Contract: W912DQ21D3004
Task Order W912DQ22F3062

Final Revised 100% Design Analysis Report

U.S. Army Corps of Engineers Kansas City District

White Chemical Corporation Superfund Site, Operable Unit 3

Remedial Design Revision

Newark, New Jersey

April 12, 2023

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April 12, 2023

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PROJECT: Contract W912DQ-21-D-3004, Task Order W912DQ22F3062
White Chemical Corporation Superfund Site – Operable Unit 3
Remedial Design Revision
Newark, New Jersey

SUBJECT: Final Revised Remedial Design Package

Dear Mr. Daniels:

CDM Federal Programs Corporation (CDM Smith) is pleased to submit the Final Revised 100% Remedial Design Package for the White Chemical Corporation Superfund Site, located in Newark, New Jersey. The package includes the Final Revised 100% Design Analysis Report (DAR), Specifications, and Plans.

If there are questions concerning this submittal, please contact me at (610) 263-2604.

Sincerely,

CDM SMITH FEDERAL PROGRAMS CORPORATION

James Romig
Project Manager

cc: M. Rahmani, CDM Smith

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Abbreviations and Acronyms

%	percent
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
1,2-DCA	1,2-dichloroethane
1,1,2-TCA	1,1,2-trichloroethane
1,1,2,2-PCA	1,1,2,2-tetrachloroethane
amsl	above mean sea level
APP	accident prevention plan
bgs	below ground surface
CDM Smith	CDM Federal Programs Corporation
CEA	Classification Exception Area
cells/mL	cells per milliliter
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
cm/sec	centimeters per second
COC	contaminant of concern
CQC	contractor quality control
CQCP	contractor quality control plan
CY	cubic yard
DAR	design analysis report
DBCP	1,2-dibromo-3-chloropropane
DHC	*Dehalococcoides* ssp.
DNAPL	dense nonaqueous phase liquid
DO	dissolved oxygen
DPT	direct push technology
EDB	1,2-dibromoethane
EPA	U.S. Environmental Protection Agency
FS	feasibility study
gpm	gallons per minute
GWQS	Ground Water Quality Standards
H&S	health and safety
IDW	investigation-derived waste
ISB	in situ bioremediation
Lactate	sodium lactate
lb	pound
MCL	maximum contaminant level
MEE	methane, ethene, and ethane
N.J.A.C.	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NPL	National Priorities List
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration

Abbreviations and Acronyms (continued)

OU	operable unit
PCE	tetrachloroethene
PDI	pre-design investigation
PPE	personal protective equipment
psi	pounds per square inch
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
qPCR	quantitative polymerase chain reaction
RA	remedial action
RAO	remedial action objective
RD	remedial design
RG	remediation goal
RI	remedial investigation
ROD	record of decision
ROI	radius of influence
SOW	statement of work
sq ft	square feet
SSHP	site safety and health plan
ssp.	species
TAT	turnaround time
TCE	trichloroethene
TAL	Target Analyte List
TI	technical impracticability
TOC	total organic carbon
UFP-QAPP	Uniform Federal Policy Quality Assurance Project Plan
USACE	U.S. Army Corps of Engineers Kansas City District
VOC	volatile organic compound
WCC	White Chemical Corporation

Section 1

Introduction

1.1 Project Overview

This final revised 100 percent (%) Design Analysis Report (DAR), prepared by CDM Federal Programs Corporation (CDM Smith), presents the design analysis to achieve the requirements set forth in the U.S. Environmental Protection Agency's (EPA's) September 2012 Record of Decision (ROD) (EPA 2012). The ROD addresses the remediation of contaminated groundwater at the White Chemical Corporation (WCC) Superfund Site, Operable Unit (OU) 3. The site is in the City of Newark, New Jersey (**Figure 1-1**). The report was prepared for the U.S. Army Corps of Engineers Kansas City District (USACE) under Contract W912DQ21D3004, Task Order W912DQ22F3062.

The final (100%) DAR was prepared by CDM Smith in 2016 (CDM Smith 2016a). In 2022, USACE tasked CDM Smith with revising the final design based on the collection of additional groundwater monitoring data in 2021; changes to the use of the site; and the latest federal, state, local, and industrial regulations, standards, and requirements.

1.2 Purposed and Organization of the Report

The purpose of this DAR is to present the technical basis for the remedial design (RD) to achieve the remedial action objectives (RAOs) specified in the OU3 ROD. This report is structured as follows:

- **Section 1: Introduction** – Presents the history and characteristics of the site and identifies the purpose and scope of this DAR. It also presents the overall strategy for project delivery. A preliminary remedial action (RA) project schedule is included in this section.
- **Section 2: Pre-Design Investigation and Pilot Study Results** – Summarizes the results of the pre-design investigation (PDI), the pilot study, and the 2021 data collected by EPA.
- **Section 3: Remedial Design Summary** – Discusses the RD, including major design assumptions, requirements, and restrictions.
- **Section 4: Quality Assurance/Quality Control** – Discusses the quality assurance (QA) and quality control (QC) organization and the process and standards that are applicable to the RA activities.
- **Section 5: Health and Safety Program** – Discusses the health and safety (H&S) program requirements that are applicable on-site during the RA activities.
- **Section 6: Permitting and Approvals** – Describes the permitting and green remediation requirements for the RA.
- **Section 7: List of Contract Drawings and Specifications** – Lists the contract drawings and specifications to be included with the Contract Documents.

- **Section 8: References** – Lists the references cited in the report.

Tables, figures, and appendices are also included in this DAR. These materials provide additional information, summarize relevant data, and serve as the basis for design decisions. In addition, the DAR references the contract drawings and the specifications for the RA, which are provided under a separate cover.

1.3 Summary of Background Information

1.3.1 Site Description

The ROD defines the site as the WCC property and associated contaminated areas; however, there are several hazardous waste sites in the area surrounding the WCC property. Therefore, to better define the extent of the site for the purpose of the OU3 RD and RA, EPA has defined the horizontal extent of the site as the area within the 1,000 micrograms per liter (µg/L) contour line for site contaminants (**Appendix A**). Based on the available data at the time of this decision, the 1,000 µg/L contour area covered the following properties (**Figure 1-2a** and **Figure 1-2b**):

- Entirety of the WCC property, which is approximately 4.4 acres and located at 660 Frelinghuysen Avenue
- A large portion of the adjacent Baltic Auto Shipping property located at 646 Frelinghuysen Avenue
- Potentially extended beneath the rail line located immediately east of the WCC property; however, access to the contaminants underneath the rail line corridor is impeded

The ROD identified chlorinated and brominated aliphatic compounds, including 1,2-dichloroethane (1,2-DCA), trichloroethene (TCE), 1,1,2-trichloroethane (1,1,2-TCA), tetrachloroethene (PCE), 1,1,2,2-tetrachloroethane (1,1,2,2-PCA), 1,2-dibromo-3-chloropropane (DBCP), and 1,2-dibromoethane (EDB) as the key site contaminants of concern (COCs).

The National Superfund Database identification number for the site is NJD980755623. The site is on EPA's National Priorities List (NPL). EPA is the lead agency and the New Jersey Department of Environmental Protection (NJDEP) is the support agency.

1.3.2 Site History

The WCC property was used for industrial purposes dating back to 1931. In September 1970, Central Service Corporation purchased the property from Union Carbide Corporation. In 1975, Central Service Corporation sold the property to Lancaster Chemical Company, a division of AZS Corporation. In 1983, WCC leased the property from AZS Corporation. WCC operated until 1990, manufacturing a variety of acid chlorides, brominated organics, mineral acids, most notably hydriodic acid, and fire-retardant compounds.

In 2016, the WCC property was an unoccupied lot. Between 2016 and 2021, the City of Newark leased the property to a private developer. The company converted all the stickup wells to flush-mount wells and used the property for parking a variety of vehicles. During the site visit in October 2022, it was noted that the WCC property had been fully occupied and topographically

altered. This resulted in the need for some modifications (topographic survey and well survey) to the original 2016 design.

1.3.3 Summary of Historical Investigations

Several investigations and RA activities were conducted by the NJDEP and EPA beginning in 1989 and continuing through the present. Details of these investigations conducted from 1989 to 2012 are provided in the ROD (EPA 2012). The investigations and RA activities are summarized below in chronological order:

- NJDEP conducted several inspections of the site between June and September 1989 pursuant to the Resource Conservation and Recovery Act, resulting in several Notices of Violation for a variety of infractions, including improper drum management, leaking drums, open containers, and inadequate aisle space.
- Between May and August 1990, NJDEP removed approximately 1,000 drums from the site.
- On September 7, 1990, EPA conducted a preliminary assessment at the site and found numerous drums, gas cylinders, storage tanks, vats and process reactors, fiber-pack drums, glass and plastic bottles, and laboratory-type containers containing hazardous substances in deteriorating conditions and leaking their contents onto site soils. In total, 4,700 empty drums were shipped off-site for disposal, 11 fuming drums were over-packed, and 6,700 drums were staged on-site for later characterization and disposal.
- Between September 1990 and November 1990, various orders were issued by the EPA, the U.S. District Court for the District of New Jersey, and the Agency for Toxic Substances and Diseases Registry, followed by removal of several thousand drums and assessment of the site between 1990 and 1991.
- EPA proposed the former WCC facility for inclusion on the NPL on May 9, 1991, and the White Chemical Corporation Site was listed on September 25, 1991.

Owing to the complex nature of the site, EPA organized the work for remediating the site into three phases or OUs. Details of activities conducted as part of each OU are provided in the ROD (EPA 2012).

- OU1: Addresses the stabilization of the site and removal of leaking drums and other containers of chemical waste (completed in 1993)
- OU2: Addresses the contaminated surface and subsurface soils and demolition and disposal of nine on-site buildings and aboveground storage tanks (completed in 2009)
- OU3: Addresses contaminated groundwater at the site; OU3, the subject of this RD, will be the final RA for the site
    - Bench-scale treatability study, remedial investigation (RI), and feasibility study (FS) for OU3 were completed in 2012 and formed the basis for selecting the final remedy (Alternative 2) of in situ bioremediation (ISB) and long-term monitoring for addressing the contaminated groundwater at the site.

- EPA issued the ROD to address the groundwater contamination for OU3 at the site using the selected remedy in September 2012.

Between August 2014 and January 2016, a PDI and a pilot study were completed at the site. In November 2021, EPA tasked Superfund Technical Assessment and Response Team V to perform one round of supplemental groundwater sampling at existing wells. The field activity and results are provided in the Monitoring Well Sampling Report (Weston Solutions 2021). The objective, scope, findings, and recommendations of the PDI, pilot study, and supplemental groundwater monitoring event (Round 4) in 2021 are discussed in Section 2.

1.3.4 Site Topography

In 2016, the WCC property was generally flat and graded, with a gentle easterly slope toward the rail line. The surface elevations across the WCC property ranged from approximately 20 feet above mean sea level (amsl) in the north, west, and central portions to approximately 12 feet amsl in the south and east (Contract Drawing **C-101**). However, the current property lessee has added sporadic patches of asphalt, dense graded aggregate, and gravel across the site, which has altered the site topography.

There are no streams or surface water bodies on the site; however, a drainage ditch is located just east of the WCC property boundary and west of the rail line corridor. This drainage ditch flows in a southerly direction. During a site visit for the RD, CDM Smith observed that the 646 Frelinghuysen Avenue property had been significantly raised with fill. This change was documented in the 2016 RD. Additionally, as noted by CDM Smith and USACE during a site visit on October 25, 2022, there was a new drainage ditch along the western boundary of the WCC property. The response approach to this topographic change is discussed in Section 3.3.

1.3.5 Site Geology

Two geologic features are primarily used when discussing the site's geology: overburden and bedrock. Fill material is encountered across the site, ranging in thickness from 2 to 10 feet. The fill consists mostly of silt with trace sand and gravel. The overburden consists of 20 to 60 feet of glacial deposits, which generally thicken (considerably) from the northwest to the southeast across the site. In general, the glacial deposits are composed of red to reddish brown silt or clay near the ground surface and near the weathered bedrock surface, with red to reddish brown sand dominating in between. Sands were generally fine to medium, with coarse sand and gravelly sand reported occasionally. Based on the OU3 RI (CDM Smith 2012a), little to no clay was found in the subsurface at MW-6, meaning clays are not continuous at the site. Based on the lithological data collected during the pilot study (CDM Smith 2016b), the thickness of the silty clay, sandy clay, and clay varies from 10 feet to less than 1 foot on top of weathered bedrock.

Beneath the overburden is the weathered bedrock, which ranges in thickness from a few feet to approximately 20 feet. The weathered bedrock is composed of highly fractured Brunswick Formation, which is predominantly composed of shales and mudstones. Bedrock is encountered at approximately 30 to 60 feet below ground surface (bgs) at the site, with bedrock elevations decreasing to the northwest and southeast.

Below the veneer of weathered bedrock is the competent bedrock of the Brunswick Formation. The average bedding orientation near the site is a strike of N47E (roughly subparallel to Frelinghuysen Avenue) and a dip of approximately 10 degrees to the northwest. Based on geophysical logs of the bedrock monitoring wells, most fractures fall into three groups. Low angle fractures (dipping less than about 30 degrees from horizontal) are found in a variety of orientations, with most dipping northwesterly. These fractures are believed to be associated with bedding. Most higher-angle fractures (dipping from 30 degrees to nearly vertical) strike to the northeast-southwest or the northwest-southeast. Northeasterly striking fractures occur more frequently than northwesterly striking fractures (CDM Smith 2012a).

1.3.6 Site Hydrogeology

Groundwater recharge at the site is primarily derived from precipitation. Based on groundwater measurements collected in December 2015 during the pilot study (CDM Smith 2016b) and in November 2021 (Weston Solutions 2021), the depth to water in the overburden ranges from approximately 7.45 to 14.82 feet below top of inner casing (with approximately 2 feet of stickup for each well) or 5.04 to 11.03 feet amsl, as shown in Specification **Section 01 11 00**. Based on the groundwater measurements conducted during the OU3 RI (CDM Smith 2012a) and pilot study (CDM Smith 2016b), the groundwater elevation in overburden generally fluctuates no more than 3 feet. Well construction information and groundwater measurements collected on December 9, 2015, during the pilot study were utilized to develop potentiometric surface maps. The potentiometric surface maps for the monitoring wells installed across the water table in the overburden (identified as shallow overburden monitoring wells) and just above the top of bedrock (identified as deep overburden monitoring wells) are presented in **Figure 1-3a** and **Figure 1-3b**, respectively. During the OU3 RI (CDM Smith 2012a), the groundwater flow localized at the site was identified to be radial in the overburden to the west, south, and east from the WCC property because of a localized groundwater mound (0.5 foot) near the WCC property; however, the overall groundwater flow direction is to the east, toward Newark Bay.

Groundwater flow velocities were estimated to be 7.3 to 58.4 feet per year for the overburden near the water table (shallow overburden) and 1.1 to 15 feet per year for the overburden near the weathered bedrock (deep overburden) (Foster Wheeler Environmental Corporation 2003). Slug tests were conducted to estimate the hydraulic conductivity in the shallow overburden wells, which ranged from 8.7×10^{-4} centimeters per second (cm/sec) to 7.2×10^{-3} cm/sec (or an average of 4×10^{-3} cm/sec), which is typical of clayey silt loam to coarse sand. Hydraulic conductivity in the deep overburden wells ranged from 1.2×10^{-3} cm/sec to 1.8×10^{-3} cm/sec (or an average of 1.5×10^{-3} cm/sec), which is typical of silt/loam (CDM Smith 2012a).

The Brunswick Formation aquifer is conceptually described as a leaky, multi-unit aquifer system where gently inclined bedding planes with the greatest hydraulic openings act as discrete aquifer units, separated by thick, leaky units. Primary porosity, permeability, and storage in the bedrock are very low; flow is dominated by secondary fracture porosity. However, the amount of flow in individual fractures or fracture sets (leakage) is variable. Two major types of joint/fracture sets dominate: shallowly dipping and steeply dipping fractures. The groundwater gradient in the bedrock is generally to the east, toward the Newark Airport and Newark Bay. There is also a slight southeasterly component to groundwater gradients in the bedrock (CDM Smith 2012a).

Based on a literature search, the hydraulic conductivity for the Brunswick Formation ranges over four orders of magnitude; accordingly, the estimated groundwater flow velocity ranges from 0.0066 foot per year to 357 feet per year.

1.3.7 Record of Decision Requirements

1.3.7.1 Remedial Action Objectives

The September 2012 OU3 ROD final remedy for the site outlined the RAOs, which address the human health risks and environmental concerns (EPA 2012). Based on the site-specific human health risk assessment results, site-related contaminants are chlorinated and brominated aliphatic compounds, including 1,2-DCA; TCE; 1,1,2-TCA; PCE; 1,1,2,2-PCA; DBCP; and EDB. These contaminants are volatile organic compounds (VOCs) and may pose risks to human health through inhalation, ingestion, and dermal contact. The following RAOs address the human health risks and environmental concerns posed by VOC-contaminated groundwater at the site:

- Protect human health by preventing exposure via drinking and showering to contaminated groundwater concentrations above remediation goals (RGs)
- Restore the groundwater in both the shallow and deep overburden aquifers to drinking water standards by reducing site contaminant concentrations to RGs to the extent practicable
- Decrease contaminant mass in the bedrock aquifer to the extent practicable

To achieve the above RAOs, RGs were developed for site contaminants in groundwater that, when achieved, will pose no unacceptable risk to human health and the environment. The lower of either the EPA federal maximum contaminant levels (MCLs) or the NJDEP Ground Water Quality Standards (GWQS) was selected as the RG where an applicable or relevant and appropriate requirement waiver is not being sought in the overburden aquifer. For the bedrock aquifer, the RGs are for developing use restrictions and other actions to prevent exposure and for assessing mitigation of the aqueous plume, but not for achieving restoration of the groundwater. RGs for site contaminants, including chlorinated and brominated VOCs, are provided in Specification **Section 01 35 45**. Site-specific RGs range from 0.02 µg/L for DBCP to 100 µg/L for trans-1,2-dichloroethene. The RGs for the primary site contaminants, 1,2-DCA, TCE, and EDB, are 2, 1, and 0.03 µg/L, respectively.

Overburden Aquifers

Areas with site contaminant concentrations exceeding the RGs require remediation. An active treatment area with site contaminant concentrations exceeding 1,000 µg/L in 2016 was developed for the overburden aquifer (**Figure 1-2a** and **Figure 1-2b**). This area approximates the delineation of contaminated groundwater, based on groundwater data available in 2016, known to be attributable to historical actions associated with the former WCC facility and excludes the portions of the groundwater where commingling plumes are believed to be occurring as a result of other known sources.

For this revised RD, groundwater contamination with site contaminants exceeding 100 µg/L within the WCC property requires remediation because such groundwater contamination can be

attributed to historical WCC operation and would result in restoring the groundwater aquifer to the extent practicable to meet the RAOs.

Bedrock Aquifer

In addition, remediation would also be carried out at known site-related, contaminated areas in the bedrock aquifer. Areas with known contamination surrounding well clusters MW-1B, MW-6B, and MW-16B (**Figure 1-2c**) would be treated to reduce the contaminant mass in the bedrock aquifer to the extent practicable. Additionally, another bedrock well cluster may be identified for injections based on pre-injection sampling of the bedrock aquifer.

1.3.7.2 Selected Remedy

Based on the results of a bench-scale treatability study conducted at the site that demonstrated successful removal of 1,2-DCA; 1,1,2-TCA; EDB; TCE; and PCE, the OU3 selected remedy to address groundwater contamination includes ISB technology. The major components of the selected remedy include:

- In situ bioremediation of the groundwater in the shallow and deep overburden aquifers by reducing site contaminant concentrations to federal MCLs and NJ GWQS, to the extent practicable
- Treatment of the bedrock aquifer in an effort to decrease contaminant mass to the extent practicable
- Establishment of a Classification Exception Area (CEA), which is an institutional control, to minimize the potential for exposure to contaminated groundwater
- Implementation of a long-term sampling and analysis program to monitor the contamination at the site to assess groundwater migration and establish whether contaminants are meeting the appropriate federal MCLs or NJ GWQS, whichever is lower

A specific bioremediation amendment was not selected as part of the ROD; however, the pilot study performed followed by groundwater monitoring program indicated both amendments (sodium lactate and EHC) were effective at the site. Additional delineation of the contamination in the overburden and bedrock aquifers would also be performed during RA activities, further delineating the areas of treatment. Details of the PDI and pilot study conducted at the site are provided in Section 2.

In addition, based on the findings of the OU3 RI/FS at the site, a technical impracticability (TI) evaluation report (CDM Smith 2012b) was prepared in accordance with the EPA's Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration (EPA 1993). The TI evaluation report provided the necessary data to support a TI waiver for remediation of groundwater in the overburden aquifers beneath the rail line corridor and in the bedrock aquifer at the site. The extent of the TI waiver is shown in **Appendix B.**

Institutional controls, such as the designation of a groundwater CEA, would be implemented to prevent possible exposure of contaminated groundwater to receptors. Development of the CEA is

not part of this RD. Since it is not anticipated that remediation and restoration of the overburden and bedrock aquifers will occur in less than 5 years, EPA will perform Five-year Reviews.

1.4 Remedial Action Scope

Based on the results of the PDI and pilot study performed at the site, the RA described in this RD will consist of implementing one round of overburden and bedrock injections with a potential secondary round of overburden injections, which will be contingent upon groundwater monitoring data following the first round of injections. To provide flexibility during the RA, the RA scope will be further divided and managed as follows:

- For the overburden aquifer:
  - At the WCC property, ISB of contaminated groundwater within the entire lateral area of the WCC property (defined as the lateral area within the 100 µg/L concentration contour for 1,2-DCA) and the vertical treatment zone (defined as the interval from the shallowest depth containing 1,2-DCA concentrations of 100 µg/L or greater to the top of weathered bedrock).
  - At the 646 Frelinghuysen Avenue property, ISB of contaminated groundwater within the lateral area of the 1,000 µg/L concentration contour for 1,2-DCA and the vertical treatment zone (defined as the interval from the shallowest depth containing 100 µg/L or greater of 1,2-DCA to the top of weathered bedrock).
  - The RA at both properties will require access agreements with the current property owners. EPA will be responsible for obtaining access. USACE and CDM Smith will provide technical support as needed (**Appendix A**).
  - At the WCC and the 646 Frelinghuysen Avenue properties, areas of the groundwater plume with site contaminant concentrations greater than the RGs outside of the treatment zone will be monitored to determine whether natural attenuation will further reduce the concentrations to the RGs as part of the CEA.
- For the bedrock, installation of four new wells in the bedrock for monitoring and/or injection and ISB of contaminated groundwater at seven existing and potentially four new bedrock wells are included in this revised RD. Based on the 2021 sample results, it is likely that MW-3B1 and MW-6B2 would not require amendment injection because contaminants were not detected at MW-3B1 and only 1,2-DCA was detected at MW-6B2 at a concentration of 20.7 µg/L. Per the conference call held with USACE in February 2023 (**Appendix A**), bedrock injection will be part of the RA scope and is not subject to a decision from EPA and USACE as indicated in the 2016 RD.

The intent of the in situ bioremediation treatment is to reduce the contaminant concentrations to low levels (e.g., 100 µg/L). Contamination remaining at concentrations greater than the RG would then be addressed through natural attenuation. At the time of the 2016 design, the horizontal extent of the treatment zone was constrained by accessibility (the building on 646 Frelinghuysen and the property boundaries of the WCC property). Therefore, a horizontal extent based on the 1,000 µg/L contour for 1,2-DCA was selected for the lateral area of remediation on the two

properties in the 2016 design. Since accessibility was not a concern vertically, the 2016 design proposed treating the vertical zone identified by contaminant concentrations greater than 100 µg/L. The 2021 data indicate that contaminant concentrations have decreased, and there may be areas at the WCC property where contaminant concentrations in groundwater are less than 1,000 µg/L. Therefore, the target concentration defining the horizontal treatment zone on WCC property has been reduced from 1,000 µg/L (proposed in the 2016 design) to 100 µg/L. However, the accessible area on 646 Frelinghuysen Avenue is likely still characterized by groundwater contaminant concentrations greater than 1,000 µg/L. Therefore, this boundary was not changed for this revised 100% design.

The details of various components of the RD are discussed in Section 3.

1.5 Nature and Extent of Contamination

1.5.1 Soil Contamination

Soil samples were collected during the installation of monitoring wells prior to pilot study treatment. The results are presented in **Table 1-1**. Contaminant concentrations in soil samples collected below 20 to 30 feet bgs were generally at least an order of magnitude greater than samples collected from shallower depths. The highest soil contaminant concentrations detected prior to pilot study treatment were 1,2-DCA (32,000 micrograms per kilogram [µg/kg]), 1-bromo-2-chloroethane (560 µg/kg), and TCE (390 µg/kg) in samples collected from 35 to 45 feet bgs at the MW-25D well location (**Table 1-1**).

1.5.2 Groundwater Contamination

1.5.2.1 Overburden Aquifer

During the OU3 RI, contaminants in the overburden aquifer were observed to have migrated radially outward to the northwest, south, and east from the WCC property to surrounding areas. The extent of the groundwater contamination at deeper intervals in the overburden was found to be greater than in the shallow overburden because of the downward vertical migration of contamination over time resulting from infiltration and gravity and the removal of contaminated soil above the water table (CDM Smith 2012a).

During the PDI and pilot study, additional monitoring wells were installed at the WCC property. The groundwater data collected during either the OU3 RI or the PDI/pilot study were used to evaluate the distribution and levels of overburden contamination as shown in **Table 1-2**. Groundwater data from the supplemental sampling event in 2021 (Round 4) are shown in **Table 1-2**. Groundwater contamination, as detected in the shallow overburden wells screened at the water table, ranged from non-detect to 15,000 µg/L, however most wells had a 1,2-DCA concentration below 100 µg/L. Notably, contaminant concentrations at MW-6 increased between the baseline and the Round 2 post-injection sampling event during the pilot study (e.g., 1,2-DCA increased from 12 µg/L in the baseline to 200 µg/L in Round 2). However, at MW-6, 1,2-DCA decreased to 12 µg/L in Round 3 and 10.4 µg/L in Round 4 (**Table 1-2**). Further discussion of the pilot study results is presented in Section 2.4.

Contaminant concentrations were observed to increase significantly at depths greater than 20 feet bgs, especially at the top of the weathered bedrock. The highest groundwater

concentrations detected during Rounds 2 and 3 were at MW-6D (1,2-DCA [64,000 µg/L] and TCE [4,300 µg/L]) and MW-3D (1-bromo-2-chloroethane [30,000 µg/L], EDB [2,700 µg/L] and 1,1,2-TCA [2,700 µg/L]) (**Table 1-2**). **Figure 1-2a** and **Figure 1-2b** present the 1,2-DCA plume in the shallow overburden and deep overburden, respectively, as determined in the OU3 RI (CDM Smith 2012a).

Based on the results of the 2021 Round 4 groundwater sampling event in November 2021, the highest concentration of 1,2-DCA was 250 µg/L at MW-24S. However, not all shallow wells were sampled. The highest concentrations in deep wells detected were 8,360 µg/L 1,2-DCA at MW-14D, 1,200 µg/L TCE at MW-2D, 16.3 µg/L EDB at MW-2D, and 264 µg/L1,1,2-TCA at MW-14D (**Table 1-2**). **Figure 1-2d** and **Figure 1-2e** display the 1,2-DCA groundwater data collected in 2021.

1.5.2.2 Bedrock Aquifer

During the OU3 RI, observed concentrations of 1,2-DCA in bedrock ranged from 35 to 180,000 µg/L in the nine bedrock wells at the WCC property and the 646 Frelinghuysen Avenue property. Both the minimum and the maximum 1,2-DCA concentrations were detected in the MW-16 well cluster on the 646 Frelinghuysen Avenue property. The maximum TCE concentration was 2,800 µg/L, the maximum 1,1,2-TCA concentration was 2,500 µg/L, and the maximum EDB concentration was 1,500 µg/L (CDM Smith 2012a). The bottom of the bedrock contamination was not fully delineated. The high contaminant concentrations detected at MW-16B2 (e.g., 1,2-DCA at 180,000 µg/L) were most likely because of migration along the down-dip fractures of bedding planes.

Matrix diffusion testing was conducted as part of the OU3 RI at one location (MW-6) from 36 to 100 feet bgs. The highest levels of 1,2-DCA contamination in the rock matrix were found from 36 to 56 feet bgs. Estimated contaminant concentrations in pore water within this zone were greater than detected in groundwater from the same depth, indicating that contaminants had migrated into the bedrock matrix. This also suggests that the concentrations of 1,2-DCA were likely greater historically than during the OU3 RI because of diffusion of contaminants into the rock matrix (CDM Smith 2012a).

During the pilot study, contaminant concentrations were significantly decreased in the nine bedrock wells when compared to the OU3 RI results from 2011. Based on the results of the post-injection Round 2 groundwater sampling event in December 2015, the highest concentrations were 12,000 µg/L 1,2-DCA (MW-6B3), 670 µg/L TCE (MW-6B1), 710 µg/L 1,1,2-TCA (MW-6B1), and 1,100 µg/L 1-bromo-2-chloroethane (MW-3B1). EDB concentrations were non-detect.

Based on the results of the Round 4 groundwater sampling event in November 2021, the highest concentrations were detected at MW-6B1 as follows: 12,100 µg/L 1,2-DCA, 738 µg/L TCE, 514 µg/L 1,1,2-TCA, and 18.8 µg/L EDB, as shown in **Table 1-2**. Four wells (MW-6B4, MW-6B2, MW-1B1, and MW1-B2) all had 1,2-DCA concentrations below 1,000 µg/L and one well (MW-3B1) was non-detect for 1,2-DCA in 2021. **Figure 1-2f** displays the 1,2-DCA groundwater data collected in 2021.

1.6 Overall Strategy for Project Delivery

1.6.1 Performance-Based Design Components

In accordance with the scope of work, this RD includes a combination of prescriptive and performance-based design components. A detailed design will be developed and proposed by the RA Contractor for performance-based design components. The Contract Documents (contract drawings and specifications) were prepared to provide the minimum design requirements for these components. These minimum requirements were developed based on the results of the pilot study, industry standards, and technical considerations that are specific to conditions at the site.

The performance-based design components include the injection mixing and delivery system. CDM Smith has developed recommendations for these design components, which are presented in Section 3. However, it is the responsibility of the RA Contractor to design, propose, and implement these components of the remedy.

1.6.2 Procurement Method/Contract Strategy

The RD contract drawings and specifications will be used by USACE to obtain the services of an RA Contractor, either through a preplaced contract mechanism or through the solicitation of proposals on a cost reimbursable basis.

1.6.3 Construction Schedule

A representative RA construction schedule, which illustrates the general time requirements and sequence for completion of work, is provided in **Figure 1-4**.

1.6.4 Review of Project Requirements

CDM Smith has reviewed the project requirements and incorporated these requirements into the design. CDM Smith has incorporated USACE, NJDEP, and EPA comments on the original 2016 design as well as design revisions discussed for the 2022 Design (**Appendix A**). USACE and EPA will independently evaluate conformance with the project requirements as part of the review and comment process.

During the course of the RA construction, additional reviews will be required by USACE as part of the construction QA/QC program to verify that the RA Contractor executes the RD in accordance with the design documents.

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Section 2

Pre-Design Investigation and Pilot Study Results

2.1 Summary of Pre-Design Investigation and Pilot Study

The PDI was conducted between May and July 2014, and the pilot study injections were conducted between July and December 2014. Pilot study performance monitoring began in March 2015 with separate events performed until September 2016. A more recent round of groundwater sampling was conducted in November 2021 by EPA. The PDI investigation was conducted to update the sitewide groundwater contaminant distribution and concentrations, whereas the pilot study was conducted to evaluate the effectiveness of different amendments (sodium lactate [lactate] vs. EHC) and different injection delivery methods (hydraulic vs. pneumatic), and to collect engineering parameters to develop the overall strategy for the RD.

Activities relating to the PDI and pilot study occurred as part of one field effort; therefore, the discussion of PDI activities and findings were incorporated into the pilot study (CDM Smith 2016b) and are hereafter collectively referred to as the pilot study. PDI activities included installation of new overburden monitoring wells (screened at intermediate and deep depths) and performance of the baseline round of groundwater monitoring. Pilot study activities included amendment injections in the overburden and bedrock aquifers, post-injection groundwater monitoring, and bioaugmentation in one overburden aquifer well. Details of the PDI and pilot study are provided in the *Draft Pilot Study Report* (CDM Smith 2016b), with a summary of the objectives, results, findings, and recommendations provided below. Details of the Round 4 supplemental groundwater monitoring event in 2021 are found in the *Monitoring Well Sampling Report* (Weston Solutions 2021).

2.2 Pilot Study Objectives

The objectives of the pilot study in the overburden aquifer included:

- Evaluation and comparison of the effectiveness of two amendments (EHC and lactate) for ISB, including longevity (as recommended in the bench-scale treatability study)
- Evaluation of the effectiveness of two amendment delivery systems (hydraulic and pneumatic pressure injection)
- Obtaining site-specific design parameters for the RD
    - Injection flow rates and pressure
    - Radius of influence
- Evaluating the need and approach for bioaugmentation

The objectives of the pilot study in the bedrock aquifer were to reduce contaminant mass, collect injection parameters (e.g., injection flow rate), and evaluate the effectiveness of ISB in bedrock wells.

2.3 Pilot Study Scope of Work

The scope of work for the pilot study for the overburden and bedrock aquifers is described below.

2.3.1 Overburden Aquifer

The pilot study for the overburden aquifer was conducted in four 5,000-square-foot (sq ft) treatment areas (**Figure 2-1**) using combinations of two injection methods (hydraulic and pneumatic) and two amendments (lactate and EHC). Two monitoring well clusters were installed at each treatment area, and one round of baseline groundwater sampling was performed to establish the baseline conditions.

Amendment injections in the four treatment areas were conducted using direct push technology (DPT) methods with a 2-foot injection screen and a bottom-up injection approach. A summary of the total injection volumes, injected amendment volumes, injected amendment concentrations and dosage, injection flow rates, and injection pressures for each treatment area are presented in **Table 2-1**. Two rounds of post-injection groundwater sampling were conducted in 2015, approximately 4 months (Round 1) and 1 year (Round 2) after the injections. A third round of sampling was performed in September 2016, and a fourth round was performed 7 years after the injections in November 2021. Between 2015 and 2021, the existing conditions at the site changed as the property owner began to lease out the property. The entity leasing the property was responsible for converting all stickup monitoring wells to flush-mounted wells. However, some monitoring wells could not be located during the 2021 sampling event (17 of the 29 overburden monitoring wells were sampled during the event). It is possible that monitoring wells were covered with gravel and/or damaged by site activities.

During the pilot study at the lactate injection areas, the dosages ranged from 3.07 pounds (lb) to 3.3 lb of lactate per cubic yard (CY) of treatment volume, with an injection volume ranging from 11.9 to 15.5 gallons per CY of treatment area. At the EHC injection areas, dosages ranged from 12 to 14 lb of EHC per CY of treatment volume for injections conducted over the entire treatment depth, and 16.8 to 18.8 lb of EHC per CY of treatment volume for injections performed only over the deep intervals. Injection volumes for the entire treatment depth and deep intervals ranged from 5.6 to 6.6 gallons per CY of treatment volume and 6.7 to 7.5 gallons per CY of treatment volume, respectively. This information is presented in **Table 2-1**. Because the deep overburden aquifer received EHC from both the "full depth" injections and the deep-overburden-only injections, the actual EHC dosing for the deep zone ranged from 29 to 33 lb of EHC per CY (**Appendix C**).

The need for bioaugmentation was evaluated for the four injection areas using the results of the post-injection Round 1 groundwater sampling event. Bioaugmentation was performed only at MW-7D by gravity feeding 12 gallons of 30% lactate solution and then injecting 200 gallons of groundwater extracted from a monitoring well with high biological activity (MW-6B1).

2.3.2 Bedrock Aquifer

The pilot study for the bedrock aquifer was conducted using lactate as the ISB amendment. Injections were conducted in nine bedrock wells (MW-1B1, MW-1B2, MW-3B1, MW-6B1, MW-6B2, MW-6B3, MW-6B4, MW-16B1, and BW-16B2) at the WCC property, as shown in **Figure 2-1**. Baseline groundwater sampling was conducted to establish the baseline conditions prior to performing the injections, and four rounds of post-injection groundwater sampling were conducted for the bedrock aquifer (two rounds in 2015, one round in 2016, and one round in 2021). Injections at four monitoring wells (MW6-B1, MW-6B2, MW-6B3, and MW-6B4) were conducted using a gravity feed system while injections at the other six monitoring wells were conducted using a combination of gravity feed and pressure injections. A summary of the total injection volumes, injected amendment volumes, injected amendment concentrations and dosage, injection flow rates, and injection pressures for each bedrock injection well location are presented in **Table 2-2**.

2.4 Pilot Study Results and Findings

2.4.1 Overburden Aquifer

The following findings are summarized from the pilot study report for the overburden aquifer injections (CDM Smith 2016b) and supplemented by the findings based on the 2016 (Round 3) and 2021 (Round 4) data:

- Amendment distribution was generally identified to achieve a 9-foot radius of influence (ROI); however, a more heterogeneous distribution of amendments was identified for deeper intervals with tighter geology (i.e., silts and clays) compared to a more homogeneous distribution for shallower intervals with sands. The additional EHC injection points at the deep interval may have played an important role, which reduced the ROI for the EHC pilot study to approximately 4.5 feet.
- Hydraulic and pneumatic injection methods achieved comparable amendment delivery rates and distribution (CDM Smith 2016b).
- In general, average injection flow rates of 18 gallons per minute (gpm) and 9 gpm were observed for lactate and EHC, respectively. Injection pressures ranged generally between 100 and 200 pounds per square inch (psi) for both the hydraulic and pneumatic injection methods.
- Varying degrees of contaminant concentration reductions were observed, with reductions of up to two orders of magnitude (**Figures 2-2** through **2-5**) observed for both amendments (lactate and EHC) based on Round 2 performance monitoring data in 2015.
- Both lactate and EHC continued to act as carbon sources, based on the results of the Round 2 post-injection groundwater sampling event, thereby continuing to enhance the in situ biodegradation of site contaminants. Additional groundwater sampling was performed in 2016 and 2021 to further evaluate the longevity of the amendments and to monitor further reductions in site contaminant concentrations.

- Groundwater sampling of 22 wells at the site was conducted in November 2021. Key findings are summarized as follows:
  - Five of the eight monitoring wells within the EHC pilot study areas were sampled. Results from four of these wells (MW-23D, MW-24D, MW-25D, and MW-25I) showed significant decreases of contaminant concentrations compared to the pilot study Round 2 sampling event (2015). Notably, in the 2021 sampling event, the 1,2-DCA concentration in each of the four wells was lower than 200 µg/L. Groundwater in one well, MW-24S, contained 1,2-DCA at 250 µg/L in 2021, which is similar to the concentration prior the pilot study (**Table 1-2**).
  - Two of the eight monitoring wells within the lactate pilot study areas were sampled. Results at MW-7S remained low and continued to decrease with each sampling event. Results at MW-27D rebounded (1,2-DCA increased to 3,960 µg/L from 81 µg/L in 2015 and 6.5 µg/L in 2016).
  - Even though not all monitoring wells in the pilot study areas were sampled in 2021, the results do demonstrate that EHC, being a long-term (typically 3 to 5 years) amendment, provided continued treatment. Lactate, being a short-term (at least 1 year at this site) amendment, was consumed and did not provide continued treatment as contaminants in clay leached out or contaminants in surrounding areas may have migrated into the treated area. Groundwater monitoring wells that were associated with lactate injections rebounded whereas groundwater monitoring wells associated with EHC did not.
  - For monitoring wells away from the pilot study areas, such as MW-14D and MW-2D, contaminant concentrations also decreased. Because these two wells are downgradient of the pilot study areas (based on the RI groundwater potentiometric surface), the concentration decreases might also be a result of treatment at the pilot study areas. For monitoring wells in the deep overburden near the bedrock injection areas, such as MW-6D and MW-3D, the significant concentration decreases could be combined results from the overburden pilot study and bedrock amendment injection.
- Areas injected with EHC generally resulted in a more sustained reduction in contaminant concentration than areas injected with lactate. Groundwater geochemical parameters were not collected in the 2021 sampling event; therefore, a complete assessment of the longevity of EHC or lactate could not be conducted.
- Both lactate and EHC were identified to successfully stimulate the growth of indigenous bacteria that are capable of degrading site contaminants. QuantArray-Chlor results from MW-26D and MW-27D (treated with lactate) and from MW-23D and MW-25D (treated with EHC) showed increases of *Dehalobacter* species (ssp.), *Dehalococcoides* ssp. (DHC), *Dehalogenimonas* ssp., and 1,2-DCA reductase above 10^4 cells per milliliter (cells/mL), indicating that a very active microbial community had been established.
- Following bioaugmentation, the populations of DHC and TCE reduction increased by four orders of magnitude at MW-7D. Additionally, a reduction of three orders of magnitude in

the concentration of site contaminants was observed at MW-7D after bioaugmentation. Overall, bioaugmentation using site groundwater was identified to be a viable approach for bioaugmentation during the RA.

- Bioaugmentation was not conducted for the EHC pilot study area and the lactate pilot study wells, MW-26D and MW-27D, while effective treatments were observed. Therefore, bioaugmentation would enhance treatment at some areas of the site but is not considered essential for areas treated by EHC and not for all areas of the site.

2.4.2 Bedrock Aquifer

The following findings were summarized from the pilot study report for the bedrock aquifer injections and supplemented by the findings based on 2021 data:

- Similar to the overburden aquifer results, varying degrees of contaminant concentration reductions were also observed in the bedrock aquifer, with up to a two order of magnitude reduction in site contaminant concentrations based on the pilot study sampling events (**Figure 2-6**).

- Lactate continued to act as a carbon source, based on the results of the Round 3 post-injection groundwater sampling event in 2016, thereby continuing to enhance the in situ biodegradation of site contaminants. Results from 2021 Round 4 sampling event confirmed further decreases of contaminant concentrations in three of the six bedrock wells sampled, as shown in **Figure 1-2f**. VOC concentrations at MW-3B1 became non-detect. VOC concentrations at MW-6B2 and MW-6B4 were below 100 µg/L. Contaminant concentrations increased in the other three wells (**Figure 1-2f**). Groundwater geochemistry parameters, such as total organic carbon (TOC), were not included in the analyses; therefore, evaluation of the longevity of injected lactate could not be assessed. Considering that lactate is generally not a long-lasting amendment, the TOC in bedrock wells were most likely returned to the natural background levels.

- Injection flow rates varied significantly for bedrock wells. The injection rates at MW-6B1, MW-6B4, and MW-3B1 were between 0.5 and 2 gpm using a gravity feed system but increased to 5.1 gpm at MW-6B4 under 20 psi of injection pressure. The injection rates at MW-1B1 and MW-6B3 were approximately 0.5 and 0.3 gpm, respectively, under 20 psi of injection pressure. Injections at MW-1B2, MW-6B2, MW-16B1, and MW-16B2 did not reach their target injection volumes upon completion of the pilot study. These wells did not readily accept the amendment solution even under an injection pressure of 20 psi.

- High concentration lactate injected into the bedrock aquifer successfully stimulated the growth of indigenous bacteria for biodegradation of site contaminants in most of the bedrock wells. QuantArray-Chlor data from MW-1B2, MW-6B1, MW-6B2, and to a lesser degree from MW-6B4, indicated high microbial populations.

2.5 Recommendation for RD/RA

Based on the available pilot study data and 2021 Round 4 data, the following recommendations and lessons learned were utilized in developing the full-scale RD and this final revised 100% RD:

- Although both lactate and EHC have proven effective in remediating site contaminants, EHC resulted in continued and significant contaminant concentration decreases after 2016. In fact, contaminant concentrations were decreased to below 200 µg/L, indicating additional amendment injection may not be necessary. Conversely, contaminant concentrations in the lactate pilot study area (MW-27) rebounded, indicating a second injection event will be necessary.
- Because of the lack of groundwater geochemical and dechlorination data, an evaluation of the longevity of EHC and lactate still could not be performed. However, based on an evaluation of the contaminant concentrations between the 2015 and 2021 sampling events, both lactate and EHC will be utilized as the amendments for the RD. EHC is recommended as the injection amendment for areas of 1,2-DCA concentrations that exceed 1,000 µg/L. Lactate is recommended as the injection amendment for areas of 1,2-DCA concentrations between 100 µg/L and 1,000 µg/L. The injection areas are based on concentrations of 1,2-DCA because it is the dominant site contaminant of concern.
- Both hydraulic and pneumatic pressure injections were similarly effective at distributing the lactate and EHC amendments. The RA Contractor will be allowed to recommend either delivery method. The overall considerations will be based on cost.
- Groundwater sampling for evaluating the longevity of both amendments in overburden and bedrock wells are recommended for the RA.
- Even though one round of injection may be sufficient if EHC is used, a provision for a second injection event during the RA construction period (5 years) is recommended. The timing and scale of a second injection event would be determined based on an evaluation of the results of the performance monitoring groundwater sampling events following the first injection event during the RA.

