphenol (4-)	220	U		220	U		230	U		190	U	
Nitroaniline (2-)	220	U		220	U		230	U		190	U	
Nitroaniline (3-)	220	U		220	U		230	U		190	U	
Nitroaniline (4-)	220	U		220	U		230	U		190	U	
Nitrobenzene	220	U		220	U		230	U		190	U	
Nitrophenol (2-)	220	U		220	U		230	U		190	U	
Nitrophenol (4-)	220	U		220	U		49	J		190	U	
Nitroso-di-n-propylamine (N-)	38	UJ		38	UJ		40	UJ		34	UJ	
Nitrosodiphenylamine (N-)	220	U		220	U		230	U		190	U	
Pentachlorophenol	220	U		220	U		230	U		190	U	
Phenol	220	U		220	U		230	U		190	U	
Trichlorobenzene (1,2,4-)	220	U		220	U		230	U		190	U	
Trichlorophenol (2,4,5-)	220	U		220	U		230	U		190	U	
Trichlorophenol (2,4,6-)	220	U		220	U		230	U		190	U	
Total Other SVOCs	150			352			1,076			207		
Total SVOCs	8,035			2,560			8,621			5,278		

Analyte	FP-05 ~0-1' 10/10/01			FP-05 ~0-1' 08/05/03			FP-05 ~1-3' 08/05/03			FP-06 ~0-1' 10/10/01			FP-06 ~0-1' 08/05/03			FP-06 ~1-3' 08/05/03		
	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																		
Acenaphthene	53			57			10	U		**1,300**			47			11		
Acenaphthylene	220			220			16			59			49			73		
Anthracene	**210**			**200**			12			**1,500**			**120**			45		
Benzo(a)anthracene	**790**			**780**			**41**			**3,600**			**320**			**160**		
Benzo(a)pyrene	**660**			**820**			**46**			**2,700**			**320**			**170**		
Benzo(b)fluoranthene	810			980			57			3,200			320			160		
Benzo(g,h,i)perylene	160	J	L	**550**			35			**660**			**260**			110		
Benzo(k)fluoranthene	**640**			**620**			31			**1,800**			**250**			99		
Chrysene	**1,100**			**870**			46			**3,400**			**320**			**160**		
Dibenz(a,h)anthracene	**58**			**150**			10			**160**			**62**			31		
Fluoranthene	**1,500**			**1,700**			93			**10,000**			**770**			**280**		
Fluorene	**78**			**75**			10	U		**970**			**40**			21		
Indeno(1,2,3-cd)pyrene	200	J	L	**730**			48			**720**			**330**			140		
Methylnaphthalene (2-)	49			**88**			20			**310**			64			38		
Naphthalene	100			72			10	U		**600**			41			28		
Phenanthrene	**1,000**			**1,000**			**59**			**11,000**			**560**			**260**		
Pyrene	**1,400**			**1,600**			**86**			**9,200**			**650**			**330**		
Total PAHs	9,028			10,512			600			51,179			4,523			2,116		
Other SVOCs																		
Benzoic acid	140	J	L							280	J							
Benzyl Alcohol	200	U								970	U							
bis(2-Chloroethoxy)methane	200	U								970	U							
bis(2-Chloroethyl)ether	35	UJ								170	UJ							
bis(2-Chloroisopropyl)ether	200	U								970	U							
bis(2-Ethylhexyl)phthalate	210			530	EB	H	400	EB	H	170	J		260	EB	H	190	U	
Bromophenyl-phenylether (4-)	200	U								970	U							
Butylbenzylphthalate	37	J								970	U							
Carbazole	57	J		220	U		200	U		1,200			190	U		190	U	
Chloro-3-methylphenol (4-)	200	U								970	U							
Chloroaniline (4-)		R								970	U							
Chloronaphthalene (2-)	200	U								970	U							
Chlorophenol (2-)	200	U								970	U							
Chlorophenyl-phenylether (4-)	200	U								970	U							
Dibenzofuran	200	U								680	J							
Dichlorobenzene (1,2-)	200	U								970	U							
Dichlorobenzene (1,3-)	200	U								970	U							
Dichlorobenzene (1,4-)	200	U								970	U							
Dichlorobenzidine (3,3'-)		R								970	U							
Dichlorophenol (2,4-)	200	U								970	U							
Diethylphthalate	200	U								970	U							
Dimethylphenol (2,4-)	200	U								970	U							
Dimethylphthalate	200	U								970	U							
Di-n-butylphthalate	200	U								970	U							
Dinitro-2-methylphenol (4,6-)	200	UJ	L							970	U							
Dinitrophenol (2,4-)		R								970	UJ	I						
Dinitrotoluene (2,4-)	200	U								970	U							
Dinitrotoluene (2,6-)	200	U								970	U							
Di-n-octylphthalate	200	UJ	L							970	U							
Hexachlorobenzene	28	UJ								140	UJ							
Hexachlorobutadiene	200	U								970	U							
Hexachlorocyclopentadiene		R								970	UJ	I						
Hexachloroethane	200	UJ	L							970	U							
Isophorone	200	U								970	U							
Methylphenol (2-)	200	U								970	U							
Methylphenol (4-)	200	U								970	U							
Nitroaniline (2-)	200	U								970	U							
Nitroaniline (3-)	200	UJ	L							970	U							
Nitroaniline (4-)	200	UJ	L							970	U							
Nitrobenzene	200	U								970	U							
Nitrophenol (2-)	200	U								970	U							
Nitrophenol (4-)	200	U								970	U							
Nitroso-di-n-propylamine (N-)	35	UJ								170	UJ							
Nitrosodiphenylamine (N-)	200	U								970	U							
Pentachlorophenol	200	U								970	U							
Phenol	200	U								970	U							
Trichlorobenzene (1,2,4-)	200	U								970	U							
Trichlorophenol (2,4,5-)	200	U								970	U							
Trichlorophenol (2,4,6-)	200	U								970	U							
Total Other SVOCs	444			530			400			2,330			260			-		
Total SVOCs	9,472			11,042			1,000			53,509			4,783			2,116		