Section 3

Remedial Design Summary

This section provides a summary of the RD presented in the Contract Documents, including the major design assumptions and rationale that were used to develop the key components of the project. ISB injection design quantities (i.e., area, volume, amendment quantities, injection volume, and duration) are based on the groundwater sample results from the OU3 RI, the pilot study results from 2014 to 2015, and supplemental groundwater monitoring (2021 Round 4 data). The final quantities will be updated after completing the groundwater screening and baseline groundwater sampling at the beginning of the RA.

The major design components will include:

- Site preparation, including mobilization, clearing, topographic surveys, locating existing monitoring wells, monitoring well condition assessment, monitoring well modifications and repairs (if applicable), utility identification, establishing temporary utility connections, construction of a staging area, construction of an equipment decontamination area, and establishment of site security
- Collection of groundwater screening data
- Installation of new monitoring wells
- Collection of baseline groundwater data
- ISB amendment injections and post-injection monitoring
- Site restoration

3.1 General Sequence of Construction

The following is the general sequence of construction anticipated during the RA at the site.

- Preparation of planning documents and obtaining permits for site preparation activities, groundwater screening, and well installation.
- Mobilization and Site Preparation – As part of the site preparation activities, the following activities will be completed:
    - Establishing the trailer compound, including the utility connections and other temporary facilities
    - Establishing site security, a temporary decontamination area, a chemical staging area, and a connection to the City of Newark water hydrant
    - Placing dense-graded aggregate on the driveway entering the WCC property

  - Clearing and removing construction debris at the site
  - Performing a utility survey at both the WCC property and the 646 Frelinghuysen Avenue property
  - Performing a topographic survey at both the WCC property and the 646 Frelinghuysen Avenue property
  - Locating all existing monitoring wells and performing a well condition assessment
- Groundwater Screening – Advancement of borings and performance of groundwater screening will be performed as discussed in Section 3.5.
- Well Installation and Repair/Replacement – Installation of new monitoring wells, exposure of buried wells, and repair of damaged wells will be performed as discussed in Sections 3.6 and 3.12.1.
- Baseline Groundwater Sampling – Baseline sampling will be performed as discussed in Section 3.7.
- Preparation of planning documents for amendment injection and obtaining permits for injection activities, following evaluation of the groundwater screening and baseline sampling results as directed by the Contracting Officer and completion of revisions to the contract drawings, as necessary, to avoid any rework on the associated planning documents and permits.
- Overburden ISB Amendment Injections and Performance Injection Monitoring – Injections and post-injection monitoring will be conducted in stages, as discussed in Sections 3.8 and 3.9.
- Bedrock ISB Amendment Injections and Performance Injection Monitoring – Injections and post-injection monitoring will be conducted in stages, as discussed in Section 3.12. (Note, bedrock ISB amendment injection can be performed concurrently with overburden ISB injection).
- Site Restoration – After completing the injection of amendments at each location, the borehole will be grouted using a tremie grouting method. After completion of injections at all locations, both properties will be restored. A topographic survey will be conducted of the area that was disturbed and restored at both the WCC property and the 646 Frelinghuysen Avenue property.
- Demobilization – During this phase, the decontamination area, injection trailers, chemical staging area, and trailer compound will be demobilized off-site.

3.2 Site Access

EPA will be responsible for obtaining access agreements to the WCC property and the 646 Frelinghuysen Avenue property. However, the RA Contractor will support EPA, as needed, to obtain any necessary access agreements for the RA and for groundwater sampling as required.

EPA will be responsible for relocating businesses at the properties, if necessary. The RA Contractor is not anticipated to perform any relocating activities, such as moving the parked vehicles on both the WCC property and the 646 Frelinghuysen Avenue property.

3.3 Topographic and Well Survey

The RA Contractor will retain the services of a New Jersey–licensed surveyor to provide a pre-remedial action topographic survey, monitoring well survey, and utility/geophysical survey of the WCC property and the 646 Frelinghuysen Avenue property prior to groundwater screening. The surveyor will also provide a topographic survey of the WCC property and the 646 Frelinghuysen Avenue property after the RA activities to indicate the finished grades and all restoration features within the remediation area. In addition, the surveyor will perform a survey (coordinates and elevation) of the groundwater screening locations, new monitoring well locations, and new elevations of wells raised from below aggregate placed by the owner/lessee or after well improvement performed at the beginning of RA. The RA Contractor will provide Form Bs for the monitoring well survey. Requirements for surveying are detailed in Specification **Section 01 71 23**.

3.4 Mobilization and Site Preparation

Mobilization and site preparation activities described herein will be performed in accordance with Specification **Section 02 10 00** at the beginning of the RA activities.

3.4.1 Contractor Mobilization

The RA Contractor will mobilize a support zone along the fence on the northeast of the site. The support zone will house the RA Contractor's on-site personnel, USACE, and EPA. The RA Contractor will propose the support zone location and any required phased relocation in the Site Preparation Plan in accordance with Specification **Section 02 10 00** for USACE approval.

3.4.2 Temporary Construction Facilities

The RA Contractor will be responsible for providing temporary facilities at the site, including a trailer compound and parking area, to support on-site personnel and store/stage field supplies and equipment.

Three trailers will be required during RA activities to house the EPA and USACE office, the RA Contractor's office, and other support facilities. All trailers will be equipped with electricity. The EPA and USACE trailer will be equipped with internet and telephone service. Portable toilets will be provided as part of the sanitary utilities. The RA Contractor is responsible for all utility hook-ups, sanitary services, and maintenance. The utility company contacts, at the time of design, are listed in the Contract Drawing **G-002**.

3.4.3 Clearing

Clearing will be conducted, as necessary, for the RA activities. Vegetation along the driveway and any vegetation impeding access to the groundwater screening locations, proposed monitoring well locations, injection locations, or designated support zones will be removed. Based on the current conditions of the site, minimal vegetation clearing is anticipated. For cost estimating, it is assumed that the areal extent for clearing is 55,000 sq ft.

Above-grade cleared material will be considered uncontaminated and will be recycled at an approved recycling facility in accordance with Specification **Section 02 81 00**.

The RA Contractor will perform clearing of the site after mobilization to the site.

3.4.4 Utility Clearance

The RA Contractor will be responsible for utilizing the appropriate New Jersey One-Call utility service and independently performing a geophysics investigation at the site prior to commencement of subsurface activities. The purpose of these investigations is to identify the locations of all underground active and inactive utilities to prevent issues with obstructions during subsurface activities.

The RA Contractor will be required to provide location and depth of all utilities in a utility survey in accordance with Specification **Section 02 10 00**. Based on the type, location, and depth of a utility and its proximity to the injection point, necessary adjustments will be made to the injection locations to maintain a minimum of 5 feet clearance in all directions from the utility to minimize the potential for the utility to act as a preferential pathway, as directed by the Contracting Officer. The RA Contractor will take the necessary precautions to ensure no damage occurs to the existing utilities.

3.4.5 Equipment Decontamination Facilities

The RA Contractor will construct a decontamination pad in accordance with Specification **Section 01 35 29** and in accordance with their approved Site Preparation Plan. The decontamination pad will be used for decontamination of drilling and sampling equipment in accordance with the Contract Documents. All equipment that comes in contact with the contaminated materials will be decontaminated prior to leaving the site or between sampling/injections. All decontamination water will be collected and properly disposed off-site.

3.4.6 Site Security

The RA Contractor will be responsible for establishing site security upon mobilization to the site and during the RA. The site is currently secured with a 6-foot-high chain-link fence to prevent public access.

3.4.7 Chemical Management

Two amendments (60% lactate solution and granular EHC) will be stored on-site during the injection activities. The RA Contractor will be required to store the 60% lactate solution within secondary containment. The secondary containment must have a minimum storage capacity of 110% of the volume of the largest container stored in the secondary containment. EHC will be stored in closed containers (i.e., shipping containers) to avoid contact with water or direct heat.

3.5 Groundwater Screening

The objectives of the groundwater screening are to:

- Update the horizontal extent of groundwater contamination, especially the 100 µg/L contour interval for site contaminants (mainly 1,2-DCA, and/or TCE) within the

overburden aquifer at the WCC property and the 1,000 µg/L contour for 1,2-DCA on the 646 Frelinghuysen Avenue property

- Update the vertical extent of the 100 µg/L contour interval for 1,2-DCA and/or TCE within the WCC property and the 646 Frelinghuysen Avenue property
- Determine monitoring well locations and depth of screen placement
- Determine the treatment zone and amendment dosing

The RA Contractor will perform groundwater screening of the overburden aquifer using a Geoprobe DPT method or approved equivalent, using a 4- or 5-foot, 10-slot screen as specified in Specification **Section 02 32 13**. Groundwater screening samples will be collected from 46 primary locations as shown in Contract Drawing **C-102**.

Generally, the primary borings are spaced 80 feet apart from each other or an existing monitoring well. The primary borings will be utilized to investigate the distribution of contaminants (mainly 1,2-DCA and/or TCE) in the overburden aquifer at the site. If needed, up to 20 secondary borings can be utilized, as necessary, to determine both the lateral and vertical contaminant distribution.

The RA Contractor will advance borings and collect groundwater screening samples at the primary locations. The RA Contractor will survey the coordinates of all groundwater screening locations. The groundwater data (concentrations and vertical profile information) collected from the primary groundwater screening locations will be evaluated to determine whether additional refinement of the groundwater contamination area is required. Based on this evaluation, the RA Contractor may be required to collect groundwater screening samples from the secondary boring locations, as directed by the Contracting Officer. The information from the secondary borings will be used to refine the horizontal or vertical concentration contour for 1,2-DCA to support the determination of treatment zones. Because 1,2-DCA exhibited the highest COC concentrations in groundwater prior to the pilot study, 1,2-DCA will be used as an indicator contaminant in the evaluations for treatment zone determination. If the contaminant distributions between two adjacent boring locations are significantly different (over an order of magnitude), a secondary boring between these two locations will be advanced to determine the treatment zone. Depending on the distribution of VOCs encountered during groundwater screening, advancement of secondary groundwater screening borings may be necessary.

Groundwater screening samples will be collected every 5 feet from the depth of refusal (assumed to be the top of weathered bedrock) to within 4 feet below the water table. The RA Contractor will use the following process to collect the groundwater screening samples:

1. RA Contractor will advance the location to the top of weathered bedrock or until refusal is encountered with an expendable point and screen installed in the lead drive rod.
2. After reaching the weathered bedrock or encountering refusal, the RA Contractor will pull the drive rods up by a length equal to the length of the screen while ensuring the expendable point and the screen are exposed to the formation.

3. RA Contractor will collect a water level reading and then briefly develop the screened interval by purging a minimum of two well volumes of water or until relatively silt free purge water is observed. Once this purge is performed, a groundwater sample will be collected for laboratory analysis.

4. Groundwater samples collected will be analyzed for Target Analyte List (TAL) VOC analysis on a maximum of 72-hour turnaround time (TAT).

5. Screen and rods will be removed from the borehole and decontaminated in accordance with the RA Contractor's approved Uniform Federal Policy – Quality Assurance Project Plan (UFP-QAPP).

6. Steps 1 through 5 will be repeated with the bottom of the subsequent sampling interval located within 6 inches of the top of previous sampling interval until the shallowest groundwater sample within 4 feet of the water table is collected.

7. RA Contractor will tremie grout the borehole location in accordance with New Jersey Administrative Code (N.J.A.C.) 7:9D.

8. If the screening point is located on an asphalt surface, after grouting the injection location with grout, the RA Contractor will use a temporary cold patch at the top of the injection location to match the surrounding asphalt surface until the site restoration is completed.

The groundwater screening samples will be collected from the corners of the WCC property first, moving inward to the center of the property because higher levels of groundwater contamination are present in the inner area of the property and there is uncertainty regarding the contaminant concentrations in the corners of the WCC property. The groundwater screening samples on the 646 Frelinghuysen Avenue property will generally be collected from east to west.

3.6 Overburden Well Construction, Installation, and Development

The RA Contractor will be responsible for performing a monitoring well assessment including locating all existing wells, raising buried wells flush to ground surface, and repairing damaged wells (Specification **Section 33 51 39**). The RA Contractor will provide proposed maintenance and repair, extension, or abandonment approaches to USACE for review and approval.

Based on the results of the groundwater screening, new overburden monitoring wells will be installed for performance monitoring during the RA. The new monitoring wells are currently proposed at locations within 200 feet of the existing monitoring wells to provide sufficient coverage for the performance monitoring during the RA. However, based on the results of groundwater screening, the location(s) and screen interval(s) for the proposed monitoring wells will be updated as directed by the Contracting Officer.

As shown on Contract Drawing **C-103**, a total of 11 overburden well clusters (each consisting of one intermediate and one deep well) and three intermediate overburden wells are proposed for the WCC property. The deep overburden monitoring wells will be installed with the bottom of the

monitoring well located on the top of the weathered bedrock, and the intermediate overburden monitoring wells will be installed at an intermediate depth within a zone with high contaminant concentrations. A summary of construction, anticipated coordinates, and anticipated screen intervals of proposed monitoring wells are provided on Contract Drawing **C-103**. The monitoring wells will be constructed, installed, and developed in accordance with N.J.A.C. 7:9D and Specification **Section 33 51 39**.

In addition, four deep overburden monitoring wells are proposed for the 646 Frelinghuysen Avenue property, as shown in Contract Drawing **C-103**, with the bottom of the screen installed at the top of the weathered bedrock. These monitoring wells will be constructed, installed, and developed using the same methodology as the new wells at the WCC property.

The RA Contractor will install the overburden monitoring wells using sonic drilling methodology with continuous soil samples collected for logging of the lithology. At a minimum, for installation of deep overburden monitoring wells, the augers will be extended to the top of weathered bedrock and the over-drilled interval (the portion in the weathered bedrock) will be backfilled with grout and then #00 sand. The bottom of the deep well screen will be placed 1 foot above the weathered bedrock. The overburden monitoring wells will be constructed of 2-inch polyvinyl chloride (PVC) riser pipes and 10-foot, 10-slot PVC screen, with #1 sand and a #00 sand seal. Specification **Section 33 51 39** provides a summary of construction, anticipated coordinates, and anticipated screen intervals of proposed monitoring wells. Contract Drawing **C-107** shows the details for overburden monitoring well installation.

All new overburden wells will be completed flush to the ground surface in accordance with Contract Drawing **C-107**.

3.7 Baseline Groundwater Sampling

At least 2 weeks after the development of the monitoring wells, the RA Contractor will conduct baseline groundwater monitoring for the RA from both overburden and bedrock wells in accordance with Specification **Section 01 80 00**. The objective of the baseline monitoring event is to establish updated baseline concentrations of site contaminants and supplement the groundwater screening data to refine the amendment injection areas. The baseline sampling results will provide updated contaminant concentrations and groundwater geochemistry in the overburden aquifer.

Groundwater samples will be collected from all existing and newly installed overburden and bedrock monitoring wells. The groundwater sample collection will be conducted using the EPA Region 2 low-stress and low-flow method (EPA 1998). A summary of existing well construction is provided in Specification **Section 01 11 00**.

The samples will be sent to an off-site laboratory for analysis of TAL VOCs; 1-bromo-2-chloroethane; methane, ethane, ethene, and acetylene (MEEA); TOC; microbial analysis via quantitative polymerase chain reaction (qPCR) conducted per Specification **Section 01 80 00**.; and anions (sulfate, nitrate, nitrite, and chloride) during the baseline sampling event. The overburden monitoring well and bedrock monitoring well samples will have a maximum 7-day TAT for preliminary unvalidated data for all analyses except for VOCs and TOC. A maximum 3-day

TAT will be required for preliminary unvalidated data for VOCs and TOC analyses. Ferrous iron will be analyzed in the field. The following field groundwater quality parameters will also be measured and recorded: pH, temperature, conductivity, dissolved oxygen (DO), turbidity, and oxidation-reduction potential (ORP). A summary of the sampling frequency and analysis activities is presented in Specification **Section 01 80 00**. All sample analysis requirements are provided in Specification **Section 01 35 45**.

3.8 Overburden ISB Injections

The results of the pilot study and supplemental groundwater monitoring event form the basis of the ISB injection design for the RA. The various components of the ISB injection design include treatment volume estimation; amendment selection, dosage, and quantity estimation; injection point locations and quantities; injection volumes; system requirements; and system operations.

3.8.1 Amendment Selection and Dosage

As discussed in Section 2, the pilot study and groundwater monitoring results (including those from 2021 sampling) indicated that EHC injections caused slower but longer-lasting reductions in site contaminant concentrations that were previously detected up to 50,000 µg/L. Pilot study results indicated that the lactate injections were also successful, but the longevity of the lactate amendment appeared to be less than longevity of the EHC amendment in sustaining enhanced contaminant dechlorination. The selection of the ISB amendment proposed for the RA is based on the anticipated concentration of site contaminants in the treatment zone, the potential for back diffusion and rebound of contaminants, the anticipated longevity of the amendment in formation and the effectiveness of delivering amendments in the tight geology (silty clay and clay).

Based the results of the 2021 groundwater sampling event, CDM Smith performed an evaluation using the two different amendments. The 2016 design included lactate injection for areas of contaminant concentrations between 100 and 50,000 µg/L, and a combination of lactate/EHC for concentrations over 50,000 µg/L. Since EHC was observed to be longer lasting than lactate, based on the 2021 groundwater sampling results, an alternative injection approach involving injection of only EHC was considered. Because EHC is more costly than lactate, a hybrid approach was selected and should reduce the need for additional injection mobilizations to achieve the target site contaminate reductions.

The details of the hybrid option are outlined below. Both amendments are proposed for the RA; however, the application of each amendment differs based on concentration range. For the proposed amendment dosages based on concentration ranges and the necessary water volumes to achieve the proposed radius of influence, see **Table 13 30 00-1** in Specification **Section 13 30 00**. Rationale for the proposed amendment dosages is as

- Lactate is proposed as the amendment for injection within the treatment zone with 1,2-DCA concentrations between 100 and 1,000 µg/L. At this lower concentration range, it is likely one round of treatment would be able to decrease contaminants to concentrations below 100 µg/L. The remaining contamination is proposed to be addressed by natural attenuation.

- EHC is proposed as the amendment for injection within the treatment zone with 1,2-DCA concentrations above 1,000 µg/L, owing to its enhanced performance in sustaining contaminant concentration reductions compared to lactate as indicated by the 2021 groundwater sample results. EHC also lasts 1 to 4 years longer than lactate. The EHC powder will be mixed with city water to prepare a 30% slurry as recommended by the EHC manufacturer.

Because 1,2-DCA greater than 20,000 µg/L are not anticipated based on the most recent data collected, an injection zone based on this concentration range is not shown on the Contract Drawings. However, if areas of groundwater containing 1,2-DCA at concentrations greater than 20,000 µg/L are identified during the groundwater screening or baseline sampling, the proposed EHC dosage is 25 lb per CY of treatment volume.

Because the dosing of EHC for different concentration ranges vary, the injection volume will also vary. The RA Contractor will be required to track the quantity of EHC injected as well as the volume of EHC slurry injected.

Because 1,2-DCA concentrations vary laterally as well as vertically, the amendment and its necessary dosing will vary between injection points and within injection points between different vertical injection intervals. The RA Contractor will be required to use the recommended EHC-to-water ratio recommended by the EHC vendor (**Appendix C**). If more water is added for ease of injection, guar gum may need to be added to keep EHC in suspension.

3.8.2 Injection Point Spacings

The spacing of injection points are proposed for different concentration ranges as follows:

- For 1,2-DCA concentrations ranging from 100 to 20,000 µg/L, lactate or EHC will be injected on a 14-foot injection grid.
- For 1,2-DCA concentrations greater than 20,000 µg/L, EHC will be injected at a 10-foot injection grid. However, based on the 2021 sample results, areas with concentrations greater than 20,000 µg/L are not anticipated and therefore this spacing is not presented on the contract drawings.

Areas anticipated for lactate injection or for lactate and EHC injection are shown in Contract Drawing **C-104.** The actual zones to be injected by lactate or EHC and their injection dosing will be determined after reviewing the groundwater screening results and baseline groundwater sample results from existing wells.

Assuming a 14-foot injection grid, each injection point would cover an area of 196 sq ft. Additional overlap was not considered necessary because the pilot study tested 9-foot ROI and distribution of amendments observed during the pilot study was heterogeneous and did not necessarily follow a typical injection ROI.

3.8.3 Treatment Volume Estimation

3.8.3.1 2016 Treatment Volume Estimation

As part of the 2016 RD, the treatment volume was estimated based on the groundwater sample results from the OU3 RI and the pilot study groundwater sampling (Rounds 1 and 2). The horizontal extent of the treatment area for the WCC property was selected to be the property boundary because the 1,000 µg/L contour for 1,2-DCA included most of the WCC property, and also because the entire WCC property is considered a source area based on site history that contaminant releases could have occurred anywhere on the property. The horizontal extent of the treatment zone at 646 Frelinghuysen Avenue was bounded by the 1,000 µg/L contour for 1,2-DCA, which corresponded to most of the area outside of the building footprint. For both the WCC property and the 646 Frelinghuysen Avenue property, the vertical treatment area was bounded by the 100 µg/L contour for 1,2-DCA concentrations.

1,2-DCA was used as the site contaminant to model and determine the overall treatment volume because it was the contaminant that had the largest horizontal and vertical footprint among the site contaminants. The location (easting and northing), screened intervals, and concentrations of 1,2-DCA were tabulated for the most relevant monitoring well and OU3 RI groundwater screening data.

A three-dimensional model (Leapfrog model) was developed using the data, and the Kriging interpolation method was utilized to estimate the treatment volumes in 2016. The model allows for estimating treatment volumes for various concentration ranges. The 1,2-DCA concentration ranges used to estimate the treatment volumes were 100 to 1,000 µg/L, 1,000 to 10,000 µg/L, 10,000 to 50,000 µg/L, and greater than 50,000 µg/L (**Figures 3-1a** and **3-1b**). The modeled vertical and horizontal extents were utilized to create simplified three-dimensional rectangular boxes representing each concentration level to estimate the treatment volume and amendment injection volumes in 2016.

3.8.3.2 Treatment Volume Estimation for this RD

Analytical results from the 17 overburden wells sampled in 2021 demonstrated significant decreases in contaminant concentrations both within and outside of the pilot study areas compared to the Round 3 sample results from 2016, approximately 2 years after the pilot study (e.g., 1,2-DCA concentrations decreased from 6,700 µg/L in September 2016 to 1,640 µg/L in 2021 at MW-2D; 1,2-DCA concentrations decreased from 14,000 to 8,360 µg/L at MW-14D). Because of this significant change in concentrations, using the treatment volume estimates calculated in the 2016 design may be too conservative. Therefore, the Leapfrog model was updated using the 2016 and 2021 data (Round 3 and Round 4, respectively) by replacing 1,2-DCA concentrations from the 2015 results with the most recent results for each well (either the 2016 or 2021 results for wells sampled in 2021). In addition, the following manual adjustments were made:

- For MW-22D within the EHC pilot study area, the 1,2-DCA concentration was 23,000 µg/L in September 2016. This well was not sampled in 2021. However, considering the significant 1,2-DCA concentration decrease in MW-24D and MW-25D between September 2016 and November 2021 (51,000 to 194 µg/L, and 23,000 to 127 µg/L, respectively), it is reasonable to predict that the 1,2-DCA concentration in MW-22D would currently be below

1,000 µg/L. Therefore, it is assumed in the model that the 1,2-DCA concentration is 900 µg/L.

- After initially updating the model to include the most recent groundwater data, the model predicted a large portion of the area between MW-6D and MW-14D to have 1,2-DCA concentrations below 100 µg/L because of the low 1,2-DCA concentration in MW-6D (80.4 µg/L) and the distance between MW-14D (8,360 µg/L) and MW-6D. However, the model was adjusted to reflect that the relatively low concentration at MW-6D is most likely localized, which is based on the conceptual site model. This assumption is also more conservative.
- After initially updating the model to include the most recent groundwater data, the model predicted a large portion of the area north of MW-23D and between MW-23D and MW-3D to have 1,2-DCA concentrations below 100 µg/L because of the lack of data and the low concentration at MW-23D (1,2-DCA at 11 µg/L in 2021). However, given historical and recent data in this area (1,2-DCA concentration of 1,900 µg/L was identified in historical boring DPT6 and 1,260 µg/L at MW-3D in 2021), the model was adjusted to assume this area contained 1,2-DCA concentrations greater than 1,000 µg/L.

The areas within the various 1,2-DCA concentration ranges and corresponding treatment volumes using the updated Leapfrog model are presented in **Figure 3-2** for both WCC and 646 Frelinghuysen Avenue properties. The total treatment volume was estimated to be approximately 174,900 CY. The volume estimates and corresponding amendment quantity estimates for each 1,2-DCA concentration range are presented in Specification **Section 13 30 00**. Furthermore, the Leapfrog model also demonstrated that the average thickness of the treatment zone with 1,2-DCA concentrations greater than 1,000 µg/L is approximately 7.5 feet; the average thickness of treatment zone with 1,2-DCA concentrations between 100 and 1,000 µg/L is approximately 9 feet. The overall average thickness of the treatment zone is 16.5 feet. Mostly, the higher concentrations were in the deeper zone above the weathered bedrock and the lower concentrations (1,2-DCA concentrations between 100 to 1,000 µg/L) were in the shallower zone, in middle of the saturated overburden.

Since there is a fence and topographic change at the boundary between the WCC and the 646 Frelinghuysen Avenue properties, the property boundary was used to create a division for the treatment zone for the two properties. The areal extent of the treatment areas for the WCC and the 646 Frelinghuysen Avenue properties are approximately 200,000 sq ft and 86,000 sq ft, respectively. Additionally, because of the large size of each property and the time required to complete amendment injection at each property, multiple treatment zones were developed within each property as shown on Contract Drawing **C-104**. The actual treatment volume will need to be revised prior to amendment injection based on groundwater screening results and baseline monitoring well results.

3.8.4 Injection Volume

Based on the results of the pilot study, lactate solution was distributed at a ratio of approximately 14 gallons per CY of treatment volume; therefore, the same delivery volume for lactate is proposed for the RA. Based on the results of the pilot study, EHC slurry was distributed at a ratio

of 5.6 to 6 gallons per CY of treatment volume through the injections over the entire depth, and at a ratio of 7.5 to 7.7 gallons per CY of treatment volume through the injections to the deep intervals (Specification **Section 13 33 00**). Therefore, the actual ratio for the deep interval was approximately 13.4 gallons per CY of treatment zone volume. The high injection volume for the deep zone is not likely to be necessary, as discussed in the EHC dosing calculations presented in **Appendix C**. EHC injection volume per CY of treatment volume would vary based on the required EHC dosing. The RA Contractor will prepare the EHC slurry per manufacturer recommendation (**Appendix C**). The total estimated injection volumes of lactate and EHC presented on Table 13 30 00-1 in Specification **Section 13 30 00**. Injection volumes were calculated using the selected amendment dosages for each CY of treatment volume. The total injection volume per injection point will be dependent on the length of the vertical injection zone for each location during the RA.

3.8.5 Injection System

The injection system will consist of components for:

- Mixing the amendments to the design concentrations using city water
- Injecting the designed concentration amendments to the target treatment zone under pressure through a DPT rig
- Switching between EHC slurry and lactate solution mixing tanks for a single injection point to account for vertical contaminant concentration changes
- Tracking the injection flow rates and total volume injected per injection interval for lactate injection
- Tracking the injection flow rates and the quantity of EHC injected per injection interval for EHC injection
- Tracking the quantity of amendment and city water used for preparing designed concentrations

The RA Contractor will be required to provide two process flow diagrams with equipment specifications to match the requirements set forth in Specification **Section 13 30 00**.

During the pilot study, hydraulic and pneumatic injection methods provided comparable results, and the RA Contractor can propose the use of the injection method that will be the most cost-effective for the government. The RA Contractor will need multiple drill rigs and multiple injection systems to inject EHC amendment simultaneously at multiple locations. The lactate injection system should be capable of injecting simultaneously at a minimum of three locations using either an injection manifold or multiple individual injection setups. Based on the results of the pilot study, the average injection flow rates at each location are expected to range from 6 to 12 gpm, depending on the amendment and injection pressures ranging from 100 to 250 psi with instantaneous pressure of 400 psi. The RA Contractor will be required to select appropriate equipment, monitoring, and control devices (e.g., pressure gauges, flow meters, totalizers, ball valves, accurate scale) suitable for the intended injection operation conditions. The performance-

based requirements for the RA Contractor to design, construct, and set up a pressure injection system are provided in Specification **Section 13 30 00**.

3.8.6 Injection Operations

The RA Contractor can implement a top-down or bottom-up approach to deliver the amendments for vertical distribution in the treatment volume. Based on the results of the pilot study and discussions with injection vendors, a bottom-up approach with a 2-foot injection screen is described herein. During the RA, the RA Contractor can propose different injection tools (such as a Geoprobe pressure-activated injection tool). The injection tooling will be subject to approval by the Contracting Officer.

For example, the lactate amendment solution may be delivered to the target treatment zones identified for only lactate injection as follows:

- Based on the designed amendment volume of 14.3 gallons of lactate solution per CY of treatment zone (as shown in Table 13 30 00-1 in Specification **13 30 00**) and using the 14-foot center to center grids (i.e., 196 sq ft area under each injection location), the RA Contractor will deliver 104 gallons of lactate solution at the designed dosage per vertical foot of treatment zone.
- At each injection location, the DPT rods with an expendable point and a 2-foot screen will be advanced to the top of weathered bedrock or refusal, and the drive rods will be pulled up 2 feet by exposing the screen to the target treatment zone.
- Total of 208 gallons of the designed concentration of lactate solution will be injected under pressure at the bottommost 2-foot treatment zone.
- After completing the bottommost injection interval, the injection screen will be pulled up 2.5 feet and injection into the next interval will proceed, resulting in a 0.5-foot zone between two adjacent injection intervals. The volume for subsequent injection volumes will include the injection volume for the 0.5-foot treatment zone between the two adjacent injection intervals. The RA Contractor will deliver 260 gallons of the designed concentration of amendment solution for the subsequent 2.5-foot intervals.
- RA Contractor will continue to inject the required volumes of amendment in the target treatment zones and pull up the screens as the volume for a specific treatment zone is completed until the top of the injection screen is at the top of the water table.
- RA Contractor will maintain, at a minimum, a spacing of 50 feet between active injection points to minimize potential impacts from adjacent injection points.
- If daylighting is observed, the RA Contractor will be required to stop the injections at the location(s) identified to be causing the daylighting. The RA Contractor will attempt to deliver the amendments at a lower injection pressure or abandon the injection location. If the location is abandoned, the injection point will be relocated within 3 feet of the original injection point and injection of the designed volume of amendment will be attempted. Injection at a relocated point will be performed a minimum of 24 hours after abandonment

of the original injection location. In the event the location continues to daylight after a maximum of five attempts per location, including the original location, the RA Contractor will equally distribute the remaining volume of amendment in the surrounding injection locations.

Prescriptive operational requirements for the injection of amendments are provided in Specification **Section 13 30 00**.

3.8.7 Injection Sequencing

The overall sequencing for the injections at the site, and within each property, is designed to begin along the perimeter of the property and migrate toward the center of the property. This approach will allow for treatment of any contaminant mass that may be mobilized because of the injection volume or pressure.

The site is divided into three treatment areas (Areas 1, 2, and 3) as shown on Contract Drawing **C-104**. Area 1 is the eastern and western treatment areas at the WCC property, Area 2 includes the center of the WCC property including the EHC pilot study areas, and Area 3 is the 646 Frelinghuysen Avenue property. This will allow the arrangement of performance monitoring to be reasonable schedule, especially the first performance monitoring event at 6 months after the completion of amendment injection. The RA Contractor may modify the treatment areas based on groundwater screening results and the overall injection sequence in the amendment injection work plan for Contracting Officer approval.

Injections in Area 1 should begin along the perimeter of the property and migrate toward the center of the property. Injections in Area 2 should begin along the perimeter of Area 2 and migrate toward the center of the areas. Injections in Area 3 should begin on the western portion of the 646 Frelinghuysen Avenue property and migrate toward the east. The injection sequencing of each area generally goes from the downgradient portion of the plume to the area upgradient of the plume. This approach provides additional control over the potential migration of contamination and allows for more manageable injection monitoring.

3.9 Overburden Performance Monitoring

Performance monitoring of the overburden aquifer will be conducted at the site to assess overall treatment effectiveness for achieving RAOs for the site, contaminant reduction rates, amendment loading and longevity, and to determine the need for additional injection events. Bedrock performance monitoring will also be conducted, as described in Section 3.12.3.

Three rounds of overburden performance monitoring will be conducted with groundwater sampling conducted 6, 15, and 24 months after completion of the first overburden injection event. The sampling sequence for overburden monitoring wells associated with each injection area will be based on the completion of injections in each area, as discussed in Section 3.8.

Synoptic water levels will be collected during each performance monitoring event and on an annual basis during the performance monitoring period, at a minimum, from all overburden and bedrock monitoring wells at the WCC property and the 646 Frelinghuysen Avenue property.

Based on the results of the 15- and 24-month sampling events, the need for a second overburden injection event will be evaluated. If a second overburden injection event is conducted, two additional rounds of groundwater sampling will be conducted, with the Round 4 sampling event performed 6 months after completing this second injection event and the Round 5 sampling event performed 12 months after completing the second injection event. If a second injection event is not conducted, the Round 4 sampling event will be conducted 33 months after completing the first injection event.

Specification **Section 01 80 00** presents a summary of the sampling frequency and analysis activities. One sample per monitoring well will be collected. The groundwater samples will be sent to an off-site laboratory for a standard (21-day) TAT for preliminary unvalidated data for all analyses except for VOC and TOC analyses. A maximum 3-day TAT will be required for preliminary unvalidated data for VOCs and TOC analyses. Ferrous iron will be analyzed in the field during Rounds 1 and 3. The following field groundwater quality parameters will be measured and recorded every round: pH, temperature, conductivity, DO, turbidity, and ORP. All sample collection and analysis, including QC samples, will be performed in accordance with Specification **Section 01 35 45** and the RA Contractor's approved UFP-QAPP.

3.10 Bioaugmentation

During the pilot study, complete dechlorination of contaminants to ethene and ethane was observed in all the wells with elevated contaminant concentrations within the lactate injection areas without the use of sitewide implementation of bioaugmentation. Dechlorination at MW-7D was initially limited; therefore, bioaugmentation was performed only at this location. Based on the dechlorination results, bioaugmentation for the site is not anticipated to be needed during the RA; however, qPCR analysis will be conducted post-injection per Specification **Section 01 80 00**. The results of these groundwater sampling events will be evaluated by the Contracting Officer to determine whether biological limitations (i.e., an insufficient amount of dechlorinating bacteria) exist at any given area that are hindering bioremediation. Bioaugmentation will not be conducted during the amendment injection event.

3.11 Second ISB Injection Event

The second injection event will be directed by the Contracting Officer based on the results of the Round 2 and Round 3 performance monitoring events. A second injection event will be implemented if the concentrations of site contaminants detected in the Round 2 and Round 3 sampling events continue to remain stable above 100 µg/L or indicate an upward trend (rebound), with the amendment concentration depleted (as determined by TOC concentrations) or the groundwater conditions are not conducive to further degradation of site contaminants.

Since the need for a second injection event will not be identified until the results of the Round 3 performance monitoring event are obtained, from a cost perspective, a second injection event is assumed to be 100% of the first injection event (cost, schedule, and materials) for the portion using lactate. The second injection event will consist of only lactate injections, based off Round 3 data. The second injection event will be conducted in a similar manner as the first amendment injection, with all necessary adjustments based on the lessons learned from the first amendment injection event.

3.12 Bedrock RA Activities

One of the components of the selected remedy in the 2012 OU3 ROD is "treatment of the bedrock aquifer in an effort to decrease contaminant mass to the extent practicable." Four known areas of bedrock contamination were also identified in the ROD for contaminant mass reduction treatment.

During the pilot study in 2015, 30% lactate solution was injected into the nine existing bedrock wells at four locations using a combination of low-pressure hydraulic injection and a gravity feed method (CDM Smith 2016b). Bedrock wells MW-1B1, MW-3B1, MW-6B1, and MW-6B4 received between 302 and 520 gallons of lactate under an injection pressure of 20 psi. Bedrock well MW-6B3 received approximately 240 gallons of lactate under an injection pressure of 20 psi or less. Bedrock wells MW-1B2, MW-6B2, MW-16B1, and MW-16B2 only received between 18 and 40 gallons of lactate under an injection pressure of 20 psi because these wells are screened in zones with small or narrow fractures (CDM Smith 2016b). Lactate solution at 30% has a higher density than water, which will allow the injected lactate to migrate by gravity through fractures along strike or down dip beyond the time of injection operation and potentially treat a larger volume of contaminated groundwater in the fracture bedrock over time.

Analytical results collected after amendment injection indicated that lactate injection has resulted in significant degradation of site-related contaminants in the bedrock aquifer down to ethane and/or ethene without resulting in notable accumulation of toxic daughter compounds (CDM Smith 2016b). Pilot study results collected in December 2015, approximately 17 months after bedrock injections, indicated that the injected lactate continued to sustain as a carbon source while enhancing significant biological activity. However, since these wells are connected to contamination from other parts of the untreated bedrock aquifer, it is difficult to predict whether contaminant concentrations would continue to decrease or rebound. Groundwater sample results collected in 2021 from six bedrock wells showed further decrease of contaminant concentrations in three bedrock wells (MW-3B1, MW-6B2, and MW-6B4) and increase of contaminant concentrations in the other three wells (MW-1B1, MW-1B2, and MW-6B1). However, the overall concentration reductions were significant compared to concentrations prior to the pilot study.

Since significant reduction in site contaminants was observed during the pilot study at the four known areas of bedrock contamination, additional bedrock treatment and monitoring of the bedrock aquifer will be conducted as part of the RA (**Appendix A**). The installation of four monitoring wells (MW-109B1, MW-109B2, MW-110B1, and MW-110B2) is proposed in the directions along strike and down dip of MW-6B1, as shown on Contract Drawing **C-105** and in Specification **Section 33 51 39**. The rationale for the proposed bedrock well clusters is presented in **Appendix D**). The objective for installation of these bedrock monitoring wells is to collect site-specific data on the extent and impact of the treatment zone from bedrock well injections, to evaluate hydraulic properties of the bedrock fractures, and to serve as potential injection points, if needed.

3.12.1 Bedrock Well Installation and Development

Two pairs of bedrock wells are proposed: one pair along strike from MW-6B1 and one pair down dip from MW-6B1. The 2016 RD proposed installing bedrock wells along strike and down dip from MW-3B1; however, the 2021 data indicated that all COCs at MW-3B1 were below detection

limits. As such, CDM Smith performed an evaluation to determine the ideal locations for proposed bedrock monitoring wells; the evaluation is presented in **Appendix D**. Within each pair, one well (a shallow bedrock well) is planned to be screened in the same bedding plane as MW-6B1, and one well (a deep bedrock well) is planned to be screened in a deeper zone than MW-6B1. Each well will be installed in a separate borehole, located approximately 15 feet apart, for each well pair. The distance of these two well pairs is designed to be 50 to 100 feet away from MW-6B1. These wells will be installed prior to the overburden monitoring wells.

Bedrock well drilling, testing, and installation includes the following activities:

- A sonic rig or air rotary will be used to advance a 10-inch borehole to the top of weathered bedrock and continue at a minimum 5 feet into competent bedrock. A 6-inch steel casing will be subsequently installed into the borehole and grouted in place. The purpose of this outer casing is to prevent any possible migration of contamination from the overburden to the bedrock during bedrock borehole drilling, testing, and well installation.
- A 6-inch borehole will be advanced inside the steel casing through bedrock up to approximately 150 feet bgs using air rotary drilling methods.
- A dense nonaqueous phase liquid (DNAPL) FLUTe liner will be installed into the borehole to identify fractures where DNAPL may be located and to prevent cross contamination among fractures. The DNAPL FLUTe liner will be installed and used in accordance with direction from the manufacturer. If DNAPL is observed in a borehole, a blank/clean FLUTe liner will be emplaced in the open borehole to restrict DNAPL movement. A decision will be made as to whether to install a bedrock well at the interval with detection of DNAPL or to abandon the borehole in coordination with USACE and EPA.
- If the DNAPL FLUTe liner does not indicate any signs of the presence of DNAPL, a suite of downhole geophysical logs will be conducted in the bedrock portion of the open boreholes, in accordance with ASTM International Standard D5753-18, including acoustic televiewer, mechanical caliper, fluid temperature and resistivity, electrical resistivity, spontaneous potential, and vertical heat-pulse flow. Information from the logs will be used to select intervals for discrete-depth groundwater sampling.
- Up to five intervals will be selected for each borehole as determined in the previous steps above. Each interval will be isolated with packers and briefly developed to clear the formation of silt and fine-grained particles. Water quality parameters including pH, conductivity, temperature, DO, ORP, and turbidity will be monitored, and samples will be collected once the parameters have stabilized. Groundwater samples will be collected and sent to an off-site lab for 24-hour TAT TAL VOC analysis.
- Based on the downhole geophysical logs and the 24-hour TAT preliminary TAL VOC results, a shallow and a deep well screen interval will be identified.
- The deep well will be installed in the initial borehole that has already been drilled. The shallow well will be installed in a separate borehole located approximately 15 feet from the

initial 150-foot borehole to a depth associated with the determined shallow well screen interval.

- Backfilling of a portion of the deep borehole may be necessary if the fracture zone selected for the deep monitoring well is shallower than 150 feet (the total depth of the deep bedrock borehole).
- The bedrock monitoring wells will be constructed using 5- or 10-foot lengths of 2-inch diameter, 0.030-inch stainless steel screen and stainless steel casing; the sand pack will be #2 sand with a #00 sand seal.
- The second well pair will be drilled, tested, and installed in the same manner as described above.

Additional detailed requirements for bedrock borehole drilling, geophysical testing, groundwater sample collection, and well installation and development are included in Specification **Section 33 51 39**.

3.12.2 Amendment Injection into Bedrock Wells

A baseline groundwater sampling event will be conducted from bedrock wells, as described in Section 3.7. After the baseline sampling event (which will include the four newly installed bedrock wells), the resulting analytical data will be evaluated to determine which bedrock wells require lactate injection based on contaminant concentrations. Based on the 2016 injection, the bedrock wells that will be considered for injection are MW-1B1, MW-1B2, MW-6B1, MW-6B3, MW-6B4, MW-16B1 and MW-16B2. Amendment injection is planned at the newly installed wells MW-109B1, MW-109B2, MW-110B1, and MW-110B2. During the RA, the Contracting Officer may direct the RA Contractor to perform amendment injection at these four wells as necessary.

Amendment injection in the bedrock aquifer will be conducted by a combination of gravity feed and low-pressure injection (the pressure for each well will be calculated based on screen interval of the well). Gravity feed injection will be performed first, and low-pressure injection using a pump will be used as a backup method if gravity feed is deemed to be slow, or as an attempt to deliver a large volume of amendment into the bedrock well(s). The details for bedrock injection will be determined using the baseline groundwater sampling results.

Wells that readily accept lactate injections would receive an injection of 1,200 gallons of 30% sodium lactate. This includes all existing bedrock wells on WCC property planned for amendment injection. The injection rate in these wells ranged from 0.5 to 3.2 gpm. If any of the newly constructed bedrock monitoring wells do not readily accept the lactate injections, and for MW-16B1 and MW-16B2, 50 gallons of 60% lactate solution will be injected into these wells. The injection rate at these wells may be between 0.1 and 0.3 gpm, based on the pilot study injections rates at bedrock wells that did not readily accept the lactate solution. At a minimum, injection at bedrock wells in the same cluster will be conducted simultaneously.

Transducers will be placed in the four newly installed bedrock monitoring wells to monitor changes in water level and possible responses to the injection at the MW-6 bedrock well cluster. After injections at this cluster, the transducers will be removed from the newly installed wells,

and injections will be performed in those wells if determined based on the baseline groundwater sampling event results. The RA Contractor will install transducers in wells not being injected based on the baseline groundwater sampling event as directed by the Contracting Officer.

3.12.3 Performance Monitoring of Bedrock Wells

The nine existing and four new bedrock wells are planned to be sampled as part of the RA activities at 6, 15, and 24 months following completion of the bedrock injections within the 5-year contract period. The purpose of the sampling is to monitor changes in contaminant concentrations and the longevity of amendment. The long-term impact of the bedrock injections, and the degree to which back diffusion will occur might require monitoring longer than the RA contract period. The groundwater samples will be analyzed for TAL VOCs (and 1-bromo-2-chlorothane), sulfate, TOC, and MEEA. The groundwater samples will be sent to an off-site laboratory for a standard (21-day) TAT for preliminary unvalidated data for all analyses except for VOC and TOC analyses. A maximum 3-day TAT will be required for preliminary unvalidated data for VOCs and TOC analyses. Microbial analysis via qPCR will also be conducted at bedrock wells per Specification **Section 01 80 00**.

3.13 Investigation-Derived Waste Disposal

The RA Contractor will be required to dispose of all investigation-derived waste (IDW) generated as a direct result of remediation activities in accordance with all federal, state, and local regulations. The anticipated waste includes soil cuttings, well development water, purge water from sampling activities, equipment decontamination water, empty lactate containers, debris from clearing activities, and construction and demolition debris from temporary facilities. The purge water from groundwater screening and well sampling and the well development water are anticipated to be hazardous. The RA Contractor will be required to dispose of all hazardous wastes within the regulatory time frame requirements. All waste characterization sampling will be performed in accordance with Specification **Section 01 35 45** and the RA Contractor's approved UFP-QAPP.

Transportation and disposal of excavated soil and purged groundwater will be performed in accordance with Specification **Section 02 81 00** and the RA Contractor's approved plans.

3.14 Operation and Maintenance

Some or all of the monitoring wells are expected to have biofilm built up on the well screens and within the gravel pack because of the enhanced biological activity. The presence of biofilm can reduce well yields, and excessive biofilm buildup could render a well useless for sampling, extraction, or injection. The RA Contractor will perform evaluation of the wells during each post-injection sampling events and well rehabilitation as necessary. Methods for well rehabilitation are provided in Specification **Section 01 85 10**. Rehabilitation using mechanical methods is acceptable. The use of chemicals during well rehabilitation will be minimized and only conducted with approval from the Contracting Officer.

3.15 Demobilization

After final inspection is completed, the RA Contractor will initiate demobilization activities. This will include, but is not limited to, removal of all trailers, equipment, materials, and personal protective equipment (PPE).

3.16 Site Restoration

At the completion of work, the RA Contractor will be required to restore both WCC property and the 646 Frelinghuysen Avenue property as shown on Contract Drawing **C-106** and in accordance with Specification **Section 32 00 00**. The RA Contractor will be required to demobilize from the site all equipment, temporary facilities, remediation components, materials, and supplies. The RA Contractor will regrade the coarse aggregate at the WCC property to a smooth, continuous surface and restore the asphalt on the driveway leading to the property at the end of remedial construction. The RA Contractor will restore the paved area on the 646 Frelinghuysen Avenue property to asphalt at the end of remedial construction. The RA Contractor will mill existing asphalt pavement and install a 2-inch layer of asphalt in accordance with Specification **Section 32 01 13**.

All temporary facilities and utilities installed as part of the remediation will be dismantled, demolished, removed, or otherwise disposed, as appropriate. The utilities installed by the RA Contractor will be removed or properly abandoned. The overburden and bedrock monitoring wells will be left in place. All demobilization activities that result in recycling, reusing, reprocessing, or salvaging activities will be reported to the Contracting Officer such that source reduction and waste minimization volumes can be documented.

3.17 Work Plans and Reporting

The RA Contractor will be responsible for preparing various work plans as required in the specification prior to mobilization to the site. The RA Contractor will also be responsible to submit chemical data reports after each sampling event, meeting the quality requirement prescribed in the specification, and document field activities. The RA report will be prepared by the architect-engineer firm providing engineering support during construction.

3.18 Green Remediation

Green remediation is the practice of considering all environmental effects of the implementation of a remedy and incorporating options to maximize the net environmental benefit of cleanup actions. EPA strives for cleanup programs that:

- Use natural resources and energy efficiently
- Reduce negative impacts on the environment
- Minimize or eliminate pollution at its source
- Reduce waste and reuse materials to the maximum extent possible

The RA Contractor will be required to incorporate green remediation practices into the RD and construction whenever feasible in accordance with the EPA Region 2 'Clean & Green' Policy, issued on March 17, 2009 and updated on April 11, 2010 (EPA 2010). Green remediation strategies will be implemented to reduce direct and indirect greenhouse gas and other emissions, increase energy efficiency, conserve and efficiently manage resources and materials, reduce waste, and increase reuse of materials.

CDM Smith performed a preliminary evaluation of green remediation practices applicable to this work assignment. Applicable green practices that will be required to be implemented by the RA Contractor during construction activities are included in Specification **Section 01 33 29** and described below. The RA Contractor will be required to supply documentation and records supporting the green remediation practices implemented (i.e., disposal certificates, utility receipts) in accordance with the RD specifications.

3.18.1 Use of 100-Percent Renewable Energy

Use of renewable energy minimizes depletion of natural resources and contributes to cleaner air by reducing air emissions. Renewable energy certificates will be obtained from the local utility provider, Public Service Electric and Gas Company, for all electricity used during the remedial construction.

3.18.2 Incorporation of Clean Diesel Fuel and Technology

Most of the fuel that will be used during construction activities is associated with drilling rigs that will be used during sampling, well installation, and injections work. The RA Contractor and subcontractors will be required to certify that only ultra-low sulfur diesel is used on the project, which will improve the quality of the vehicle exhaust. In addition, vehicle and drill rig idling will not be allowed for longer than 5 minutes.

3.18.3 Material Reuse, Reduction, and Recycling

Material reuse, reduction, and recycling minimizes impacts on natural resources and reduces the production of waste. Waste reduction minimizes environmental impacts by limiting the amount of land required for waste disposal and minimizing consumption of fossil fuels and generation of air emissions associated with transport of the waste. Material reuse, reduction, and recycling practices at the site will include the items detailed below.

- Nonhazardous construction waste generated during remediation will be sent to an approved recycling facility. The RA Contractor will submit disposal certificates documenting that the waste was sent to a recycling facility.
- One hundred percent of the copy papers, file folders, and paper office supplies will be required to come from recycled sources. Required recovered materials content will be recommended by EPA's Comprehensive Procurement Guidelines.
- Local labor will be used, when possible, to reduce fuel consumption associated with driving to the site. Locally supplied materials will be used when possible.
- Amendments will be delivered to the subsurface using DPT injection method. This drilling method is anticipated to expedite the injection schedule and minimize IDW generation. The

aqueous IDW that will be generated during the RA is anticipated to be hazardous while the solid IDW is anticipated to be nonhazardous. The RA Contractor will verify this during the groundwater screening, well installation, and baseline groundwater monitoring activities and develop management and disposal practices of the IDW during RA, which would maximize the beneficial reuse of the IDW to the extent practicable.

- The RA Contractor will be required to inject amendment with water supplied by a nearby fire hydrant. The fire hydrant supplies potable water. As such, a large quantity of potable water will be used. However, efforts will be made to minimize spillage and maximize the amount being used for injections.
- The number of field mobilizations will be minimized, when possible, to reduce fuel consumption.
- Sequencing and scheduling will be performed in such a manner to minimize transportation and/or shipping fuel consumption whenever possible. This will include consideration for sample shipments, transportation of waste material for off-site disposal, amendment delivery, and on-site handling of amendments during injections.

3.18.4 Sustainable Practices

Sustainable site practices minimize degradation of ecosystems and promote good stormwater management. The sustainable practices listed below are associated with the site activities.

- All construction activities will be performed on a previously developed site. No destruction of habitat will be required to complete the remedial construction activities.
- No new impervious material will be generated as part of site activities, which can contribute to localized flooding and aquifer depletion.
- Dust control will be implemented during earthwork activities so that the work will not adversely impact air quality.

3.19 Construction Cost Estimate

The draft revised construction cost estimate will be submitted under separate cover to USACE. The construction cost estimate was prepared using Micro-Computer Aided Cost Estimating System, Second Generation (MII), Version 4.1, Build 3. The submittal includes associated backup documentation detailing the cost assumptions used for the cost estimate.

3.20 Project Schedule

A proposed RA schedule is included as **Figure 1-4**. This schedule illustrates the general time requirements and sequence for completion of work. The schedule assumes that one mobilization will be needed to complete the initial injection. The RA Contractor will determine the actual duration of injections to accomplish the work, as described in Section 3.

Section 4

Quality Assurance/Quality Control

This section describes the procedures that will be implemented to provide QA/QC during the construction activities at the site. The intent of the construction QA/QC is to verify that all work is completed in accordance with the requirements in the final Contract Documents (drawings and specifications). Information has been included herein to summarize the various QA/QC measures that will be contained in the Contract Specifications and to identify the manner by which these QA/QC measures will be implemented and monitored during construction.

4.1 Construction QA/QC Organization

It is the responsibility of all involved parties to ensure that quality is maintained throughout the construction duration. USACE will have the overall responsibility for construction QA/QC. The USACE Contracting Officer will have the following roles in the implementation of the QA/QC procedures:

- Conduct progress meetings on a periodic basis during remediation to address the status of project construction, schedule changes, test results, observations and findings, issues of noncompliance, change orders, and upcoming activities. Weekly construction status meetings between USACE, EPA, and the RA Contractor are recommended; however, the chosen frequency of the meetings depends on the environmental significance of site activities and the level of oversight required.
- Monitor the construction QA program, including review of the sampling results, testing data, and the various inspection reports.
- Maintain continuous communication with the EPA Remedial Project Manager.

The Contracting Officer's QA/QC representative will have the following responsibilities:

- Review all design documentation, including the design drawings and specifications.
- Review (as required) modifications to the design drawings and specifications as they occur during the RA.
- Aid in determining that the construction has been completed in general conformance with the drawings, specifications, and approved shop drawings.
- Maintain contact with the remedial construction and operations contractor, herein referred to as the RA Contractor, regarding conformance with the QA/QC requirements.
- Provide assistance to the Contracting Officer's resident engineering representative in the review and interpretation of field and laboratory testing results.
- Review shop drawings and other submittals from the RA Contractor.

- Review all field and laboratory QA/QC testing and inspection results for conformance with the specifications and RD report. Provide an interpretation of data to determine areas that are in conformance and those that are in non-conformance with these documents. Determine areas that require reworking and/or repair.
- Perform periodic site visits to review construction progress and QA/QC procedures.
- Confirm that the Contracting Officer's resident engineering representative is notified of any noted deficiencies in QC testing results or procedures.
- Coordinate with the RA Contractor and all lower-tier subcontractors to ensure compliance with the QA/QC requirements.
- Maintain a continuous record of any changes or modifications to the design drawings and specifications.

USACE will provide Resident Engineering and Field Inspection Representatives who have knowledge and experience with the construction activities on-site. The Inspection Representatives will assist the resident engineering representative with the following responsibilities:

- Record any on-site activities that could result in noncompliance with the design documents and report these activities to the Contracting Officer's QA/QC Representative.
- Document field and laboratory testing as required by the specifications.
- Observe construction materials delivered to the site to determine general conformance with material specifications.
- Observe and record procedures used for site preparation and construction and any deficiencies in these activities.
- Prepare daily construction logs and a daily QC report.
- Serve as the daily contact person and maintain routine contact with the Contracting Officer and the RA Contractor regarding conformance with QC measures.

The RA Contractor will identify a Contractor Quality Control (CQC) System Manager in accordance with Specification **Section 01 45 00.00** who will be responsible for overall management of CQC and have the authority to act in CQC matters for all features of work. The CQC Manager will have the following roles:

- Maintain an on-site supervisory presence during construction, with no duties other than QC.
- Maintain a continuous line of communication with the Contracting Officer's QA/QC representative to identify and discuss field issues as they arise.
- Provide shop drawing submittals to confirm that the Contract Specifications are being met.

- Confirm that the QA/QC requirements (e.g., testing, inspection) of the specifications are being met.
- Identify potential design/construction issues as early as possible to avoid impact to the project performance and/or construction schedule.

4.2 Construction QA/QC Activities

The Contract Documents play an important role in the implementation and monitoring of QA/QC activities. The contents of these documents establish the QA/QC elements of activities occurring before, during, and after the construction. Specific to QA/QC, the specifications may, depending on the given component of construction, specify any or all of the following items:

- Performance standards or operating conditions to assist the RA Contractor in the selection and purchase of equipment
- Required construction materials
- Applicable codes, standards, and specifications to govern material and workmanship quality
- Information to be submitted for technical review
- Coordination of work activities for all elements of construction
- Manufacturer or field testing requirements
- Performance guarantees
- Workmanship/equipment warranties

Fulfillment of the specifications provides the framework for QA/QC measures by identifying the appropriate equipment and materials to be utilized, indicating acceptable construction practices, requiring on- and off-site testing, and specifying performance and workmanship warranties. To gauge compliance with the requirements of the Contract Documents, QA/QC activities, such as review of technical submittals and material/equipment testing and inspection, are performed. These activities are further discussed below.

4.2.1 Review of Technical Submittals

For certain elements of construction, the specifications will require the RA Contractor to prepare technical data and submit this information to the Contracting Officer for review. The objective of this requirement is to monitor the RA Contractor's understanding of the design and prevent any misinterpretation of the specifications that may otherwise impact the design objectives or construction schedule. The submittal of technical data, also referred to as shop drawing submittals, encompasses many elements of construction activity. Required submittals may include material samples, manufacturer's literature describing the component, engineering calculations, engineering drawings for components showing proper dimensions and details, installation drawings, operating instructions, and layout drawings.

The shop drawing review process is an essential activity for monitoring QA/QC before construction begins. The submittal of a shop drawing signifies that all quantities, dimensions, field construction criteria, materials, model numbers, and other pertinent information have been determined and verified by the RA Contractor. It also ensures that the RA Contractor incorporates the specifications and the design drawings into the construction activities.

The Contracting Officer's resident engineering representative will review the shop drawings to determine general compliance with the design drawings and specifications. Submitted data are reviewed as follows:

- "A – Approved as submitted" if no objections are observed or comments made.
- "B – Approved, except as Noted. Resubmission not Required" if minor objections, comments, or additions are made but resubmittal is not considered necessary.
- "C –Resubmission Required" if the objections, comments, or additions are extensive. The RA Contractor would be required to resubmit the items after correction.
- "D – Will be Returned by Separate Correspondence."
- "E – Not approved or Disapproved" or "X – Receipt acknowledged, does not comply" if the submittal under consideration is not acceptable or indicates noncompliance with the contract requirements, or if the data submitted are not sufficiently complete to establish compliance with the design drawings and specifications.
- "F – Receipt Acknowledged" if the submittal is listed as "For Information Only."
- "G – Other action required" if the RA Contractor is to take additional action, as specified by the Government. The RA Contractor would be required to take the necessary action then resubmit the items.

The technical submittal and review process allows the monitoring and control of the quality of construction before construction is actually initiated.

4.2.2 Field Inspection and Testing of Materials, Equipment, and Installation

In addition to the technical data required by the RA Contractor prior to construction activities, several requirements exist in the Contract Specifications for specific testing and inspection of equipment and materials. This testing and/or inspection will be required on-site once the component or material has been installed or placed. Testing of selected material and equipment provides additional assurances that the component has been properly manufactured, installed, and/or coordinated with other components of construction. The Contract Specifications require documentation that testing/inspections have been performed for, but not limited to, the following:

- Inspection of material on delivery and prior to installation
- Sieve analysis of granular materials
- Testing of pressure piping (waterline) for leakage

- Field running tests on all pumps and injection system setup
- Inspection of all electrical work by a representative of the local authorities having jurisdiction
- Coordination and calibration of instrumentation components

In addition to the documentation involving the QC of all materials and equipment, operational and performance requirements must be met for the injection system.

The following inspections will be conducted at two stages during the RA. The first inspection will be conducted after all site preparation works are completed, and the second inspection will be conducted after the site restoration activities and prior to demobilization.

4.2.2.1 Pre-Final Inspections

A pre-final inspection will be performed by the EPA, USACE, Contracting Officer, and RA Contractor. The inspection will be performed over the course of a one-day period and include a visual inspection of the work completed at the site to demonstrate that the project has met design criteria detailed in the Contract Specifications.

For the pre-final inspection, a list of incomplete work items will be developed by the Contracting Officer and submitted to the RA Contractor according to the pre-final inspection results. The RA Contractor will be responsible for making all repairs, replacements, or adjustments to meet the required performance criteria. Any major incomplete work items identified by the Contracting Officer will be addressed immediately. If necessary, follow-up inspections will be performed to verify completion of major work items.

In addition, on-site performance of the injection delivery system will be demonstrated through successful completion of startup testing where the RA Contractor will demonstrate that the system is capable of continuous operation in accordance with the specifications. The system will be tested with clean water to ensure that the system is functioning as designed and that all equipment, controls, and instrumentation are working properly. The RA Contractor will be responsible for making all repairs, replacements, or adjustments to meet the required performance criteria. Injections will not commence until the system is operating to the satisfaction of the Contracting Officer.

4.2.2.2 Final Inspections

The final inspection will be conducted by the EPA, USACE, Contracting Officer, and RA Contractor after all punch-list items identified during the pre-final inspections have been addressed. The inspection will include a visual inspection of all work. Any incomplete work items identified by the EPA, USACE, and/or Contracting Officer will be corrected by the RA Contractor immediately.

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Section 5

Health and Safety Program

5.1 Site Description and Contamination Characterization

A description of the site including location, approximate size, past uses, and a summary of contamination are included in Section 1.

5.2 Hazard Assessment and Risk Analysis

CDM Smith employed a systematic method to assess hazards, risks, and mitigating controls applicable to this RD. There are several chemical and physical hazards that are associated with the remedial activities to be performed at the site. To ensure that these hazards are adequately evaluated, the RA Contractor will be required to develop an Accident Prevention Plan (APP), which will include a site Safety and Health Plan (SSHP). The APP will be submitted to USACE for approval prior to the beginning of the field activities. The APP/SSHP will be developed and implemented by the RA Contractor's Safety and Health Manager in accordance with EM 385-1-1, ER 385-1-92, and all relevant Occupational Safety and Health Administration (OSHA) requirements, as indicated in Specification **Section 01 35 29**.

Potential exposures to workers involved with the remedial activities can be summarized as follows:

- Direct contact with contaminated soil, groundwater, and biological agents
- Inhalation or ingestion of metal and organic particulates
- Construction safety issues such as fall protection, slips, trips and falls, equipment, machinery, heat and cold stress, and hearing protection

In addition to describing how exposure levels will be maintained below the maximum permissible concentrations (as prescribed by OSHA, American Conference of Governmental Industrial Hygienists, and others), the APP/SSHP will also address the H&S hazards associated with each site task and operation to be performed during the RA. The following are anticipated tasks/operations:

- Mobilization
- Site preparation (e.g., clearing, construction of staging area)
- Groundwater screening
- Monitoring well installation, development, and sampling
- IDW management
- Amendment mixing and injections

- Off-site transportation and disposal of excavated material
- Site restoration
- Decontamination of tools and equipment
- Demobilization

5.3 Staff Organization, Qualifications, and Responsibilities

The plans and specifications will require that a Certified Industrial Hygienist (CIH) with experience in hazardous wastes develop, implement, and oversee the RA Contractor's H&S Program and the APP/SSHP. The CIH will be required to sign and date the APP/SSHP. An experienced site Safety and Health Officer will be required to implement and enforce the H&S Program and the APP/SSHP elements during the remedial activities. At least two people certified in first-aid and cardiopulmonary resuscitation will be available to oversee RA activities. A certified occupational physician will be required to be available for monitoring medical surveillance protocols and for review of all examination/test results.

5.4 Training

All personnel performing on-site work activities will be required to complete the applicable training in compliance with 29 Code of Federal Regulations (CFR) 1910/29 CFR 1926.65 €, 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response), and EM 385-1-1. At a minimum, the following will be required training for all general site workers:

- Forty hours of Hazardous, Toxic, and Radioactive Waste H&S training off-site
- Eight hours of refresher training annually
- Three days of actual field experience under the direct supervision of a trained, experienced supervisor
- Eight-hour supervisor's course for all on-site supervisors covering at least the following topics:
    - Employer's safety and health program
    - PPE program
    - Spill containment program
    - Health hazard monitoring techniques
- Site-specific training covering all elements in the APP/SSHP will be provided to workers before on-site work begins. Site-specific training will be updated as site circumstances warrant.

Individuals involved with shipping hazardous materials and/or hazardous waste will be required to have received the appropriate U.S. Department of Transportation training.

5.5 Personal Protective Equipment

The RA Contractor will be required to submit a written PPE program in accordance with the requirements of EM 385-1-1 Section 5. The program will provide a detailed description of the minimum PPE required, including the specific materials of construction for each site-specific task/operation based on the hazard/risk analysis performed. Levels of protection will be relevant to site-specific conditions, including potential heat stress and associated PPE safety hazards. The program will also describe the procedures to determine its effectiveness as well as procedures for on-site fit-testing of respirators and proper cleaning, maintenance, inspection, and storage of all PPE. The RA Contractor will be required to identify the levels of protection required for each site activity in the APP/SSHP. The RA Contractor will perform continuous air monitoring during the excavation and loading of all contaminated materials. It is anticipated that all field activities will be performed in Modified Level D PPE. The RA Contractor will be required to detail actions necessary for increasing and decreasing levels of protection in the APP/SSHP.

5.6 Medical Surveillance

All on-site personnel will be required to participate in a medical surveillance program overseen by a licensed physician certified in occupational medicine. The medical surveillance program will comply with OSHA standards 29 CFR 1910.120 (f) and 29 CFR 1926.65 (f) and the requirements contained in ER 385-1-92. The RA Contractor will be required to maintain a medical opinion written by the attending physician describing the fitness of individuals to perform site activities.

Certification of personnel participation in the medical surveillance program will be included in the APP/SSHP. All personnel medical records will be maintained in accordance with 29 CFR 1910.1020.

5.7 Exposure Monitoring/Air Sampling Program

The RA Contractor will be required to detail the specifics of the program designed to quantify airborne concentrations of hazardous materials. This program will rely on direct instrument reading air monitoring. The program will be able to assess potential employee exposure in active work areas and will describe action levels and include corrective actions. Requirements for evaluation, recordkeeping, and reporting will be consistent with those outlined in ER 385-1-92, Section 9 and in EM 385-1-1 Section 6. The exposure monitoring and air sampling program is detailed in Specification **Section 01 35 29**.

5.8 Heat/Cold Stress Monitoring

Details of the heat and cold stress monitoring program will be described in the RA Contractor's APP/SSHP. Monitoring will be based on ambient temperatures, humidity, wind speed, solar radiation, duration and intensity of work, and PPE ensembles. The RA Contractor will be required to comply with the protocols, schedules, and requirements of EM 385-1-1 Section 06.

5.9 Standard Operating Procedures, Engineering Controls, and Work Practices

Standard operating procedures, such as site rules/prohibitions, work permit requirements, material handling procedures, drum/container handling procedures, excavation and trench safety, guarding of machinery and equipment, electrical protection, lockout/tagout, fall protection, hazard communication, illumination, sanitation, engineering controls, signs and labels, and hazardous material handling and storage, where applicable, will be detailed in the APP/SSHP.

5.10 Site Control Measures

Site control measures, such as details regarding work zone delineation, communications, site security, and general site access, will be included in the APP/SSHP. Site delineation and designation will be based on the excavation area and the hazard/risk analysis performed in accordance with ER 385-1-92. If there are any utilities in the excavation area, they will be controlled in accordance with EM 385-1-1 Section 25.A.

5.11 Personal Hygiene and Decontamination

The specifications will detail the necessary facilities and procedures for personal hygiene and decontamination of site personnel. The APP/SSHP will address methods for waste minimization and decontamination of site personnel.

5.12 Equipment Decontamination

The RA Contractor will be required to detail facilities, procedures, and other site features pertaining to decontamination in accordance with EM 385-1-1 Section 33.B.02 and Specification **Section 01 35 29**.

5.13 Emergency Equipment and First-Aid Requirements

At a minimum, occupational physician-approved first-aid equipment and supplies, including emergency eyewashes and showers, emergency-use respirators, spill control materials and equipment, and fire extinguishers, will be included with the APP/SSHP consistent with the requirements of EM-385-1-1, Section 3 and Specification **Section 01 35 29**. Emergency equipment and personnel required to be on-site will have the capacity to respond to project-specific emergencies.

5.14 Emergency Response and Contingency Procedures

The RA Contractor will be required to develop and implement an emergency response plan that complies with the requirements of Specification **Section 01 35 29**, 29 CFR 1910.120, and EM 385-1-1.

5.15 Accident Prevention

The APP/SSHP will also provide an activity hazard analysis for each project activity. This analysis will explain the hazards associated with each activity and what will be done to mitigate any

accident potential. The RA Contractor will be required to conduct daily safety and health inspections to ensure the effectiveness of the APP/SSHP and to determine whether operations are being conducted in accordance with the APP/SSHP, USACE, and OSHA regulations, and contract requirements.

In the event of an accident/incident, the RA Contractor will be required to report to the appropriate authority in accordance with EM 385-1-1. This requirement is included in Specification **Section 01 35 29**. Within 2 working days of any reportable accident, the RA Contractor will complete and submit the required accident reports.

5.16 Logs, Reports, and Recordkeeping

Details of training records maintenance, daily safety inspection logs, equipment maintenance logs, employee/visitor register, medical opinions, and exposure monitoring logs will be included in the APP/SSHP and must be in compliance with the requirements of ER 385-1-92 Section 9, EM 385-1-1 Section 33.B, and Specification **Section 01 35 29**.

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Section 6

Permitting and Approvals

6.1 Permit Requirements

All RA activities will be performed in compliance with all federal, state, and local government regulations and permit requirements. The permit equivalencies and approvals identified for this site are described in this section. The RA Contractor will identify and comply with any additional permit requirements as necessary. The RA Contractor will complete and submit the NJDEP Permit Identification Form during the project planning stage. The Permit Identification Form will allow NJDEP to determine whether any additional permits will be necessary. The form can be found at http://www.state.nj.us/dep/pcer/docs/pifupdate.pdf. **Table 6-1** presents the summary of permit equivalencies and approvals.

6.1.1 Discharge to Groundwater Permit Equivalency

It will be the RA Contractor's responsibility to obtain a New Jersey State Pollution Discharge Elimination System Discharge to Ground Water permit equivalency for RA construction. NJDEP can issue a permit-by-rule (N.J.A.C. 7:26E-7.2) for the remediation with no expiration date as long as the remediation is done in accordance with the NJDEP Technical Requirement for site remediation. Since the case is a Superfund site, a permit-by-rule equivalent will be issued.

The RA Contractor will be responsible for submitting the permit application to NJDEP. The Contracting Officer will provide necessary coordination and assistance.

6.1.2 Well Drilling

It will be the RA Contractor's responsibility to direct a New Jersey–licensed driller to obtain well drilling permits for the installation of the bedrock and overburden monitoring wells and groundwater screening borings as necessary. The Contracting Officer will assist the RA Contractor in coordination with NJDEP in obtaining approval.

6.1.3 Well Sealing and Abandonment

A permit will be required for the sealing and abandonment of wells. The permit will be submitted by the licensed New Jersey well drilling contractor to the NJDEP for approval. Well sealing and abandonment will be performed in accordance with N.J.A.C. 7:9D.

6.1.4 Public Utilities

The RA Contractor will contact the local public utility entities to obtain permits (e.g., electrical, water, sanitary, storm drain, gas, and telephone), as required by the RA.

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Section 7

List of Contract Drawings and Specifications

7.1 List of Specifications

Section No.	Section Title
DIVISION I – GENERAL REQUIREMENTS	
01 11 00	Summary of Work
01 30 00	Administrative Requirements
01 32 01.00 10	Project Schedule
01 32 36	Video Monitoring and Documentation
01 33 00	Submittal Procedures
01 33 29	Sustainability Requirements and Reporting
01 35 29	Health, Safety, and Emergency Response Procedures
01 35 45	Chemical Data Quality Control
01 45 00.00	Contractor Quality Control
01 45 00.15	Resident Management System Contractor Mode (RMS CM)
01 50 00	Temporary Construction Facilities and Utilities
01 57 19	Temporary Environmental Controls
01 58 00	Project Identification
01 71 23	Surveying
01 78 00	Closeout Submittals
01 80 00	Performance Sampling and Analysis
01 85 10	Well Maintenance Program
DIVISION 2 – EXISTING CONDITIONS	
02 10 00	Site Preparation
02 32 13	Subsurface Drilling and Sampling
02 81 00	Transportation and Disposal of Waste Material
DIVISION 13 – SPECIAL CONSTRUCTION	
13 30 00	Amendment Injection System and Operation
DIVISION 32 – EXTERIOR IMPROVEMENTS	
32 00 00	Site Restoration
32 01 13	Asphaltic Paving
DIVISION 33 – UTILITIES	
33 51 39	Monitoring Wells

7.2 List of Contract Drawings

Sheet	Title
G-001	Cover Sheet and Index
G-002	General Notes and Legend
C-101	Existing Site Conditions
C-102	Site Preparation and Groundwater Screening
C-103	Overburden Well Installation, and Baseline Sampling
C-104	Overburden Injection Layouts and Injection Sequence
C-105	Bedrock Well Installation
C-106	Site Restoration Plan
C-107	Well Installation Details

Section 8

References

CDM Smith. 2012a. Final Remedial Investigation Report. White Chemical Corporation Superfund Site, OU3-Groundwater. Remedial Investigation/Feasibility Study (RI/FS). Newark, Essex County, New Jersey. May 14.

_____. 2012b. Final Bench-Scale Treatability Study Technical Memorandum. White Chemical Corporation Superfund Site, OU3-Groundwater. Remedial Investigation/Feasibility Study. Newark, Essex County, New Jersey. May 22.

_____. 2016a. Final 100% Remedial Design. White Chemical Corporation Superfund Site, OU3-Groundwater. Remedial Design. Newark, Essex County, New Jersey. September 153.

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Foster Wheeler Environmental Corporation. 2003. Final Remedial Investigation Report, OU2-Soils. White Chemical Corporation, Newark, New Jersey. April.

EPA. 1993. Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration. EPA/540-R-93-080. September.

_____. 1998. Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells. March 16.

_____. 2010. Region 2 "Clean & Green" Policy. Updated April 11.

_____. 2012. Record of Decision: White Chemical Corporation, Newark, Essex County, New Jersey, Operable Unit 3 – Groundwater. September.

Weston Solutions. 2021. Monitoring well sampling report White Chemical Corporation Site, 660 Frelinghuysen Ave, Essex County, Newark, New Jersey. December.

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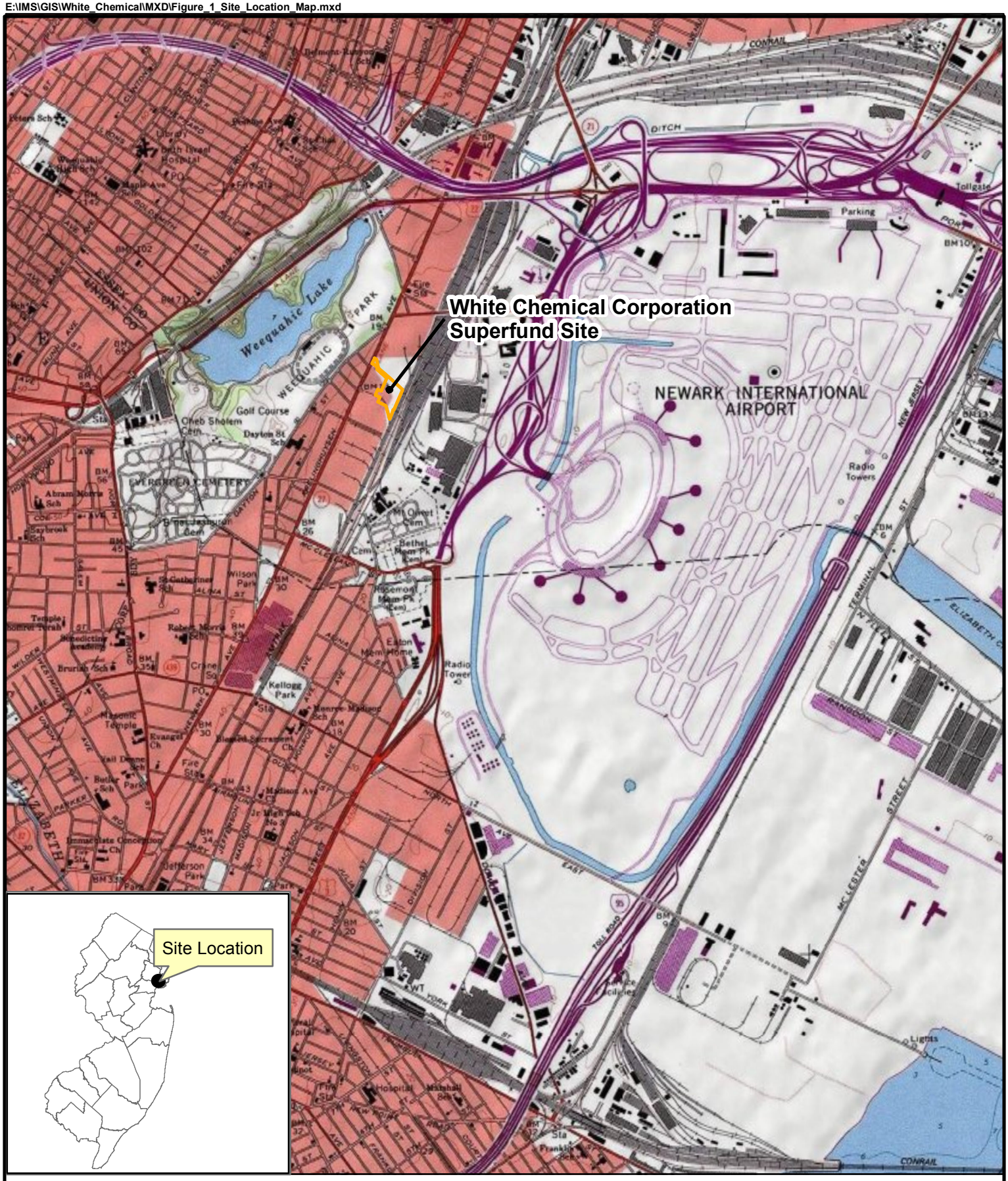
Figures

E:\IMS\GIS\White_Chemical\MXD\Figure_1_Site_Location_Map.mxd



Source: U.S. Geological Survey 7.5 minute Topographic Quadrangle, Elizabeth, N.J.-N.Y., 1981.

Legend

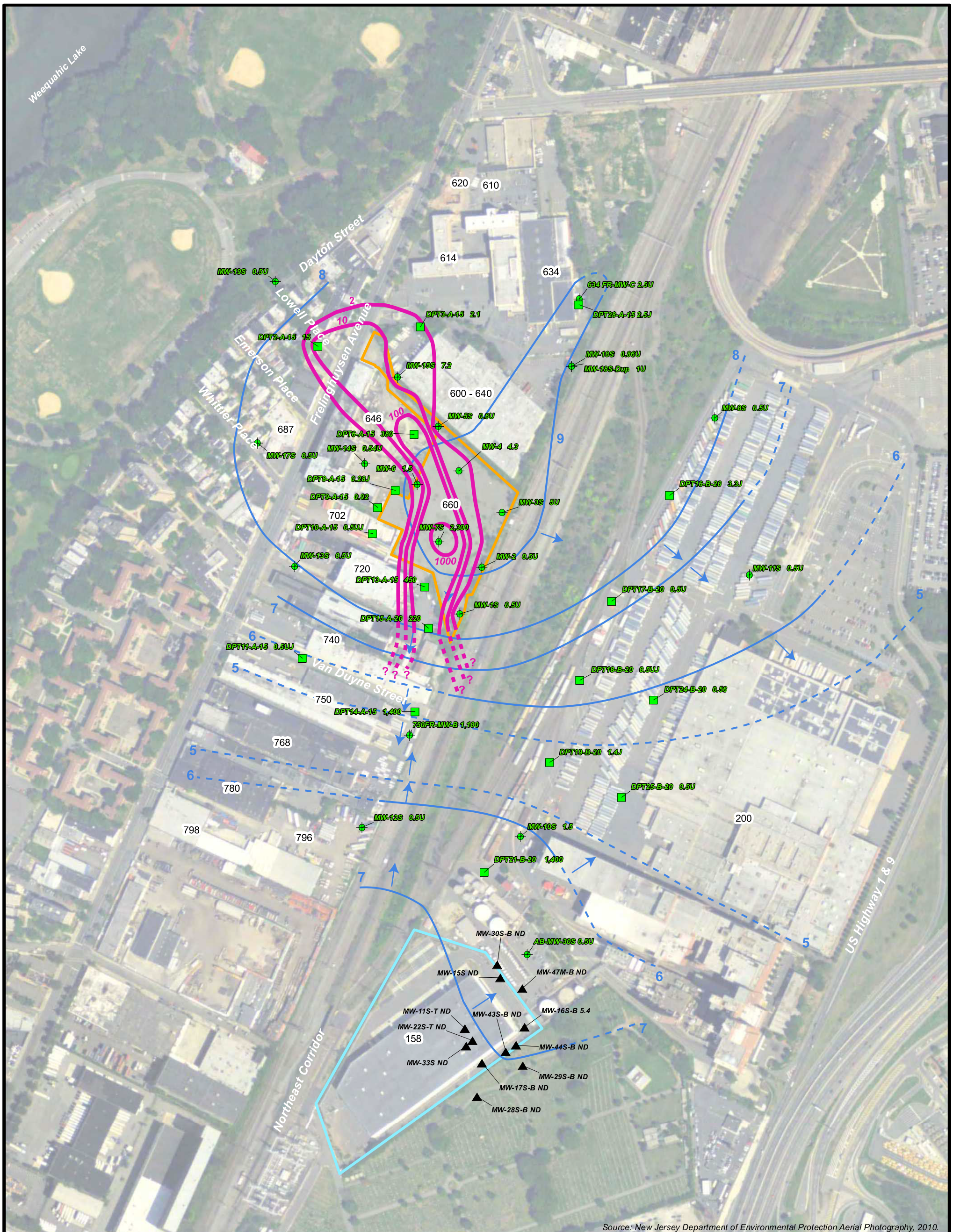
White Chemical Corporation Property Boundary

N

0 1,250 2,500 5,000 Feet

CDM Smith

Figure 1-1
Site Location Map
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey



Legend

- Overburden Aquifer at Shallow Depth Aquifer Wells, with Round 2 1,2-DCA - May 2011
- Overburden Aquifer at Shallow Depth third-party data collected by Penick in August 2011 (not collected or validated by EPA). Penick is a NJDEP - lead site.
- Overburden Aquifer at Shallow Depth DPT Locations, with 1,2-DCA
- White Chemical Corporation Property Boundary
- Penick Site Boundary
- Round 2 Overburden Aquifer at Shallow Depth groundwater elevation contours (feet amsl) - dashed where inferred
- Groundwater flow direction
- Overburden Aquifer at Shallow Depth 1,2-DCA contours (ug/L), dashed where inferred
- ? Uncertainty regarding plume configuration due to multiple contaminant sources in the area

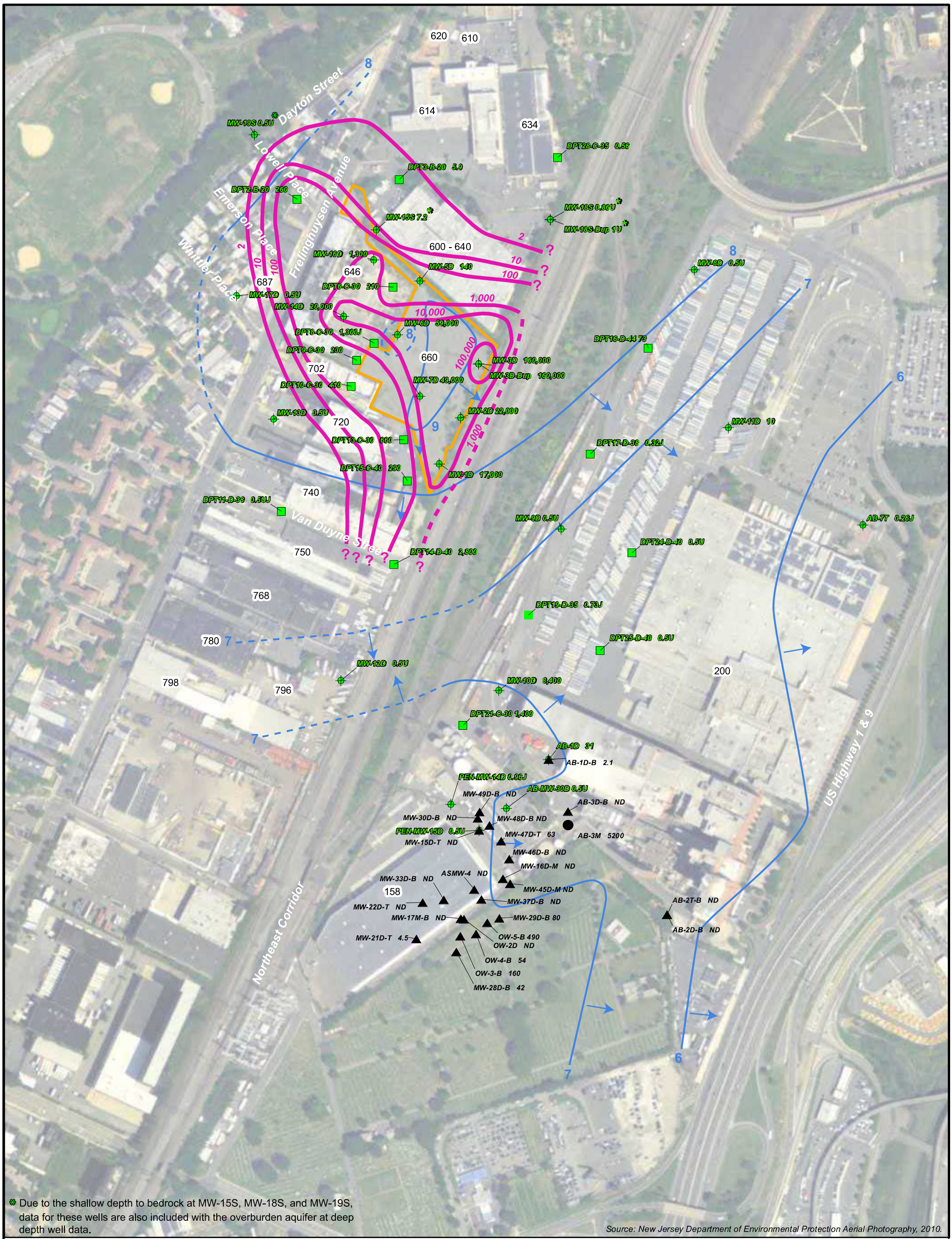
N

0 175 350 Feet

Note:
J - Estimated value
ND - Not Detected
U - Not detected, with detection limit shown.
All results in ug/L

CDM Smith

Figure 1-2a
1,2-DCA Plume - Overburden Aquifer at Shallow Depth
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey



Due to the shallow depth to bedrock at MW-15S, MW-18S, and MW-19S, data for these wells are also included with the overburden aquifer at deep depth well data.

Source: New Jersey Department of Environmental Protection Aerial Photography, 2010.

Legend

- Overburden Aquifer at Deep Depth Wells, with Round 2 1,2-DCA - May 2011
- Overburden Aquifer at Deep Depth DPT Locations, with 1,2-DCA
- Overburden Aquifer at Deep Depth third-party data collected by Penick in August 2011 (not collected or validated by EPA). Penick is a NJDEP-lead site.
- Overburden Aquifer at Deep Depth third-party data collected by Penick in November 2010 (not collected or validated by EPA)
- White Chemical Corporation Property Boundary
- Round 2 Overburden Aquifer at Deep Depth groundwater elevation contours (feet amsl) - dashed where inferred
- Groundwater flow direction
- 1,2-DCA contours (ug/L), dashed where inferred
- ? Uncertainty regarding plume configuration due to multiple contaminant sources in the area.