Analyte	FP-08 ~0-1' 10/10/01			FP-09 ~0-1' 10/10/01			FP-09 ~0-1' 08/05/03			FP-09 ~1-3' 08/05/03			FP-09A ~0-1' 10/13/06			FP-09A ~1-3' 10/13/06		
	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
PAHs																		
Acenaphthene	10	U		32			30			10	U		8.9			0.68	J	I
Acenaphthylene	28			120			99			12			21			0.8	J	I
Anthracene	24			**130**			**170**			10	U		32			1.5	J	I
Benzo(a)anthracene	**100**			**580**			**610**			24			**190**			4.8	J	I
Benzo(a)pyrene	**100**			**570**			**620**			22			**140**			3.4	J	I
Benzo(b)fluoranthene	150			840			860			35			240			6.5		
Benzo(g,h,i)perylene	40			**200**			**390**			21			86			3.5	J	I
Benzo(k)fluoranthene	120			**640**			**570**			15			170			2.8	J	I
Chrysene	**180**			**820**			**750**			25			**260**			6.9		
Dibenz(a,h)anthracene	13			**55**			**120**			10	U		**40**			5.3	U	
Fluoranthene	**240**			**1,100**			**1,300**			49			**420**			9.4		
Fluorene	13			**100**			**89**			10	U		13			0.75	J	I
Indeno(1,2,3-cd)pyrene	50			**210**			**570**			30			98			3.3	J	I
Methylnaphthalene (2-)	30			**1,100**			**260**			26			36			1.3	J	I
Naphthalene	50			**1,100**			140			12			34			1.4	J	I
Phenanthrene	**190**			**830**			**840**			35			**210**			6.2		
Pyrene	**190**			**930**			**950**			41			**310**			7.6		
Total PAHs	1,518			9,357			8,368			347			2,308.9			60.83		
Other SVOCs																		
Benzoic acid	100	J	L	190	J	L												
Benzyl Alcohol	200	U		270	U													
bis(2-Chloroethoxy)methane	200	U		270	U													
bis(2-Chloroethyl)ether	35	UJ		47	UJ													
bis(2-Chloroisopropyl)ether	200	U		270	U													
bis(2-Ethylhexyl)phthalate	46	J		120	J		440	EB	H	230	EB	H						
Bromophenyl-phenylether (4-)	200	U		270	U													
Butylbenzylphthalate	200	U		270	U													
Carbazole	200	U		96	J		210	U		210	U							
Chloro-3-methylphenol (4-)	200	U		270	U													
Chloroaniline (4-)	200	U		270	U													
Chloronaphthalene (2-)	200	U		270	U													
Chlorophenol (2-)	200	U		270	U													
Chlorophenyl-phenylether (4-)	200	U		270	U													
Dibenzofuran	200	U		99	J													
Dichlorobenzene (1,2-)	200	U		270	U													
Dichlorobenzene (1,3-)	200	U		270	U													
Dichlorobenzene (1,4-)	200	U		270	U													
Dichlorobenzidine (3,3'-)	200	U		270	U													
Dichlorophenol (2,4-)	200	U		270	U													
Diethylphthalate	200	U		270	U													
Dimethylphenol (2,4-)	200	U		270	U													
Dimethylphthalate	200	U		270	U													
Di-n-butylphthalate	200	U		270	U													
Dinitro-2-methylphenol (4,6-)	200	U		270	U													
Dinitrophenol (2,4-)	200	UJ	I	270	UJ	I												
Dinitrotoluene (2,4-)	200	U		270	U													
Dinitrotoluene (2,6-)	200	U		270	U													
Di-n-octylphthalate	200	U		270	UJ	L												
Hexachlorobenzene	28	UJ		37	UJ													
Hexachlorobutadiene	200	U		270	U													
Hexachlorocyclopentadiene	200	U		270	UJ	I												
Hexachloroethane	200	U		270	U													
Isophorone	200	U		270	U													
Methylphenol (2-)	200	U		270	U													
Methylphenol (4-)	200	U		93	J													
Nitroaniline (2-)	200	U		270	U													
Nitroaniline (3-)	200	U		270	U													
Nitroaniline (4-)	200	U		270	U													
Nitrobenzene	200	U		270	U													
Nitrophenol (2-)	200	U		270	U													
Nitrophenol (4-)	200	U		270	U													
Nitroso-di-n-propylamine (N-)	35	UJ		47	UJ													
Nitrosodiphenylamine (N-)	200	U		270	U													
Pentachlorophenol	200	U		270	U													
Phenol	200	U		270	U													
Trichlorobenzene (1,2,4-)	200	U		270	U													
Trichlorophenol (2,4,5-)	200	U		270	U													
Trichlorophenol (2,4,6-)	200	U		270	U													
Total Other SVOCs	146			598			440			230			-			-		
Total SVOCs	1,664			9,955			8,808			577			2,309			61		

TABLE 18
Summary of Sediment Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Concentrations in µg/kg

Analyte	COPC Screening Levels: Human Health: USEPA Region IX Res. Soil PRGs	Ecological: 1990 NOAA ER-Ls	Threshold Effects Levels (TELs)	Probable Effects Levels (PELs)	Ontario Lowest Effect Levels (LELs)	USEPA SQBs	USEPA SQCs	MADEP TECs
PAHs								
Acenaphthene	370,000	**150**	NS	NS	NS	NS	NS	NS
Acenaphthylene	NS	NS	NS	NS	NS	NS	NS	NS
Anthracene	2,200,000	85	NS	NS	220	NS	NS	**57**
Benzo(a)anthracene	620	230	**32**	385	320	NS	NS	108
Benzo(a)pyrene	62	400	**32**	782	370	NS	NS	150
Benzo(b)fluoranthene	620	NS	NS	NS	NS	NS	NS	NS
Benzo(g,h,i)perylene	NS	NS	NS	NS	**170**	NS	NS	NS
Benzo(k)fluoranthene	6,200	NS	NS	NS	**240**	NS	NS	NS
Chrysene	62,000	400	**57**	862	340	NS	NS	166
Dibenz(a,h)anthracene	62	60	NS	NS	NS	60	NS	**33**
Fluoranthene	230,000	600	**111**	2,355	750	NS	NS	423
Fluorene	270,000	**35**	NS	NS	190	540	NS	77
Indeno(1,2,3-cd)pyrene	620	NS	NS	NS	**200**	NS	NS	NS
Methylnaphthalene (2-)	NS	**65**	NS	NS	NS	NS	NS	NS
Naphthalene	5,600	340	NS	NS	NS	480	NS	**176**
Phenanthrene	NS	225	**42**	515	560	NS	NS	204
Pyrene	230,000	350	**53**	875	490	NS	NS	195
Total PAHs	NS	NS	NS	NS	NS	NS	NS	NS
Other SVOCs								
Benzoic acid	24,000,000	NS	NS	NS	NS	NS	NS	NS
Benzyl Alcohol	1,800,000	NS	NS	NS	NS	NS	NS	NS
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS
bis(2-Chloroethyl)ether	220	NS	NS	NS	NS	NS	NS	NS
bis(2-Chloroisopropyl)ether	2,900	NS	NS	NS	NS	NS	NS	NS
bis(2-Ethylhexyl)phthalate	35,000	NS	NS	NS	NS	NS	NS	NS
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	**1,300**	NS	NS
Butylbenzylphthalate	1,200,000	NS	NS	NS	NS	**11,000**	NS	NS
Carbazole	24,000	NS	NS	NS	NS	NS	NS	NS
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS
Chloroaniline (4-)	24,000	NS	NS	NS	NS	NS	NS	NS
Chloronaphthalene (2-)	490,000	NS	NS	NS	NS	NS	NS	NS
Chlorophenol (2-)	6,300	NS	NS	NS	NS	NS	NS	NS
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS
Dibenzofuran	15,000	NS	NS	NS	NS	**2,000**	NS	NS
Dichlorobenzene (1,2-)	110,000	NS	NS	NS	NS	**340**	NS	NS
Dichlorobenzene (1,3-)	53,000	NS	NS	NS	NS	**1,700**	NS	NS
Dichlorobenzene (1,4-)	3,400	NS	NS	NS	NS	**350**	NS	NS
Dichlorobenzidine (3,3'-)	1,100	NS	NS	NS	NS	NS	NS	NS
Dichlorophenol (2,4-)	18,000	NS	NS	NS	NS	NS	NS	NS
Diethylphthalate	4,900,000	NS	NS	NS	NS	**630**	NS	NS
Dimethylphenol (2,4-)	120,000	NS	NS	NS	NS	NS	NS	NS
Dimethylphthalate	61,000,000	NS	NS	NS	NS	NS	NS	NS
Di-n-butylphthalate	610,000	NS	NS	NS	NS	**11,000**	NS	NS
Dinitro-2-methylphenol (4,6-)	610	NS	NS	NS	NS	NS	NS	NS
Dinitrophenol (2,4-)	12,000	NS	NS	NS	NS	NS	NS	NS
Dinitrotoluene (2,4-)	12,000	NS	NS	NS	NS	NS	NS	NS
Dinitrotoluene (2,6-)	6,100	NS	NS	NS	NS	NS	NS	NS
Di-n-octylphthalate	240,000	NS	NS	NS	NS	NS	NS	NS
Hexachlorobenzene	300	NS	NS	NS	**20**	NS	NS	NS
Hexachlorobutadiene	1,800	NS	NS	NS	NS	NS	NS	NS
Hexachlorocyclopentadiene	37,000	NS	NS	NS	NS	NS	NS	NS
Hexachloroethane	6,100	NS	NS	NS	NS	**1,000**	NS	NS
Isophorone	510,000	NS	NS	NS	NS	NS	NS	NS
Methylphenol (2-)	310,000	NS	NS	NS	NS	NS	NS	NS
Methylphenol (4-)	31,000	NS	NS	NS	NS	NS	NS	NS
Nitroaniline (2-)	18,000	NS	NS	NS	NS	NS	NS	NS
Nitroaniline (3-)	1,800	NS	NS	NS	NS	NS	NS	NS
Nitroaniline (4-)	18,000	NS	NS	NS	NS	NS	NS	NS
Nitrobenzene	2,000	NS	NS	NS	NS	NS	NS	NS
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS
Nitrophenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS
Nitroso-di-n-propylamine (N-)	69	NS	NS	NS	NS	NS	NS	NS
Nitrosodiphenylamine (N-)	99,000	NS	NS	NS	NS	NS	NS	NS
Pentachlorophenol	3,000	NS	NS	NS	NS	NS	NS	NS
Phenol	1,800,000	NS	NS	NS	NS	NS	NS	NS
Trichlorobenzene (1,2,4-)	6,200	NS	NS	NS	NS	**9,200**	NS	NS
Trichlorophenol (2,4,5-)	610,000	NS	NS	NS	NS	NS	NS	NS
Trichlorophenol (2,4,6-)	610	NS	NS	NS	NS	NS	NS	NS
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS

Flood Plain Sediments (cont.)

Analyte	FP-09B ~0-1' 10/13/06 Result	Qualifier	Bias	FP-09B ~1-3' 10/13/06 Result	Qualifier	Bias	FP-09C ~0-1' 10/13/06 Result	Qualifier	Bias	FP-09C ~1-3' 10/13/06 Result	Qualifier	Bias	FP-09D ~0-1' 10/13/06 Result	Qualifier	Bias	FP-09D ~1-3' 10/13/06 Result	Qualifier	Bias	FP-09E ~0-1' 10/13/06 Result	Qualifier	Bias	FP-09E ~1-3' 10/13/06 Result	Qualifier	Bias	FP-09F ~0-1' 10/13/06 Result	Qualifier	Bias	FP-09F ~1-3' 10/13/06 Result	Qualifier	Bias	FP-10 ~0-1' 10/10/01 Result	Qualifier	Bias
PAHs																																		
Acenaphthene	6.6			0.6	J	I	1.9	J	L	0.86	J	I	31			5.3			6.8			5.6			4.3			2	J	I	14		
Acenaphthylene	8.7			1.2	J	I	3.4	J	L	0.84	J	I	21			7.2			11			17			31	J	I	9.5			34		
Anthracene	19			2.4	J	I	5.8	J	L	0.74	J	I	**90**			32			54			32			23			10			38		
Benzo(a)anthracene	**130**			16			**36**	J	L	4.3	J	I	**370**			**130**			**700**	J	L	**170**			**120**			**57**			**150**		
Benzo(a)pyrene	**90**			13			**37**	J	L	3.7	J	I	**280**			**91**			**520**	J	L	**140**			**100**	J	I	**34**			**150**		
Benzo(b)fluoranthene	160			20			58	J	L	6.1			440			150			730	J	L	200			160			94			200		
Benzo(g,h,i)perylene	65			14			28	J	L	4.1	J	I	150			59			**320**	J	I	68			57	J	I	18			58		
Benzo(k)fluoranthene	120			12			27	J	L	3.8	J	I	**320**			110			**610**	J	L	170			120	J	I	42			190		
Chrysene	**180**			23			49	J	L	6.9			**500**			**180**			**800**	J	L	**250**			**180**			**110**			**250**		
Dibenz(a,h)anthracene	31			5.2			9.9	J	L	1.3	J	I	**72**			30			**130**			32			24	J	I	11			18		
Fluoranthene	**280**			33			69	J	L	10			**730**			**290**			**1,300**	J	L	**340**			**230**			**130**			**360**		
Fluorene	8			0.8	J	I	2.3	J	L	4.4	U		34			8.1			9			19			11			9.5			19		
Indeno(1,2,3-cd)pyrene	72			13			26	J	L	4	J	I	170			65			**350**	J	L	79			58	J	I	22			71		
Methylnaphthalene (2-)	21			1.8	J	I	9.4	J	L	1.5	J	I	50			18			32			**170**			**66**			50			34		
Naphthalene	23			2.3	J	I	6.5	J	L	1.4	J	I	41			20			16			76			38			26			65		
Phenanthrene	**130**			13			**43**	J	L	4.9			**460**			**150**			**300**			**240**			**170**			**120**			**270**		
Pyrene	**210**			26			**69**	J	L	7.9			**600**			**190**			**990**	J	L	**270**			**210**			**100**			**290**		
Total PAHs	1,554.3			197.3			481.2			62.34			4,359			1,535.6			6,878.8			2,278.6			1,602.3			845			2,211		
Other SVOCs																																		
Benzoic acid																															100	J	L
Benzyl Alcohol																															190	U	
bis(2-Chloroethoxy)methane																															190	U	
bis(2-Chloroethyl)ether																															34	UJ	
bis(2-Chloroisopropyl)ether																															190	U	
bis(2-Ethylhexyl)phthalate																															130	J	
Bromophenyl-phenylether (4-)																															190	U	
Butylbenzylphthalate																															190	U	
Carbazole																															190	U	
Chloro-3-methylphenol (4-)																															190	U	
Chloroaniline (4-)																															190	U	
Chloronaphthalene (2-)																															190	U	
Chlorophenol (2-)																															190	U	
Chlorophenyl-phenylether (4-)																															190	U	
Dibenzofuran																															190	U	
Dichlorobenzene (1,2-)																															190	U	
Dichlorobenzene (1,3-)																															190	U	
Dichlorobenzene (1,4-)																															190	U	
Dichlorobenzidine (3,3'-)																															190	U	
Dichlorophenol (2,4-)																															190	U	
Diethylphthalate																															190	U	
Dimethylphenol (2,4-)																															190	U	
Dimethylphthalate																															190	U	
Di-n-butylphthalate																															190	U	
Dinitro-2-methylphenol (4,6-)																															190	U	
Dinitrophenol (2,4-)																															190	UJ	I
Dinitrotoluene (2,4-)																															190	U	
Dinitrotoluene (2,6-)																															190	U	
Di-n-octylphthalate																															190	U	
Hexachlorobenzene																															27	UJ	
Hexachlorobutadiene																															190	U	
Hexachlorocyclopentadiene																															190	U	
Hexachloroethane																															190	U	
Isophorone																															190	U	
Methylphenol (2-)																															190	U	
Methylphenol (4-)																															190	U	
Nitroaniline (2-)																															190	U	
Nitroaniline (3-)																															190	U	
Nitroaniline (4-)																															190	U	
Nitrobenzene																															190	U	
Nitrophenol (2-)																															190	U	
Nitrophenol (4-)																															190	U	
Nitroso-di-n-propylamine (N-)																															34	UJ	
Nitrosodiphenylamine (N-)																															190	U	
Pentachlorophenol																															190	U	
Phenol																															190	U	
Trichlorobenzene (1,2,4-)																															190	U	
Trichlorophenol (2,4,5-)																															190	U	
Trichlorophenol (2,4,6-)																															190	U	
Total Other SVOCs	-			-			-			-			-			-			-			-			-			-			230		
Total SVOCs	1,554			197			481			62			4,359			1,536			6,879			2,279			1,602			845			2,441		