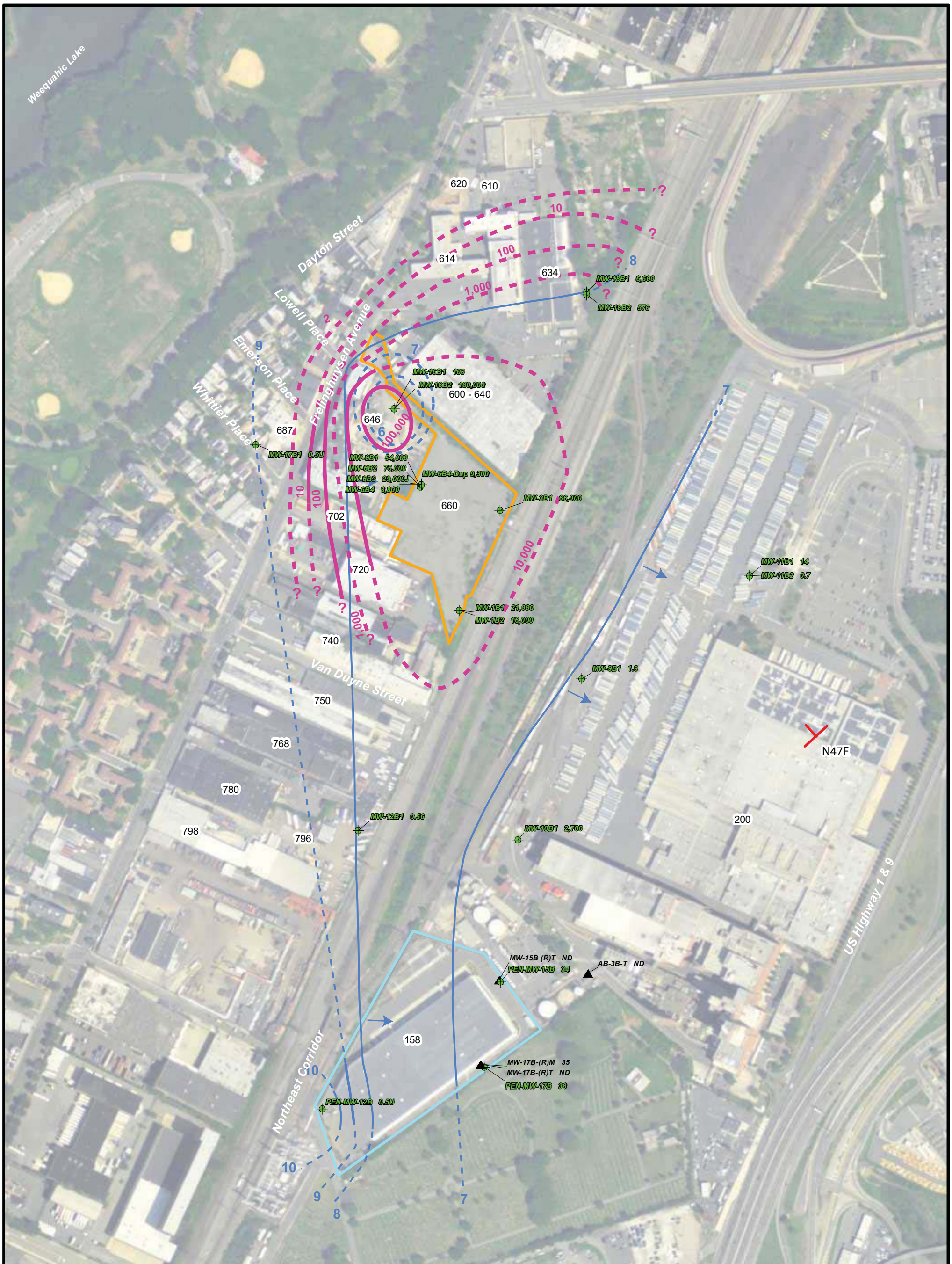
N

0 175 350 Feet

Note:
J - Estimated value
ND - Not Detected
U - Not detected, with detection limit shown.
All results in ug/L

CDM Smith

Figure 1-2b
1,2-DCA Plume - Bedrock/Overburden Aquifer at Deep Depth
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey



Source: New Jersey Department of Environmental Protection Aerial Photography, 2010.

Legend

- Bedrock Aquifer Wells, with Round 2 1,2-DCA - May 2011
- Bedrock third-party data collected by Penick in August 2011 (not collected or validated by EPA). Penick is a NJDEP-lead site.
- White Chemical Corporation Property Boundary
- Penick Site Boundary
- All results in ug/L
- Round 2 Bedrock aquifer groundwater elevation contours (feet amsl) - dashed where inferred.
- Groundwater flow direction
- Bedrock 1,2-DCA contours (ug/L), dashed where inferred.
- ? Uncertainty regarding plume configuration due to multiple contaminant sources in the area.

Strike/Dip

N

0 175 350 Feet

Figure 1-2c
1,2 - DCA Plume - Bedrock Aquifer
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

Note:
1,2-DCA - 1,2-dichloroethane
ND - Not Detected
U - Not detected, with detection limit shown.

CDM Smith

Legend

- Bedrock Wells
- Deep Overburden Wells
- Intermediate Wells
- Shallow Overburden Wells
- White Chemical Site Boundary

1,2 DCA Round 3 Result in ug/L (11/2021)

ND - Non Detect Result
NS - Not Sampled

Source: New Jersey Department of Environmental Protection Aerial Photography, 2010.

N

0 110 220 440 Feet

Figure 1-2d
1,2-DCA Results
Shallow Overburden Aquifer
White Chemical Corporation
Superfund Site, OU3
Newark, New Jersey

Source: New Jersey Department of Environmental Protection Aerial Photography, 2010.

Legend

- Bedrock Wells
- Deep Overburden Wells
- Intermediate Wells
- Shallow Overburden Wells
- White Chemical Site Boundary

1,2 DCA Round 3 Result in ug/L (11/2021)

ND - Non Detect Result
NS - Not Sampled

N

0 110 220 440 Feet

Figure 1-2e
1,2-DCA Results
Deep Overburden Aquifer
White Chemical Corporation
Superfund Site, OU3
Newark, New Jersey

Source: New Jersey Department of Environmental Protection Aerial Photography, 2010.

Legend

- Bedrock Wells
- Deep Overburden Wells
- Intermediate Wells
- Shallow Overburden Wells
- White Chemical Site Boundary

1,2 DCA Round 3 Result in ug/L (11/2021)

ND - Non Detect Result
NS - Not Sampled
All Results are shown in ug/L

N

0 110 220 440 Feet

Figure 1-2f
1,2-DCA Results Bedrock Aquifer
White Chemical Corporation
Superfund Site, OU3
Newark, New Jersey

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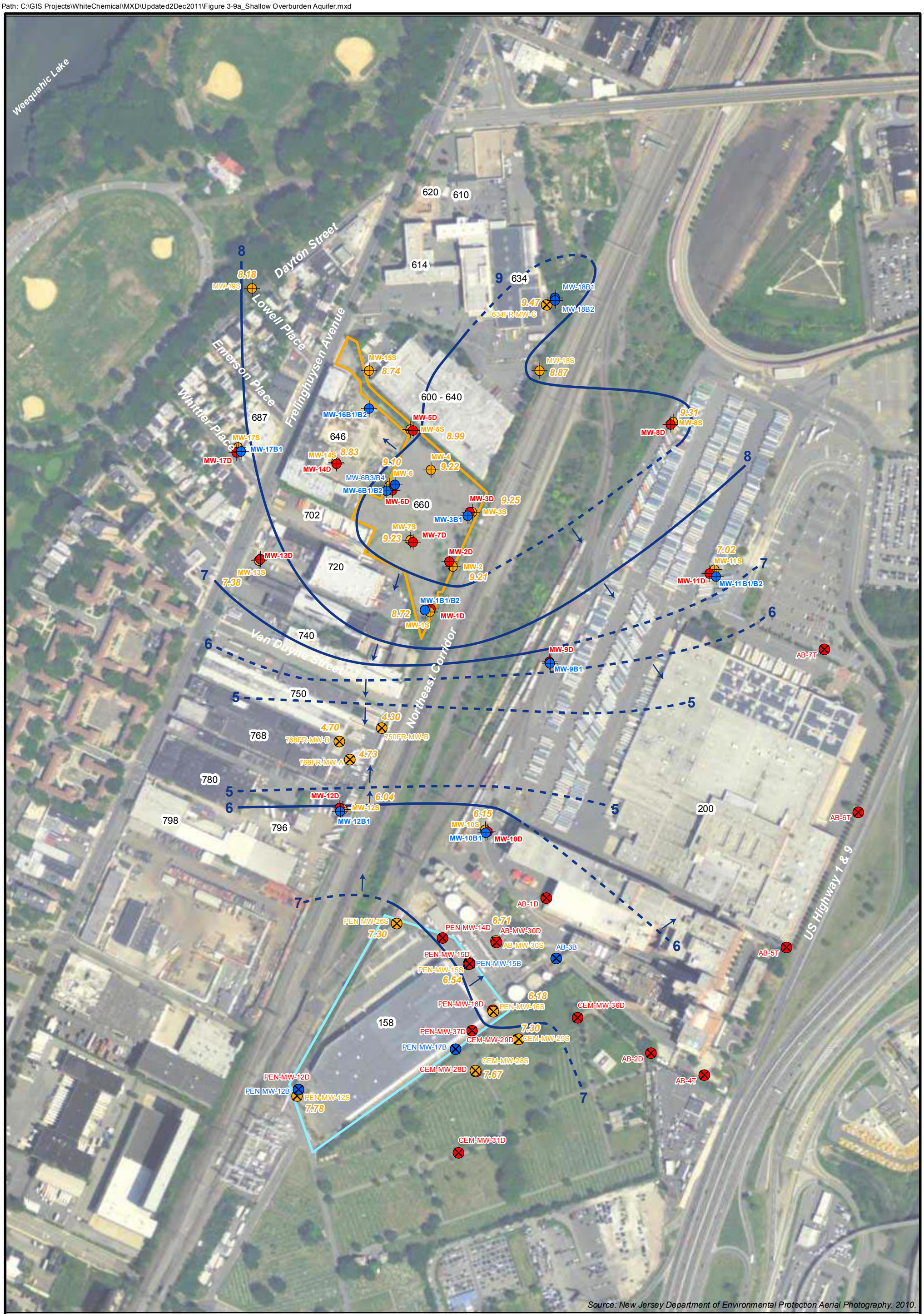


Source: New Jersey Department of Environmental Protection Aerial Photography, 2010.

Legend

- White Chemical Corporation Property Boundary
- White Chemical wells
- Third Party Wells
- Penick Boundary
- Bedrock Wells
- Overburden Aquifer At Shallow Depth Wells
- Overburden Aquifer At Deep Depth Wells
- Water Level Elevation – Round 3, in feet above mean sea level. Dashed where inferred
- Groundwater Gradient Direction

N

0 175 350 Feet

CDM Smith

Figure 1-3a
OU3 RI Round 3 Groundwater Elevation Contours
Overburden Aquifer At Shallow Depth
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

Path: C:\GIS Projects\WhiteChemical\MXD\Updated2Dec2011\Figure 3-9b_Deep Overburden Aquifer.mxd

Source: New Jersey Department of Environmental Protection Aerial Photography, 2010.

Legend

- White Chemical Corporation Property Boundary
- White Chemical wells
- Third Party Wells
- Penick Boundary
- Groundwater Gradient Direction
- Bedrock Wells
- Overburden Aquifer At Shallow Depth Wells
- Overburden Aquifer At Deep Depth Wells
- Water Level Elevation – Round 3, in feet above mean sea level. Dashed where inferred

N

0 175 350 Feet

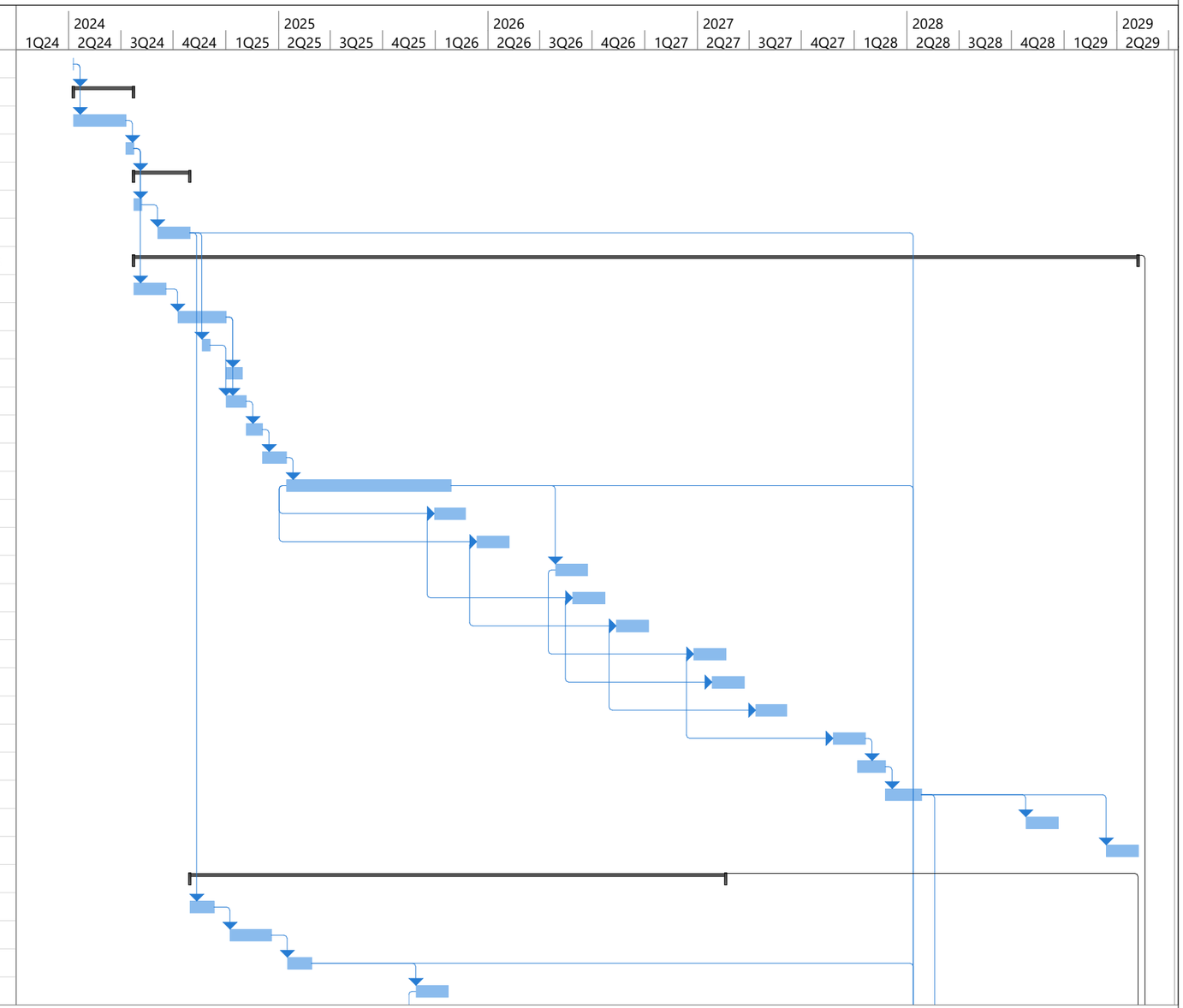
CDM Smith

*Note: Due to the shallow depth to bedrock at MW-15S, MW-18S, and MW-19S, the screen intervals in these wells span the shallow and deep depths of the overburden aquifer; therefore, the elevations in these "shallow wells" are used in the groundwater elevation contour figures of the overburden aquifer at shallow and deep depths.

Figure 1-3b
OU3 RI Round 3 Groundwater Elevation Contours
Overburden Aquifer At Deep Depth
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

Figure 1-4
Preliminary Remedial Action Construction Schedule
White Chemical Corporation Superfund Site - OU3
Newark, New Jersey

ID	Task Mode	Task Name	Duration
1		Notice to Proceed	1 day
2		**Project Planning and Mobilization**	**75 days**
3		Project Planning, Submittals, and Review	65 days
4		Mobililzation	10 days
5		**Existing Monitoring Well Assessment**	**70 days**
6		Existing Monitoring Well Assessment	10 days
7		Modification/Improvement of Existing Monitoring Wells	40 days
8		**Overburden Remediation**	**1251 days**
9		Groundwater Screening (Primary and Secondary Locations)	40 days
10		Review of Groundwater Screening Data	60 days
11		Sampling of Existing Overburden Monitoring Wells	10 days
12		Installation of Overburden Monitoring Wells	20 days
13		Development of Amendment Injection Detailed Approach	25 days
14		Governemnt Review of Amendment Injection Work Plan	20 days
15		NJDEP Discharge to Groundwater Permit Equivalent	30 days
16		Amendment Injection at WCC and 646 Frelinghuysen Ave	205 days
17		Round 1 (6 months) Groundwater Sampling Zone 1	40 days
18		Round 1 (6 months) Groundwater Sampling Zone 2	40 days
19		Round 1 (6 months) Groundwater Sampling Zone 3	40 days
20		Round 2 (15 months) Groundwater Sampling Zone 1	40 days
21		Round 2 (15 months) Groundwater Sampling Zone 2	40 days
22		Round 2 (15 months) Groundwater Sampling Zone 3	40 days
23		Round 3 (24 months) Groundwater Sampling Zone 1	40 days
24		Round 3 (24 months) Groundwater Sampling Zone 2	40 days
25		Round 3 (24 months) Groundwater Sampling Zone 3	40 days
26		Determine Second Amendment Injection and Submit Plans	35 days
27		Second Amendment Injection	45 days
28		Round 4 Groundwater Sampling (6 months after second injection)	40 days
29		Round 5 Groundwater Sampling (12 months after second injection)	40 days
30		**Bedrock Remediation**	**668 days**
31		Bedrock Borehole Geophysical Assessment and Well Installation	30 days
32		Baseline Bedrock Sampling	52 days
33		Bedrock Amendment Injection	30 days
34		Bedrock Round 1 (6 months) Sampling	40 days

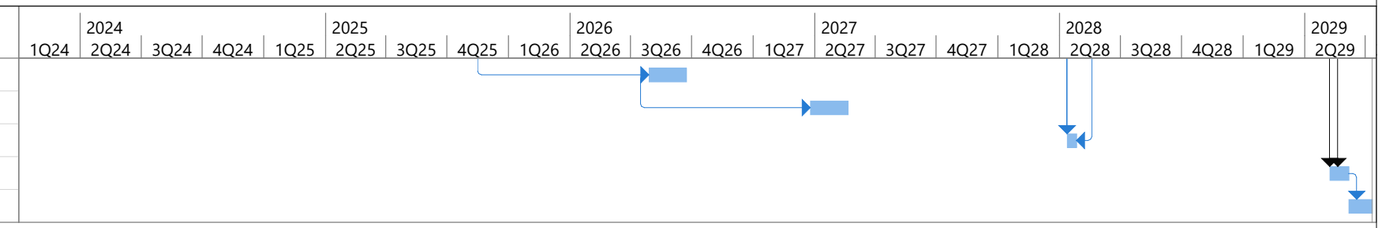


Project: WCC RA Schedule-0118
Date: Sun 4/9/23

Task		Project Summary		Manual Task		Start-only		Deadline	
Split		Inactive Task		Duration-only		Finish-only		Progress	
Milestone		Inactive Milestone		Manual Summary Rollup		External Tasks		Manual Progress	
Summary		Inactive Summary		Manual Summary		External Milestone			

Figure 1-4
Preliminary Remedial Action Construction Schedule
White Chemical Corporation Superfund Site - OU3
Newark, New Jersey

ID		Task Mode	Task Name	Duration
35			Bedrock Round 2 (15 months) Sampling and Analyses	40 days
36			Bedrock Round 3 (24 months) Sampling and Analyses	40 days
37			**Demobilization**	**10 days**
38			**Finalizing All Closeout Submittals**	20 days
39			**Project Closeout**	25 days



Project: WCC RA Schedule-0118
Date: Sun 4/9/23

Task		Project Summary		Manual Task		Start-only		Deadline	
Split		Inactive Task		Duration-only		Finish-only		Progress	
Milestone		Inactive Milestone		Manual Summary Rollup		External Tasks		Manual Progress	
Summary		Inactive Summary		Manual Summary		External Milestone			

Path: F:\White Chemical\GIS\White Chemical\MXD\Figure_3-3_Pilot_Study_Area.mxd

Source: New Jersey Department of Environmental Protection Aerial Photography, 2007.

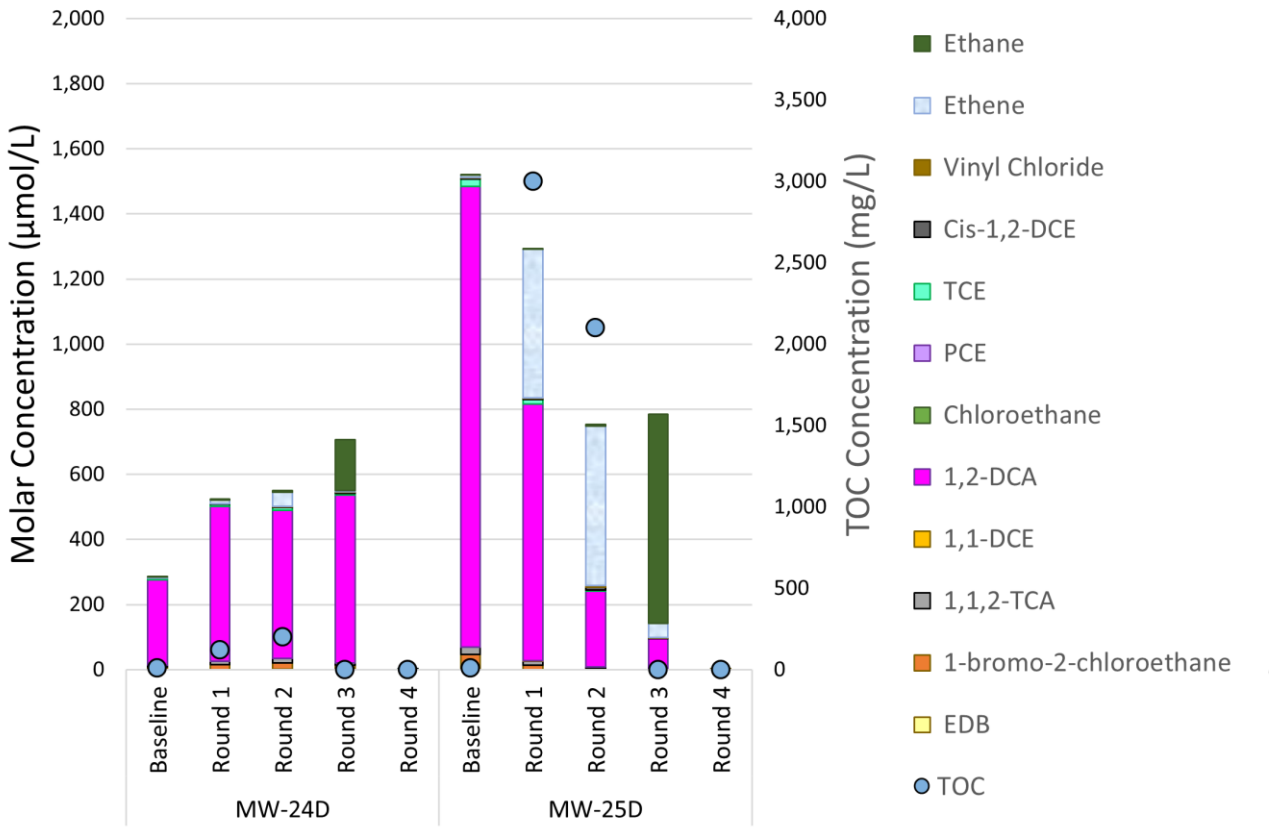
Legend

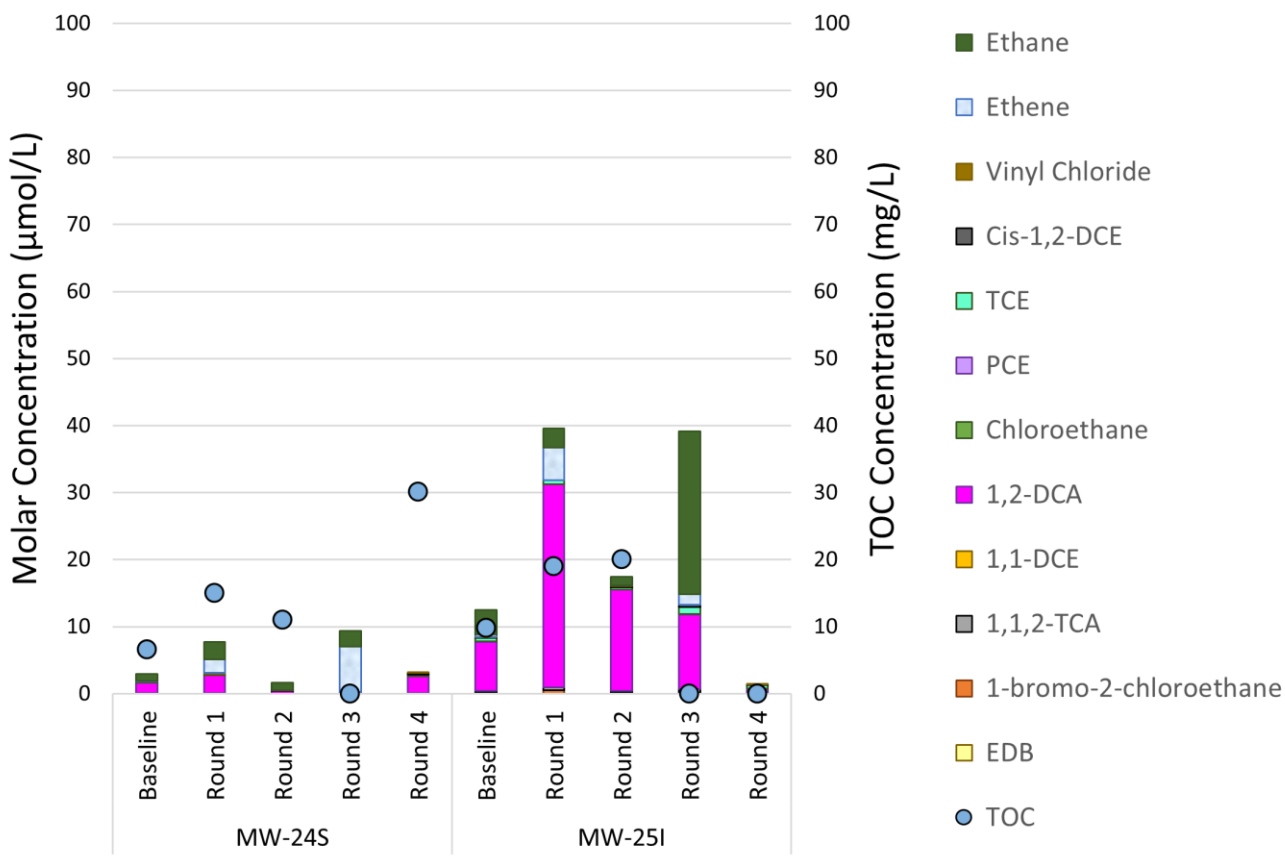
- White Chemical Site Boundary
- 1,2-DCA contour (µg/L), dashed where inferred
- Pilot Study (PS) Part A - EHC Injection
- PS Part B - Lactate Injection
- Shallow Overburden Excavated Area
- Monitoring Well
- Areas on either side of the lines will be treated by different vendors
- Bedrock Wells
- Shallow and Intermediate Overburden Wells
- Deep Overburden Wells

N

0 40 80 Feet

Figure 2-1
Pilot Study Areas
White Chemical Corporation
Superfund Site, OU3
Ne**wark, New Jersey**

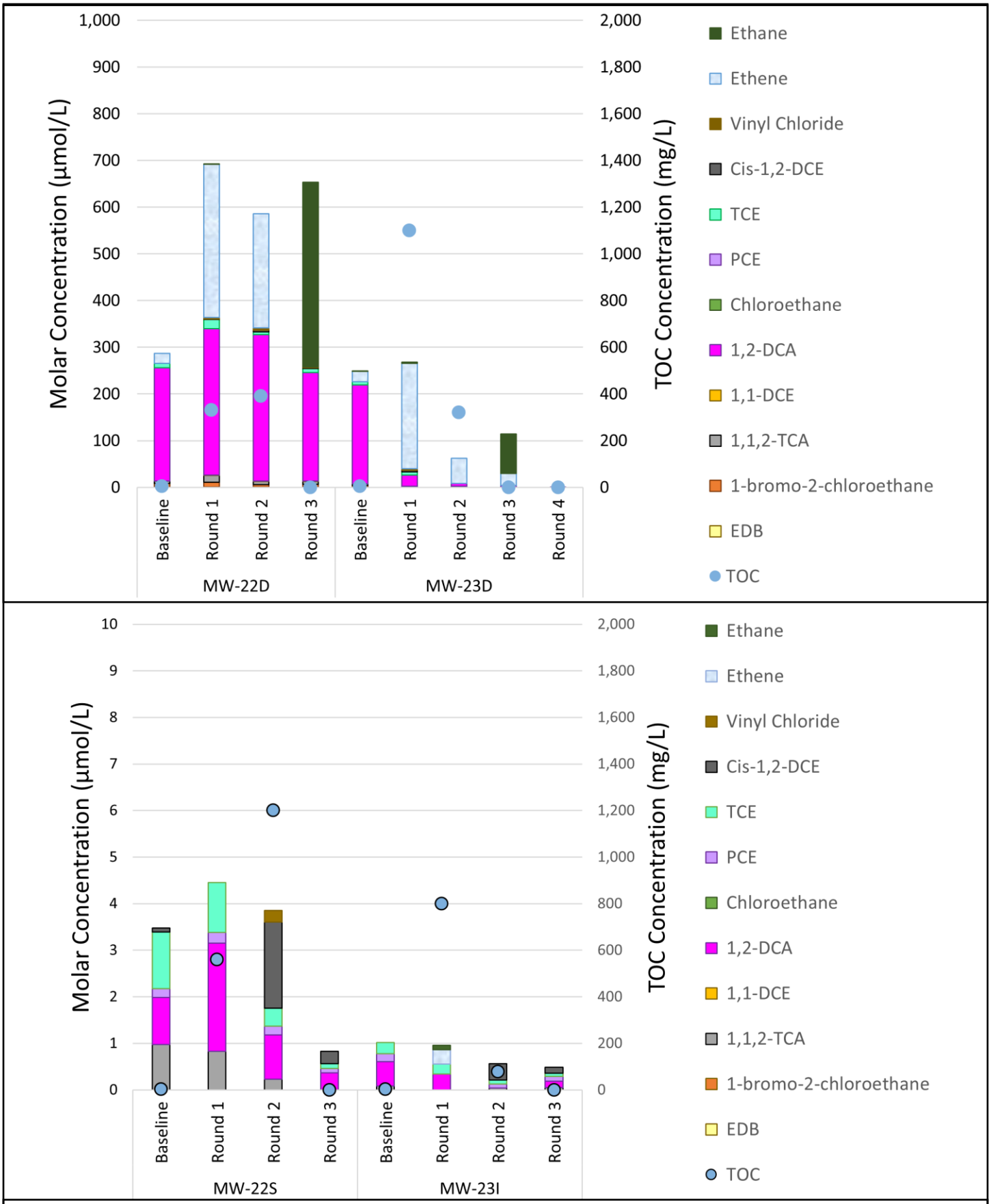




CDM Smith

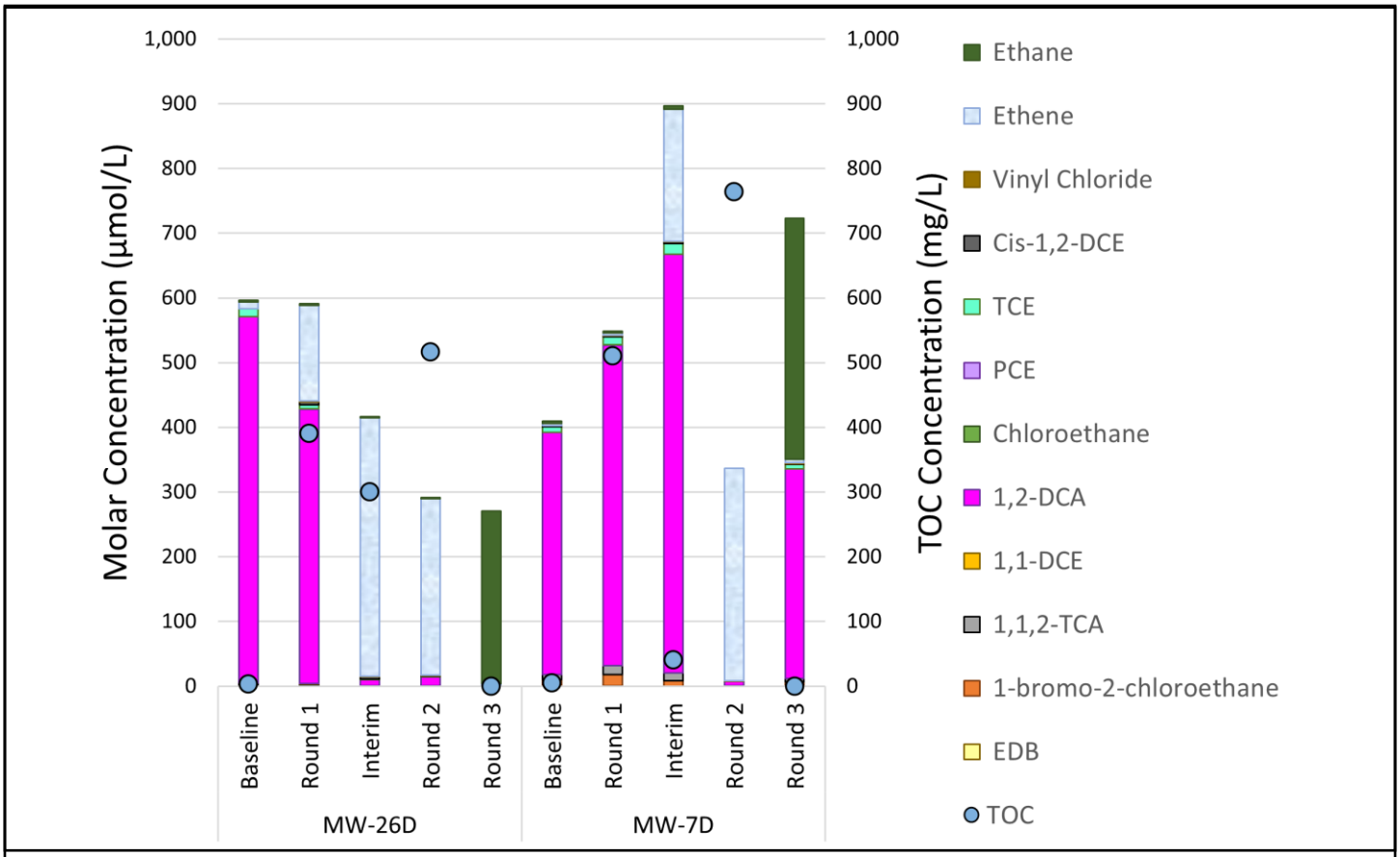
Notes:
µmol – micromole
mg/L – milligrams per liter
TOC – total organic carbon

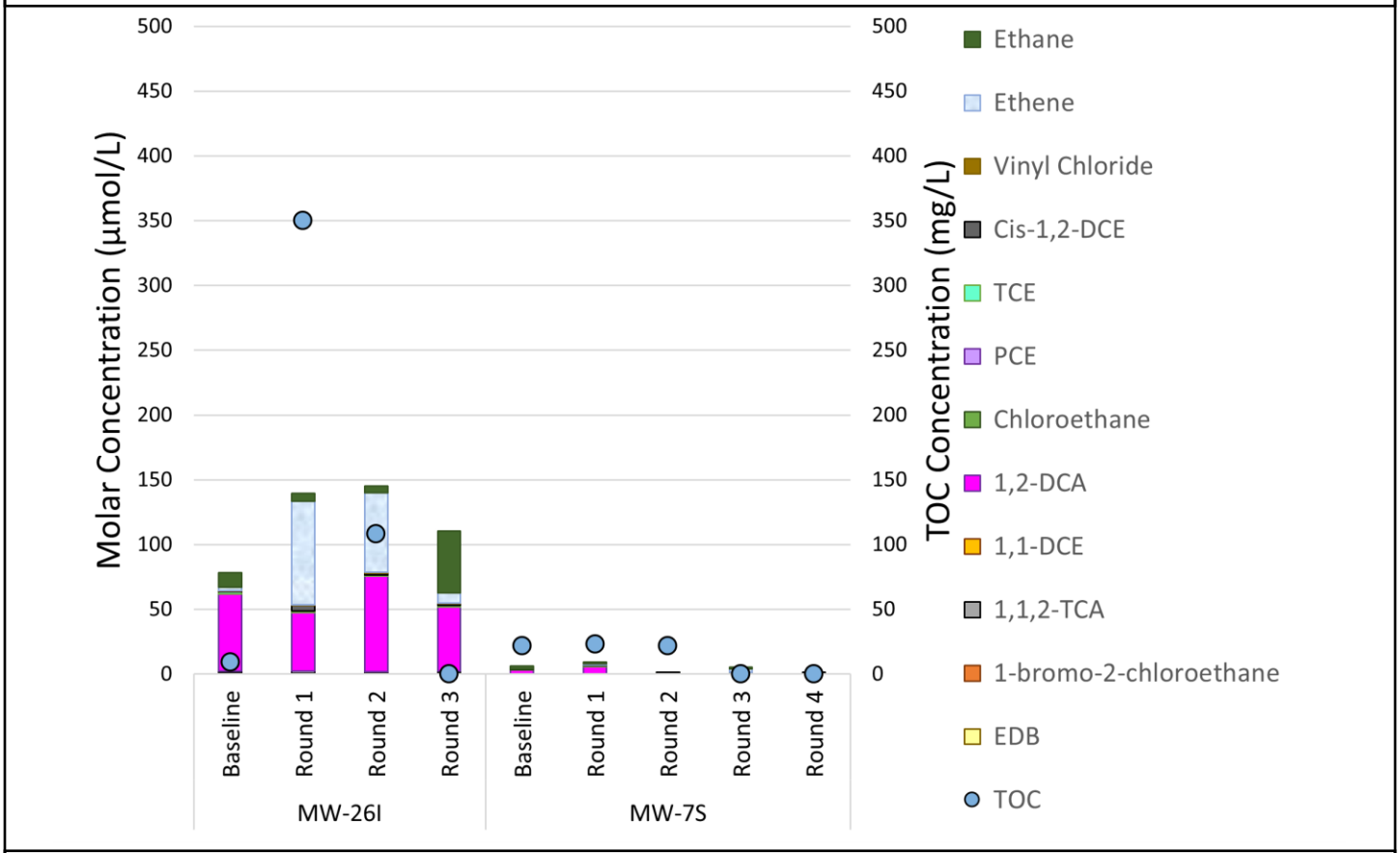
Figure 2-2
Contaminant Concentrations at the Hydraulic EHC© Study Area
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey



Notes:
µmol – micromole
mg/L – milligrams per liter
TOC – total organic carbon

Figure 2-3
Contaminant Concentrations at the Pneumatic EHC© Study Area
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

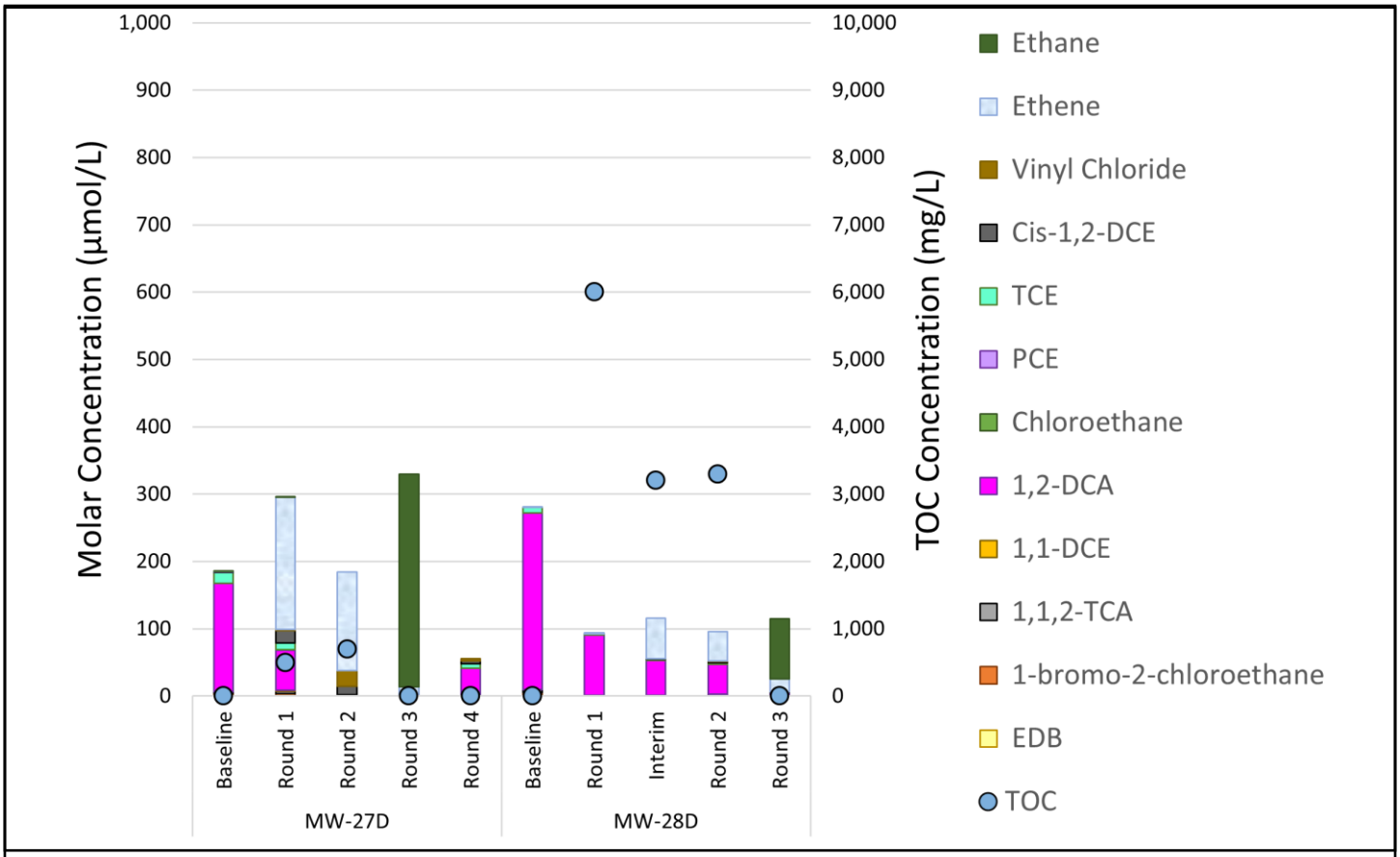


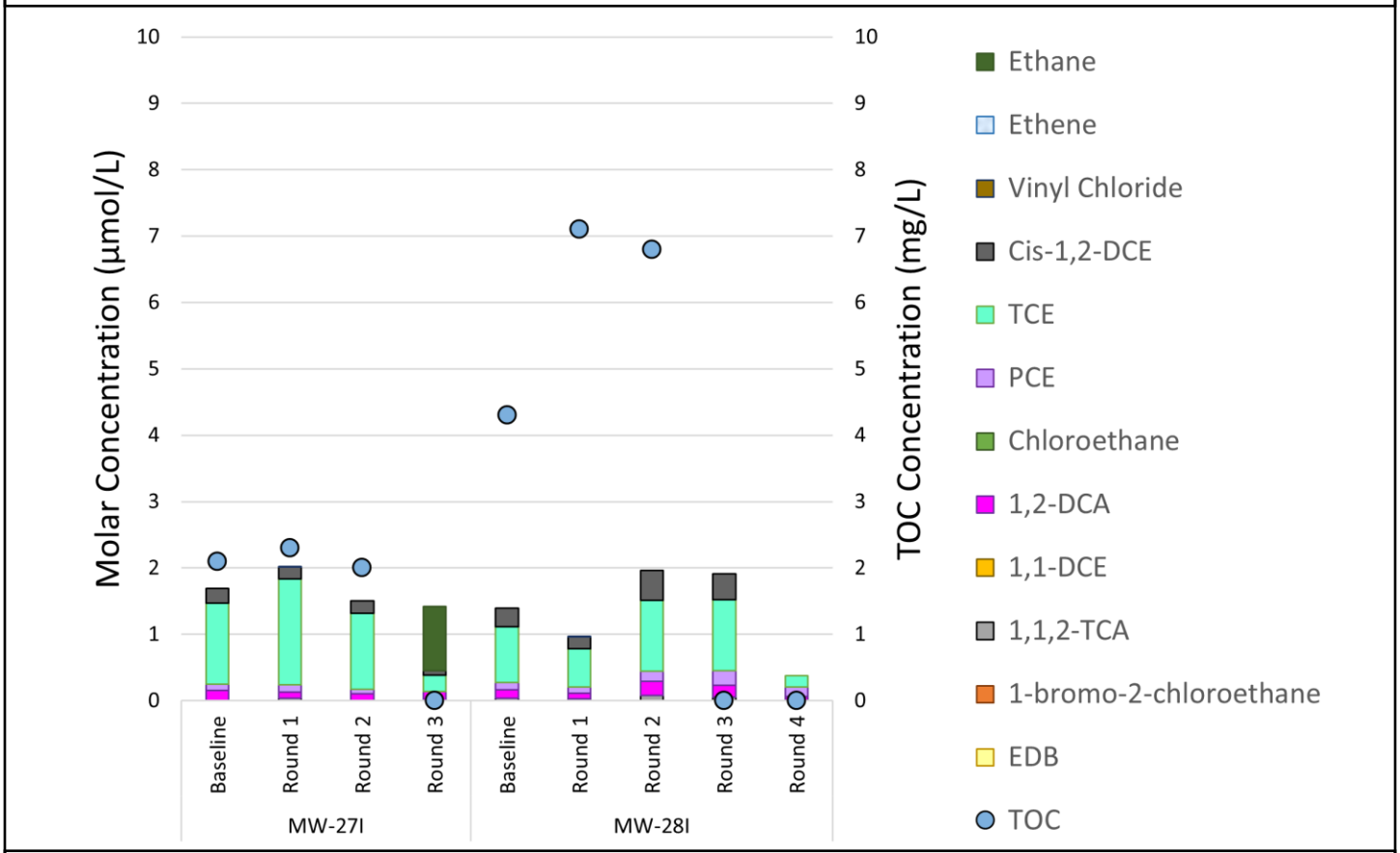


CDM Smith

Notes:
µmol – micromole
mg/L – milligrams per liter
TOC – total organic carbon

Figure 2-4
Contaminant Concentrations at the Hydraulic Lactate Study Area
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