Flood Plain Reference Sediments

Analyte	FPR-01 ~0-1' 10/09/01 Result	Qualifier	Bias	FPR-02 ~0-1' 10/09/01 Result	Qualifier	Bias	FPR-03 ~0-1' 10/09/01 Result	Qualifier	Bias	FPR-04 ~0-1' 10/09/01 Result	Qualifier	Bias	FPR-05 ~0-1' 10/09/01 Result	Qualifier	Bias	FPR-06 ~0-1' 10/09/01 Result	Qualifier	Bias	FPR-07 ~0-1' 10/09/01 Result	Qualifier	Bias
PAHs																					
Acenaphthene	45			9.6	U		9.7	U		9.8	U		12	U		10	U		10	U	
Acenaphthylene	91			9.6	U		9.7	U		9.8	U		16			34			30		
Anthracene	**130**			9.6	U		9.7	U		9.8	U		12			26			22		
Benzo(a)anthracene	**400**			27			9.7	U		14			**53**			**94**			**87**		
Benzo(a)pyrene	**510**			26			9.7	U		14			**56**			**100**			**100**		
Benzo(b)fluoranthene	740			29			9.7	U		20			81			150			160		
Benzo(g,h,i)perylene	160			14			9.7	U		11			45			39			38		
Benzo(k)fluoranthene	**530**			31			9.7	U		18			60			120			100		
Chrysene	**740**			38			9.7	U		24			**95**			**170**			**160**		
Dibenz(a,h)anthracene	**44**			9.6	U		9.7	U		9.8	U		12	U		11			11		
Fluoranthene	**1,100**			60			9.7	U		39			**130**			**240**			**250**		
Fluorene	**72**			9.6	U		9.7	U		9.8	U		12	U		17			14		
Indeno(1,2,3-cd)pyrene	180			17			9.7	U		12			41			47			46		
Methylnaphthalene (2-)	**78**			9.6	U		9.7	U		9.8	U		12	U		17			17		
Naphthalene	130			11			9.7	U		11			22			28			35		
Phenanthrene	**870**			**52**			9.7	U		29			**110**			**210**			**190**		
Pyrene	**900**			51			9.7	U		30			**110**			**200**			**190**		
Total PAHs	6,720			356			-			222			831			1,503			1,450		
Other SVOCs																					
Benzoic acid	270	J	L	88	J	L	73	J	L	81	J	L	530			190	J	L	180	J	L
Benzyl Alcohol	380	U		190	U		190	U		200	U		250	U		34	J		200	U	
bis(2-Chloroethoxy)methane	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
bis(2-Chloroethyl)ether	66	UJ		34	UJ		34	UJ		34	UJ		43	UJ		35	UJ		35	UJ	
bis(2-Chloroisopropyl)ether	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
bis(2-Ethylhexyl)phthalate	440			190	U		190	U		200	U		43	J		93	J		130	J	
Bromophenyl-phenylether (4-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Butylbenzylphthalate	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Carbazole	95	J		190	U		190	U		200	U		250	U		200	U		200	U	
Chloro-3-methylphenol (4-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Chloroaniline (4-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Chloronaphthalene (2-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Chlorophenol (2-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Chlorophenyl-phenylether (4-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Dibenzofuran	64	J		190	U		190	U		200	U		250	U		200	U		200	U	
Dichlorobenzene (1,2-)	380	U		35	J		190	U		200	U		250	U		200	U		200	U	
Dichlorobenzene (1,3-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Dichlorobenzene (1,4-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Dichlorobenzidine (3,3'-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Dichlorophenol (2,4-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Diethylphthalate	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Dimethylphenol (2,4-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Dimethylphthalate	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Di-n-butylphthalate	70	J		190	U		190	U		200	U		250	U		200	U		200	U	
Dinitro-2-methylphenol (4,6-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Dinitrophenol (2,4-)	380	UJ	I	190	UJ	I	190	UJ	I	200	UJ	I	250	UJ	I	200	UJ	I	200	UJ	I
Dinitrotoluene (2,4-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Dinitrotoluene (2,6-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Di-n-octylphthalate	380	UJ	L	190	U		190	U		200	U		250	U		200	UJ	L	200	UJ	L
Hexachlorobenzene	53	UJ		27	UJ		27	UJ		28	UJ		35	UJ		28	UJ		28	UJ	
Hexachlorobutadiene	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Hexachlorocyclopentadiene	380	UJ	I	190	U		190	U		200	U		250	U		200	U		200	U	
Hexachloroethane	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Isophorone	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Methylphenol (2-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Methylphenol (4-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Nitroaniline (2-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Nitroaniline (3-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Nitroaniline (4-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Nitrobenzene	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Nitrophenol (2-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Nitrophenol (4-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Nitroso-di-n-propylamine (N-)	66	UJ		34	UJ		34	UJ		34	UJ		43	UJ		35	UJ		35	UJ	
Nitrosodiphenylamine (N-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Pentachlorophenol	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Phenol	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Trichlorobenzene (1,2,4-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Trichlorophenol (2,4,5-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Trichlorophenol (2,4,6-)	380	U		190	U		190	U		200	U		250	U		200	U		200	U	
Total Other SVOCs	939			123			73			81			573			317			310		
Total SVOCs	7,659			479			73			303			1,404			1,820			1,760		