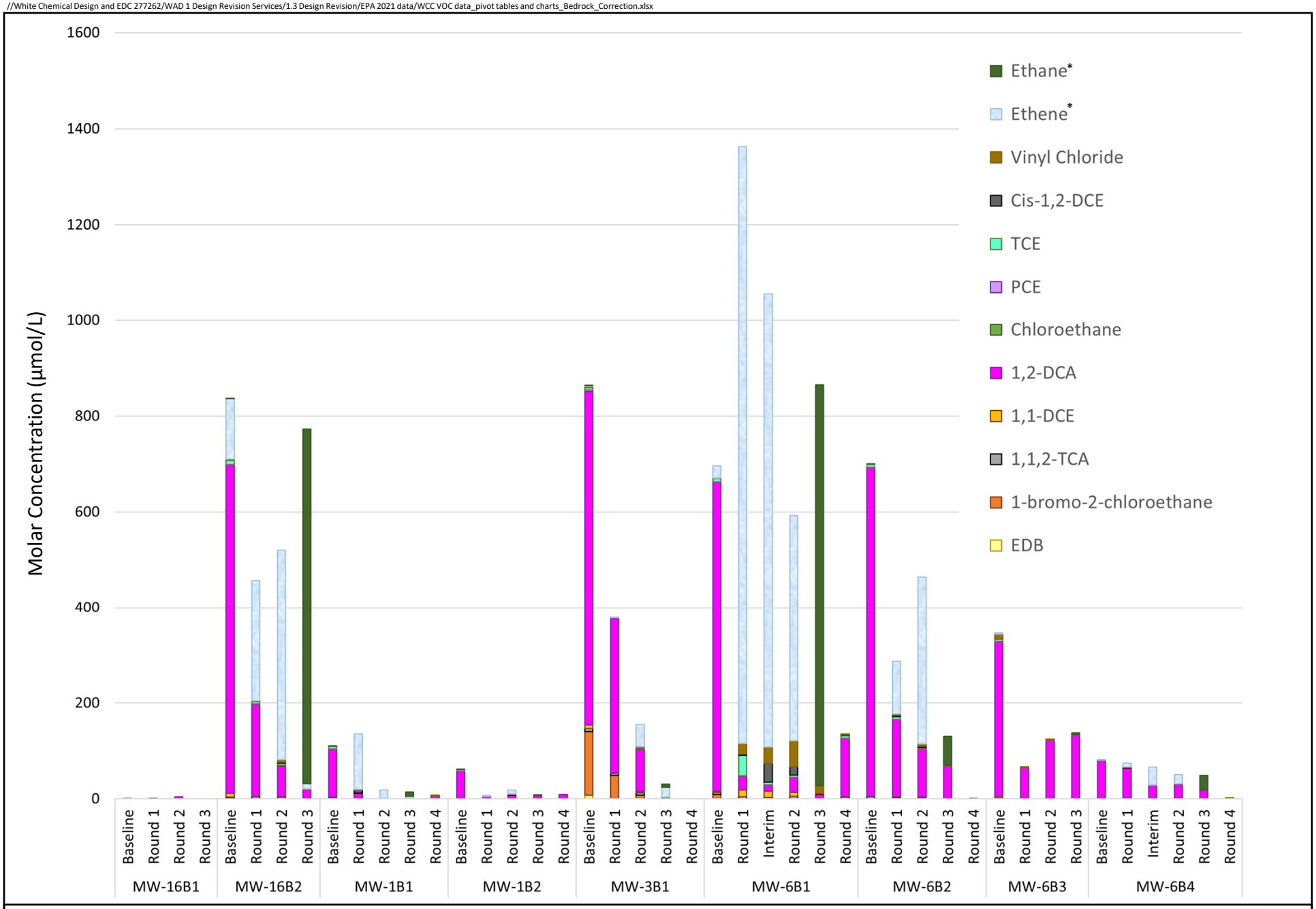




CDM Smith

Notes:
µmol – micromole
mg/L – milligrams per liter
TOC – total organic carbon

Figure 2-5
Contaminant Concentrations at the Pneumatic Lactate Study Area
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey



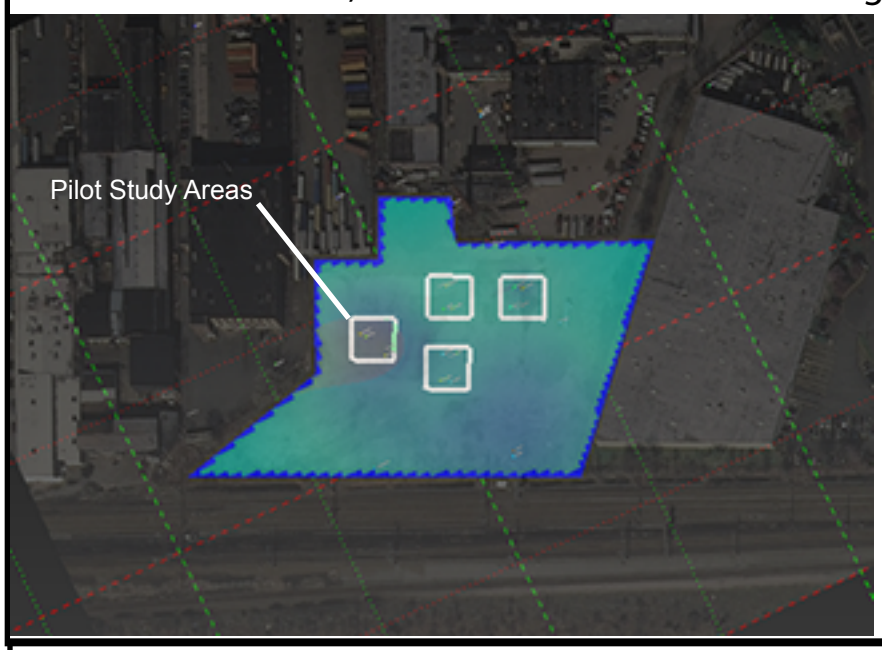
CDM Smith

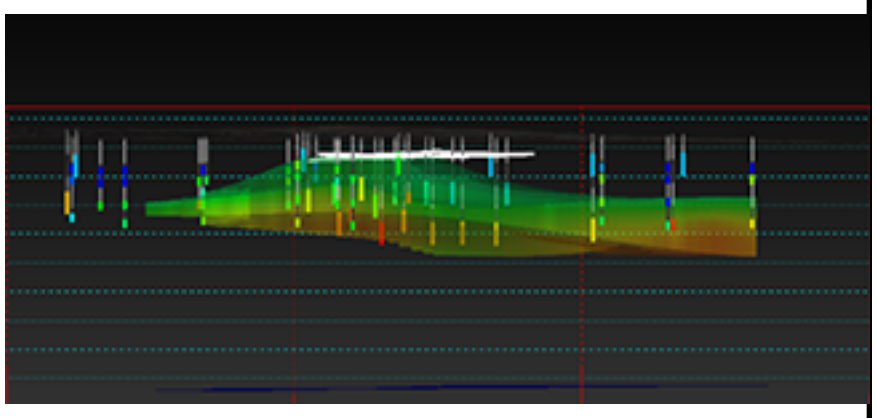
Notes:
µmol – micromole
mg/L – milligrams per liter
TOC – total organic carbon

* Samples in Round 4 were not analyzed for ethene and ethane.

Figure 2-6
Contaminant Concentrations at the Bedrock Study Area
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

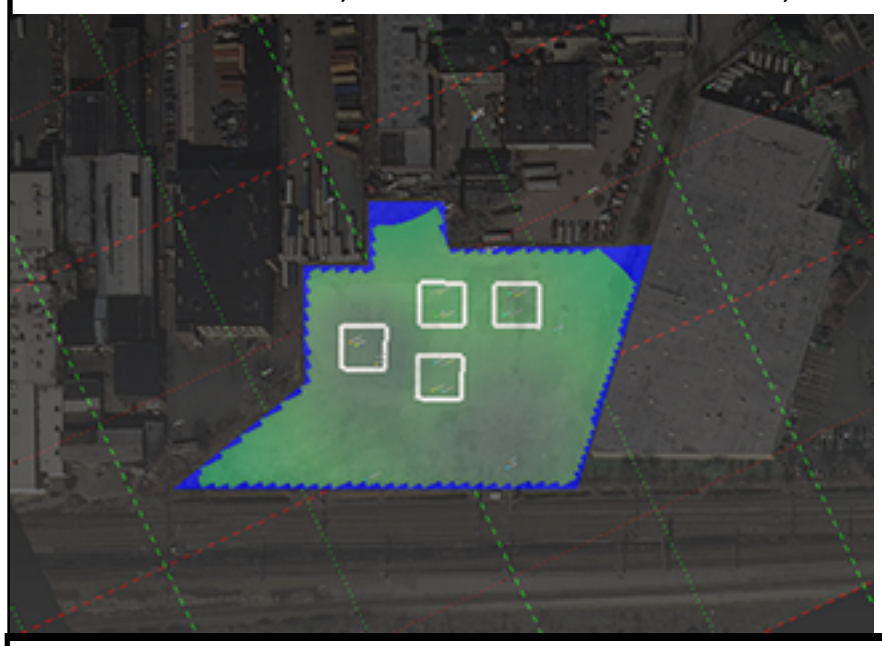
Concentrations of 1,2-dichloroethane Above 100 ug/L

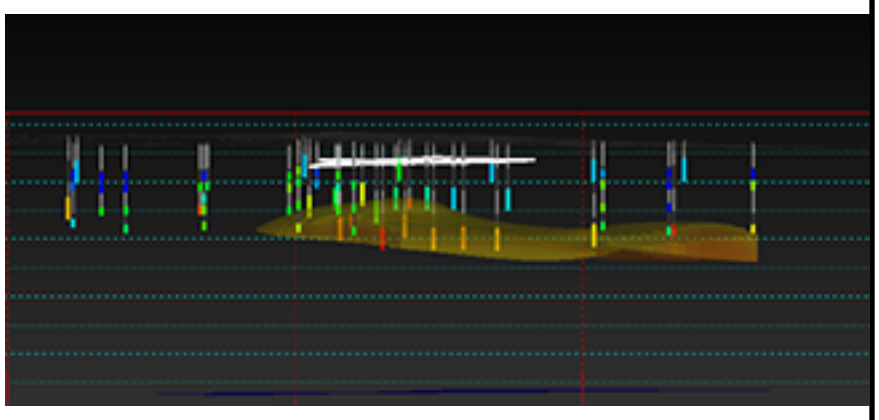




Total volume containing groundwater concentrations above 100 ug/L - 147,120 cubic yards.

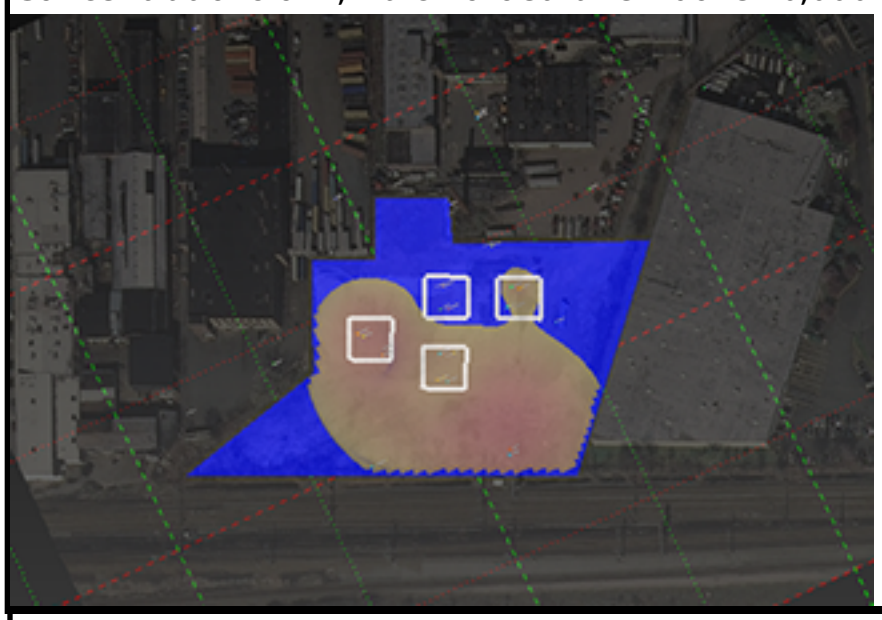
Concentrations of 1,2-dichloroethane Above 1,000 ug/L

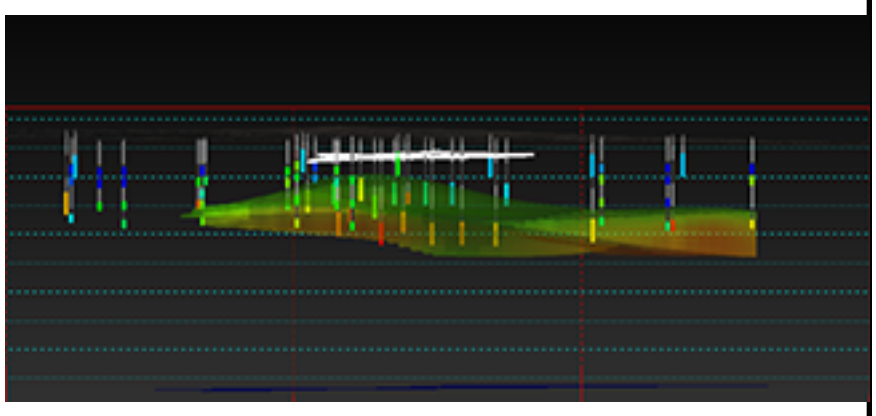




Total volume containing groundwater concentrations above 1,000 ug/L - 89,940 cubic yards.

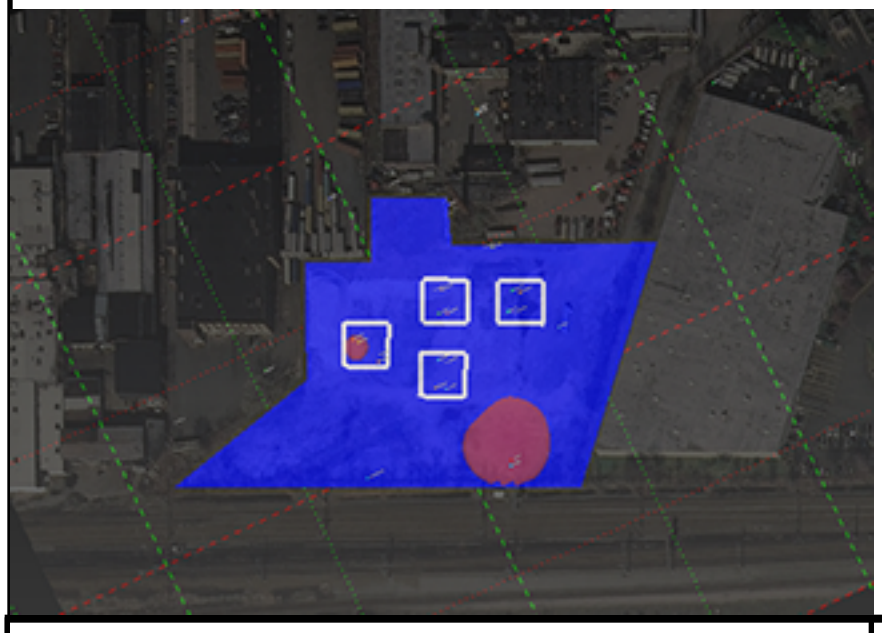
Concentrations of 1,2-dichloroethane Above 10,000 ug/L

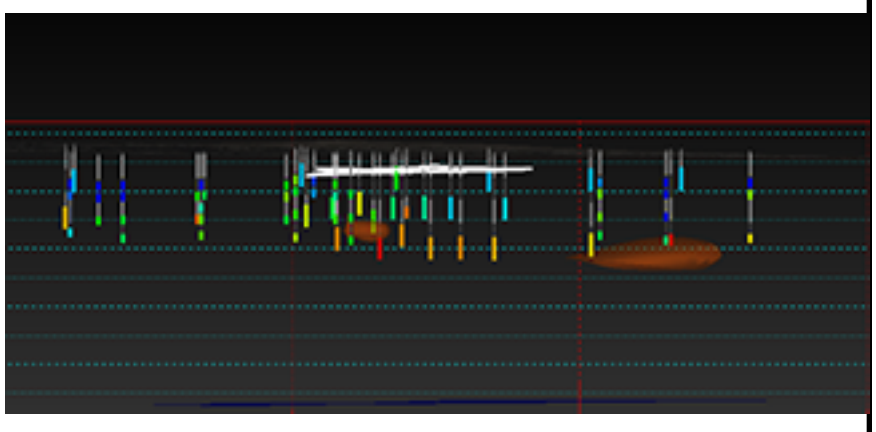




Total volume containing groundwater concentrations above 10,000 ug/L - 37,014 cubic yards.

Concentrations of 1,2-dichloroethane Above 50,000 ug/L





Total volume containing groundwater concentrations above 50,000 ug/L - 4,753 cubic yards.

Plan Views

West East

Side Views

For legend, see Figure 3-1b.

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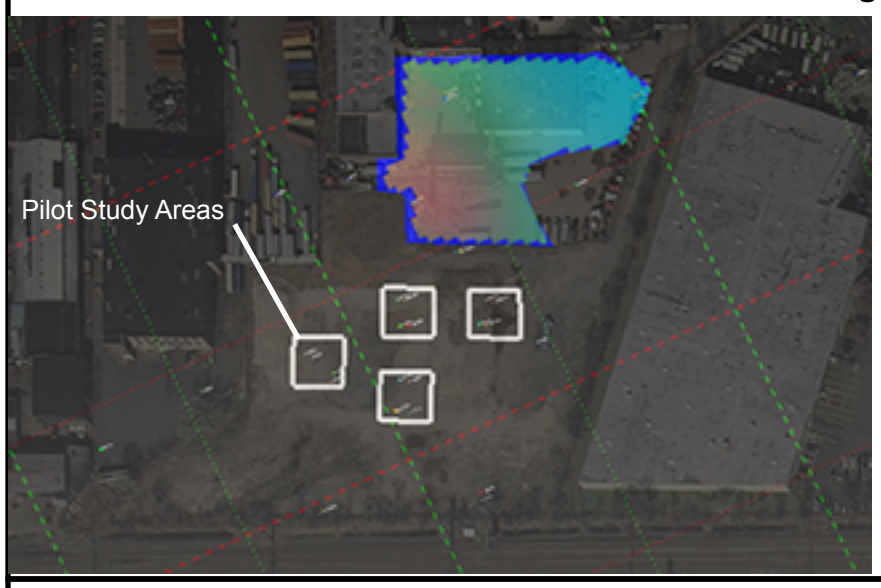
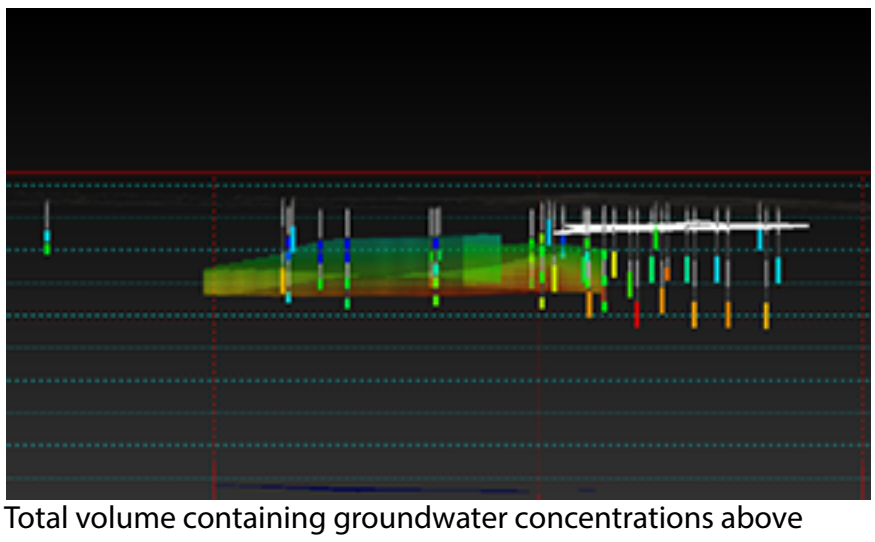
Figure 3-1a
2016 Model of Contamination at the WCC Property
White Chemical Corporation Superfund Site - OU3
Newark, New Jersey

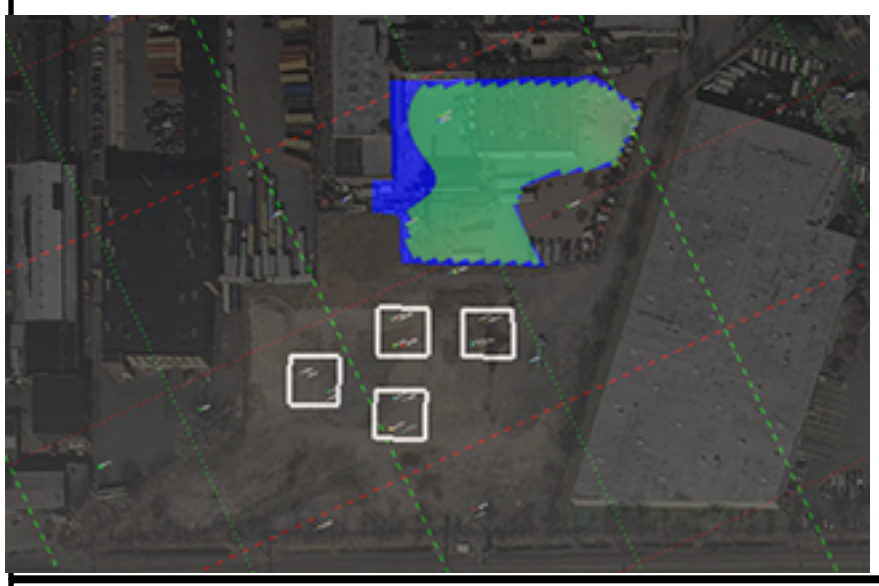
Concentrations of 1,2-dichloroethane Above 100 ug/L

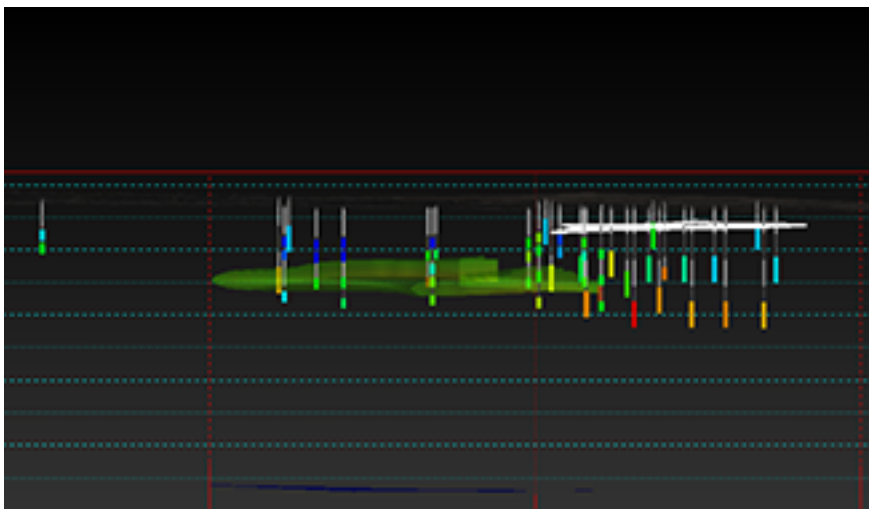




Total volume containing groundwater concentrations above 100 ug/L - 31,185 cubic yards.

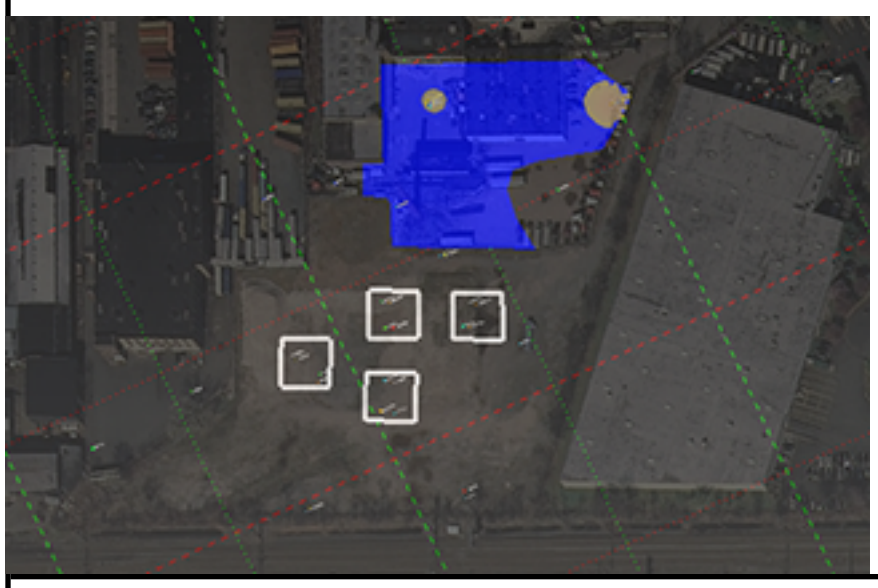
Concentrations of 1,2-dichloroethane Above 1,000 ug/L

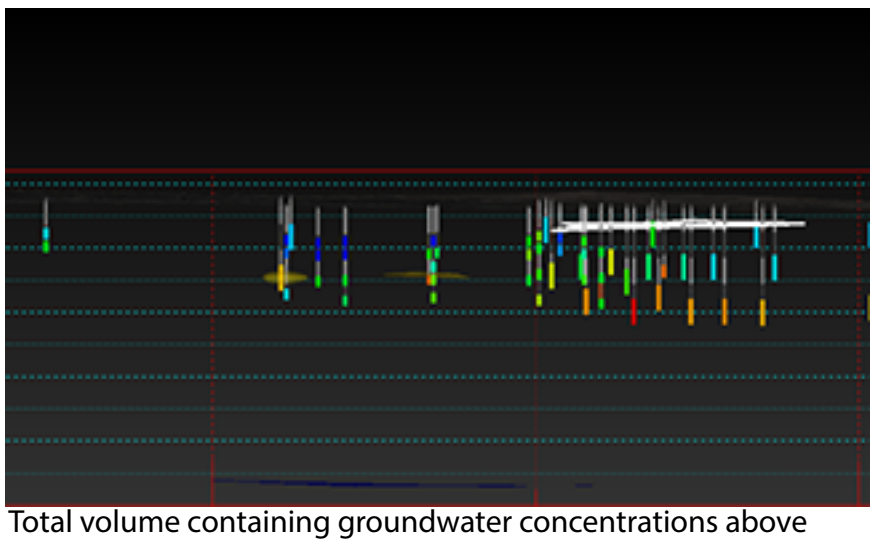




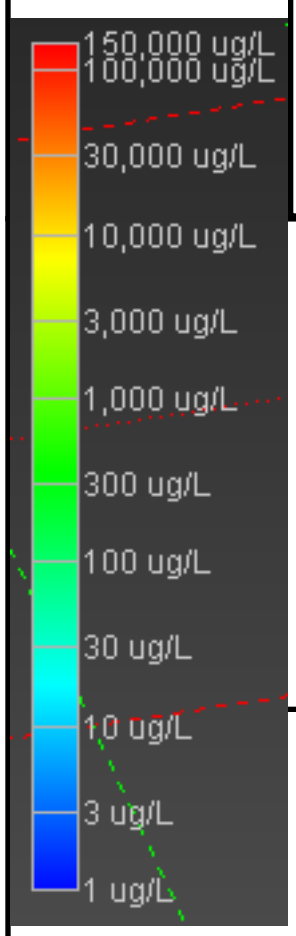
Total volume containing groundwater concentrations above 1,000 ug/L - 14,358 cubic yards.

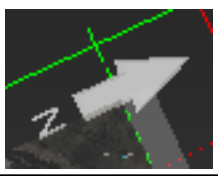
Concentrations of 1,2-dichloroethane Above 10,000 ug/L





Total volume containing groundwater concentrations above 10,000 ug/L - 220 cubic yards.





Plan Views

West East

Side Views

No concentrations of 1,2-dichloroethane were detected above 50,000 ug/L.

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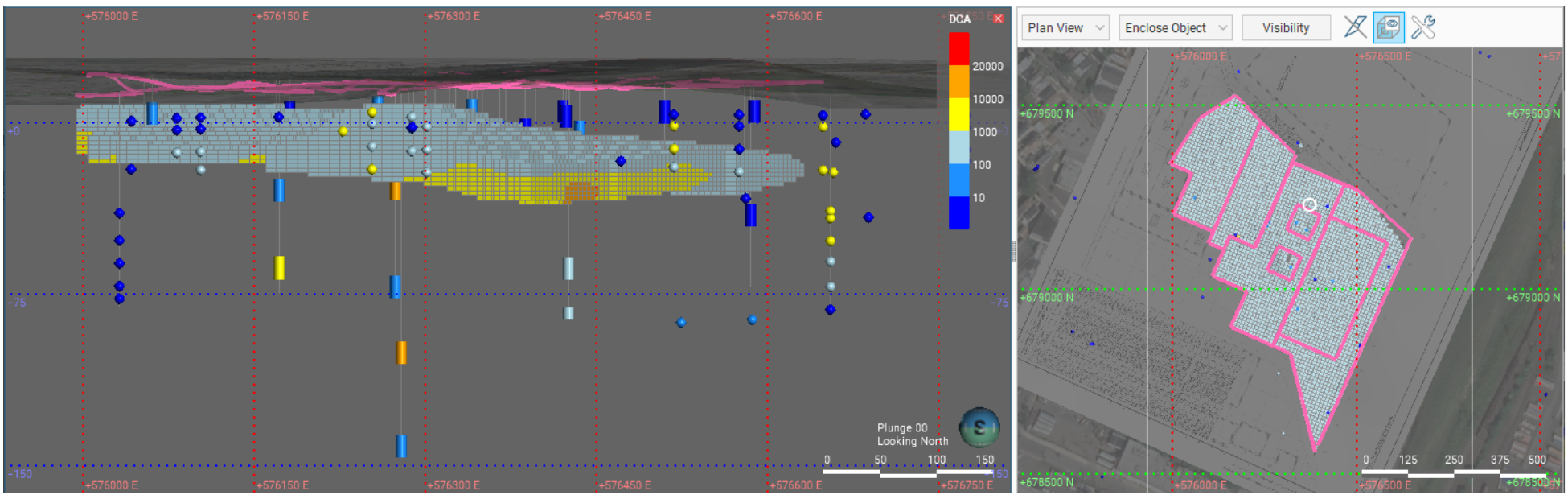
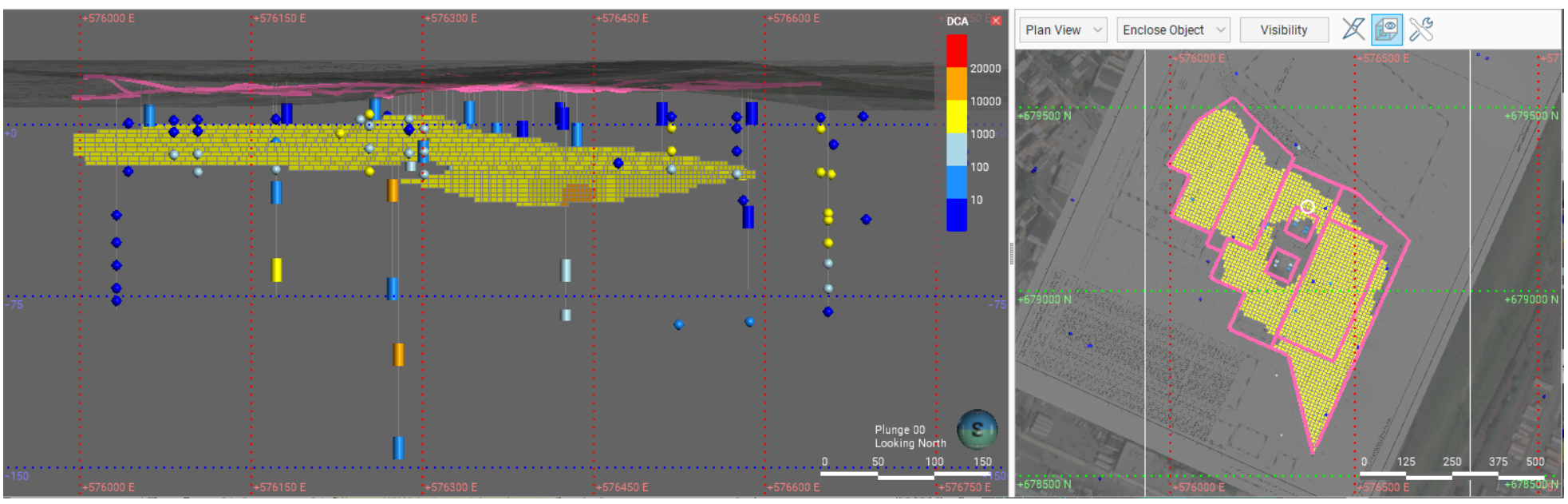
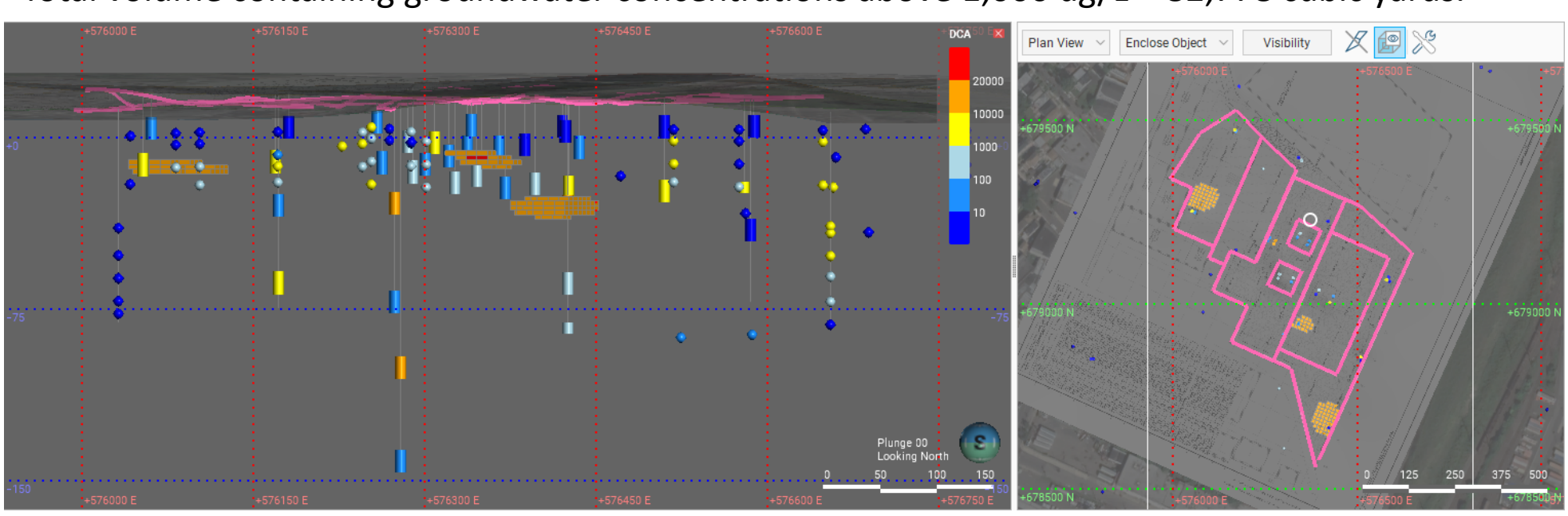
Figure 3-1b
2016 Model of Contamination at the 646 Frelinghuysen Avenue Property
White Chemical Corporation Superfund Site - OU3
Newark, New Jersey



Total volume containing groundwater concentrations above 100 ug/L – 174,889 cubic yards.



Total volume containing groundwater concentrations above 1,000 ug/L – 82,778 cubic yards.



Total volume containing groundwater concentrations above 10,000 ug/L – 1,896 cubic yards.

Treatment Zone Area Average Thickness
30 ft of Saturated Overburden
13.5 ft <100 ug/L
9 ft 100<x<1000 ug/L
7.5 ft >1000 ug/L

Figure 3-2
Model of 1,2-DCA at the WCC Property
and 646 Frelinghuysen Avenue Property
White Chemical Superfund Site - OU3
Newark, New Jersey

CDM Smith

Leapfrog Works 3DVA Analysis-TJC-03232023

Tables

Table 1-1
Soil VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

Sample ID	SB-23D-15-20	SB-23D-20-25	SB-23D-25-30	SB-23D-30-35	SB-23D-35-40	SB-23D-40-45	SB-24D-5-10	SB-24D-10-15	SB-25D-10-15	SB-25D-15-20	SB-25D-20-25	SB-25D-25-30	SB-900D-25-30	SB-25D-30-35	SB-25D-35-40	SB-25D-40-45
Well ID	MW-23D	MW-23D	MW-23D	MW-23D	MW-23D	MW-23D	MW-24D	MW-24D	MW-25D	MW-25D	MW-25D	MW-25D	MW-25D	MW-25D	MW-25D	MW-25D
Sample Date	5/16/2014	5/16/2014	5/16/2014	5/16/2014	5/16/2014	5/16/2014	5/19/2014	5/19/2014	5/15/2014	5/15/2014	5/15/2014	5/15/2014	5/15/2014	5/15/2014	5/15/2014	5/15/2014
Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N
Parent Sample Code	--	--	--	--	--	--	--	--	--	--	--	--	SB-25D-25-30	--	--	--
Sample Depth (ft bgs)	17-18	22-23	28.5-29.5	32.5-33.5	35.5-36.5	41.5-42.5	9-10	13.5-14.5	12-13	17-18	22-23	28.5-29.5	28.5-29.5	32.5-33.5	35-36	43.5-44.5
1,1,2,2-Tetrachloroethane	ND	6.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	37	48	750 J	500 L	140
1,1,2-Trichloroethane	ND	ND	7.4	69	22	36	ND	ND	ND	ND	ND	22	14	220	99	250 J
1,1-Dichloroethene	ND	ND	ND	5.8	4.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10 L
1,2-Dibromo-3-Chloropropane	ND	ND	ND	6.2	5.8	ND	ND	ND	ND	ND	ND	44	89	420	1100 L	830
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	16	13	9.8
1,2-Dichloroethane	ND	ND	83	480	250	530	5.1	6.8	ND	ND	33	1,100	180	630	32,000	26,000
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	33
1-Bromo-2-Chloroethane	ND	ND	5.1	50	19	31	ND	ND	ND	ND	ND	20	9.5	250 J	150	560
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.8	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.3 L
cis-1,2-Dichloroethene	ND	ND	ND	8.5	4.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30 L
Methylene Chloride	ND	ND	5.5	5.3	ND	ND	6.2	10	ND	ND	ND	ND	5.7	11	9.2	52 L
Tetrachloroethene	5.6	ND	ND	9.9	7.6	9.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	12
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12 L
Trichloroethene	7.7	12	ND	150	110	130	ND	ND	ND	ND	ND	17	ND	32	12	390
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	63 J

Notes:
All results in micrograms per kilogram (µg/kg).
FD - field duplicate
ft bgs - feet below ground surface
J - estimated result
L - actual value likely greather than reported value
N - field sample
ND - not detected, reporting limit approximately 5 µg/kg
VOC - volatile organic compound

Table 1-1
Soil VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

Sample ID	SB-26D-10-15	SB-26D-20-25	SB-26D-25-30	SB-26D-30-35	SB-27D-40-45	SB-28D-10-15	SB-28D-15-20	SB-28D-20-25	SB-28D-25-30	SB-28D-30-35	SB-28D-35-40	SB-901D-35-40	SB-28D-40-45
Well ID	MW-26D	MW-26D	MW-26D	MW-26D	MW-27D	MW-28D	MW-28D	MW-28D	MW-28D	MW-28D	MW-28D	MW-28D	MW-28D
Sample Date	5/19/2014	5/19/2014	5/19/2014	5/19/2014	5/14/2014	5/20/2014	5/20/2014	5/20/2014	5/20/2014	5/20/2014	5/20/2014	5/20/2014	5/20/2014
Sample Type	N	N	N	N	N	N	N	N	N	N	N	FD	N
Parent Sample Code	--	--	--	--	--	--	--	--	--	--	--	SB-28D-35-40	--
Sample Depth (ft bgs)	12-13	23.5-24.5	25.1-26.1	32-33	42-42.5	12-13	17-18	22-23	27-28	32.5-33.5	38-39	38-39	40.5-41.5
1,1,2,2-Tetrachloroethane	ND	22	ND	ND	ND	ND	ND	ND	ND	27	40	32	100
1,1,2-Trichloroethane	ND	110	36	ND	17	ND	ND	ND	ND	77	110	53	220 J
1,1-Dichloroethene	ND	6.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-Chloropropane	ND	110	18	ND	ND	ND	ND	ND	ND	98	89	76	340
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	39	13,000	5,500	920	240	6.5	13	42	11	3,600	6,700	12,000	29,000
1,2-Dichloropropane	ND	14	9.4	ND	ND	ND	ND	ND	ND	ND	17	ND	42
1-Bromo-2-Chloroethane	ND	81	40	ND	4.8	ND	ND	ND	ND	53	140	70	270
Benzene	ND	ND	ND	ND	ND	ND	ND	10	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.2 L
cis-1,2-Dichloroethene	ND	19	ND	ND	5.6	ND	ND	ND	ND	11	14	ND	33 L
Methylene Chloride	5.6	21	ND	ND	16	ND	ND	17	ND	26	16	7.3	16 L
Tetrachloroethene	ND	ND	6.7	ND	6.7	ND	ND	ND	ND	7.1	13	ND	21
trans-1,2-Dichloroethene	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	6.1	ND	16 L
Trichloroethene	ND	300 J	240	ND	85	ND	ND	ND	23	190	290 J	49	320
Vinyl Chloride	ND	25	ND	ND	5.4 J	ND	ND	ND	ND	ND	15	ND	54 L

Notes:
All results in micrograms per kilogram (µg/kg).
FD - field duplicate
ft bgs - feet below ground surface
J - estimated result
L - actual value likely greather than reported value
N - field sample
ND - not detected, reporting limit approximately 5 µg/kg
VOC - volatile organic compound

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

			Well ID	MW-1B1							MW-1B2							MW-1D		MW-1S	
			Location	MW-1B1	MW-1B1	MW-1B1	MW-1B1	MW-1B1	MW-1B1	MW-1B1	MW-1B2	MW-1B2	MW-1B2	MW-1B2	MW-1B2	MW-1B2	MW-1B2	MW-1D	MW-1D	MW-1S	MW-1S
			Date	6/11/2010	5/18/2011	6/23/2014	4/16/2015	12/7/2015	9/12/2016	11/9/2021	6/11/2010	5/18/2011	6/23/2014	4/16/2015	12/7/2015	9/12/2016	11/9/2021	6/11/2010	5/18/2011	6/11/2010	5/18/2011
			Sample ID	MW-1B1-R1	MW-1B1-R2	MW-1B1-RDB	MW-1B1-RD1	MW-1B1-R2	MW-1B1-R3-091216	MW-1B1-01	MW-1B2-R1	MW-1B2-R2	MW-1B2-RDB	MW-1B2-RD1	MW-1B2-R2	MW-1B2-R3-091216	MW-1B2-01***	MW-1D-R1	MW-1D-R2	MW-1S-R1	MW-1S-R2
			Parent Sample ID																		
			Depth (ft bgs)																		
CAS No.	Chemical	Unit	ROD Remediation Goal																		
Volatile Organic Compounds																					
71-55-6	1,1,1-Trichloroethane	µg/l	30	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	1	50 U	100 U	100 U	25 UJ	5 U	0.5 U	5 U	50 U	100 U	100 U	25 UJ	50 U	50 U	500 UJ	**46 J**	100 U	**0.77**	0.5 U
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
79-00-5	1,1,2-Trichloroethane	µg/l	3	**110**	**380**	**180**	**36**	5 U	0.5 U	**6.99**	**89**	**170**	100 U	25 U	50 U	50 U	500 UJ	**840 J**	**420**	0.5 U	0.5 U
75-34-3	1,1-Dichloroethane	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
75-35-4	1,1-Dichloroethene	µg/l	**1**	50 U	**56 J**	100 U	25 U	5 U	0.5 U	5 U	50 U	**87 J**	100 U	25 U	50 U	50 U	500 UJ	130 U	**67 J**	0.5 U	0.5 U
87-61-6	1,2,3-Trichlorobenzene	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	**48 J**	100 U	0.5 U	0.5 U
120-82-1	1,2,4-Trichlorobenzene	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	**33 J**	100 U	0.5 U	0.5 U
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	0.02	50 U	100 U	100 U	25 UJ	5 U	0.5 U	5 U	50 U	100 U	100 U	25 UJ	50 U	50 U	500 UJ	**190**	**88 J**	0.5 U	0.5 U
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	0.02	NA	**2.9 J**	NA	NA	NA		NA	NA	**14**	NA	NA	NA		NA	NA	**90 J**	0.05 U	0.05 U
106-93-4	1,2-Dibromoethane	µg/l	0.03	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
106-93-4	1,2-Dibromoethane - SIM	µg/l	0.03	NA	**0.16 J**	NA	NA	NA		NA	NA	**1.4** J	NA	NA	NA		NA	NA	**6**	**0.062**	0.05 U
95-50-1	1,2-Dichlorobenzene	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
107-06-2	1,2-Dichloroethane	µg/l	2	**30000**	**21000**	**10000**	**1100**	**69**	**88**	**558 ****	**23000**	**16000**	**5800**	**500**	**780**	**660**	**946 J**	**20000**	**17000**	0.5 U	0.5 U
78-87-5	1,2-Dichloropropane	µg/l	1	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
541-73-1	1,3-Dichlorobenzene	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
106-46-7	1,4-Dichlorobenzene	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
107-04-0	1-Bromo-2-Chloroethane	µg/l	--	NA	NA	**300**	25 U	5 U	0.5 U	NA	NA	NA	100 U	25 U	50 U	50 U	NA	NA	NA	NA	NA
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	--	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA
78-93-3	2-Butanone (MEK)	µg/l	--	500 U	1000 U	200 U	**1200**	**2200**	**130 J**	10 U	500 U	1000 U	200 U	**1400**	**2800**	**1700 J**	**2,550 J**	1300 UJ	1000 U	5 U	5 U
591-78-6	2-Hexanone	µg/l	--	500 U	1000 U	200 U	250 U	50 U	5 UJ	10 U	500 U	1000 U	200 U	250 U	500 U	500 UJ	1,000 UJ	**1300 J**	1000 U	5 U	5 U
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	--	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA
460-00-4	4-Bromofluorobenzene	µg/l	--	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	--	500 U	1000 U	200 U	250 U	50 U	5 U	10 U	500 U	1000 U	200 U	250 U	500 U	500 U	1000 UJ	1300 UJ	1000 U	5 U	5 U
67-64-1	Acetone	µg/l	--	**390 J**	1000 U	200 U	250 U	**440**	**28**	10 U	500 U	1000 U	200 U	250 U	1000 UL	500 U	1,000 UJ	1300 UJ	1000 U	**1.2 J**	5 U
71-43-2	Benzene	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
74-97-5	Bromochloromethane	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
75-27-4	Bromodichloromethane	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
75-25-2	Bromoform	µg/l	--	50 UJ	100 U	100 U	25 U	5 U	0.5 U	5 U	50 UJ	100 U	100 U	25 U	50 U	50 U	500 UJ	130 UJ	100 U	0.5 U	0.5 U
74-83-9	Bromomethane	µg/l	--	50 U	100 U	100 U	25 UJ	5 U	0.5 U	5 U	50 U	100 U	100 U	25 UJ	50 UL	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
75-15-0	Carbon Disulfide	µg/l	--	50 U	100 U	100 U	25 U	5 U	**9.1**	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
56-23-5	Carbon Tetrachloride	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
108-90-7	Chlorobenzene	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
75-00-3	Chloroethane	µg/l	--	50 U	100 U	100 U	25 U	5 U	**6.8 L**	5 U	50 U	100 U	100 U	25 U	50 U	50 UL	500 UJ	130 U	100 U	0.5 U	0.5 U
67-66-3	Chloroform	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
74-87-3	Chloromethane	µg/l	--	50 U	100 U	100 U	25 U	5 UL	0.5 U	5 U	50 U	100 U	100 U	25 U	50 UL	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
156-59-2	cis-1,2-Dichloroethene	µg/l	70	50 U	**100**	100 U	**610**	**5.8**	**3.1**	**17.9**	50 U	**65 J**	100 U	25 U	**160**	50 U	500 UJ	**510**	**290**	**0.15 J**	0.5 U
10061-01-5	cis-1,3-Dichloropropene	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 UJ	100 U	0.5 U	0.5 U
110-82-7	Cyclohexane	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 UJ	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
124-48-1	Dibromochloromethane	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
75-71-8	Dichlorodifluoromethane	µg/l	--	50 U	100 U	100 U	25 U	5 UL	0.5 UJ	5 U	50 U	100 U	100 U	25 U	50 UL	50 UJ	500 UJ	130 U	100 U	0.5 U	0.5 U
100-41-4	Ethylbenzene	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	**4,680 J**	130 U	100 U	0.5 U	0.5 U
462-06-6	Fluorobenzene	µg/l	--	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA
98-82-8	Isopropylbenzene	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
108-38-3	m,p-Xylene	µg/l	--	50 U	100 U	100 U	25 U	5 U	**0.96**	5 U	50 U	100 U	100 U	25 U	50 U	50 U	**19,600 J**	130 U	100 U	0.5 U	0.5 U
79-20-9	Methyl Acetate	µg/l	--	50 U	100 U	100 U	25 U	20 UL	0.5 U	5 U	50 U	100 U	100 U	25 U	200 UJ	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
1634-04-4	Methyl Tert-Butyl Ether	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
108-87-2	Methylcylohexane	µg/l	--	**17 J**	100 U	100 U	25 U	5 UJ	0.5 U	5 U	**11 J**	100 U	100 U	25 U	50 UJ	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
75-09-2	Methylene Chloride	µg/l	--	**190**	100 U	100 U	25 U	5 U	**0.52**	5 U	**140**	100 U	100 U	25 U	50 U	**100**	500 UJ	130 U	100 U	0.5 U	0.5 U
95-47-6	o-Xylene	µg/l	--	50 U	100 U	100 U	25 U	5 U	**0.75**	5 U	50 U	100 U	100 U	25 U	50 U	50 U	**4,220 J**	130 U	100 U	0.5 U	0.5 U
100-42-5	Styrene	µg/l	--	50 U	100 U	100 U	25 U	5 UJ	0.5 U	5 U	50 U	100 U	100 U	25 U	50 UJ	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
127-18-4	Tetrachloroethene	µg/l	1	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	**52 J**	100 U	0.5 U	0.5 U
108-88-3	Toluene	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
156-60-5	trans-1,2-Dichloroethene	µg/l	100	50 U	100 U	100 U	**53**	**33**	**22**	**9.38**	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	**210**	**99 J**	0.5 U	0.5 U
10061-02-6	trans-1,3-Dichloropropene	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 UJ	100 U	0.5 U	0.5 U
79-01-6	Trichloroethene	µg/l	1	**250**	**1000**	**730**	**50**	5 U	**11**	**142**	**180**	**580**	**270**	25 U	50 U	50 U	500 UJ	**4500**	**2600**	**1.3**	**0.25 J**
75-69-4	Trichlorofluoromethane	µg/l	--	50 U	100 U	100 U	25 U	5 U	0.5 U	5 U	50 U	100 U	100 U	25 U	50 U	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U
75-01-4	Vinyl Chloride	µg/l	1	50 U	100 U	100 U	**200**	**6.4**	0.5 U	**13.5**	50 U	100 U	100 U	25 U	**79**	50 U	500 UJ	130 U	100 U	0.5 U	0.5 U

Notes:

Highlighted cells represent detected concentrations greater than the ROD Remediation Goal.
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

			MW-2								MW-2D							MW-3B1							
			MW-2 6/10/2010 MW-2-R1	MW-2 5/18/2011 MW-2-R2	MW-2 6/20/2014 MW-2-RDB	MW-2 4/14/2015 MW-2-RD1	MW-2 12/4/2015 MW-2-R2	MW-2 9/12/2016 MW-2-R3-091216		MW-2 11/9/2021 MW-2D-01	MW-2D 6/10/2010 MW-2D-R1	MW-2D 5/18/2011 MW-2D-R2	MW-2D 6/20/2014 MW-2D-RDB	MW-2D 4/14/2015 MW-2D-RD1	MW-2D 12/4/2015 MW-2D-R2	MW-2D 9/12/2016 MW-2D-R3-091216		MW-2D 11/9/2021 MW-2D-01	MW-3B1 6/9/2010 MW-3B1-R1	MW-3B1 5/24/2011 MW-3B1-R2	MW-3B1 6/23/2014 MW-3B1-RDB	MW-3B1 4/17/2015 MW-3B1-RD1	MW-3B1 12/3/2015 MW-3B1-R2	MW-3B1 9/12/2016 MW-3B1-R3-091216		MW-3B1 11/8/2021 MW-3B1-01
CAS No.	Chemical	Unit																							
Volatile Organic Compounds																									
71-55-6	1,1,1-Trichloroethane	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50 U	5 U	50 U	2500 U	100 U	25 U	50 U	5 U	5 U	
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	**3.2 J**	**7.8**	5 U	0.5 UJ	5 U	0.5 U	5 U		25 U	100 U	100 U	25 UJ	50 U	50 U	5 U	50 U	2500 U	100 U	25 UJ	50 U	5 U	5 U	
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50 U	5 U	50 U	2500 U	100 U	25 U	50 U	5 U	5 U	
79-00-5	1,1,2-Trichloroethane	µg/l	**4.8**	**2.2**	5 U	0.5 U	5 U	0.5 U	5 U		**1400 J**	**810 J**	**490**	**450**	**530**	**360**	**115**	**600**	**540 J**	**820**	**510**	**630**	5 U	5 U	
75-34-3	1,1-Dichloroethane	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50 U	5 U	50 U	2500 U	100 U	25 U	50 U	5 U	5 U	
75-35-4	1,1-Dichloroethene	µg/l	**1.4**	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		**170**	**180**	**120**	**95**	**110**	**94**	**37.8**	**89**	2500 U	**740**	**40**	**230**	5 U	5 U	
87-61-6	1,2,3-Trichlorobenzene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50 U	5 U	50 U	2500 U	100 U	25 U	50 U	5 U	5 U	
120-82-1	1,2,4-Trichlorobenzene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50 U	5 U	50 U	2500 U	100 U	25 U	50 U	5 U	5 U	
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	0.5 UJ	0.5 U	5 U	0.5 UJ	5 U	0.5 U	5 U		**360**	**210**	**110**	**160 J**	**130**	**92**	**24**	**36 J**	2500 U	100 U	25 UJ	50 U	5 U	5 U	
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	**0.17**	0.05 U	NA	NA	NA		NA		NA	**300** J	NA	NA	NA		NA	NA	2.5 U	NA	NA	NA			NA
106-93-4	1,2-Dibromoethane	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		**230**	**210**	**120**	**95**	**99**	**68**	**16.3**	**65**	**1500 J**	**1500**	**75**	50 U	5 U	5 U	
106-93-4	1,2-Dibromoethane - SIM	µg/l	0.05 U	0.05 U	NA	NA	NA		NA		NA	**89** J	NA	NA	NA		NA	NA	**160** J	NA	NA	NA			NA
95-50-1	1,2-Dichlorobenzene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50 U	5 U	50 U	2500 U	100 U	25 U	50 U	5 U	5 U	
107-06-2	1,2-Dichloroethane	µg/l	**36**	0.5 U	10 U	**1.9**	5 U	0.5 U	5 U		**36000**	**22000**	**10000**	**11000**	**7800**	**6700**	**1,640 ******	**33000**	**66000**	**69000**	**32000**	**8700**	240		5 U
78-87-5	1,2-Dichloropropane	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50 U	5 U	**20 J**	2500 U	100 U	25 U	50 U	5 U	5 U	
541-73-1	1,3-Dichlorobenzene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50 U	5 U	50 U	2500 U	100 U	25 U	50 U	5 U	5 U	
106-46-7	1,4-Dichlorobenzene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50 U	5 U	50 U	2500 U	100 U	25 U	50 U	5 U	5 U	
107-04-0	1-Bromo-2-Chloroethane	µg/l	NA	NA	5 U	0.5 U	5 U	**0.5**	U	NA	NA	NA	**1700**	**1600**	**1700**	**1100**	NA	NA	NA	**19000**	**7000**	**1100**	**5**	U	NA
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA			NA
78-93-3	2-Butanone (MEK)	µg/l	5 U	5 U	10 U	5 U	50 U	5	UJ	10 U	250 U	1000 U	200 U	250 U	500 U	500	UJ	10 U	500 U	25000 U	200 U	250 U	**1200**	**2100**	**J**	**20.7**
591-78-6	2-Hexanone	µg/l	5 U	5 U	10 U	5 U	50 U	5	UJ	10 U	250 U	1000 U	200 U	250 U	500 U	500	UJ	10 U	500 U	25000 U	200 U	250 UL	500 U	50	UJ	10 U
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA			NA
460-00-4	4-Bromofluorobenzene	µg/l	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA			NA
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	5 U	5 U	10 U	5 U	50 U	5	U	10 U	250 U	1000 U	200 U	250 U	500 U	500	U	10 U	500 U	25000 U	200 U	250 U	500 U	50	U	10 U
67-64-1	Acetone	µg/l	5 U	5 U	10 U	5 UL	100 UL	5	U	10 U	250 U	1000 U	200 U	250 UL	1000 U	500	U	10 U	500 U	25000 U	200 U	250 UL	1000 U	**1000**		**16.2**
71-43-2	Benzene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50 U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
74-97-5	Bromochloromethane	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50 U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
75-27-4	Bromodichloromethane	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50 U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
75-25-2	Bromoform	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50 U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
74-83-9	Bromomethane	µg/l	0.5 U	0.5 UJ	5 U	0.5 UL	5 UL	0.5	UL	5 U	25 U	100 U	100 U	25 UL	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
75-15-0	Carbon Disulfide	µg/l	0.5 U	0.5 UJ	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
56-23-5	Carbon Tetrachloride	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
108-90-7	Chlorobenzene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U		25 U	100 U	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
75-00-3	Chloroethane	µg/l	0.5 U	0.5 UJ	5 U	0.5 U	5 U	0.5	UL	5 U	25 U	100 U	100 U	25 U	50 U	50	UL	5 U	50 U	2500 U	100 U	25 U	50 U	11	**L**	5 U
67-66-3	Chloroform	µg/l	**0.88**	0.5 U	5 U	0.5 U	5 U	0.5	U	5 U	25 U	100 U	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
74-87-3	Chloromethane	µg/l	0.5 U	0.5 UJ	5 U	0.5 U	5 UL	0.5	UL	5 U	25 U	100 U	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 UL
156-59-2	cis-1,2-Dichloroethene	µg/l	**7**	**2.6**	5 U	0.5 U	5 U	0.5	U	5 U	**330**	**360**	**240**	**220**	**210**	**190**	**89.6**	**32 J**	2500 U	100 U	25 U	50 U	5	U	5 U
10061-01-5	cis-1,3-Dichloropropene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5	U	5 U	25 U	100 R	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
110-82-7	Cyclohexane	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 UJ	0.5	U	5 U	25 U	100 U	100 U	25 U	50 UJ	50	U	5 U	50 U	2500 U	100 U	25 U	50 UJ	5	U	5 U
124-48-1	Dibromochloromethane	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5	U	5 U	25 U	100 U	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
75-71-8	Dichlorodifluoromethane	µg/l	0.5 U	0.5 UJ	5 U	0.5 U	5 UL	0.5	UJ	5 U	25 U	100 U	100 U	25 U	50 UL	50	UJ	5 U	50 U	2500 U	100 U	25 U	50 UL	5	UJ	5 U
100-41-4	Ethylbenzene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5	U	5 U	25 U	100 U	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
462-06-6	Fluorobenzene	µg/l	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA			NA
98-82-8	Isopropylbenzene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5	U	5 U	25 U	100 U	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
108-38-3	m,p-Xylene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5	U	5 U	25 U	100 U	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
79-20-9	Methyl Acetate	µg/l	0.5 U	0.5 U	5 U	0.5 U	20 UJ	0.5	U	5 U	25 U	100 U	100 U	25 U	200 U	50	U	5 U	50 U	2500 U	100 U	25 UL	200 U	5	U	5 U
1634-04-4	Methyl Tert-Butyl Ether	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5	U	5 U	25 U	100 U	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
108-87-2	Methylcylohexane	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 UJ	0.5	U	5 U	25 U	100 U	100 U	25 U	50 UJ	50	U	5 U	50 U	2500 U	100 U	25 U	50 UJ	5	U	5 U
75-09-2	Methylene Chloride	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5	U	5 U	25 U	100 U	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
95-47-6	o-Xylene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5	U	5 U	25 U	100 U	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
100-42-5	Styrene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 UJ	0.5	U	5 U	25 U	100 U	100 U	25 U	50 UJ	50	U	5 U	50 U	2500 U	100 U	25 U	50 UJ	5	U	5 U
127-18-4	Tetrachloroethene	µg/l	**3.9**	**3.7**	5 U	0.5 U	5 U	0.64		5 U	**120**	100 U	100 U	**52**	50 U	**50**	U	**14.7**	**62**	2500 U	**520**	**69**	**210**	62		5 U
108-88-3	Toluene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5	U	5 U	25 U	100 U	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
156-60-5	trans-1,2-Dichloroethene	µg/l	**3.2**	**2.1**	5 U	0.5 U	5 U	0.5	U	5 U	**110**	**110**	100 U	**74**	**67**	**65**	**23.4**	**28 J**	2500 U	100 U	25 U	50 U	5	U	5 U
10061-02-6	trans-1,3-Dichloropropene	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5	U	5 U	25 U	100 R	100 U	25 U	50 U	50	U	5 U	50 U	2500 U	100 U	25 U	50 U	5	U	5 U
79-01-6	Trichloroethene	µg/l	**120**	**49**	5 U	**1.4**	5 U	3.7		5 U	**12000**	**8400**	**4500**	**4800**	**4400**	**4100**	**1,200 ******	**920**	2500 U	**630**	**120**	**280**	9.2		5 U
75-69-4	Trichlorofluoromethane	µg/l	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5	U	5 U	25 U	100 U	100 U	25 U	50 UJ	50	U	5 U	50 U	2500 U	100 U	25 UJ	50 UJ	5	U	5 U
75-01-4	Vinyl Chloride	µg/l	**0.23 J**	0.5 U	5 U	0.5 U	5 U	0.5	U	5 U	**24 J**	100 U	100 U	25 U	50 U	**50**	U	**6.21**	**32 J**	2500 U	**220**	**35**	**260**	65		5 UL

Notes:

Highlighted cells represent detected concentrations greater than the ROD
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

			MW-3D									MW-3S								MW-4						
			MW-3D 6/9/2010 MW-3D-R1	MW-3D 5/24/2011 MW-3D-R2	MW-3D 5/24/2011 MW-3D-R2-Dup MW-3D-R2	MW-3D 6/20/2014 MW-3D-RDB	MW-3D 4/14/2015 MW-3D-RD1	MW-3D 12/1/2015 MW-3D-R2	MW-3D 9/12/2016 MW-3D-R3-091216		MW-3D 11/8/2021 MW-3D-01	MW-3S 6/9/2010 MW-3S-R1	MW-3S 5/24/2011 MW-3S-R2	MW-3S 6/20/2014 MW-3S-RDB	MW-3S 4/14/2015 MW-3S-RD1	MW-3S 12/1/2015 MW-3S-R2	MW-3S 9/12/2016 MW-3S-R3-091216		MW-3S 11/8/2021 MW-3S-01	MW-4 6/8/2010 MW-4-R1	MW-4 5/19/2011 MW-4-R2	MW-4 6/20/2014 MW-4-RDB	MW-4 4/14/2015 MW-4-RD1	MW-4 12/3/2015 MW-4-R2	MW-4 9/13/2016 MW-4-R3-091316	
CAS No.	Chemical	Unit																								
Volatile Organic Compounds																										
71-55-6	1,1,1-Trichloroethane	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	500 U	10000 U	10000 U	100 U	25 UJ	50 U	50	U	5 U	**83**	**310**	**15**	**13 J**	5 U	0.5	U	5 U	**99**	**180**	5 U	**2.4 J**	**2.8**	**1.3**	
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	**0.5**	U
79-00-5	1,1,2-Trichloroethane	µg/l	**4100**	**3800 J**	**4000 J**	**2100**	**2500**	**3300**	**590**		**19.1**	**11**	5 U	5 U	**7.2**	5 U	0.5	U	5 U	**22**	**12**	5 U	**0.65**	2.5 U	**0.5**	U
75-34-3	1,1-Dichloroethane	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	**0.5**	U
75-35-4	1,1-Dichloroethene	µg/l	**1200**	**2100 J**	**2700 J**	**1300**	**780**	**970**	410		5 U	**0.13 J**	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	**0.5**	U
87-61-6	1,2,3-Trichlorobenzene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
120-82-1	1,2,4-Trichlorobenzene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	500 U	10000 U	10000 U	100 U	25 UJ	50 U	50	U	5 U	**4.7**	5 U	5 U	0.5 UJ	5 U	0.5	U	5 U	**3.4**	**2.8 J**	5 U	0.5 UJ	2.5 U	**0.5**	U
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	NA	1 R	10 U	NA	NA	NA			NA	**4.1 J**	0.05 U	NA	NA	NA			NA	**1.7 J**	**2 J**	NA	NA	NA		
106-93-4	1,2-Dibromoethane	µg/l	**5800**	**5900 J**	**8800 J**	**3800**	**3900**	**2700**	**760**		**12.7**	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	**0.5**	U
106-93-4	1,2-Dibromoethane - SIM	µg/l	NA	**550 J**	**2800 J**	NA	NA	NA			NA	0.05 U	0.05 U	NA	NA	NA			NA	0.05 U	0.05 U	NA	NA	NA		
95-50-1	1,2-Dichlorobenzene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
107-06-2	1,2-Dichloroethane	µg/l	**240000**	**160000**	**160000**	**130000**	**150000**	**160000**	**42000**		**1,260 *******	**2.4**	5 U	10 U	**1.5**	5 U	0.5	U	5 U	**2.3**	**4.3**	10 U	**1.3**	**4.2**	**0.54**	
78-87-5	1,2-Dichloropropane	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	**0.5**	U
541-73-1	1,3-Dichlorobenzene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
106-46-7	1,4-Dichlorobenzene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
107-04-0	1-Bromo-2-Chloroethane	µg/l	NA	NA	NA	**37000**	**42000**	**30000**	**9000**		NA	NA	NA	5 U	0.5 U	5 U	**0.5**	U	NA	NA	NA	5 U	0.5 U	2.5 U	**0.5**	U
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		
78-93-3	2-Butanone (MEK)	µg/l	5000 U	100000 U	100000 U	200 U	250 U	500 U	**500**	UJ	**25**	5 U	50 U	10 U	5 U	50 U	5	UJ	10 U	5 U	5 U	10 U	5 U	25 U	5	UJ
591-78-6	2-Hexanone	µg/l	5000 U	100000 U	100000 U	200 U	250 U	500 U	500	UJ	10 U	5 U	50 U	10 U	5 UL	50 U	5	UJ	10 U	5 U	5 U	10 U	5 UL	25 U	5	UJ
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		
460-00-4	4-Bromofluorobenzene	µg/l	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	5000 U	100000 U	100000 U	200 U	250 U	500 U	500	U	10 U	5 U	50 U	10 U	5 U	50 U	5	U	10 U	5 U	5 U	10 U	5 U	25 U	5	U
67-64-1	Acetone	µg/l	5000 U	100000 U	100000 U	200 U	250 UL	1000 U	500	U	10 U	5 U	50 U	10 U	5 UL	100 UL	5	U	10 U	5 U	5 U	10 U	5 UL	50 U	5	U
71-43-2	Benzene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
74-97-5	Bromochloromethane	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
75-27-4	Bromodichloromethane	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
75-25-2	Bromoform	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
74-83-9	Bromomethane	µg/l	500 U	10000 U	10000 U	100 U	25 UL	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 UL	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
75-15-0	Carbon Disulfide	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
56-23-5	Carbon Tetrachloride	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
108-90-7	Chlorobenzene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
75-00-3	Chloroethane	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	UL	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	UL	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	UL
67-66-3	Chloroform	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	**0.41 J**	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	**0.5**	U
74-87-3	Chloromethane	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 UL	0.5 U	5 U	5 U	0.5 U	5 UL	0.5	U	5 UL	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
156-59-2	cis-1,2-Dichloroethene	µg/l	500 U	10000 U	10000 U	100 U	25 U	**820**	300		5 U	**24**	**7**	5 U	**3.8**	5 U	0.55		5 U	**32**	**24**	5 U	**0.51**	2.5 U	**0.5**	U
10061-01-5	cis-1,3-Dichloropropene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
110-82-7	Cyclohexane	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 UJ	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 UJ	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 UJ	0.5	U
124-48-1	Dibromochloromethane	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
75-71-8	Dichlorodifluoromethane	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 UL	50	UJ	5 U	0.5 U	5 U	5 U	0.5 U	5 UL	0.5	UJ	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 UL	0.5	UJ
100-41-4	Ethylbenzene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
462-06-6	Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		
98-82-8	Isopropylbenzene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
108-38-3	m,p-Xylene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
79-20-9	Methyl Acetate	µg/l	500 U	10000 U	10000 U	100 U	25 U	200 U	50	U	5 U	0.5 U	5 U	5 U	0.5 UL	20 UJ	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 UL	10 U	0.5	U
1634-04-4	Methyl Tert-Butyl Ether	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	**0.5**	U
108-87-2	Methylcylohexane	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 UJ	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 UJ	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 UJ	0.5	U
75-09-2	Methylene Chloride	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	89		5 UL	0.5 U	**3 J**	5 U	0.5 U	5 U	0.5	U	5 UL	0.5 U	0.5 U	5 U	0.5 U	2.5 U	**0.5**	U
95-47-6	o-Xylene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
100-42-5	Styrene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 UJ	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 UJ	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 UJ	0.5	U
127-18-4	Tetrachloroethene	µg/l	**480 J**	10000 U	10000 U	**230**	**190**	**130**	66		5 U	**12**	**8.4**	**7**	**6.7**	5 U	1.5		5 U	**16**	**15**	**17**	**14**	**10**	**9.5**	
108-88-3	Toluene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
156-60-5	trans-1,2-Dichloroethene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	**7.6**	**3.3 J**	5 U	**1.6**	5 U	0.5	U	5 U	**5.9**	**4.8**	5 U	0.5 U	2.5 U	**0.5**	U
10061-02-6	trans-1,3-Dichloropropene	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 U	50	U	5 U	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 U	0.5 U	0.5 U	5 U	0.5 U	2.5 U	0.5	U
79-01-6	Trichloroethene	µg/l	**2300**	**1600 J**	**2800 J**	**2400**	**2200**	**1700**	**740**		**15.2**	**110**	**47**	**15**	**18**	5 U	3.8		5 U	**180**	**140**	**18**	**13**	**14**	**9.8**	
75-69-4	Trichlorofluoromethane	µg/l	500 U	10000 U	10000 U	100 U	25 U	50 UJ	50	U	5 U	**0.33 J**	5 U	5 U	0.5 UJ	5 U	0.5	U	5 U	**0.56**	**0.3 J**	5 U	0.5 UJ	2.5 UJ	0.5	U
75-01-4	Vinyl Chloride	µg/l	**310 J**	10000 U	10000 U	**710**	**210**	**570**	**440**		**6.01 L**	0.5 U	5 U	5 U	0.5 U	5 U	0.5	U	5 UL	0.5 U	**0.37 J**	5 U	0.5 U	2.5 U	**0.5**	U

Notes:

Highlighted cells represent detected concentrations greater than the ROD
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

			MW-5D		MW-5S		MW-6									MW-6B1										MW-6B2					
			MW-5D 6/8/2010 MW-5D-R1	MW-5D 5/17/2011 MW-5D-R2	MW-5S 6/8/2010 MW-5S-R1	MW-5S 5/17/2011 MW-5S-R2	MW-6 6/14/2010 MW-6-R1	MW-6 5/20/2011 MW-6-R2	MW-6 6/19/2014 MW-6-RDB	MW-6 4/14/2015 MW-6-RD1	MW-6 12/1/2015 MW-6-R2	MW-6 9/15/2016 MW-6-R3-091516		MW-6 9/15/2016 MW-9R-R3-091516 MW-6-R3-091516		MW-6 11/9/2021 MW-6-01	MW-6B1 6/14/2010 MW-6B1-R1	MW-6B1 6/14/2010 MW-6B1-R1-DUP MW-6B1-R1	MW-6B1 5/20/2011 MW-6B1-R2	MW-6B1 6/19/2014 MW-6B1-RDB	MW-6B1 4/16/2015 MW-6B1-RD1	MW-6B1 9/29/2015 MW-6B1-BIO	MW-6B1 12/2/2015 MW-6B1-R2		MW-6B1 9/15/2016 MW-6B1-R3-091516		MW-6B1 11/10/2021 MW-6B1-01	MW-6B1 11/10/2021 MW-6B1-02	MW-6B2 6/14/2010 MW-6B2-R1	MW-6B2 5/20/2011 MW-6B2-R2	MW-6B2 6/19/2014 MW-6B2-RDB	MW-6B2 4/16/2015 MW-6B2-RD1	MW-6B2 12/2/2015 MW-6B2-R2	MW-6B2 9/15/2016 MW-6B2-R3-091516	
CAS No.	Chemical	Unit																													
Volatile Organic Compounds																															
71-55-6	1,1,1-Trichloroethane	µg/l	0.5 UJ	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	100 U	50	U	5 U	5 U	250 U	5 UJ	100 U	25 U	100 U	50	U
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	**1.3 J**	2.5 U	**22**	**6.8**	0.5 U	**2.7**	**20**	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 UJ	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 UJ	50 U	50	U
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	**1.8 J**	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	100 U	50	U	5 U	5 U	250 U	5 UJ	100 U	25 U	100 U	50	U
79-00-5	1,1,2-Trichloroethane	µg/l	**180**	**47**	**7.8**	**2.2**	0.5 UJ	**0.6**	5 U	**0.62**	50 U	5	U	**5**	U	5 U	**1100**	**1300**	**600**	**600**	**580**	**380**	**710**	**50**	U	**514 *******	**508 *******	**1100 J**	**570 J**	**550**	**340**	**310**	50	U
75-34-3	1,1-Dichloroethane	µg/l	**0.36 J**	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
75-35-4	1,1-Dichloroethene	µg/l	**14 J**	**4.9**	0.5 U	0.5 U	0.5 UJ	0.5 U	5 U	**1.3**	50 U	**5**	U	5	U	5 U	250 U	250 U	**160 J**	**210**	**1300**	**1300**	**780**	**57**		**47**	**51.7**	250 U	**160 J**	**130**	**110**	**72**	50	U
87-61-6	1,2,3-Trichlorobenzene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
120-82-1	1,2,4-Trichlorobenzene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	**17 J**	**7.4**	0.5 U	0.5 U	0.5 UJ	**330**	**260**	**250 J**	**75**	**36**		34		**21.9**	250 U	250 U	250 U	100 U	**88 J**	200 UJ	100 U	**50**	U	**85.7**	**97.2**	250 UJ	**10**	100 U	25 UJ	100 U	50	U
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	NA	**5.8 J**	0.05 U	**0.14**	0.088 U	**430 J**	NA	NA	NA						NA	NA	**84**	NA	NA	NA	NA			NA	NA	NA	**18 J**	NA	NA	NA		
106-93-4	1,2-Dibromoethane	µg/l	**2.9 J**	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	**50**	U	**17.4**	**18.8**	250 U	**9.2 J**	100 U	25 U	50 U	50	U
106-93-4	1,2-Dibromoethane - SIM	µg/l	NA	**0.67**	0.05 U	**0.0067 J**	0.05 U	**0.066 J**	NA	NA	NA						NA	NA	**31 J**	NA	NA	NA	NA			NA	NA	NA	**4.3 J**	NA	NA	NA		
95-50-1	1,2-Dichlorobenzene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
107-06-2	1,2-Dichloroethane	µg/l	**440**	**140**	**1.2**	0.6 U	0.5 U	**1.5**	**12**	**12**	**200**	**12**		**12**		**10.4**	**87000 J**	**100000**	**54000**	**64000**	**2900**	**1300**	**3100**	**870**		**12,100 *****	**11,500 *****	**65000**	**76000**	**68000**	**16000**	**10000**	**6800**	**K**
78-87-5	1,2-Dichloropropane	µg/l	**0.52**	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	**91**	**80**	**87**	**50**	U	**16.1**	**18.2**	250 U	**19 J**	100 U	25 U	50 U	50	U
541-73-1	1,3-Dichlorobenzene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
106-46-7	1,4-Dichlorobenzene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
107-04-0	1-Bromo-2-Chloroethane	µg/l	NA	NA	NA	NA	NA	NA	5 U	0.5 U	**56**	**5**	U	**5**	U		NA	NA	NA	**1300**	**52**	50 U	50 U	**50**	U	NA	NA	NA	NA	**520**	**68**	**68**	50	U
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA						NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA	NA		
78-93-3	2-Butanone (MEK)	µg/l	5 U	25 U	5 U	5 U	5 U	5 U	10 U	**7.4**	500 U	50	UJ	50	UJ	10 U	2500 U	2500 U	2500 U	200 U	**2000**	**2100**	**3500**	**1600**	**J**	**2,300 *******	**2,230 *******	2500 U	50 U	200 U	250 U	**2000**	500	UJ
591-78-6	2-Hexanone	µg/l	5 U	25 U	5 U	5 U	5 U	5 U	10 U	5 U	500 U	50	UJ	50	UJ	10 U	2500 U	2500 U	2500 U	200 U	250 U	2000 U	500 U	500	UL	10 U	10 U	2500 U	50 U	200 U	250 UL	500 U	500	UJ
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA						NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA	NA		
460-00-4	4-Bromofluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA						NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA	NA		
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	5 U	25 U	5 U	5 U	5 U	5 U	10 U	5 U	500 U	50	U	50	U	10 U	2500 U	2500 U	2500 U	200 U	250 U	500 U	1000 U	500	U	10 U	10 U	2500 U	50 U	200 U	250 U	1000 U	500	U
67-64-1	Acetone	µg/l	5 U	25 U	5 U	5 U	5 U	5 U	10 U	**26**	1000 U	50	U	50	U	10 U	2500 U	2500 U	2500 U	200 U	250 U	1000 U	500 U	**500**	U	**851 *******	**815 *******	2500 U	50 U	200 U	250 UL	500 U	500	U
71-43-2	Benzene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
74-97-5	Bromochloromethane	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
75-27-4	Bromodichloromethane	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
75-25-2	Bromoform	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
74-83-9	Bromomethane	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 UJ	50 U	5	U	5	U	5 UL	250 U	250 U	250 U	100 U	25 UJ	100 U	50 UJ	50	UJ	5 UL	5 UL	250 U	5 UJ	100 U	25 U	50 UJ	50	UJ
75-15-0	Carbon Disulfide	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
56-23-5	Carbon Tetrachloride	µg/l	0.5 UJ	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	100 U	50	U	5 U	5 U	250 U	5 UJ	100 U	25 U	100 U	50	U
108-90-7	Chlorobenzene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
75-00-3	Chloroethane	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	UL	5	UL	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	UL	5 U	5 U	250 U	5 UJ	100 U	25 U	50 U	50	UL
67-66-3	Chloroform	µg/l	**0.43 J**	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
74-87-3	Chloromethane	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	100 U	50 U	50	UL	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	UL
156-59-2	cis-1,2-Dichloroethene	µg/l	**60**	**43**	**9.7**	**2.7**	0.5 UJ	**0.27 J**	**13**	**49**	**52**	22		22		5 U	250 U	250 U	250 U	100 U	**230**	**3800**	**1700**	**160**		**87.9**	**84**	250 U	**31 J**	100 U	**230**	**240**	50	U
10061-01-5	cis-1,3-Dichloropropene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	100 U	50	U	5 U	5 U	250 UJ	5 U	100 U	25 U	100 U	50	U
110-82-7	Cyclohexane	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 UJ	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	100 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	100 U	50	U
124-48-1	Dibromochloromethane	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
75-71-8	Dichlorodifluoromethane	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 UL	5	UJ	5	UJ	5 U	250 U	250 U	250 U	100 U	25 U	50 U	100 UL	50	UJ	5 U	5 U	250 U	5 UJ	100 U	25 U	100 UL	50	UJ
100-41-4	Ethylbenzene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	**4.1**	**120**	**160**	**150**	**140**		140		**36.2**	250 U	250 U	250 U	100 U	**48**	50 U	50 U	**50**	U	**29.9**	**32.2**	250 U	5 U	100 U	25 U	50 U	50	U
462-06-6	Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA						NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA	NA		
98-82-8	Isopropylbenzene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	**1.3**	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	50 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	50 U	50	U
108-38-3	m,p-Xylene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	**3.5**	**170**	**160**	**140**	**95**		95		**8.68**	250 U	250 U	250 U	100 U	**370**	**350**	**280**	**310**		**328 *******	**338 *******	250 U	5 U	100 U	25 U	50 U	50	U
79-20-9	Methyl Acetate	µg/l	0.5 UJ	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	200 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	200 U	50 U	50	U	5 U	5 U	250 U	5 UJ	100 U	25 UL	50 U	50	U
1634-04-4	Methyl Tert-Butyl Ether	µg/l	**0.62 J**	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 UJ	50 U	50	U	5 U	5 U	250 U	5 UJ	100 U	25 U	50 U	50	U
108-87-2	Methylcyclohexane	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 UJ	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	100 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	100 U	50	U
75-09-2	Methylene Chloride	µg/l	**1.4 J**	**1.3 J**	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 UJ	250 U	100 U	**280**	**410**	**260**	**69**		**12**	**12.2**	250 U	**27 J**	100 U	25 U	50 U	50	U
95-47-6	o-Xylene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	**2.3**	**58**	**74**	**59**	**32**		32		5 U	250 U	250 U	250 U	100 U	**68**	**66**	**57**	**57**		**62.2**	**66**	250 U	5 U	100 U	25 U	50 U	50	U
100-42-5	Styrene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	**0.42 J**	**18**	**13**	50 UJ	7		7.1		5 U	250 U	250 U	250 U	100 U	25 U	50 U	100 U	50	U	5 U	5 U	250 U	5 U	100 U	25 U	100 U	50	U
127-18-4	Tetrachloroethene	µg/l	**21**	**7.9**	**3.3**	**1.5**	0.5 U	**1.9**	**51**	**41**	50 U	13		12		5 U	250 U	250 U	250 U	100 U	**61**	50 U	50 U	**50**	U	**10.3**	**11.9**	250 U	**9.5 J**	100 U	25 U	50 U	50	U
108-88-3	Toluene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	**4.4**	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	**51**	**57**	50 U	**50**	U	**30.2**	**31.7**	250 U	5 U	100 U	25 U	50 U	50	U
156-60-5	trans-1,2-Dichloroethene	µg/l	**14 J**	**7.3**	**1.3**	0.66 U	0.5 UJ	0.5 U	5 U	**2.6**	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	**86**	**120**	**100**	**73**		**19.4**	**20**	250 U	**14 J**	100 U	**34**	**80**	50	U
10061-02-6	trans-1,3-Dichloropropene	µg/l	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 U	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 UJ	100 U	50	U	5 U	5 U	250 UJ	5 U	100 U	25 U	100 U	50	U
79-01-6	Trichloroethene	µg/l	**800**	**440**	**48**	**19**	0.5 U	**3.1**	**40**	**30**	50 U	10		**11**		5 U	**1000**	**1100**	**620**	**960**	**5700**	**670**	**670**	**50**	U	**738 *******	**707 *******	**990**	**580 J**	**580**	**760**	**350**	**68**	
75-69-4	Trichlorofluoromethane	µg/l	0.5 UJ	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	50 UJ	5	U	5	U	5 U	250 U	250 U	250 U	100 U	25 U	50 U	100 U	50	U	5 U	5 U	250 U	5 UJ	100 U	25 UJ	100 U	50	U
75-01-4	Vinyl Chloride	µg/l	**0.87**	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	**1.6**	50 U	5.1		5.8		5 U	250 U	250 U	250 U	**110**	**1900**	**3000**	**4700**	**1400**		**188 *******	**195**	250 U	**33 J**	100 U	**300**	**410**	**85**	

Notes:

Highlighted cells represent detected concentrations greater than the ROD
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