TABLE 18
Summary of Sediment Data - Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analyte	Concentrations in µg/kg																																						
	COPC Screening Levels								Flood Plain Reference Sediments (cont.)									Former Mill Tailrace Sediments																				
	Human Health	Ecological							FPR-08			FPR-09			FPR-10			TR-1			TR-2			TR-3						TR-4			TR-5					
									~0-1'			~0-1'			~0-1'			~0-0.5'			~0-0.4'			~0-0.4'			~0-0.5'			~0-0.4'			~0-0.6'					
									10/09/01			10/09/01			10/09/01			07/25/01			07/25/01			07/25/01			12/16/02			07/25/01			07/25/01					
	USEPA Region IX Res. Soil PRGs	1990 NOAA ER-Ls	Threshold Effects Levels (TELs)	Probable Effects Levels (PELs)	Ontario Lowest Effect Levels (LELs)	USEPA SQBs	USEPA SQCs	MADEP TECs	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias			
PAHs																																							
Acenaphthene	370,000	**150**	NS	NS	NS	NS	NS	NS	50			10	U		9.7	U		130			25			**250**			55			**600**			**220**					
Acenaphthylene	NS	NS	NS	NS	NS	NS	NS	NS	610			17			46			30			44			670			240			1300			460					
Anthracene	2,200,000	85	NS	NS	220	NS	NS	**57**	**360**			17			33			44			34			**780**			**170**			**1,400**			**520**					
Benzo(a)anthracene	620	230	**32**	385	320	NS	NS	108	**1,300**			**67**			**130**			30			**110**			**2,700**			**430**			**4,000**			**1,200**					
Benzo(a)pyrene	62	400	**32**	782	370	NS	NS	150	**1,200**			**76**			**160**			25			**160**			**2,400**	J	L	**670**			**3,200**			**1,200**	J	L			
Benzo(b)fluoranthene	620	NS	NS	NS	NS	NS	NS	NS	1,200			86			170			26			140			4,400	J	L	580			4600			2,000	J	L			
Benzo(g,h,i)perylene	NS	NS	NS	NS	**170**	NS	NS	NS	**350**			26			60			18			80			**380**	J	L	120	J	L	**1,600**			**270**	J	L			
Benzo(k)fluoranthene	6,200	NS	NS	NS	**240**	NS	NS	NS	**880**			71			160			18			85			**3,200**	J	L	**660**			**3,800**			**1,400**	J	L			
Chrysene	62,000	400	**57**	862	340	NS	NS	166	**1,900**			**100**			**230**			30			**150**			**3,000**			**630**			**4,500**			**1,500**					
Dibenz(a,h)anthracene	62	60	NS	NS	60	NS	NS	**33**	**110**			10	U		15			6.3			21			**180**	J	L	**48**			**240**			**100**	J	L			
Fluoranthene	230,000	600	**111**	2,355	750	NS	NS	423	**2,700**			**150**			**300**			72			**250**			**3,900**			**720**			**9,000**			**2,300**					
Fluorene	270,000	**35**	NS	NS	190	540	NS	77	**230**			11			22			**110**			30			**360**			**73**			**870**			**340**					
Indeno(1,2,3-cd)pyrene	620	NS	NS	NS	**200**	NS	NS	NS	**360**			31			56			17			84			**440**	J	L	150			**1,800**			**430**	J	L			
Methylnaphthalene (2-)	NS	**65**	NS	NS	NS	NS	NS	NS	**84**			16			23			**420**			**73**			**450**			**170**			**730**			**420**					
Naphthalene	5,600	340	NS	NS	NS	480	NS	**176**	98			23			25			**380**			96			**520**			**260**			**920**			**510**					
Phenanthrene	NS	225	**42**	515	560	NS	NS	204	**2,400**			**120**			**290**			**340**			**190**			**2,000**			**550**			**6,900**			**1,700**					
Pyrene	230,000	350	**53**	875	490	NS	NS	195	**3,000**			**140**			**340**			**76**			**300**			**4,800**			**1,300**			**8,500**			**3,600**					
Total PAHs	NS	NS	NS	NS	NS	NS	NS	NS	16,832			951			2,060			1,772.3			1,872			30,430			6,826			53,960			18,170					
Other SVOCs																																							
Benzoic acid	24,000,000	NS	NS	NS	NS	NS	NS	NS	390	UJ	L	180	J	L	190	UJ	L	42	J	L	67	J	L	480	J	L	170	J	L	620	J	L	500	J	L			
Benzyl Alcohol	1,800,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		66	J		190	UJ	L	54	J		57	J				
bis(2-Chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
bis(2-Chloroethyl)ether	220	NS	NS	NS	NS	NS	NS	NS	68	UJ		35	UJ		34	UJ		43	UJ		35	UJ		51	UJ					41	UJ		46	UJ				
bis(2-Chloroisopropyl)ether	2,900	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
bis(2-Ethylhexyl)phthalate	35,000	NS	NS	NS	NS	NS	NS	NS	100	J		50	J		310			46	J		200	U		290			340	U		110	J		290					
Bromophenyl-phenylether (4-)	NS	NS	NS	NS	NS	**1,300**	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Butylbenzylphthalate	1,200,000	NS	NS	NS	NS	**11,000**	NS	NS	390	U		200	U		52	J		250	U		200	U		290	U					230	U		270	U				
Carbazole	24,000	NS	NS	NS	NS	NS	NS	NS	91	J		200	U		190	U		250	U		200	U		210	J		190	U		630			170	J				
Chloro-3-methylphenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Chloroaniline (4-)	24,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Chloronaphthalene (2-)	490,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Chlorophenol (2-)	6,300	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Chlorophenyl-phenylether (4-)	NS	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Dibenzofuran	15,000	NS	NS	NS	NS	**2,000**	NS	NS	390	U		200	U		190	U		250	U		200	U		100	J					460			82	J				
Dichlorobenzene (1,2-)	110,000	NS	NS	NS	NS	**340**	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Dichlorobenzene (1,3-)	53,000	NS	NS	NS	NS	**1,700**	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Dichlorobenzene (1,4-)	3,400	NS	NS	NS	NS	**350**	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Dichlorobenzidine (3,3'-)	1,100	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Dichlorophenol (2,4-)	18,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Diethylphthalate	4,900,000	NS	NS	NS	NS	**630**	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Dimethylphenol (2,4-)	120,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		60	J	H	190	UJ	L	72	J	H	270	U				
Dimethylphthalate	61,000,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Di-n-butylphthalate	610,000	NS	NS	NS	NS	**11,000**	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Dinitro-2-methylphenol (4,6-)	610	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	UJ	L	200	U		290	U					230	U		270	U				
Dinitrophenol (2,4-)	12,000	NS	NS	NS	NS	NS	NS	NS	390	UJ	I	200	UJ	I	190	UJ	I		R		500	UJ	L	730	UJ	L				580	UJ	L	660	UJ	L			
Dinitrotoluene (2,4-)	12,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Dinitrotoluene (2,6-)	6,100	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Di-n-octylphthalate	240,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	UJ	L	190	U		230	U		270	UJ	L			
Hexachlorobenzene	300	NS	NS	NS	**20**	NS	NS	NS	54	UJ		28	UJ		27	UJ		35	UJ		28	UJ		41	UJ					33	UJ		37	UJ				
Hexachlorobutadiene	1,800	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Hexachlorocyclopentadiene	37,000	NS	NS	NS	NS	NS	NS	NS	390	UJ	I	200	U		190	UJ	I	250	UJ	L	200	UJ	L	290	UJ	L				230	UJ	L	270	UJ	L			
Hexachloroethane	6,100	NS	NS	NS	NS	**1,000**	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Isophorone	510,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Methylphenol (2-)	310,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Methylphenol (4-)	31,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		160	J		190	U		190	J		150	J				
Nitroaniline (2-)	18,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Nitroaniline (3-)	1,800	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Nitroaniline (4-)	18,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U		190	U		230	U		270	U				
Nitrobenzene	2,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Nitrophenol (2-)	NS	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Nitrophenol (4-)	NS	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Nitroso-di-n-propylamine (N-)	69	NS	NS	NS	NS	NS	NS	NS	68	UJ		35	UJ		34	UJ		43	UJ		35	UJ		51	UJ					41	UJ		46	UJ				
Nitrosodiphenylamine (N-)	99,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Pentachlorophenol	3,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Phenol	1,800,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		95	J					70	J		85	J				
Trichlorobenzene (1,2,4-)	6,200	NS	NS	NS	NS	**9,200**	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Trichlorophenol (2,4,5-)	610,000	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Trichlorophenol (2,4,6-)	610	NS	NS	NS	NS	NS	NS	NS	390	U		200	U		190	U		250	U		200	U		290	U					230	U		270	U				
Total Other SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	191			230			362			88			67			1,461			170			2,206			1,334					
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	NS	17,023			1,181			2,422			1,860.3			1,939			31,891			6,996			56,166			19,504					

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. (SHA) on the dates indicated; see Table 1D for identity of sample delivery groups (SDGs).

2. For samples collected in 2001 and 2002, Woods Hole Group Environmental Laboratories (WHGEL) of Raynham, Massachusetts, performed analyses for semi-volatile organic compounds (SVOCs) by United States Environmental Protection Agency (USEPA) Method 8270C-EI; and polycyclic aromatic hydrocarbons (PAHs) by USEPA Method 8270C using selective ion monitoring (SIM) (when required to achieve Project Action Levels).

For samples collected in 2006, Alpha Woods Hole Laboratories (formerly WHGEL) of Raynham, Massachusetts, performed analyses for PAHs by USEPA Method 8270C using SIM.

3. Data validation and data usability assessment performed by SHA and New Environmental Horizons, Inc. (NEH). Results are presented in the Data Usability Report (SHA, 2002) and in Appendix C of this Report.

4. All concentrations are presented in micrograms per kilogram (µg/kg), which are equivalent to parts per billion (ppb).

5. "COPC Screening Levels" indicates contaminants of potential concern (COPC) screening levels used to determine inclusion of an analyte in the human health or ecological risk assessments. Analyte detections that exceed the human health screening level (shaded value) are shaded. Analyte detections that exceed the lowest of the ecological screening levels (**bold** value) are in **bold**.

"USEPA Region IX Res. Soil PRGs" indicates the values presented are from the USEPA Region IX Residential Soil Preliminary Remediation Goals (PRGs), dated October 1, 2004. PRGs based on non-cancer effects are multiplied by 0.1 per USEPA Guidance (USEPA Region 1, Risk Update Number 5, September 1999). The soil PRGs are used as a conservative estimate of target risk levels, and some exposure pathways included in the residential soil PRG development may not be applicable for sediment exposure.

"1990 NOAA ER-Ls" indicates National Oceanic and Atmospheric Administration (NOAA) Effects Range - Low (ER-L). The values presented are from "The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program," from the National Ocean Service, Rockville, Maryland, March 1990, NOAA, page 138.

"Threshold Effects Levels (TELs)" and "Probable Effects Levels (PELs)" indicate the values presented are from "A Preliminary Evaluation of Sediment Quality Assessment Values for Freshwater Ecosystems," by Smith, et al., J. Great Lakes Res., 22(3): 624-638.

"Ontario Lowest Effect Levels (LELs)" indicates the values presented are from "Development of the Ontario Provincial Sediment Quality Guidelines for Polycyclic Aromatic Hydrocarbons (PAHs)," Ministry of Environment and Energy, Ontario, Canada, January 1994.

"USEPA SQBs" indicates the values presented are Sediment Quality Benchmarks (SQBs) from USEPA Ecotox Thresholds (1996).

"USEPA SQCs" indicates the values presented are Sediment Quality Criteria (SQC) from USEPA Ecotox Thresholds (1996). The values are the lower limit of the 95 percent confidence interval.

"MADEP TECs" indicates the values presented are from the Massachusetts Department of Environmental Protection (MADEP) "Recommended Freshwater Sediment Screening Values" (May 2002), which are based on the consensus-based threshold effect concentrations (TECs) from "Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems," by MacDonald, et al., Archives of Environmental Contamination and Toxicology, 36:20-31.

A blank Result field indicates sample was not analyzed for this parameter.

6. Total concentrations listed (e.g. Total PAHs) are the sum of detected concentrations of the relevant suite of compounds. "PAHs" are polycyclic aromatic hydrocarbons. "Other SVOCs" are non-PAH semi-volatile organic compounds.

7. The following qualifiers and biases were assigned during data validation by NEH. Refer to NEH's Data Usability Reports (included in Appendix A.2 of the Data Usability Report [SHA, 2002], Appendix B.7 of the Phase 1B RI Data Usability Report [SHA, 2004], and Appendix C of this Report) for additional detail regarding qualifiers and bias.

Qualifiers:
"J" The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"U" The compound was analyzed for, but was not detected. The associated numerical value is the sample-specific reporting limit. The value is usable for project decisions as a non-detect result at the reporting limit.
"UJ" The compound was analyzed for, but was not detected. The sample-specific quantitation (reporting) limit is estimated. The non-detect result is usable for project objectives with documentation of the bias or uncertainty in the result.
"R" Indicates data rejected during validation.

Bias:
"L" Low
"I" Indeterminate
"H" High

TABLE 19
Summary of Soil Vapor Data–Volatile & Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/m^3												
	COPC Screening Levels	AA-01			SV-01			SV-02			SV-03		
	Target Soil Gas Concentrations	09-07-06			09-07-06			09-07-06			09-07-06		
		Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
VOCs													
AVOCs													
Benzene	**3.1**	1.60	U		16.0	U		1.54	J	I	2.12		
Ethylbenzene	**22**	2.17	U		21.7	U		15.8			5.00		
Ethyltoluene (4-)	**NS**	2.46	U		24.6	U		9.27			2.65		
Styrene	**1,000**	2.13	U		21.3	U		4.26	U		2.13	U	
Toluene	**400**	1.88	U		74.2			63.0			26.2		
Trimethylbenzene (1,2,4-)	**6.0**	2.46	U		24.6	U		**35.9**			2.46	U	
Trimethylbenzene (1,3,5-)	**6.0**	2.46	U		**28.4**			**10.2**			3.07		
Xylene (m,p-)	**7,000**	4.34	U		16.9	J	I	66.4			18.6		
Xylene (o-)	**7,000**	2.17	U		9.54	J	I	24.3			8.45		
Total AVOCs	NS	-			129.04			226.41			66.09		
CVOCs													
Benzyl Chloride	**0.5**	2.59	U		25.9	U		5.17	U		2.59	U	
Carbon tetrachloride	**1.6**	3.14	U		31.4	U		6.29	U		3.14	U	
Chlorobenzene	**60**	2.30	U		23.0	U		4.60	U		2.30	U	
Chloroethane	**10,000**	1.32	U		13.2	U		2.64	U		1.32	U	
Chloroform	**1.1**	2.44	U		**12.3**	J	I	4.88	U		2.44	U	
Chloromethane	**24**	1.03	U		10.3	U		2.06	U		1.03	U	
Chloropropene (3-)	NS	1.56	U		15.6	U		3.13	U		1.56	U	
Dichlorobenzene (1,2-)	**200**	3.00	U		30.0	U		6.01	U		3.00	U	
Dichlorobenzene (1,3-)	**110**	3.00	U		30.0	U		6.01	U		2.06	J	I
Dichlorobenzene (1,4-)	**800**	3.00	U		30.0	U		6.01	U		3.00	U	
Dichloroethane (1,1-)	**500**	2.02	U		20.2	U		4.04	U		2.02	U	
Dichloroethane (1,2-)	**0.94**	2.02	U		20.2	U		4.04	U		2.02	U	
Dichloroethene (1,1-)	**200**	1.98	U		19.8	U		3.96	U		1.98	U	
Dichloroethene (cis-1,2-)	**35**	1.98	U		**40.0**			3.96	U		1.98	U	
Dichloroethene (trans-1,2-)	**70**	1.98	U		19.8	U		3.96	U		1.98	U	
Dichloropropane (1,2-)	**4.0**	2.31	U		23.1	U		4.62	U		2.31	U	
Dichloropropene (cis-1,3-) †	**6.1**	2.27	U		22.7	U		4.53	U		2.27	U	
Dichloropropene (trans-1,3-) †	**6.1**	2.27	U		22.7	U		4.53	U		2.27	U	
Hexachlorobutadiene	**1.1**	5.33	U		53.3	U		10.6	U		5.33	U	
Methylene chloride	**52**	12.5			34.7	U		4.52	J	I	3.47	U	
Tetrachloroethane (1,1,2,2-)	**0.42**	3.43	U		34.3	U		6.86	U		3.43	U	
Tetrachloroethene	**8.1**	3.39	U		33.9	U		6.78	U		3.39	U	
Trichlorobenzene (1,2,4-)	**200**	3.71	U		37.1	U		7.42	U		3.71	U	
Trichloroethane (1,1,1-)	**2,200**	2.72	U		27.2	U		5.45	U		2.72	U	
Trichloroethane (1,1,2-)	**1.5**	2.72	U		27.2	U		5.45	U		2.72	U	
Trichloroethene ‡	**0.22**	2.68	U		**3,860**			**2.70**	J	I	**4.02**		
Vinyl chloride	**2.8**	1.28	U		12.8	U		2.55	U		1.28	U	
Total CVOCs	NS	12.5			3,912.30			7.22			6.08		
Other VOCs													
Acetone	**350**	1.39	J	I	11.1	J	I	4.06	J	I	4.89		
Bromodichloromethane	**1.4**	3.35	U		33.5	U		6.70	U		3.35	U	
Bromoform	**22**	5.16	U		51.6	U		10.3	U		5.16	U	
Bromomethane	**5.0**	1.94	U		19.4	U		3.88	U		1.94	U	
Butadiene (1,3-)	**0.087**	1.10	U		11.0	U		2.21	U		1.10	U	
Butanone (2-)	**1,000**	1.47	U		14.7	U		2.95	U		1.47	U	
Carbon disulfide	**700**	1.56	U		15.6	U		3.11	U		1.56	U	
Cyclohexane	NS	1.72	U		17.2	U		3.44	U		1.72	U	
Dibromochloromethane	**1.0**	4.26	U		42.6	U		8.51	U		4.26	U	
Dibromoethane (1,2-)	**0.11**	3.84	U		38.4	U		7.68	U		3.84	U	
Dichloro-1,2-tetrafluoroethane (1,1,2,2-)	NS	3.49	U		34.9	U		6.98	U		3.49	U	
Dichlorodifluoromethane	**200**	4.94	U		49.4	U		9.88	U		4.94	U	
Dioxane (1,4-)	NS	3.60	U		36.0	U		7.20	U		3.60	U	
Ethyl Alcohol	NS	3.76	U		12.8	J	I	4.39	J	I	4.81		
Ethylacetate	**3,200**	1.80	U		18.0	U		3.60	U		1.80	U	
Heptane	NS	2.05	U		20.5	U		4.10	U		2.05	U	
Hexane (n-)	**200**	3.52	U		35.2	U		5.23	J	I	0.99	J	I
Hexanone (2-)	NS	2.05	U		20.5	U		4.09	U		2.05	U	
Iso-Propyl Alcohol	NS	1.23	U		12.3	U		2.46	U		1.23	U	
Methyl-2-pentanone (4-)	**80**	2.05	U		20.5	U		4.09	U		2.05	U	
Methyl-tert Butyl Ether	**3,000**	1.80	U		18.0	U		3.60	U		1.80	U	
Propylene	NS	1.72	U		17.2	U		3.44	U		1.72	U	
Tetrahydrofuran	NS	1.47	U		14.7	U		2.95	U		1.53		
Trichloro-1,1,2-trifluoroethane (1,2,2-)	**30,000**	3.83	U		38.3	U		7.66	U		3.83	U	
Trichlorofluoromethane	**700**	2.81	U		28.1	U		5.61	U		2.81	U	
Trimethylpentane (2,2,4-)	NS	2.33	U		23.3	U		4.67	U		2.33	U	
Vinyl acetate	**200**	1.76	U		17.6	U		3.52	U		1.76	U	
Vinyl Bromide	NS	2.18	U		21.8	U		4.37	U		2.18	U	
Total Other VOCs	NS	1.39			23.9			13.68			12.224		
Total VOCs	NS	13.89			4,065.24			247.31			84.394		
PAHs													
Methylnaphthalene (2-)	**70**	8.00	U		2.30	J	I	4.19	J	I	8.00	U	
Naphthalene	**3.0**	2.00	U		**7.15**			**10.9**			1.56	J	I
Total PAHs	NS	-			9.45			15.09			1.56		