			MW-683										MW-684										MW-6D							
			MW-683 5/26/2011 MW-683-R2	MW-683 8/25/2011 MW-683-R3	MW-683 8/25/2011 MW-1068-R3 MW-683-R3	MW-683 6/20/2014 MW-683-RDB	MW-683 4/17/2015 MW-683-RD1	MW-683 4/17/2015 MW-9683-RD1 MW-683-RD1	MW-683 12/2/2015 MW-683-R2	MW-683 12/2/2015 MW-9683-R2 MW-683-R2	MW-683 9/15/2016 MW-683-R3-091516		MW-684 5/23/2011 MW-684-R2	MW-684 5/23/2011 MW-684-R2-Dup MW-684-R2	MW-684 8/25/2011 MW-684-R3	MW-684 6/20/2014 MW-684-RDB	MW-684 4/16/2015 MW-684-RD1	MW-684 9/29/2015 MW-684-BIO	MW-684 9/29/2015 MW-9684-BIO MW-684-BIO	MW-684 12/2/2015 MW-684-R2	MW-684 9/15/2016 MW-684-R3-091516		MW-684 11/9/2021 MW-684-01	MW-6D 6/14/2010 MW-6D-R1	MW-6D 5/20/2011 MW-6D-R2	MW-6D 6/19/2014 MW-6D-RDB	MW-6D 4/14/2015 MW-6D-RD1	MW-6D 12/1/2015 MW-6D-R2	MW-6D 9/15/2016 MW-6D-R3-091516		MW-6D 11/8/2021 MW-6D-01
CAS No.	Chemical	Unit																												
Volatile Organic Compounds																														
71-55-6	1,1,1-Trichloroethane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50 U		50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50 U		5 U	250 U	500 U	100 U	25 U	2.5 U	50 U	5 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	25 U	25 U	1300 U	100 U	25 UJ	25 UJ	50 U	50 U	50 U		50 U	50 U	25 U	100 U	25 UJ	50 U	50 U	5 U	50 U		5 U	**1100**	**340 J**	**150**	**340 J**	**410**	56	5 U
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50 U		50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50 U		5 U	250 U	500 U	100 U	25 U	2.5 U	50 U	5 U
79-00-5	1,1,2-Trichloroethane	µg/l	**47**	**38**	1300 U	100 U	**38**	**36**	50 U	50 U	**54**		**130**	**120**	**110**	100 U	**80**	50 U	**59**	**72**	50 U		5 U	**2200**	**1800**	**380**	**1200**	**1800**	570	5 U
75-34-3	1,1-Dichloroethane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50 U		50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50 U		5 U	250 U	500 U	100 U	25 U	2.5 U	50 U	5 U
75-35-4	1,1-Dichloroethene	µg/l	**180**	25 U	1300 U	**270**	25 U	25 U	50 U	50 U	**50**	U	**51**	50 U	**58**	100 U	25 U	50 U	50 U	5 U	50 U		5 U	250 U	500 U	100 U	**62**	**67**	50 U	5 U
87-61-6	1,2,3-Trichlorobenzene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50 U		50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50 U		5 U	250 U	500 U	100 U	25 U	2.5 UL	50 U	5 U
120-82-1	1,2,4-Trichlorobenzene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50 U		50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50 U		5 U	250 U	500 U	100 U	25 U	2.5 U	50 U	5 U
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	25 U	25 U	1300 U	100 U	25 UJ	25 UJ	50 U	50 U	50 U		50 U	50 U	25 U	100 U	25 UJ	200 UJ	200 UJ	5 U	50 U		5 U	**3800 J**	**2100**	**2000**	**4000**	**2900**	**960**	**18.8**
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	**0.17**	**0.32**	**0.24**	NA	NA	NA	NA	NA			**0.63**	**6.3**	**4.2**	NA	NA	NA	NA	NA			NA	NA	**5200 J**	NA	NA	NA		NA
106-93-4	1,2-Dibromoethane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50 U		50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50 U		5 U	**220 J**	500 U	100 U	**230**	**340**	110	5 U
106-93-4	1,2-Dibromoethane - SIM	µg/l	**0.15** J	**2.2**	**2.1**	NA	NA	NA	NA	NA			**0.17 J**	**1.7 J**	**4**	NA	NA	NA	NA	NA			NA	NA	**240 J**	NA	NA	NA		NA
95-50-1	1,2-Dichlorobenzene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50 U		50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50 U		5 U	250 U	500 U	100 U	25 U	2.5 U	50 U	5 U
107-06-2	1,2-Dichloroethane	µg/l	**29000 J**	**30000 J**	**29000**	**32000**	**6300**	**6500**	**12000**	**11000**	**13000**	**K**	**8800**	**9300**	**13000 J**	**7900**	**6200**	**2800**	**3200**	**2900**	**1800**		**95.6**	**26000**	**59000**	**4400**	**24000**	**64000**	**9000**	**K**	**80.4**
78-87-5	1,2-Dichloropropane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50 U		50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50 U		5 U	250 U	500 U	100 U	**30**	**47**	50 U	5 U
541-73-1	1,3-Dichlorobenzene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50 U		50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50 U		5 U	250 U	500 U	100 U	25 U	2.5 U	50 U	5 U
106-46-7	1,4-Dichlorobenzene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50 U		50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50 U		5 U	250 U	500 U	100 U	25 U	2.5 U	50 U	5 U
107-04-0	1-Bromo-2-Chloroethane	µg/l	NA	NA	NA	**330**	**54**	**38**	**53**	50 U	**50**	U	NA	NA	NA	100 U	**86**	50 U	50 U	**30**	**50**	U	NA	NA	NA	**610**	**2500**	**3400**	**1000**		NA
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		NA
78-93-3	2-Butanone (MEK)	µg/l	250 U	250 UJ	13000 U	200 U	250 U	250 U	**1000**	500 U	2400	**J**	500 U	500 U	250 U	200 U	250 U	500 U	500 U	50 U	500	UJ	10 U	2500 U	5000 U	200 U	250 U	**310**	500	UJ	10 U
591-78-6	2-Hexanone	µg/l	250 U	250 U	13000 U	200 U	250 UL	250 UL	500 U	500 U	500	UJ	500 U	500 U	250 U	200 U	250 U	2000 U	2000 U	50 U	500	UJ	10 U	2500 U	5000 U	200 U	250 U	25 U	500	UJ	10 U
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	NA	NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		NA
460-00-4	4-Bromofluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		NA
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	250 U	250 U	13000 U	200 U	250 U	250 U	500 U	500 U	500	U	500 U	500 U	250 U	200 U	250 U	500 U	500 U	50 U	500	U	10 U	2500 U	5000 U	200 U	250 U	25 U	500	U	10 U
67-64-1	Acetone	µg/l	250 U	250 UJ	13000 U	200 U	250 UL	250 UL	1000 U	1000 U	500	U	500 U	500 U	250 U	200 U	250 U	1000 U	1000 U	100 U	500	U	10 U	2500 U	5000 U	200 U	250 UL	**100 K**	500	U	10 U
71-43-2	Benzene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	250 U	500 U	100 U	25 U	2.5 U	50	U	5 U
74-97-5	Bromochloromethane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	250 U	500 U	100 U	25 U	2.5 U	50	U	5 U
75-27-4	Bromodichloromethane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	250 U	500 U	100 U	25 U	2.5 U	50	U	5 U
75-25-2	Bromoform	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	250 U	500 U	100 U	25 U	5 U	50	U	5 U
74-83-9	Bromomethane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	UJ	50 U	50 U	25 U	100 U	25 UJ	100 U	100 U	5 U	50	UJ	5 UL	250 U	500 U	100 U	25 UL	2.5 U	50	UJ	5 U
75-15-0	Carbon Disulfide	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	250 U	500 U	100 U	25 U	**11**	50	U	5 U
56-23-5	Carbon Tetrachloride	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	250 U	500 U	100 U	25 U	5 U	50	U	5 U
108-90-7	Chlorobenzene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	250 U	500 U	100 U	25 U	2.5 U	50	U	5 U
75-00-3	Chloroethane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	UL	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	**50**	UL	**5.95**	250 U	500 U	100 U	25 U	2.5 U	50	UL	5 U
67-66-3	Chloroform	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	250 U	500 U	100 U	25 U	**3 K**	50	U	5 U
74-87-3	Chloromethane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	UL	50 U	50 U	25 U	100 U	25 U	100 U	100 U	5 U	50	UL	5 U	250 U	500 U	100 U	25 U	2.5 U	50	UL	5 U
156-59-2	cis-1,2-Dichloroethene	µg/l	**35**	**26**	1300 U	100 U	**40**	**34**	50 U	50 U	50	U	50 U	50 U	**19 J**	100 U	**150**	50 U	50 U	**9**	50	U	5 U	**72 J**	500 U	100 U	25 U	**56**	50	U	5 U
10061-01-5	cis-1,3-Dichloropropene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	250 U	500 U	100 U	25 U	2.5 U	50	U	5 U
110-82-7	Cyclohexane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 UJ	50 UJ	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 UJ	50	U	5 U	250 U	500 U	100 U	25 U	2.5 U	50	U	5 U
124-48-1	Dibromochloromethane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	250 U	500 U	100 U	25 U	2.5 U	50	U	5 U
75-71-8	Dichlorodifluoromethane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 UL	50 UL	50	UJ	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 UL	50	UJ	5 U	250 U	500 U	100 U	25 U	2.5 UL	50	UJ	5 U
100-41-4	Ethylbenzene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	**190 J**	500 U	100 U	**58**	**35**	50	U	5 U
462-06-6	Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		NA
98-82-8	Isopropylbenzene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	250 U	500 U	100 U	25 U	2.5 U	50	U	5 U
108-38-3	m,p-Xylene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 R	50 R	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	**1200**	**460 J**	**300**	**280**	**180**	**110**		**8.31**
79-20-9	Methyl Acetate	µg/l	25 U	25 U	1300 U	100 U	25 UL	25 UL	200 U	200 U	50	U	50 U	50 U	25 U	100 U	25 U	200 U	200 U	20 U	50	U	5 U	250 U	500 U	100 U	25 U	2.5 U	50	U	5 U
1634-04-4	Methyl Tert-Butyl Ether	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 UJ	50 UJ	**9.3**	50	U	5 U	250 U	500 U	100 U	25 U	2.5 U	50	U	5 U
108-87-2	Methylcylohexane	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 UJ	50 UJ	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 UJ	50	U	5 U	250 U	500 U	100 U	25 U	2.5 U	50	U	5 U
75-09-2	Methylene Chloride	µg/l	25 U	31 U	**1200 JB**	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	**200**	200 U	5 U	50	U	5 U	250 UJ	500 U	100 U	25 U	**25**	50	U	5 UL
95-47-6	o-Xylene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	**190 J**	500 U	100 U	**62**	**46**	50	U	5 U
100-42-5	Styrene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 UJ	50 UJ	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 UJ	50	U	5 U	**160 J**	500 U	100 U	25 U	**5.6**	50	U	5 U
127-18-4	Tetrachloroethene	µg/l	25 U	**7.9 J**	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	**6.4 J**	100 U	25 U	50 U	50 U	5 U	50	U	5 U	**230 J**	500 U	**120**	**130**	**91**	**50**	U	**10.9**
108-88-3	Toluene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	250 U	500 U	100 U	**26**	**38**	50	U	5 U
156-60-5	trans-1,2-Dichloroethene	µg/l	25 U	**8.1 J**	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 U	50	U	5 U	250 U	500 U	100 U	25 U	**15**	50	U	5 U
10061-02-6	trans-1,3-Dichloropropene	µg/l	25 U	25 U	1300 U	100 U	25 U	25 U	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 UJ	50 UJ	5 U	50	U	5 U	250 U	500 U	100 U	25 U	2.5 U	50	U	5 U
79-01-6	Trichloroethene	µg/l	**410**	**480 J**	1300 U	**620**	**110**	**97**	**130**	**140**	**98**		**350**	**330**	**270 J**	**130**	**110**	**110**	**110**	**65**	**50**	U	**6.42**	**3700**	**2900**	**1100**	**2900**	**4300**	**1800**		**28.2**
75-69-4	Trichlorofluoromethane	µg/l	25 U	25 U	1300 U	100 U	25 UJ	25 UJ	50 U	50 U	50	U	50 U	50 U	25 U	100 U	25 U	50 U	50 U	5 UJ	50	U	5 U	250 U	500 U	100 U	25 U	5 U	50	U	5 U
75-01-4	Vinyl Chloride	µg/l	**70**	**97**	1300 U	**940**	**150**	**150**	**150**	**150**	180		50 U	50 U	25 U	100 U	25 U	50 U	50 U	**51**	**50**	U	**10.6**	250 U	500 U	100 U	25 U	**16**	50	U	5 UL

Notes:

Highlighted cells represent detected concentrations greater than the ROD
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

			MW-7D								MW-7S								MW-13D		MW-13S		MW-14D							
			MW-7D 6/10/2010 MW-7D-R1	MW-7D 5/19/2011 MW-7D-R2	MW-7D 6/23/2014 MW-7D-RDB	MW-7D 4/15/2015 MW-7D-RD1	MW-7D 9/29/2015 MW-7D-BIO	MW-7D 1/7/2016 MW-7D-R2	MW-7D 9/13/2016 MW-7D-R3-091316		MW-7S 6/10/2010 MW-7S-R1	MW-7S 5/19/2011 MW-7S-R2	MW-7S 6/23/2014 MW-7S-RDB	MW-7S 4/15/2015 MW-7S-RD1	MW-7S 1/7/2016 MW-7S-R2	MW-7S 9/14/2016 MW-7S-R3-091416		MW-7S 11/10/2021 MW-7S-01	MW-13D 6/8/2010 MW-13D-R1	MW-13D 5/10/2011 MW-13D-R2	MW-13S 6/8/2010 MW-13S-R1	MW-13S 5/10/2011 MW-13S-R2	MW-14D 6/8/2010 MW-14D-R1	MW-14D 5/17/2011 MW-14D-R2	MW-14D 6/20/2014 MW-14D-RDB	MW-14D 4/14/2015 MW-14D-RD1	MW-14D 12/4/2015 MW-14D-R2	MW-14D 9/14/2016 MW-14D-R3-091416		MW-14D 11/10/2021 MW-14D-01
CAS No.	Chemical	Unit																												
Volatile Organic Compounds																														
71-55-6	1,1,1-Trichloroethane	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	**1100**	**820**	**1600**	**2900 J**	**1200**	10 U	**820**		**57 J**	**250 J**	**29**	**100 J**	**23**	18		5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	100 U	100 U	25 UJ	50 U	50	U	5 U
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	**0.29 J**	100 U	100 U	25 U	50 U	50	U	5 U
79-00-5	1,1,2-Trichloroethane	µg/l	**1100**	**600**	**1100**	**1800**	**1600**	**16**	**740**		**35 J**	**96**	**14**	**32**	**8.1**	6.4		5 U	0.5 U	0.5 U	0.5 U	0.5 U	**370 J**	**410**	**290**	**310**	**440**	**260**		**284 ***
75-34-3	1,1-Dichloroethane	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	**50**	U	**0.18 J**	5 U	5 U	25 U	2.5 U	0.5	U	5 U	**0.15 J**	0.5 U	0.5 U	0.5 U	**0.47 J**	100 U	**100**	25 U	50 U	50	U	5 U
75-35-4	1,1-Dichloroethene	µg/l	130 U	250 U	100 U	**34**	50 U	10 U	**50**	U	**1.6**	**2.9 J**	5 U	25 U	**1.4 J**	1.5		5 U	0.5 U	0.5 U	0.5 U	0.5 U	**53 J**	**67 J**	100 U	**58**	**74**	**56**		**102**
87-61-6	1,2,3-Trichlorobenzene	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
120-82-1	1,2,4-Trichlorobenzene	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	**1300**	**620**	**1800**	**1700 J**	**1200 J**	10 U	**880**		**74**	**340 J**	**12**	25 UJ	**3.6**	3.5		5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	**1.4 J**	100 U	100 U	25 UJ	50 U	50	U	5 U
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	NA	**1200 J**	NA	NA	NA	NA			NA	**240 J**	NA	NA	NA			NA	0.05 U	0.05 U	0.05 U	0.05 U	NA	**3.8 J**	NA	NA	NA			NA
106-93-4	1,2-Dibromoethane	µg/l	**58 J**	250 U	100 U	**96**	50 U	10 U	**50**	U	**1.6**	**4.4 J**	5 U	25 U	2.5 U	0.5	U	5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	**5.8 J**	100 U	100 U	25 U	50 U	50	U	5 U
106-93-4	1,2-Dibromoethane - SIM	µg/l	NA	**18 J**	NA	NA	NA	NA			NA	**0.9 J**	NA	NA	NA			NA	0.05 U	0.05 U	0.05 U	0.05 U	NA	**11 J**	NA	NA	NA			NA
95-50-1	1,2-Dichlorobenzene	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
107-06-2	1,2-Dichloroethane	µg/l	**73000**	**49000**	**37000**	**49000**	**64000**	**700**	**32000**	**J**	**1000**	**2300**	**310**	**530**	**99**	**81**		**16.4**	0.5 UJ	0.5 U	0.5 UJ	0.5 U	**3800 J**	**20000**	**15000**	**14000**	**13000**	**14000**		**8,360 *****
78-87-5	1,2-Dichloropropane	µg/l	130 U	250 U	100 U	**62**	**76**	10 U	**50**	U	**2.4**	**8.1**	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	**1.9**	100 U	100 U	25 U	50 U	50	U	5 U
541-73-1	1,3-Dichlorobenzene	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
106-46-7	1,4-Dichlorobenzene	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
107-04-0	1-Bromo-2-Chloroethane	µg/l	NA	NA	**1400**	**2500**	**1200**	5 U	**920**		NA	NA	**11**	25 U	5 U	**2.8**		NA	NA	NA	NA	NA	NA	NA	**300**	**210**	**310**	**260**		NA
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	NA	NA	NA	NA	NA	5 U			NA	NA	NA	NA	**6.7 J**			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			NA
78-93-3	2-Butanone (MEK)	µg/l	1300 U	2500 U	200 U	250 U	500 U	**770**	500	UJ	5 U	50 U	10 U	250 U	25 U	5	UJ	10 U	5 U	5 U	5 U	5 U	5 U	1000 U	200 U	250 U	500 U	500	UJ	10 U
591-78-6	2-Hexanone	µg/l	1300 U	2500 U	200 U	250 U	2000 U	100 U	500	UJ	5 U	50 U	10 U	250 U	25 U	5	UJ	10 U	5 U	5 U	5 U	5 U	5 U	1000 U	200 U	250 U	500 U	500	UJ	10 U
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	NA	NA	NA	NA	NA	5 U			NA	NA	NA	NA	5 U			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			NA
460-00-4	4-Bromofluorobenzene	µg/l	NA	NA	NA	NA	NA	5 U			NA	NA	NA	NA	5 U			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			NA
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	1300 U	2500 U	200 U	250 U	500 U	100 U	500	U	5 U	50 U	10 U	250 U	25 U	5	U	10 U	5 U	5 U	5 U	5 U	5 U	1000 U	200 U	250 U	500 U	500	U	10 U
67-64-1	Acetone	µg/l	1300 U	2500 U	200 U	250 U	1000 U	**130**	500	U	5 U	50 U	10 U	250 U	25 U	5	U	10 U	5 U	5 U	5 U	5 U	5 U	1000 U	200 U	250 UL	1000 U	500	U	10 U
71-43-2	Benzene	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	**50**	U	**1.8 J**	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	**0.26 J**	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
74-97-5	Bromochloromethane	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
75-27-4	Bromodichloromethane	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.62**	100 U	100 U	25 U	50 U	50	U	5 U
75-25-2	Bromoform	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
74-83-9	Bromomethane	µg/l	130 U	250 U	100 U	25 UJ	100 U	10 U	50	UL	0.5 U	5 U	5 U	25 UJ	2.5 U	0.5	UL	5 UL	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 UL	50 U	50	UL	5 U
75-15-0	Carbon Disulfide	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
56-23-5	Carbon Tetrachloride	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
108-90-7	Chlorobenzene	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
75-00-3	Chloroethane	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	**50**	UL	**7.4**	5 U	5 U	25 U	2.5 U	0.5	UL	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	UL	5 U
67-66-3	Chloroform	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	**50**	U	**0.19 J**	5 U	5 U	25 U	2.5 U	0.5	U	5 U	**0.3 J**	0.5 U	0.5 U	0.5 U	**11**	100 U	100 U	25 U	50 U	**50**	U	**8.66**
74-87-3	Chloromethane	µg/l	130 U	250 U	100 U	25 U	100 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
156-59-2	cis-1,2-Dichloroethene	µg/l	**120 J**	250 U	**130**	**220**	**220**	**18**	**150**		**20**	**50**	**10**	**35**	**15**	**16**		**5.7**	**1.3**	**1.4**	**0.41 J**	**0.55**	**7.1 J**	100 U	100 U	25 U	50 U	**50**	U	**9.18**
10061-01-5	cis-1,3-Dichloropropene	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
110-82-7	Cyclohexane	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 UJ	50	U	5 U
124-48-1	Dibromochloromethane	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.12 J**	100 U	100 U	25 U	50 U	50	U	5 U
75-71-8	Dichlorodifluoromethane	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	UJ	0.5 U	5 U	5 U	25 U	2.5 U	0.5	UJ	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 UL	50	UJ	5 U
100-41-4	Ethylbenzene	µg/l	130 U	250 U	100 U	25 U	50 U	**6.4 J**	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
462-06-6	Fluorobenzene	µg/l	NA	NA	NA	NA	NA	5 U			NA	NA	NA	NA	5 U			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			NA
98-82-8	Isopropylbenzene	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	**50**	U	**0.31 J**	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
108-38-3	m,p-Xylene	µg/l	130 U	250 U	100 U	25 U	50 U	**37**	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
79-20-9	Methyl Acetate	µg/l	130 U	250 U	100 U	25 U	200 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	UJ	5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	100 U	100 U	25 U	200 U	50	U	5 U
1634-04-4	Methyl Tert-Butyl Ether	µg/l	130 U	250 U	100 U	25 U	50 UJ	10 U	**50**	U	**0.4 J**	5 U	5 U	25 U	2.5 U	0.5	U	5 U	**1.4 J**	**1.8**	**4.9 J**	**11**	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
108-87-2	Methylcylohexane	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 UJ	50	U	5 U
75-09-2	Methylene Chloride	µg/l	**300**	250 U	**190**	**310**	**460**	10 U	**85**		**2.4**	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	**29 J**	**57 J**	100 U	**32**	50 U	**50**	U	**18.4**
95-47-6	o-Xylene	µg/l	130 U	250 U	100 U	25 U	50 U	**14**	**50**	U	**1.3**	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
100-42-5	Styrene	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 UJ	50	U	5 U
127-18-4	Tetrachloroethene	µg/l	**32 J**	250 U	100 U	**66**	50 U	10 U	**50**	U	**4.8**	**8.4**	5 U	25 U	**5.7**	**6.2**		**51.1**	**17**	**14**	**0.28 J**	0.5 U	**18**	100 U	100 U	25 U	50 U	**50**	U	**21**
108-88-3	Toluene	µg/l	130 U	250 U	100 U	25 U	50 U	**7 J**	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
156-60-5	trans-1,2-Dichloroethene	µg/l	**65 J**	250 U	100 U	**120**	**110**	**91**	**170**		**21 J**	**42**	**8.4**	25 U	**4.9**	6.3		5 U	**0.098 J**	0.5 U	0.5 U	0.5 U	**2.3 J**	100 U	100 U	25 U	50 U	50	U	5 U
10061-02-6	trans-1,3-Dichloropropene	µg/l	130 U	250 U	100 U	25 U	50 UJ	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	100 U	100 U	25 U	50 U	50	U	5 U
79-01-6	Trichloroethene	µg/l	**1200**	**600**	**1200**	**1600**	**2200**	**6.3 J**	**910**		**100 J**	**160**	**50**	**120**	**61**	**54**		**38.1**	**5.7**	**5.4**	0.5 U	0.5 U	**330 J**	**300**	**260**	**230**	**270**	**210**		271*
75-69-4	Trichlorofluoromethane	µg/l	130 U	250 U	100 U	25 U	50 U	10 U	50	U	0.5 U	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	100 U	100 U	25 U	50 UJ	50	U	5 U
75-01-4	Vinyl Chloride	µg/l	130 U	250 U	100 U	**70**	**140**	**88**	**130**		**3.8**	5 U	5 U	25 U	2.5 U	0.5	U	5 U	0.5 U	0.5 U	**0.31 J**	0.5 U	**7.7**	100 U	100 U	25 U	50 U	**50**	U	**22.2**

Notes:

Highlighted cells represent detected concentrations greater than the ROD
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

			MW-14S								MW-15S		MW-16B1							MW-16B2						
			MW-14S 6/8/2010 MW-14S-R1	MW-14S 5/17/2011 MW-14S-R2	MW-14S 6/20/2014 MW-14S-RDB	MW-14S 4/14/2015 MW-14S-RD1	MW-14S 12/4/2015 MW-14S-R2	MW-14S 9/14/2016 W-14S-R3-091		MW-14S 11/10/2021 MW-14S-01	MW-15S 6/10/2010 MW-15S-R1	MW-15S 5/17/2011 MW-15S-R2	MW-16B1 6/9/2010 MW-16B1-R1	MW-16B1 5/19/2011 MW-16B1-R2	MW-16B1 6/19/2014 MW-16B1-RDB	MW-16B1 4/15/2015 MW-16B1-RD1	MW-16B1 12/7/2015 MW-16B1-R2	MW-16B1 9/14/2016 MW-16B1-R3-091416		MW-16B2 6/9/2010 MW-16B2-R1	MW-16B2 6/9/2010 MW-16B2-R1-DUP MW-16B2-R1	MW-16B2 5/19/2011 MW-16B2-R2	MW-16B2 6/19/2014 MW-16B2-RDB	MW-16B2 4/15/2015 MW-16B2-RD1	MW-16B2 12/8/2015 MW-16B2-R2	MW-16B2 9/15/2016 MW-16B2-R3-091516	
CAS No.	Chemical	Unit																								
Volatile Organic Compounds																										
71-55-6	1,1,1-Trichloroethane	µg/l	**0.15 J**	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	100 U	50	U
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	0.5 UJ	0.5 U	100 U	0.5 UJ	5 U	5	U	5 U	**12**	**16**	0.5 UJ	0.5 U	5 U	25 UJ	50 U	50	U	0.5 U	130 UJ	250 U	100 U	25 UJ	50 U	**50**	U
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	0.5 UJ	0.5 U	100 U	0.5 U	5 U	5	U	5 U	**9.2**	**5.6**	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	100 U	50	U
79-00-5	1,1,2-Trichloroethane	µg/l	0.5 U	0.5 U	**290**	0.5 U	5 U	5	U	5 U	**32**	**13**	**0.63**	0.5 U	5 U	25 U	50 U	**50**	U	**8.2**	**2000**	**620**	**120**	**480**	**450**	**50**	U
75-34-3	1,1-Dichloroethane	µg/l	**0.36 J**	0.5 U	100 U	0.5 U	5 U	5	U	5 U	**0.38 J**	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	**50**	U
75-35-4	1,1-Dichloroethene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	**1.7**	**0.34 J**	**1**	**1.4**	5 U	25 U	50 U	**50**	U	**1.7**	**450**	**1900**	**830**	**99**	**75**	**50**	U
87-61-6	1,2,3-Trichlorobenzene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
120-82-1	1,2,4-Trichlorobenzene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	0.5 UJ	0.5 U	100 U	0.5 UJ	5 U	5	U	5 U	**2.4**	**1.9**	0.5 UJ	0.5 U	5 U	25 UJ	50 U	50	U	0.5 U	130 UJ	250 U	100 U	25 UJ	100 U	**50**	U
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	0.05 U	0.05 U	NA	NA	NA			NA	**1.4**	**1.7 J**	0.05 UJ	0.05 U	NA	NA	NA			NA	NA	2.5 U	NA	NA	NA		
106-93-4	1,2-Dibromoethane	µg/l	0.5 UJ	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	**50**	U
106-93-4	1,2-Dibromoethane - SIM	µg/l	0.05 U	0.05 U	NA	NA	NA			NA	**0.17**	0.05 U	0.05 U	0.05 U	NA	NA	NA			NA	NA	**3.6** J	NA	NA	NA		
95-50-1	1,2-Dichlorobenzene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
107-06-2	1,2-Dichloroethane	µg/l	0.5 U	0.54 U	**15000**	**0.69**	5 U	**8.7**		**18.1**	**62**	**7.2**	**35**	**100**	**63**	**140**	**410**	**50**	U	**110000**	**110000**	**180000**	**68000**	**19000**	**6400**	**1900**	
78-87-5	1,2-Dichloropropane	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	**50**	U	**0.13 J**	**39 J**	250 U	100 U	25 U	50 U	**50**	U
541-73-1	1,3-Dichlorobenzene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
106-46-7	1,4-Dichlorobenzene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
107-04-0	1-Bromo-2-Chloroethane	µg/l	NA	NA	**300**	0.5 U	5 U	**5**	U	NA	NA	NA	NA	NA	5 U	25 U	50 U	**50**	U	NA	NA	NA	**430**	**99**	50 U	**50**	U
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		
78-93-3	2-Butanone (MEK)	µg/l	5 U	5 U	200 U	5 U	50 U	50	UJ	10 U	5 U	5 U	5 U	5 U	10 U	250 U	**680**	500	UJ	5 U	1300 U	2500 U	200 U	250 U	500 U	500	UJ
591-78-6	2-Hexanone	µg/l	5 U	5 U	200 U	5 U	50 U	50	UJ	10 U	5 U	5 U	5 U	5 U	10 U	250 UL	500 U	500	UJ	5 U	1300 U	2500 U	200 U	250 UL	500 U	500	UJ
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		
460-00-4	4-Bromofluorobenzene	µg/l	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	5 U	5 U	200 U	5 U	50 U	50	U	10 U	5 U	5 U	5 U	5 U	10 U	250 U	500 U	500	U	5 U	1300 U	2500 U	200 U	250 U	1000 U	500	U
67-64-1	Acetone	µg/l	5 U	5 U	200 U	5 UL	100 UL	50	U	10 U	5 U	5 U	5 U	19 U	10 U	250 UL	1000 UL	500	U	5 U	1300 U	2500 U	200 U	250 UL	500 U	500	U
71-43-2	Benzene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
74-97-5	Bromochloromethane	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
75-27-4	Bromodichloromethane	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
75-25-2	Bromoform	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
74-83-9	Bromomethane	µg/l	0.5 U	0.5 U	100 U	0.5 UL	5 UL	5	UL	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 UL	50	UL	0.5 U	130 U	250 U	100 U	25 U	50 UJ	50	UJ
75-15-0	Carbon Disulfide	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
56-23-5	Carbon Tetrachloride	µg/l	0.5 UJ	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	**0.69**	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	100 U	50	U
108-90-7	Chlorobenzene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
75-00-3	Chloroethane	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	UL	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	UL	0.5 U	130 U	250 U	100 U	**32**	**67**	**50**	UL
67-66-3	Chloroform	µg/l	**55**	**23**	100 U	0.5 U	5 U	5	U	5 U	**0.5**	0.5 U	**0.85**	**1.5**	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	**50**	U
74-87-3	Chloromethane	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 UL	5	U	5 U	0.5 U	0.5 U	0.5 U	**0.45 J**	5 U	25 U	50 UL	50	UL	0.5 U	130 U	250 U	100 U	25 U	50 U	50	UL
156-59-2	cis-1,2-Dichloroethene	µg/l	**1.5**	**2.2**	100 U	**2.3**	5 U	5	U	5 U	**25**	**17**	**0.24 J**	**0.36 J**	5 U	25 U	50 U	**50**	U	**0.28 J**	**76 J**	250 U	100 U	**37**	**190**	**50**	U
10061-01-5	cis-1,3-Dichloropropene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	100 U	50	U
110-82-7	Cyclohexane	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 UJ	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 UJ	50	U	0.5 U	130 U	250 U	100 U	25 U	100 U	50	U
124-48-1	Dibromochloromethane	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
75-71-8	Dichlorodifluoromethane	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 UL	5	UJ	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 UL	50	UJ	0.5 U	130 U	250 U	100 U	25 U	100 UL	50	UJ
100-41-4	Ethylbenzene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
462-06-6	Fluorobenzene	µg/l	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		
98-82-8	Isopropylbenzene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
108-38-3	m,p-Xylene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
79-20-9	Methyl Acetate	µg/l	0.5 UJ	0.5 U	100 U	0.5 U	20 UJ	5	UJ	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 UL	200 UJ	50	U	0.5 U	130 U	250 U	100 U	25 UL	50 U	50	U
1634-04-4	Methyl Tert-Butyl Ether	µg/l	0.5 UJ	0.5 U	100 U	**0.95**	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	**50**	U
108-87-2	Methylcylohexane	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 UJ	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 UJ	50	U	0.5 U	130 U	250 U	100 U	25 U	100 U	50	U
75-09-2	Methylene Chloride	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
95-47-6	o-Xylene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
100-42-5	Styrene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 UJ	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 UJ	50	U	0.5 U	130 U	250 U	100 U	25 U	100 U	50	U
127-18-4	Tetrachloroethene	µg/l	**34**	**52**	100 U	**75**	**10**	**70**		**22.1**	**12**	**7.6**	**0.4 J**	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	**50**	U
108-88-3	Toluene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	50 U	50	U
156-60-5	trans-1,2-Dichloroethene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	**3**	**1.6**	0.5 U	0.5 U	5 U	25 U	50 U	**50**	U	**0.12 J**	**34 J**	250 U	100 U	25 U	**77**	**57**	
10061-02-6	trans-1,3-Dichloropropene	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 U	50 U	50	U	0.5 U	130 U	250 U	100 U	25 U	100 U	50	U
79-01-6	Trichloroethene	µg/l	**5.9**	**8.8**	**260**	**12**	5 U	10		5 U	**170**	**120**	**7.9**	**7.4**	5 U	25 U	50 U	**50**	U	**10**	**3000**	**2800**	**1200**	**690**	**590**	**54**	
75-69-4	Trichlorofluoromethane	µg/l	0.5 UJ	0.5 U	100 U	0.5 U	5 U	5	U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	25 UJ	50 U	50	U	0.5 U	130 U	250 U	100 U	25 UJ	100 U	50	U
75-01-4	Vinyl Chloride	µg/l	0.5 U	0.5 U	100 U	0.5 U	5 U	5	U	5 U	**0.33 J**	0.5 U	**0.24 J**	**2.7**	**9.6**	25 U	50 U	**50**	U	**0.3 J**	**90 J**	250 U	**230**	**110**	**460** L	**120**	

Notes:

Highlighted cells represent detected concentrations greater than the ROD
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

			MW-16D		MW-22D								MW-22S					MW-23D						MW-23I						
			MW-16D 6/9/2010 MW-16D-R1	MW-16D 5/19/2011 MW-16D-R2	MW-22D 6/24/2014 MW-22D-RDB	MW-22D 6/24/2014 MW-922D-RDB MW-22D-RDB	MW-22D 4/15/2015 MW-22D-RD1	MW-22D 12/2/2015 MW-22D-R2	MW-22D 9/14/2016 MW-22D-R3-091416		MW-22D 9/14/2016 MW-922D-R3-091416 MW-22D-R3-091416		MW-22S 6/24/2014 MW-22S-RDB	MW-22S 4/15/2015 MW-22S-RD1	MW-22S 12/2/2015 MW-22S-R2	MW-22S 9/14/2016 MW-22S-R3-091416		MW-23D 6/24/2014 MW-23D-RDB	MW-23D 4/15/2015 MW-23D-RD1	MW-23D 12/7/2015 MW-23D-R2	MW-23D 9/14/2016 MW-23D-R3-091416		MW-23D 11/11/2021 MW-23D-01		MW-23I 6/24/2014 MW-23I-RDB	MW-23I 4/17/2015 MW-23I-RD1	MW-23I 4/17/2015 MW-923I-RD1 MW-23I-RD1	MW-23I 12/7/2015 MW-23I-R2	MW-23I 12/7/2015 MW-923I-R2 MW-23I-R2	MW-23I 9/14/2016 MW-23I-R3-091416	
CAS No.	Chemical	Unit																												
Volatile Organic Compounds																														
71-55-6	1,1,1-Trichloroethane	µg/l	0.5 U	5 U	100 U	100 U	25 U	10 U	50	U	0.5	UL	5 U	25 U	10 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	**9.9**	**71**	100 U	100 U	**100 J**	**35 J**	**50**	U	**10**		**74**	**40 J**	5 UJ	**5**	U	**170**	25 UJ	50 U	5	U	5 U	**7.7**	25 UJ	5 UJ	5 U	5 U	**5**	U
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	0.5 U	5 U	100 U	100 U	25 U	10 U	50	U	0.5	UL	5 U	25 U	10 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
79-00-5	1,1,2-Trichloroethane	µg/l	**28**	**110**	**700**	**700**	**1900**	**840**	**810**		**730**		**130**	**110**	**31 J**	**5**	U	**400**	**240**	**280**	5	U	5 U	**11**	25 U	**9.7**	**5.1**	**5.7**	**6.3**	
75-34-3	1,1-Dichloroethane	µg/l	**0.14 J**	5 U	100 U	100 U	25 U	5 U	50	U	1.3	L	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
75-35-4	1,1-Dichloroethene	µg/l	**2.5**	5 U	100 U	100 U	**110**	**99 J**	62		60		5 U	25 U	5 UJ	5	U	100 U	**52**	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
87-61-6	1,2,3-Trichlorobenzene	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	0.5	U	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
120-82-1	1,2,4-Trichlorobenzene	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	0.5	U	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	**4.1**	**100**	**250**	**300**	**690 J**	**180**	**50**	U	130		**10**	25 UJ	10 UJ	**5**	U	**230**	25 UJ	50 U	5	U	5 U	5 U	25 UJ	5 UJ	5 U	5 U	**5**	U
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	NA	**110 J**	NA	NA	NA	NA					NA	NA	NA			NA	NA	NA			NA	NA	NA	NA	NA	NA		
106-93-4	1,2-Dibromoethane	µg/l	**0.86**	5 U	100 U	100 U	**64**	**50 J**	50	U	23		5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
106-93-4	1,2-Dibromoethane - SIM	µg/l	NA	**0.4** J	NA	NA	NA	NA					NA	NA	NA			NA	NA	NA			NA	NA	NA	NA	NA	NA		
95-50-1	1,2-Dichlorobenzene	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	0.5	U	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
107-06-2	1,2-Dichloroethane	µg/l	**470**	**1300**	**24000**	**25000**	**31000**	**31000 J**	**23000**		**23000**	**K**	**100**	**230**	**94 J**	**36**		**21000**	**2300**	**600**	**350**		**11**	**52**	**34**	**37**	5 U	5 U	**14**	
78-87-5	1,2-Dichloropropane	µg/l	**0.41 J**	5 U	100 U	100 U	**36**	**44 J**	50	U	21		5 U	25 U	5 UJ	5	U	100 U	25 U	**90**	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
541-73-1	1,3-Dichlorobenzene	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	0.5	U	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
106-46-7	1,4-Dichlorobenzene	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	0.5	U	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
107-04-0	1-Bromo-2-Chloroethane	µg/l	NA	NA	**1200**	**1200**	**1500**	**820**	910		800		5 U	25 U	5 UJ	**5**	U	**610**	**38**	50 U	**5**	U	NA	5 U	25 U	5 U	5 U	5 U	**5**	U
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA					NA	NA	NA			NA	NA	NA			NA	NA	NA	NA	NA	NA		
78-93-3	2-Butanone (MEK)	µg/l	5 U	50 U	200 U	200 U	**520**	**1000**	1300	**J**	**2400**	**J**	10 U	**570**	**9300 J**	200	**J**	200 U	**1900**	**1800**	**61**	**J**	**432 ****	10 U	**1100**	**930**	**400 J**	**430 J**	50	UJ
591-78-6	2-Hexanone	µg/l	5 U	50 U	200 U	200 U	250 U	50 U	500	UJ	8.9	**J**	10 U	250 U	50 UJ	50	UJ	200 U	250 U	500 U	50	UJ	10 U	10 U	250 U	50 U	50 U	50 U	50	UJ
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	NA	NA	NA	NA	NA	NA					NA	NA	NA			NA	NA	NA			NA	NA	NA	NA	NA	NA		
460-00-4	4-Bromofluorobenzene	µg/l	NA	NA	NA	NA	NA	NA					NA	NA	NA			NA	NA	NA			NA	NA	NA	NA	NA	NA		
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	5 U	50 U	200 U	200 U	250 U	100 U	500	U	5	U	10 U	250 U	100 UJ	50	U	200 U	250 U	500 U	50	U	10 U	10 U	250 U	50 U	50 U	50 U	50	U
67-64-1	Acetone	µg/l	5 U	50 U	200 U	200 U	250 U	**1700**	2600		3100	**J**	10 U	250 U	**1000**	890		200 U	**2100**	**5700 L**	**95**		**1,460 ****	10 U	250 U	50 UL	100 U	100 U	50	U
71-43-2	Benzene	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	0.5	UL	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
74-97-5	Bromochloromethane	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	0.5	UL	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
75-27-4	Bromodichloromethane	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	0.5	U	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
75-25-2	Bromoform	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	0.5	U	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
74-83-9	Bromomethane	µg/l	0.5 U	5 U	100 U	100 U	25 UJ	**10 J**	50	UL	0.5	UL	5 U	25 UJ	5 UJ	5	UL	100 U	25 UJ	50 UL	5	UL	5 U	5 U	25 UJ	5 UL	5 U	5 U	5	UL
75-15-0	Carbon Disulfide	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	2.2	L	5 U	25 U	**6.7 J**	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
56-23-5	Carbon Tetrachloride	µg/l	0.5 U	5 U	100 U	100 U	25 U	10 U	50	U	0.5	UL	5 U	25 U	10 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
108-90-7	Chlorobenzene	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	0.75		5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
75-00-3	Chloroethane	µg/l	**0.94**	5 U	100 U	100 U	25 U	5 U	50	UL	13	**L**	5 U	25 U	5 UJ	5	UL	100 U	25 U	50 U	5	UL	5 U	5 U	25 U	5 U	5 U	5 U	5	UL
67-66-3	Chloroform	µg/l	**0.52**	5 U	100 U	100 U	25 U	**7.6 J**	50	U	3.2	**L**	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
74-87-3	Chloromethane	µg/l	0.5 U	5 U	100 U	100 U	25 U	**6.9 J**	50	UL	0.5	UL	5 U	25 U	5 UJ	5	U	100 U	25 U	50 UL	5	U	5 U	5 U	25 U	5 U	5 UL	5 UL	5	U
156-59-2	cis-1,2-Dichloroethene	µg/l	**13**	**18**	100 U	100 U	**84**	**290**	**190**		190		**8.3**	25 U	**180 J**	25		100 U	**360**	50 U	5.7		5 U	5 U	25 U	5 U	**34**	**34**	13	
10061-01-5	cis-1,3-Dichloropropene	µg/l	0.5 U	5 U	100 U	100 U	25 U	10 U	50	U	0.5	U	5 U	25 U	10 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
110-82-7	Cyclohexane	µg/l	0.5 U	5 U	100 U	100 U	25 U	10 U	50	U	0.5	UL	5 U	25 U	10 UJ	5	U	100 U	25 U	50 UJ	5	U	5 U	5 U	25 U	5 U	5 UJ	5 UJ	5	U
124-48-1	Dibromochloromethane	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	0.5	U	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
75-71-8	Dichlorodifluoromethane	µg/l	0.5 U	5 U	100 U	100 U	25 U	10 UL	50	UJ	0.5	UJ	5 U	25 U	10 UJ	5	UJ	100 U	25 U	50 UL	5	UJ	5 U	5 U	25 U	5 U	5 UL	5 UL	5	UJ
100-41-4	Ethylbenzene	µg/l	0.5 U	5 U	100 U	100 U	25 U	**9.3 J**	50	U	6.1		5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
462-06-6	Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA					NA	NA	NA			NA	NA	NA			NA	NA	NA	NA	NA	NA		
98-82-8	Isopropylbenzene	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	0.5	U	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
108-38-3	m,p-Xylene	µg/l	0.5 U	5 U	100 U	100 U	**41**	**46 J**	50	U	38		5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	7.8		5 U	5 U	25 U	5 U	5 U	5 U	5	U
79-20-9	Methyl Acetate	µg/l	0.5 U	5 U	100 U	100 U	25 U	5 U	50	U	0.5	UJ	5 U	25 U	5 UJ	5	UJ	100 U	25 U	200 UJ	5	UJ	5 U	5 U	25 U	5 U	20 UL	20 UL	5	UJ
1634-04-4	Methyl Tert-Butyl Ether	µg/l	**26 J**	**18**	100 U	100 U	25 U	5 U	50	U	0.5	UL	5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
108-87-2	Methylcylohexane	µg/l	0.5 U	5 U	100 U	100 U	25 U	10 U	50	U	0.5	U	5 U	25 U	10 UJ	5	U	100 U	25 U	50 UJ	5	U	5 U	5 U	25 U	5 U	5 UJ	5 UJ	5	U
75-09-2	Methylene Chloride	µg/l	0.5 U	5 U	100 U	100 U	**54**	**63 J**	**50**	U	19	**L**	**6**	25 U	**6.8 J**	5	U	100 U	**30**	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	**5**	U
95-47-6	o-Xylene	µg/l	0.5 U	5 U	100 U	100 U	25 U	**20 J**	50	U	10		5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
100-42-5	Styrene	µg/l	0.5 U	5 U	100 U	100 U	25 U	10 U	50	U	0.5	U	5 U	25 U	10 UJ	5	U	100 U	25 U	50 UJ	5	U	5 U	5 U	25 U	5 U	5 UJ	5 UJ	5	U
127-18-4	Tetrachloroethene	µg/l	**61**	**52**	100 U	100 U	**53**	**19 J**	**50**	U	**15**		**31**	**39**	**31 J**	16		100 U	**62**	50 U	5	U	5 U	**28**	25 U	**19**	**14**	**13**	16	
108-88-3	Toluene	µg/l	0.5 U	5 U	100 U	100 U	25 U	**8.7 J**	50	U	6.5		5 U	25 U	5 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
156-60-5	trans-1,2-Dichloroethene	µg/l	**1.5**	5 U	100 U	100 U	**25**	**79 J**	**50**	U	37	**L**	**5.6**	25 U	**11 J**	5	U	100 U	**38**	50 U	**36**		5 U	5 U	25 U	5 U	5 U	5 U	5	U
10061-02-6	trans-1,3-Dichloropropene	µg/l	0.5 U	5 U	100 U	100 U	25 U	10 U	50	U	0.5	U	5 U	25 U	10 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
79-01-6	Trichloroethene	µg/l	**48 J**	**86**	**1200**	**1200**	**2600**	**820**	**1100**		**1000**		**160**	**140**	**50 J**	**14**		**900**	**840**	50 U	17		5 U	**31**	**28**	**26**	**12**	**12**	**8.9**	
75-69-4	Trichlorofluoromethane	µg/l	0.5 U	5 U	100 U	100 U	25 U	10 U	50	U	0.5	UL	5 U	25 U	10 UJ	5	U	100 U	25 U	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U
75-01-4	Vinyl Chloride	µg/l	**1.7**	5 U	100 U	100 U	**240**	**470 J**	140		140		5 U	25 U	**21 J**	5	U	100 U	**300**	50 U	5	U	5 U	5 U	25 U	5 U	5 U	5 U	5	U