TABLE 19
Summary of Soil Vapor Data–Volatile & Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/m3.												
	COPC Screening Levels	SV-04			SV-05			SV-06			SV-07		
	Target Soil Gas Concentrations	09-07-06			09-07-06			09-07-06			09-06-06		
		Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias
VOCs													
AVOCs													
Benzene	**3.1**	1.60	U		1.08	J	I	**5.84**			**12.9**		
Ethylbenzene	**22**	4.70			8.95			**24.3**			2.17	U	
Ethyltoluene (4-)	**NS**	2.46	U		4.33			10.5			2.46	U	
Styrene	**1,000**	2.13	U		2.13	U		2.13	U		2.13	U	
Toluene	**400**	9.39			28.9			105			5.20		
Trimethylbenzene (1,2,4-)	**6.0**	2.46	U		2.46	U		**33.8**			2.46	U	
Trimethylbenzene (1,3,5-)	**6.0**	2.49			5.81			**9.63**			2.46	U	
Xylene (m,p-)	**7,000**	16.2			35.9			90.9			4.34	U	
Xylene (o-)	**7,000**	5.46			13.1			27.3			2.17	U	
Total AVOCs	NS	38.24			98.07			307.27			18.1		
CVOCs													
Benzyl Chloride	**0.5**	2.59	U		2.59	U		2.59	U		2.59	U	
Carbon tetrachloride	**1.6**	3.14	U		3.14	U		3.14	U		3.14	U	
Chlorobenzene	**60**	2.30	U		2.30	U		2.30	U		2.30	U	
Chloroethane	**10,000**	1.32	U		1.32	U		1.32	U		1.32	U	
Chloroform	**1.1**	2.44	U		2.44	U		2.44	U		2.44	U	
Chloromethane	**24**	1.03	U		1.03	U		1.03	U		1.03	U	
Chloropropene (3-)	NS	1.56	U		1.56	U		1.56	U		1.56	U	
Dichlorobenzene (1,2-)	**200**	3.00	U		3.00	U		3.00	U		3.00	U	
Dichlorobenzene (1,3-)	**110**	3.00	U		3.00	U		3.00	U		3.00	U	
Dichlorobenzene (1,4-)	**800**	3.00	U		3.00	U		3.00	U		3.00	U	
Dichloroethane (1,1-)	**500**	2.02	U		2.02	U		2.02	U		2.02	U	
Dichloroethane (1,2-)	**0.94**	2.02	U		2.02	U		2.02	U		2.02	U	
Dichloroethene (1,1-)	**200**	1.98	U		1.98	U		1.98	U		1.98	U	
Dichloroethene (cis-1,2-)	**35**	1.98	U		1.98	U		1.98	U		1.98	U	
Dichloroethene (trans-1,2-)	**70**	1.98	U		1.98	U		1.98	U		1.98	U	
Dichloropropane (1,2-)	**4.0**	2.31	U		2.31	U		2.31	U		2.31	U	
Dichloropropene (cis-1,3-) †	**6.1**	2.27	U		2.27	U		2.27	U		2.27	U	
Dichloropropene (trans-1,3-) †	**6.1**	2.27	U		2.27	U		2.27	U		2.27	U	
Hexachlorobutadiene	**1.1**	5.33	U		5.33	U		5.33	U		5.33	U	
Methylene chloride	**52**	39.0			2.41	J	I	5.70			2.75	J	I
Tetrachloroethane (1,1,2,2-)	**0.42**	3.43	U		3.43	U		3.43	U		3.43	U	
Tetrachloroethene	**8.1**	3.39	U		3.39	U		2.95	J	I	3.39	U	
Trichlorobenzene (1,2,4-)	**200**	3.71	U		3.71	U		3.71	U		3.71	U	
Trichloroethane (1,1,1-)	**2,200**	2.72	U		2.72	U		1.75	J	I	2.72	U	
Trichloroethane (1,1,2-)	**1.5**	2.72	U		2.72	U		2.72	U		2.72	U	
Trichloroethene ‡	**0.22**	2.68	U		2.68	U		**33.2**			**49.8**		
Vinyl chloride	**2.8**	1.28	U		1.28	U		1.28	U		1.28	U	
Total CVOCs	NS	39			2.41			43.6			52.55		
Other VOCs													
Acetone	**350**	10.8			4.38	J	I	22.8			76.1		
Bromodichloromethane	**1.4**	3.35	U		3.35	U		3.35	U		3.35	U	
Bromoform	**22**	5.16	U		5.16	U		5.16	U		5.16	U	
Bromomethane	**5.0**	1.94	U		1.94	U		1.94	U		1.94	U	
Butadiene (1,3-)	**0.087**	1.10	U		1.10	U		1.10	U		1.10	U	
Butanone (2-)	**1,000**	1.47	U		1.47	U		3.32			2.37		
Carbon disulfide	**700**	1.56	U		1.56	U		2.86			2.89		
Cyclohexane	NS	1.72	U		1.72	U		1.72	U		8.89		
Dibromochloromethane	**1.0**	4.26	U		4.26	U		4.26	U		4.26	U	
Dibromoethane (1,2-)	**0.11**	3.84	U		3.84	U		3.84	U		3.84	U	
Dichloro-1,2-tetrafluoroethane (1,1,2,2-)	NS	3.49	U		3.49	U		3.49	U		3.49	U	
Dichlorodifluoromethane	**200**	4.94	U		4.94	U		4.94	U		4.94	U	
Dioxane (1,4-)	NS	3.60	U		3.60	U		3.60	U		3.60	U	
Ethyl Alcohol	NS	4.40			4.83			5.03			12.1		
Ethylacetate	**3,200**	1.80	U		1.80	U		1.80	U		1.80	U	
Heptane	NS	2.05	U		1.05	J	I	2.24			2.05	U	
Hexane (n-)	**200**	1.54	J	I	2.21	J	I	7.79			4.87		
Hexanone (2-)	NS	2.05	U		2.05	U		2.05	U		2.05	U	
Iso-Propyl Alcohol	NS	1.23	U		1.23	U		1.23	U		1.23	U	
Methyl-2-pentanone (4-)	**80**	2.05	U		2.05	U		2.05	U		2.05	U	
Methyl-tert Butyl Ether	**3,000**	1.80	U		1.80	U		1.80	U		1.80	U	
Propylene	NS	1.72	U		1.72	U		1.72	U		1.72	U	
Tetrahydrofuran	NS	1.47	U		1.23	J	I	1.00	J	I	1.61		
Trichloro-1,1,2-trifluoroethane (1,2,2-)	**30,000**	3.83	U		3.83	U		3.83	U		3.83	U	
Trichlorofluoromethane	**700**	2.55	J	I	32.8			2.64	J	I	2.81	U	
Trimethylpentane (2,2,4-)	NS	2.33	U		2.33	U		2.33	U		2.33	U	
Vinyl acetate	**200**	1.76	U		1.76	U		1.76	U		1.76	U	
Vinyl Bromide	NS	2.18	U		2.18	U		2.18	U		2.18	U	
Total Other VOCs	NS	19.29			46.5			47.68			108.83		
Total VOCs	NS	96.53			146.98			398.55			179.48		
PAHs													
Methylnaphthalene (2-)	**70**	8.00	U		8.00	U		8.00	U		8.00	U	
Naphthalene	**3.0**	2.00	U		1.96	J	I	2.04			1.19	J	I
Total PAHs	NS	-			1.96			2.04			1.19		

TABLE 19
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Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Analytes	Concentrations in µg/m3.										
	COPC Screening Levels	SV-08			SV-09			SV-10			
	Target Soil Gas Concentrations	09-06-06			09-06-06			09-06-06			
		Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	
VOCs											
AVOCs											
Benzene	**3.1**	**5.27**			1.15	J	I	**9.90**			
Ethylbenzene	**22**	1.91	J	I	3.00			2.17	U		
Ethyltoluene (4-)	**NS**	2.46	U		2.46	U		2.46	U		
Styrene	**1,000**	2.13	U		9.58			2.13	U		
Toluene	**400**	9.48			8.62			9.41			
Trimethylbenzene (1,2,4-)	**6.0**	2.46	U		**17.0**			2.46	U		
Trimethylbenzene (1,3,5-)	**6.0**	5.71			4.80			2.46	U		
Xylene (m,p-)	**7,000**	7.14			6.88			4.34	U		
Xylene (o-)	**7,000**	5.17			6.77			1.88	J	I	
Total AVOCs	NS	34.68			57.8			21.19			
CVOCs											
Benzyl Chloride	**0.5**	2.59	U		2.59	U		2.59	U		
Carbon tetrachloride	**1.6**	**3.48**			3.14	U		3.14	U		
Chlorobenzene	**60**	2.30	U		2.30	U		2.30	U		
Chloroethane	**10,000**	1.32	U		1.32	U		1.32	U		
Chloroform	**1.1**	2.44	U		2.44	U		2.44	U		
Chloromethane	**24**	1.03	U		1.03	U		1.03	U		
Chloropropene (3-)	NS	1.56	U		1.56	U		1.56	U		
Dichlorobenzene (1,2-)	**200**	3.00	U		3.00	U		3.00	U		
Dichlorobenzene (1,3-)	**110**	3.00	U		3.00	U		3.00	U		
Dichlorobenzene (1,4-)	**800**	3.00	U		3.00	U		3.00	U		
Dichloroethane (1,1-)	**500**	2.02	U		2.02	U		2.02	U		
Dichloroethane (1,2-)	**0.94**	2.02	U		2.02	U		2.02	U		
Dichloroethene (1,1-)	**200**	1.98	U		1.98	U		1.98	U		
Dichloroethene (cis-1,2-)	**35**	1.98	U		1.98	U		1.98	U		
Dichloroethene (trans-1,2-)	**70**	1.98	U		1.98	U		1.98	U		
Dichloropropane (1,2-)	**4.0**	2.31	U		2.31	U		2.31	U		
Dichloropropene (cis-1,3-) †	**6.1**	2.27	U		2.27	U		2.27	U		
Dichloropropene (trans-1,3-) †	**6.1**	2.27	U		2.27	U		2.27	U		
Hexachlorobutadiene	**1.1**	5.33	U		5.33	U		5.33	U		
Methylene chloride	**52**	**97.2**			2.42	J	I	4.02			
Tetrachloroethane (1,1,2,2-)	**0.42**	3.43	U		3.43	U		3.43	U		
Tetrachloroethene	**8.1**	2.02	J	I	3.39	U		**24.7**			
Trichlorobenzene (1,2,4-)	**200**	3.71	U		3.71	U		3.71	U		
Trichloroethane (1,1,1-)	**2,200**	2.72	U		2.72	U		2.72	U		
Trichloroethane (1,1,2-)	**1.5**	2.72	U		2.72	U		2.72	U		
Trichloroethene ‡	**0.22**	**16.6**			**2.10**	J	I	**4.23**			
Vinyl chloride	**2.8**	1.28	U		1.28	U		1.28	U		
Total CVOCs	NS	119.3			4.52			32.95			
Other VOCs											
Acetone	**350**	83.2			98.8			98.1			
Bromodichloromethane	**1.4**	3.35	U		3.35	U		3.35	U		
Bromoform	**22**	5.16	U		5.16	U		5.16	U		
Bromomethane	**5.0**	1.94	U		1.94	U		1.94	U		
Butadiene (1,3-)	**0.087**	1.10	U		1.10	U		1.10	U		
Butanone (2-)	**1,000**	11.8			7.55			15.0			
Carbon disulfide	**700**	16.0			10.5			7.00			
Cyclohexane	NS	1.72	U		1.72	U		1.72	U		
Dibromochloromethane	**1.0**	4.26	U		4.26	U		4.26	U		
Dibromoethane (1,2-)	**0.11**	3.84	U		3.84	U		3.84	U		
Dichloro-1,2-tetrafluoroethane (1,1,2,2-)	NS	3.49	U		3.49	U		3.49	U		
Dichlorodifluoromethane	**200**	4.94	U		4.94	U		4.94	U		
Dioxane (1,4-)	NS	3.60	U		3.60	U		3.60	U		
Ethyl Alcohol	NS	169			40.6			8.38			
Ethylacetate	**3,200**	1.80	U		1.80	U		1.80	U		
Heptane	NS	11.5			2.05	U		2.05	U		
Hexane (n-)	**200**	4.72			1.65	J	I	6.47			
Hexanone (2-)	NS	2.05	U		2.05	U		2.05	U		
Iso-Propyl Alcohol	NS	1.23	U		3.15			2.71			
Methyl-2-pentanone (4-)	**80**	3.04			7.12			2.05	U		
Methyl-tert Butyl Ether	**3,000**	1.80	U		1.80	U		1.80	U		
Propylene	NS	1.72	U		1.72	U		1.72	U		
Tetrahydrofuran	NS	1.47	U		1.47	U		1.97			
Trichloro-1,1,2-trifluoroethane (1,2,2-)	**30,000**	3.83	U		3.83	U		3.83	U		
Trichlorofluoromethane	**700**	2.81	U		4.17			3.04			
Trimethylpentane (2,2,4-)	NS	2.33	U		2.33	U		2.33	U		
Vinyl acetate	**200**	1.76	U		1.76	U		1.76	U		
Vinyl Bromide	NS	2.18	U		2.18	U		2.18	U		
Total Other VOCs	NS	299.26			173.54			142.67			
Total VOCs	NS	453.24			235.86			196.81			
PAHs											
Methylnaphthalene (2-)	**70**	8.00	U		17.8			8.00	U		
Naphthalene	**3.0**	2.00	U		**6.55**			0.69	J	I	
Total PAHs	NS	-			24.35			0.69			

TABLE 19
Summary of Soil Vapor Data–Volatile & Semi-Volatile Organic Compounds
Addendum to the RI Report
Phases 1B-4 / 1B-5 Investigations
Blackburn & Union Privileges Superfund Site
Walpole, Massachusetts

Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. (SHA) on the dates indicated; see Table 1E for identity of sample delivery groups (SDGs).

2. Alpha Woods Hole Laboratories (AWHL) of Westborough, Massachusetts, performed analyses for volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method TO-15, and select polycyclic aromatic hydrocarbons (PAHs) (naphthalene and 2-methylnaphthalene) by Massachusetts Department of Environmental Protection Method APH Draft 1 (February 2000).

3. Data validation and data usability assessment were performed by New Environmental Horizons, Inc. (NEH). Results are presented in Appendix C of this Report.

4. Concentrations are presented in micrograms per cubic meter ($\mu g/m^3$).

5. Total concentrations listed (e.g. Total VOCs) are the sum of detected concentrations of the relevant suite of compounds.

6. "COPC Screening Levels" indicates contaminants of potential concern (COPC) screening levels used to determine inclusion of an analyte in the human health risk assessment. Analyte detections which exceed the Target Soil Gas Concentrations (**bold** value) are in **bold**.

"Target Soil Gas Concentrations" indicates the values listed are from Table 2C in the USEPA Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils. Target soil gas concentrations based on non-carcinogenic effects are multiplied by 0.1 per USEPA Guidance (USEPA Region I, Risk Update Number 5, September 1999).

7. "AVOCs" are aromatic, non-chlorinated VOCs.
"CVOCs" are chlorinated VOCs.
"†" indicates the Target Soil Gas Concentration values presented are for 1,3-dichloropropene (isomer unspecified).
"‡" indicates the Target Soil Gas Concentration for trichloroethene is based on the upper bound cancer slope factor identified in the USEPA's Draft Risk Assessment for Trichloroethene (USEPA, 2001).

8. The following qualifiers and biases were assigned during data validation by NEH. Refer to Appendix C of this Report for additional detail regarding qualifiers and bias.

Qualifiers:
"J" The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project objectives with the documentation of the uncertainty, bias, and/or imprecision.
"U" The compound was analyzed for, but was not detected. The associated numerical value is the sample-specific reporting limit. The value is usable for project decisions as a non-detect result at the reporting limit.

Bias:
"I" Indeterminate