Notes:

Highlighted cells represent detected concentrations greater than the ROD
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

			MW-24D						MW-24S						MW-25D						MW-25I					
			MW-24D 6/24/2014 MW-24D-RDB	MW-24D 4/16/2015 MW-24D-RD1	MW-24D 12/3/2015 MW-24D-R2	MW-24D 9/14/2016 MW-24D-R3-091416		MW-24D 11/9/2021 MW-24D-01	MW-24S 6/24/2014 MW-24S-RDB	MW-24S 4/16/2015 MW-24S-RD1	MW-24S 12/3/2015 MW-24S-R2	MW-24S 9/14/2016 MW-24S-R3-091416		MW-24S 11/11/2021 MW-24S-01	MW-25D 6/24/2014 MW-25D-RDB	MW-25D 4/17/2015 MW-25D-RD1	MW-25D 12/3/2015 MW-25D-R2	MW-25D 9/13/2016 MW-25D-R3-091316		MW-25D 11/8/2021 MW-25D-01	MW-25I 6/24/2014 MW-25I-RDB	MW-25I 4/16/2015 MW-25I-RD1	MW-25I 12/3/2015 MW-25I-R2	MW-25I 9/13/2016 MW-25I-R3-091316		MW-25I 11/8/2021 MW-25I-01	MW-25I 11/8/2021 MW-25I-02
CAS No.	Chemical	Unit																								
Volatile Organic Compounds																										
71-55-6	1,1,1-Trichloroethane	µg/l	100 U	25 U	100 U	50	U	5 U	5 U	0.5 U	1 U	0.5	U	5 U	100 U	25 U	100 U	50	UL	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	**1800**	**2100 J**	**3800**	1700		5 U	**16**	**7.4 J**	**3.4**	0.56		5 U	**4300**	**1900 J**	**500**	50	U	5 U	**94**	**120 J**	**43**	82		5 UL	**7.59**
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	100 U	25 U	100 U	50	U	5 U	5 U	0.5 U	1 U	0.5	U	5 U	100 U	25 U	100 U	50	UL	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
79-00-5	1,1,2-Trichloroethane	µg/l	**800**	**1400**	**1900**	**1000**		**9.61**	**6.1**	**2.6**	**2.2**	**0.5**	U	**6.24**	**3000**	**1800**	**700**	**120**		**10**	**38**	**55**	**26**	74		5 UL	5 U
75-34-3	1,1-Dichloroethane	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	UL	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
75-35-4	1,1-Dichloroethene	µg/l	100 U	**26**	50 U	50	U	5 U	5 U	**0.99**	0.5 U	**0.5**	U	**5.08**	100 U	**42**	50 U	50	UL	5 U	5 U	25 U	5 U	5	U	5 U	5 U
87-61-6	1,2,3-Trichlorobenzene	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
120-82-1	1,2,4-Trichlorobenzene	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	**2400**	**4100 J**	**4400**	2200		5 U	**29**	**10 J**	1 U	0.5	U	5 U	**5700**	**1800 J**	**100**	50	U	5 U	**71**	25 UJ	**13**	5	U	5 UL	5 U
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	NA	NA	NA				NA	NA	NA				NA	NA	NA				NA	NA	NA				NA
106-93-4	1,2-Dibromoethane	µg/l	100 U	**94**	**120**	78		5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	**310**	**62**	50 U	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
106-93-4	1,2-Dibromoethane - SIM	µg/l	NA	NA	NA				NA	NA	NA				NA	NA	NA				NA	NA	NA				NA
95-50-1	1,2-Dichlorobenzene	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
107-06-2	1,2-Dichloroethane	µg/l	**26000**	**47000**	**45000**	**51000**		**194 ***	**160**	**270**	**39 K**	**22**		**250 ***	**140000**	**78000**	**23000**	**9200**		**127**	**720**	**3000**	**1500**	**1100**		**48.1 L**	**52.5**
78-87-5	1,2-Dichloropropane	µg/l	100 U	**34**	50 U	50	U	5 U	5 U	**0.69**	0.5 U	0.5	U	5 U	100 U	**86**	**89**	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
541-73-1	1,3-Dichlorobenzene	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
106-46-7	1,4-Dichlorobenzene	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
107-04-0	1-Bromo-2-Chloroethane	µg/l	**1100**	**2100**	**2900**	**1800**			5 U	**1.1**	**0.7**	**0.5**	U		**6400**	**1800**	**400**	**81**			**23**	**71**	**29**	**23**			NA
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	NA	NA	NA				NA	NA	NA				NA	NA	NA				NA	NA	NA				NA
78-93-3	2-Butanone (MEK)	µg/l	200 U	250 U	**530**	500	UJ	10 U	10 U	**70**	5 U	5	UJ	10 U	200 U	250 U	**3000**	**2300**	**J**	**2,240 *****	10 U	250 U	50 U	**220**	**J**	**33.6**	**34.9**
591-78-6	2-Hexanone	µg/l	200 U	250 U	500 U	500	UJ	10 U	10 U	5 U	5 U	5	UJ	10 U	200 U	250 UL	500 U	**500**	UJ	**88.7**	10 U	250 U	50 U	50	UJ	10 U	10 U
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	NA	NA	NA				NA	NA	NA				NA	NA	NA				NA	NA	NA				NA
460-00-4	4-Bromofluorobenzene	µg/l	NA	NA	NA				NA	NA	NA				NA	NA	NA				NA	NA	NA				NA
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	200 U	250 U	1000 U	500	U	10 U	10 U	5 U	10 U	5	U	10 U	200 U	250 U	1000 U	**500**	U	**17.8**	10 U	250 U	50 U	50	U	10 U	10 U
67-64-1	Acetone	µg/l	200 U	250 U	500 U	500	U	10 U	10 U	5 U	5 U	5	U	10 U	200 U	250 UL	**680**	**500**	UL	**1,070 *****	10 U	250 U	100 U	74		10 U	**14**
71-43-2	Benzene	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	UL	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
74-97-5	Bromochloromethane	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	UL	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
75-27-4	Bromodichloromethane	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
75-25-2	Bromoform	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
74-83-9	Bromomethane	µg/l	100 U	25 UJ	50 UJ	50	UL	5 U	5 U	0.5 UJ	0.5 UJ	0.5	UL	5 U	100 U	25 U	**75 J**	50	UL	5 U	5 U	25 UJ	5 U	5	U	5 UL	5 U
75-15-0	Carbon Disulfide	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	UL	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
56-23-5	Carbon Tetrachloride	µg/l	100 U	25 U	100 U	50	U	5 U	5 U	0.5 U	1 U	0.5	U	5 U	100 U	25 U	100 U	50	UL	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
108-90-7	Chlorobenzene	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
75-00-3	Chloroethane	µg/l	100 U	25 U	50 U	**50**	UL	**5.82**	5 U	**1.7**	0.5 U	1.2	**L**	5 U	100 U	25 U	50 U	50	UL	5 U	5 U	25 U	5 U	5	UL	5 UL	5 U
67-66-3	Chloroform	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	UL	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
74-87-3	Chloromethane	µg/l	100 U	25 U	50 U	50	UL	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	UL	5 UL	5 U	25 U	5 U	5	U	5 UL	5 U
156-59-2	cis-1,2-Dichloroethene	µg/l	100 U	**130**	**290**	**220**		**24.8**	5 U	**6.5**	**5 K**	**1.3**		**24.6**	**220**	**350**	**770**	**160**	**L**	**47.8**	**14**	25 U	**14**	**38**		**8.58 L**	**9.23**
10061-01-5	cis-1,3-Dichloropropene	µg/l	100 U	25 U	100 U	50	U	5 U	5 U	0.5 U	1 U	0.5	U	5 U	100 U	25 U	100 U	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
110-82-7	Cyclohexane	µg/l	100 U	25 U	100 U	50	U	5 U	5 U	0.5 U	1 U	0.5	U	5 U	100 U	25 U	100 U	50	UL	5 U	5 U	25 U	5 UJ	5	U	5 UL	5 U
124-48-1	Dibromochloromethane	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
75-71-8	Dichlorodifluoromethane	µg/l	100 U	25 U	100 UL	50	UJ	5 U	5 U	0.5 U	1 UL	0.5	UJ	5 U	100 U	25 U	100 UL	50	UJ	5 U	5 U	25 U	5 UL	5	UJ	5 UL	5 U
100-41-4	Ethylbenzene	µg/l	100 U	**30**	**69**	50	U	5 U	5 U	0.5 U	**0.92**	0.5	U	5 U	**110**	**52**	50 U	**50**	U	**10.2**	5 U	25 U	5 U	5	U	5 UL	5 U
462-06-6	Fluorobenzene	µg/l	NA	NA	NA				NA	NA	NA				NA	NA	NA				NA	NA	NA				NA
98-82-8	Isopropylbenzene	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
108-38-3	m,p-Xylene	µg/l	100 U	**70**	**120**	**78**		**13.9**	5 U	0.5 U	**0.69**	0.5	U	5 U	**460**	**200**	**120**	**79**		**41.3**	5 U	25 U	5 U	7.1		5 UL	5 U
79-20-9	Methyl Acetate	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	UJ	5 U	100 U	25 UL	50 U	50	UL	5 U	5 U	25 U	20 U	5	U	5 UL	5 U
1634-04-4	Methyl Tert-Butyl Ether	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.5	U	5 U	100 U	25 U	50 U	50	UL	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
108-87-2	Methylcylohexane	µg/l	100 U	25 U	100 U	50	U	5 U	5 U	0.5 U	1 U	0.5	U	5 U	100 U	25 U	100 U	50	U	5 U	5 U	25 U	5 UJ	5	U	5 UL	5 U
75-09-2	Methylene Chloride	µg/l	**120**	**240**	**360**	250		5 U	5 U	**1.1**	**0.93 K**	0.5	U	5 U	**580**	**390**	**290**	**110**	**L**	**29.1 L**	5 U	25 U	5 U	13		5 UL	5 UL
95-47-6	o-Xylene	µg/l	100 U	**36**	**52**	**50**	U	**10**	5 U	0.5 U	**0.8**	0.54		5 U	**110**	**52**	50 U	**50**	U	**13.2**	5 U	25 U	5 U	5	U	5 UL	5 U
100-42-5	Styrene	µg/l	100 U	25 U	100 U	50	U	5 U	5 U	0.5 U	1 U	0.5	U	5 U	**130**	**48**	100 U	50	U	5 U	5 U	25 U	5 UJ	5	U	5 UL	5 U
127-18-4	Tetrachloroethene	µg/l	100 U	**50**	50 U	50	U	5 U	5 U	**1.3**	**0.75**	0.5	U	5 U	**130**	**42**	50 U	50	U	5 U	**6.6**	25 U	5 U	**15**		**52.1**	**50.9**
108-88-3	Toluene	µg/l	100 U	25 U	50 U	50	U	5 U	5 U	0.5 U	0.5 U	0.6		5 U	100 U	**46**	50 U	**50**	U	**16.6**	5 U	25 U	5 U	5	U	5 UL	5 U
156-60-5	trans-1,2-Dichloroethene	µg/l	100 U	**65**	**110**	**140**		**19.5**	**5.1**	**4.1**	**3.6 K**	**6.3**		**9.44**	100 U	**180**	**400**	**190**	**L**	**55**	**18**	25 U	**15**	**29**		**26.6 L**	**29.5**
10061-02-6	trans-1,3-Dichloropropene	µg/l	100 U	25 U	100 U	50	U	5 U	5 U	0.5 U	1 U	0.5	U	5 U	100 U	25 U	100 U	50	U	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
79-01-6	Trichloroethene	µg/l	**650**	**940**	**980**	**840**		**8.93**	**22**	**14**	**5.6**	**0.68**		**30**	**3000**	**1800**	**630**	**210**		**35.8**	**70**	**85**	**44**	**130**		**58.6**	**60.1**
75-69-4	Trichlorofluoromethane	µg/l	100 U	25 U	100 U	50	U	5 U	5 U	0.5 U	1 U	0.5	U	5 U	100 U	25 UJ	100 U	50	UL	5 U	5 U	25 U	5 U	5	U	5 UL	5 U
75-01-4	Vinyl Chloride	µg/l	100 U	**96**	**170**	140		5 U	5 U	**10**	0.5 U	**0.5**	U	**8.36**	**230**	**200**	**500**	**130**	**L**	**43 L**	**6**	25 U	**5.4**	**5**	U	**9.95 L**	**11.1 L**

Notes:

Highlighted cells represent detected concentrations greater than the ROD
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

			MW-26D						MW-26I						MW-27D						MW-27I						MW-28D						
			MW-26D 6/24/2014 MW-26D-RDB	MW-26D 4/17/2015 MW-26D-RD1	MW-26D 9/30/2015 MW-26D-BIO	MW-26D 1/7/2016 MW-26D-R2	MW-26D 9/12/2016 MW-26D-R3-091216		MW-26I 6/24/2014 MW-26I-RDB	MW-26I 4/16/2015 MW-26I-RD1	MW-26I 1/7/2016 MW-26I-R2	MW-26I 1/7/2016 MW-926I-R2 MW-26I-R2	MW-26I 9/12/2016 MW-26I-R3-091216		MW-27D 6/23/2014 MW-27D-RDB	MW-27D 4/15/2015 MW-27D-RD1	MW-27D 12/3/2015 MW-27D-R2	MW-27D 9/13/2016 MW-27D-R3-091316		MW-27D 11/10/2021 MW-27D-01	MW-27I 6/25/2014 MW-27I-RDB	MW-27I 4/15/2015 MW-27I-RD1	MW-27I 12/3/2015 MW-27I-R2	MW-27I 9/13/2016 MW-27I-R3-091316		MW-28D 6/23/2014 MW-28D-RDB	MW-28D 6/23/2014 MW-928D-RDB MW-28D-RDB	MW-28D 4/17/2015 MW-28D-RD1	MW-28D 9/30/2015 MW-28D-BIO	MW-28D 12/8/2015 MW-28D-R2	MW-28D 9/13/2016 MW-28D-R3-091316	
CAS No.	Chemical	Unit																															
Volatile Organic Compounds																																	
71-55-6	1,1,1-Trichloroethane	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	100 U	5	U
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	**120**	**31 J**	12 U	20 U	**5**	U	**320**	**210 J**	**240**	**260**	260		100 U	25 UJ	5 U	5	U	5 U	**300**	**440 J**	**250**	**140**		**470**	**450**	**58 J**	50 U	**120**	**15**	**K**
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	100 U	5	U
79-00-5	1,1,2-Trichloroethane	µg/l	**350**	**310**	**62**	**43**	**5.8**		**150**	**240**	**160 J-**	**180**	**140**		**250**	**460**	**49**	**5**	U	**113**	5 U	**3.7**	5 U	**5**	U	**510**	**480**	**80**	**93**	**220**	**33**	
75-34-3	1,1-Dichloroethane	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
75-35-4	1,1-Dichloroethene	µg/l	100 U	**28**	12 U	20 U	5.3		5 U	25 U	100 U	100 U	50	U	100 U	**130**	**83**	**5**	U	**48.7**	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
87-61-6	1,2,3-Trichlorobenzene	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
120-82-1	1,2,4-Trichlorobenzene	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	**480**	**200 J**	50 UJ	20 U	**5**	U	**330**	**250 J**	**240**	**260**	**300**		**130**	25 UJ	5 U	5	U	5 U	**10**	**4.1 J**	5 U	**5**	U	**1100**	**980**	**40 J**	200 UJ	100 U	5	U
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	NA	NA	NA	NA			NA	NA	NA	NA			NA	NA	NA				NA	NA	NA			NA	NA	NA	NA	NA		
106-93-4	1,2-Dibromoethane	µg/l	100 U	25 U	12 U	20 U	**5**	U	**6.2**	25 U	100 U	100 U	50	U	100 U	25 U	5 U	**5**	U	**7.88**	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
106-93-4	1,2-Dibromoethane - SIM	µg/l	NA	NA	NA	NA			NA	NA	NA	NA			NA	NA	NA			NA	NA	NA	NA			NA	NA	NA	NA	NA		
95-50-1	1,2-Dichlorobenzene	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
107-06-2	1,2-Dichloroethane	µg/l	**56000**	**42000**	**980**	**1400**	**46**		**5900**	**4500**	**7300**	**7200**	**4900**		**16000**	**5900**	**81**	**6.5**		**3960**	**15**	**9.6**	**10 K**	**14**	**K**	**26000**	**24000**	**8800**	**5100**	**4400**	**490**	**K**
78-87-5	1,2-Dichloropropane	µg/l	100 U	**50**	**23**	**13 J**	**5**	U	**11**	**25**	100 U	100 U	50	U	100 U	25 U	**7.7**	**5**	U	**7.7**	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
541-73-1	1,3-Dichlorobenzene	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
106-46-7	1,4-Dichlorobenzene	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
107-04-0	1-Bromo-2-Chloroethane	µg/l	**320**	**140**	50 U	25 U	**5**	U	**140**	**49**	100 UJ	200 U	**150**		**600**	**530**	5 U	5	U	5 U	5 U	**0.52**	5 U	**5**	U	**800**	**740**	**120**	**94**	**120**	5	U
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	NA	NA	NA	25 U			NA	NA	100 UJ	200 U			NA	NA	NA				NA	NA	NA			NA	NA	NA	NA	NA		
78-93-3	2-Butanone (MEK)	µg/l	200 U	250 U	**430**	**480**	500	**J**	10 U	**810**	1000 U	1000 U	500	UJ	200 U	250 U	**370**	**50**	UJ	**370**	10 U	5 U	50 U	50	UJ	200 U	200 U	**3400 J**	**510**	**2900**	4000	**J**
591-78-6	2-Hexanone	µg/l	200 U	250 U	500 U	200 U	50	UJ	10 U	250 U	1000 U	1000 U	500	UJ	200 U	250 U	50 U	50	UJ	50 U	10 U	5 U	50 U	50	UJ	200 U	200 U	250 UL	2000 U	500 U	50	UJ
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	NA	NA	NA	25 U			NA	NA	100 UJ	200 U			NA	NA	NA			NA	NA	NA	NA			NA	NA	NA	NA	NA		
460-00-4	4-Bromofluorobenzene	µg/l	NA	NA	NA	25 U			NA	NA	100 UJ	200 U			NA	NA	NA			NA	NA	NA	NA			NA	NA	NA	NA	NA		
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	200 U	250 U	120 U	200 U	50	U	10 U	250 U	1000 U	1000 U	500	U	200 U	250 U	50 U	50	U	50 U	10 U	5 U	50 U	50	U	200 U	200 U	250 U	500 U	1000 U	50	U
67-64-1	Acetone	µg/l	200 U	250 U	250 U	200 U	110		10 U	250 U	1000 U	1000 U	500	U	200 U	250 U	**470**	**320**		**470**	10 U	5 U	100 U	50	U	200 U	200 U	250 UL	1000 U	**1400**	660	
71-43-2	Benzene	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
74-97-5	Bromochloromethane	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
75-27-4	Bromodichloromethane	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
75-25-2	Bromoform	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
74-83-9	Bromomethane	µg/l	100 U	25 UJ	25 UL	20 U	5	U	5 U	25 UJ	100 U	100 U	50	U	100 U	25 UJ	5 U	5	U	5 U	5 U	0.5 UJ	5 U	5	UL	100 U	100 U	25 U	100 UL	50 UJ	5	UL
75-15-0	Carbon Disulfide	µg/l	100 U	25 U	12 U	20 UJ	5	U	5 U	25 U	100 UJ	100 UJ	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
56-23-5	Carbon Tetrachloride	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	100 U	5	U
108-90-7	Chlorobenzene	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
75-00-3	Chloroethane	µg/l	100 U	25 U	12 U	20 U	5	UL	5 U	25 U	100 U	100 U	50	UL	100 U	25 U	5 U	5	UL	5 U	5 U	0.5 U	5 U	5	UL	100 U	100 U	25 U	50 U	50 U	5	UL
67-66-3	Chloroform	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	**20 J**	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
74-87-3	Chloromethane	µg/l	100 U	25 U	25 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	100 U	50 U	5	U
156-59-2	cis-1,2-Dichloroethene	µg/l	100 U	**450**	**340**	**160**	**190**		**53**	**440**	**96 J**	**100**	**110**		**140**	**1800**	**1200**	**5**	U	**402**	**22**	**17**	**18 K**	6.1	**K**	100 U	100 U	**27**	**74**	**170**	**38**	**K**
10061-01-5	cis-1,3-Dichloropropene	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 R	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	100 U	5	U
110-82-7	Cyclohexane	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 UJ	5	U	5 UJ	5 U	0.5 U	5 UJ	5	U	100 U	100 U	25 U	50 U	100 U	5	U
124-48-1	Dibromochloromethane	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
75-71-8	Dichlorodifluoromethane	µg/l	100 U	25 U	12 U	20 U	5	UJ	5 U	25 U	100 U	100 U	50	UJ	100 U	25 U	5 UL	5	UJ	5 UL	5 U	0.5 U	5 UL	5	UJ	100 U	100 U	25 U	50 U	100 UL	5	UJ
100-41-4	Ethylbenzene	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
462-06-6	Fluorobenzene	µg/l	NA	NA	NA	25 U			NA	NA	100 UJ	200 U			NA	NA	NA			NA	NA	NA	NA			NA	NA	NA	NA	NA		
98-82-8	Isopropylbenzene	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
108-38-3	m,p-Xylene	µg/l	100 U	25 U	**16**	20 U	9.7		5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
79-20-9	Methyl Acetate	µg/l	100 U	25 U	50 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	20 U	5	U	20 U	5 U	0.5 U	20 U	5	UJ	100 U	100 U	25 UL	200 U	50 U	5	UJ
1634-04-4	Methyl Tert-Butyl Ether	µg/l	100 U	25 U	12 UL	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 UL	50 U	5	U
108-87-2	Methylcylohexane	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 UJ	5	U	5 UJ	5 U	0.5 U	5 UJ	5	U	100 U	100 U	25 U	50 U	100 U	5	U
75-09-2	Methylene Chloride	µg/l	100 U	**66**	50 U	20 U	**5**	U	**15**	**74**	100 U	100 U	130		100 U	**73**	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	200 U	50 U	6.3	**K**
95-47-6	o-Xylene	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
100-42-5	Styrene	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 UJ	5	U	5 UJ	5 U	0.5 U	5 UJ	5	U	100 U	100 U	25 U	50 U	100 U	5	U
127-18-4	Tetrachloroethene	µg/l	100 U	**26**	12 U	20 U	**5**	U	**14**	25 U	100 U	100 U	50	U	100 U	**130**	**6.7**	**5**	U	**28.8**	**16**	**18**	**12**	5	U	100 U	100 U	25 U	50 U	50 U	**5**	U
108-88-3	Toluene	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 U	50 U	5	U
156-60-5	trans-1,2-Dichloroethene	µg/l	100 U	**43**	**48**	**28**	**45**		**53**	**52**	100 U	**37 J**	50	U	100 U	**96**	**100**	**35**		**50.6**	**9.1**	**7**	**7.7 K**	5	U	100 U	100 U	25 U	50 U	50 U	**19**	**K**
10061-02-6	trans-1,3-Dichloropropene	µg/l	100 U	25 U	12 UJ	20 U	5	U	5 U	25 U	100 R	100 U	50	U	100 U	25 U	5 U	5	U	5 U	5 U	0.5 U	5 U	5	U	100 U	100 U	25 U	50 UJ	100 U	5	U
79-01-6	Trichloroethene	µg/l	**1600**	**860**	**62**	**38**	**5**	U	**210**	**120**	**150**	**150**	**210**		**2000**	**1300**	**5.6**	**5**	U	**820**	**160**	**210**	**150**	**32**		**1100**	**990**	**250**	**230**	**350**	**31**	
75-69-4	Trichlorofluoromethane	µg/l	100 U	25 U	12 U	20 U	5	U	5 U	25 U	100 U	100 U	50	U	100 U	25 U	5 UJ	5	U	5 UJ	5 U	0.5 U	5 U	5	U	100 U	100 U	25 UJ	50 U	100 U	5	U
75-01-4	Vinyl Chloride	µg/l	100 U	**140**	**84**	20 U	**5**	U	**31**	**56**	100 U	100 U	52		100 U	**110**	**2000**	**6.8**		**279**	5 U	**1.1**	5 U	5	U	100 U	100 U	25 U	50 U	**52 L**	12	**K**

Notes:

Highlighted cells represent detected concentrations greater than the ROD
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

			MW-28I																					
			MW-28I	MW-28I	MW-28I	MW-28I	MW-28I	DPT1	DPT1	DPT1	DPT1	DPT2	DPT2	DPT3	DPT3	DPT3	DPT4	DPT5	DPT5	DPT6	DPT6	DPT6	DPT6
			6/23/2014	4/15/2015	12/8/2015	9/13/2016	11/10/2021	11/13/2009	11/13/2009	11/13/2009	11/13/2009	11/13/2009	11/13/2009	11/9/2009	11/9/2009	11/9/2009	11/9/2009	11/3/2009	11/19/2009	11/5/2009	11/5/2009	11/5/2009	11/5/2009
			MW-28I-RD8	MW-28I-RD1	MW-28I-R2	MW-28I-R3-091316	MW-28I-01	DPT1-A-15	DPT1-B-20	DPT1-C-30	DPT1-D-35	DPT2-A-15	DPT2-B-20	DPT103-A-15	DPT3-A-15	DPT3-B-20	DPT4-A-20	DPT5-A-20	DPT5-B-30	DPT101-B-20	DPT6-A-15	DPT6-B-20	DPT6-C-30
								11-15	16-20	26-30	31-35	11-15	16-20	11-15	11-15	16-20	16-20	16-20	26-30	16-20	11-15	16-20	26-30
CAS No.	Chemical	Unit																					
Volatile Organic Compounds																							
71-55-6	1,1,1-Trichloroethane	µg/l	5 U	0.5 U	10 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	13 UJ	0.5 U	50 U	13 U	13 U	13 U	0.5 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	**25**	**27 J**	**90**	42	5 U	13 UJ	13 U	0.5 UJ	0.5 UJ	0.5 UJ	**0.79 J**	**19**	**28**	**2.6**	**28**	0.5 U	50 U	13 U	**15**	13 U	0.5 U
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	5 U	0.5 U	10 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 UJ	**0.55 J**	**0.7**	**33**	**85**	0.5 U	50 U	13 U	**4.7 J**	13 U	0.5 U
79-00-5	1,1,2-Trichloroethane	µg/l	**5.1**	**3.4**	**10**	6.7	5 U	13 U	13 U	0.5 U	0.5 U	**1.1**	**10**	**13**	**14**	**6.2**	**58**	**14**	**840**	13 U	**45**	**40**	**2.1**
75-34-3	1,1-Dichloroethane	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	**0.19 J**	0.5 U	0.5 U	**2.7**	13 U	**0.14 J**	50 U	13 U	13 U	13 U	0.5 U
75-35-4	1,1-Dichloroethene	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
87-61-6	1,2,3-Trichlorobenzene	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 UJ	13 U	13 U	13 U	0.5 U
120-82-1	1,2,4-Trichlorobenzene	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	5 U	**2.2 J**	10 U	5 U	5 U	13 UJ	13 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	**0.81**	0.5 U	13 U	**0.38 J**	50 U	13 U	13 U	13 U	0.5 U
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-93-4	1,2-Dibromoethane	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	13 U	0.5 U	**69**	13 U	13 U	13 U	0.5 U
106-93-4	1,2-Dibromoethane - SIM	µg/l	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
107-06-2	1,2-Dichloroethane	µg/l	**12**	**8.3**	**21 K**	**18**	**6.35**	13 U	13 U	**0.56**	**0.48 J**	**15**	**260**	**1.9 J**	**2.1**	**5.9**	**160**	**450**	**41000**	**1600**	**380**	**1900**	**210**
78-87-5	1,2-Dichloropropane	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
541-73-1	1,3-Dichlorobenzene	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
106-46-7	1,4-Dichlorobenzene	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
107-04-0	1-Bromo-2-Chloroethane	µg/l	5 U	0.5 U	5 U	**5** U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-93-3	2-Butanone (MEK)	µg/l	10 U	5 U	50 U	50 UJ	10 U	130 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	130 U	**1.4 J**	500 U	130 U	130 U	130 U	5 U
591-78-6	2-Hexanone	µg/l	10 U	5 U	50 U	50 UJ	10 U	130 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	130 U	5 U	500 U	130 U	130 U	130 U	5 U
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
460-00-4	4-Bromofluorobenzene	µg/l	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	10 U	5 U	100 U	50 U	10 U	130 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	130 U	5 U	500 U	130 U	130 U	130 U	5 U
67-64-1	Acetone	µg/l	10 U	5 U	50 U	50 U	10 U	130 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	130 U	5 U	500 U	130 U	130 U	130 U	5 U
71-43-2	Benzene	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	**0.29 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
74-97-5	Bromochloromethane	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
75-27-4	Bromodichloromethane	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
75-25-2	Bromoform	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
74-83-9	Bromomethane	µg/l	5 U	0.5 UJ	5 UJ	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 UJ	0.5 U
75-15-0	Carbon Disulfide	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	**0.28 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
56-23-5	Carbon Tetrachloride	µg/l	5 U	0.5 U	10 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	**2.9 J**	0.5 UJ	0.5 UJ	0.5 UJ	13 UJ	0.5 U	50 U	13 U	13 U	13 U	0.5 U
108-90-7	Chlorobenzene	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
75-00-3	Chloroethane	µg/l	5 U	0.5 U	5 U	5 UL	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
67-66-3	Chloroform	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	**6.2 J**	**0.32 J**	0.5 U	**0.58**	**7.4**	0.5 U	0.5 U	0.5 U	13 U	**1.2**	50 U	13 U	13 U	13 U	0.5 U
74-87-3	Chloromethane	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
156-59-2	cis-1,2-Dichloroethene	µg/l	**27**	**17**	**44 K**	38	5 U	13 U	13 U	0.5 U	0.5 U	**0.88**	**6.3**	**18 J**	**20 J**	**70 J**	**79 J**	**20**	**34 J**	**3.6 J**	**11 J**	**3.7 J**	**0.42 J**
10061-01-5	cis-1,3-Dichloropropene	µg/l	5 U	0.5 U	10 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
110-82-7	Cyclohexane	µg/l	5 U	0.5 U	10 U	5 U	5 U	**200**	**470 J**	**0.12 J**	**0.21 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
124-48-1	Dibromochloromethane	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
75-71-8	Dichlorodifluoromethane	µg/l	5 U	0.5 U	10 UL	5 UJ	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
100-41-4	Ethylbenzene	µg/l	5 U	0.5 U	5 U	5 U	5 U	**8 J**	**86**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	**2.6 J**	13 U	13 U	0.5 U
462-06-6	Fluorobenzene	µg/l	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
98-82-8	Isopropylbenzene	µg/l	5 U	0.5 U	5 U	5 U	5 U	**42**	**94**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
108-38-3	m,p-Xylene	µg/l	5 U	0.5 U	5 U	5 U	5 U	**4.2 J**	**69**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	**4.4 J**	13 U	13 U	0.5 U
79-20-9	Methyl Acetate	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
1634-04-4	Methyl Tert-Butyl Ether	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	**0.98 J**	0.5 UJ	0.5 U	0.5 U	13 U	**0.2 J**	50 U	13 U	13 U	13 U	0.5 U
108-87-2	Methylcylohexane	µg/l	5 U	0.5 U	10 U	5 U	5 U	**240**	**180 J**	**0.19 J**	**0.44 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
75-09-2	Methylene Chloride	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	**14**	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	**1.1**
95-47-6	o-Xylene	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	**6.3 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
100-42-5	Styrene	µg/l	5 U	0.5 U	10 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
127-18-4	Tetrachloroethene	µg/l	**19**	**16**	**26**	**37**	**23.4**	13 U	13 U	0.5 U	0.5 U	**1.2**	**3.4**	**4.6**	**5 J**	**14 J**	**48**	**140**	**29 J**	**2.8 J**	**4.7 J**	**2 J**	0.5 U
108-88-3	Toluene	µg/l	5 U	0.5 U	5 U	5 U	5 U	13 U	**11 J**	**0.17 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.33 J**	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
156-60-5	trans-1,2-Dichloroethene	µg/l	**8.2**	**4.8**	**9.3 K**	9.1	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	**0.24 J**	**2.3 J**	**2.4 J**	**2.5 J**	**11 J**	**0.2 J**	50 U	**13 J**	**5.8 J**	**9.6 J**	0.5 U
10061-02-6	trans-1,3-Dichloropropene	µg/l	5 U	0.5 U	10 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
79-01-6	Trichloroethene	µg/l	**110**	**76**	**140**	**140**	**22.2**	13 U	13 U	**13**	**11**	**3.4**	**10**	**100**	**99 J**	**150 J**	**450**	**20**	**910**	**24**	**28**	**22**	**0.68**
75-69-4	Trichlorofluoromethane	µg/l	5 U	0.5 U	10 U	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	13 U	0.5 U	50 U	13 U	13 U	13 U	0.5 U
75-01-4	Vinyl Chloride	µg/l	5 U	**0.6**	5 UL	5 U	5 U	13 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	**0.37 J**	50 U	13 U	13 U	13 UJ	0.5 U

Notes:

Highlighted cells represent detected concentrations greater than the ROD
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

CAS No.	Chemical	Unit	DPT7 11/18/2009 DPT7-A-15 11-15	DPT7 11/18/2009 DPT7-B-20 16-20	DPT7 11/18/2009 DPT7-C-30 26-30	DPT7 11/18/2009 DPT7-D-36 32-36	DPT8 11/4/2009 DPT8-A-15 11-15	DPT8 11/4/2009 DPT8-B-25 21-25	DPT8 11/4/2009 DPT8-C-30 26-30	DPT8 11/4/2009 DPT8-D-37 33-37	DPT9 11/4/2009 DPT9-A-15 11-15	DPT9 11/4/2009 DPT9-B-20 16-20	DPT9 11/4/2009 DPT9-C-30 26-30	DPT9 11/4/2009 DPT9-D-38 34-38	DPT10 11/18/2009 DPT10-A-15 11-15	DPT10 11/18/2009 DPT10-B-20 16-20	DPT10 11/18/2009 DPT10-C-30 26-30	DPT11 11/19/2009 DPT11-A-15 11-15	DPT11 11/19/2009 DPT11-B-20 16-20	DPT11 11/19/2009 DPT11-C-30 26-30	DPT11 11/19/2009 DPT11-D-38 34-38	DPT12 11/5/2009 DPT12-A-15 11-15	DPT12 11/5/2009 DPT12-B-20 16-20	DPT12 11/5/2009 DPT12-C-36 32-36	DPT13 11/6/2009 DPT102-A-15 11-15	DPT13 11/6/2009 DPT13-A-15 11-15	DPT13 11/6/2009 DPT13-B-20 16-20
Volatile Organic Compounds																											
71-55-6	1,1,1-Trichloroethane	µg/l	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	**0.14 J**	0.5 UJ	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 UJ	0.5 UJ	13 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 UJ	0.5 UJ	13 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	**5.2 J**	13 U	**34**
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 UJ	0.5 UJ	13 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
79-00-5	1,1,2-Trichloroethane	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**210**	**1300**	0.5 U	0.5 U	**95**	**14**	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**5.1 J**	13 U	**27**
75-34-3	1,1-Dichloroethane	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.22 J**	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.13 J**	0.5 U	0.5 U	13 U	13 U	13 U
75-35-4	1,1-Dichloroethene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**15 J**	**86**	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
87-61-6	1,2,3-Trichlorobenzene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
120-82-1	1,2,4-Trichlorobenzene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	**2.5**	13 U	0.5 U	0.5 U	13 U	13 U	0.5 UJ	0.5 UJ	13 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	13 U	13 U	**20**
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-93-4	1,2-Dibromoethane	µg/l	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	**13 J**	**57**	0.5 U	0.5 U	13 U	13 U	0.5 UJ	0.5 UJ	13 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
106-93-4	1,2-Dibromoethane - SIM	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	**0.34 J**	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
107-06-2	1,2-Dichloroethane	µg/l	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	**0.28 J**	**47 J**	**1300 J**	**940**	**0.92**	0.5 U	**230**	**130**	0.5 UJ	0.5 UJ	**410**	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	**1.1**	**2.9**	**17**	**470**	**450**	**50**
78-87-5	1,2-Dichloropropane	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.84**	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
541-73-1	1,3-Dichlorobenzene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
106-46-7	1,4-Dichlorobenzene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	**0.24 J**	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
107-04-0	1-Bromo-2-Chloroethane	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-93-3	2-Butanone (MEK)	µg/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U	130 U	5 U	5 U	130 U	130 U	5 U	5 UJ	130 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	130 U	130 U	130 U
591-78-6	2-Hexanone	µg/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U	130 U	5 U	5 U	130 U	130 U	5 U	5 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	130 U	130 U	130 U
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
460-00-4	4-Bromofluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	5 U	5 U	5 U	5 U	5 U	5 U	5 U	130 U	5 U	5 U	130 U	130 U	5 U	5 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	130 U	130 U	130 U
67-64-1	Acetone	µg/l	5 U	5 U	5 U	5 U	5 U	**1.1 J**	**1.4 J**	130 U	5 U	5 U	130 U	130 U	5 U	5 U	130 U	5 U	5 U	5 U	**4.3 J**	5 U	**2.7 J**	5 U	130 U	**56 J**	130 U
71-43-2	Benzene	µg/l	**1.3**	**1.2**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	13 U	0.5 U	0.5 U	13 U	13 U	**0.18 J**	0.5 U	13 U	0.5 U	0.5 U	0.5 U	**0.22 J**	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
74-97-5	Bromochloromethane	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
75-27-4	Bromodichloromethane	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.48 J**	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
75-25-2	Bromoform	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
74-83-9	Bromomethane	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
75-15-0	Carbon Disulfide	µg/l	**0.14 J**	**0.21 J**	0.5 U	0.5 U	0.5 U	0.5 U	**0.093 J**	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.29 J**	0.5 U	13 U	13 U	13 U
56-23-5	Carbon Tetrachloride	µg/l	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 UJ	0.5 UJ	13 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
108-90-7	Chlorobenzene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.18 J**	13 U	0.5 U	0.5 U	13 U	13 U	**8.4**	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
75-00-3	Chloroethane	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	**0.52**	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
67-66-3	Chloroform	µg/l	0.5 U	0.5 U	0.5 U	**0.61**	0.5 U	**1.8**	**6.6**	13 U	**16**	0.5 U	**17**	13 U	0.5 U	0.5 U	13 U	0.5 U	**0.34 J**	**0.35 J**	**0.53**	**15**	**44 J**	0.5 U	13 U	13 U	13 U
74-87-3	Chloromethane	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	**3.5 J**	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	**1.4**	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
156-59-2	cis-1,2-Dichloroethene	µg/l	**2.1**	**2.2**	0.5 U	**1.5**	0.5 U	**0.25 J**	**4.1 J**	13 U	0.5 U	0.5 U	13 U	13 U	**0.28 J**	**0.67**	13 U	**7.8**	**2.3**	**4.3**	**0.14 J**	**0.19 J**	**0.28 J**	**0.17 J**	13 U	13 U	**18**
10061-01-5	cis-1,3-Dichloropropene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
110-82-7	Cyclohexane	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	**0.21 J**	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
124-48-1	Dibromochloromethane	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.13 J**	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
75-71-8	Dichlorodifluoromethane	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
100-41-4	Ethylbenzene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	**0.11 J**	**3.4 J**	**2.9 J**	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.13 J**	0.5 U	0.5 U	13 U	13 U	13 U
462-06-6	Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
98-82-8	Isopropylbenzene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	**0.15 J**	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
108-38-3	m,p-Xylene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.12 J**	13 U	0.5 U	**0.16 J**	**5.2 J**	**4.2 J**	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.44 J**	0.5 U	0.5 U	13 U	13 U	13 U
79-20-9	Methyl Acetate	µg/l	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 UJ	0.5 UJ	13 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
1634-04-4	Methyl Tert-Butyl Ether	µg/l	**1.7 J**	**0.19 J**	**0.12 J**	0.5 UJ	0.5 U	0.5 UJ	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 UJ	0.5 UJ	13 U	**0.2 J**	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
108-87-2	Methylcylohexane	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
75-09-2	Methylene Chloride	µg/l	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	**30 J**	**140**	**1.1**	0.5 U	**36**	**31**	0.5 UJ	0.5 UJ	13 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	**16**	0.5 U	0.5 U	**31**	13 U	13 U
95-47-6	o-Xylene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.2 J**	13 U	0.5 U	0.5 U	**2.5 J**	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.12 J**	0.5 U	0.5 U	13 U	13 U	13 U
100-42-5	Styrene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
127-18-4	Tetrachloroethene	µg/l	0.5 U	0.5 U	**0.62**	**2.2**	**0.64**	**0.36 J**	**6.6**	**35**	**0.3 J**	0.5 U	**9.4 J**	13 U	0.5 U	**0.61**	13 U	**0.55**	**0.21 J**	0.5 U	**0.3 J**	**0.13 J**	**1.2**	**0.18 J**	13 U	13 U	13 U
108-88-3	Toluene	µg/l	**0.25 J**	**0.14 J**	**0.22 J**	**0.17 J**	0.5 U	0.5 U	**0.29 J**	13 U	**0.16 J**	0.5 U	13 U	13 U	**0.16 J**	**0.27 J**	13 U	**0.11 J**	0.5 U	0.5 U	**0.72**	**0.25 J**	**0.17 J**	0.5 U	13 U	13 U	13 U
156-60-5	trans-1,2-Dichloroethene	µg/l	0.5 U	**0.31 J**	0.5 U	0.5 U	0.5 U	0.5 U	**1.2 J**	**5.6 J**	0.5 U	0.5 U	13 U	13 U	0.5 U	**0.3 J**	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	13 U	**12 J**
10061-02-6	trans-1,3-Dichloropropene	µg/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	**5.7 J**	13 U
79-01-6	Trichloroethene	µg/l	**0.6**	**25**	**1.3**	**21**	**6.5**	**2.1**	**110**	**570**	**1.1**	0.5 U	**65**	**7.8 J**	0.5 U	**1.7**	**4.8 J**	**17**	**3.3**	**7.4**	**0.44 J**	**0.23 J**	**1.4**	**0.32 J**	13 U	13 U	**68**
75-69-4	Trichlorofluoromethane	µg/l	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 U	13 U	0.5 U	0.5 U	13 U	13 U	0.5 UJ	0.5 UJ	13 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	13 U	13 U	13 U
75-01-4	Vinyl Chloride	µg/l	**2.3**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**3.2**	**16**	0.5 U	0.5 U	**3.7 J**	13 U	0.5 U	**0.19 J**	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U	**12 J**	13 U

Notes:

Highlighted cells represent detected concentrations greater than the ROD
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

CAS No.	Chemical	Unit	DPT13 11/6/2009 DPT13-C-30 26-30	DPT14 11/19/2009 DPT14-A-15 11-15	DPT14 11/19/2009 DPT14-B-20 16-20	DPT14 11/19/2009 DPT14-C-30 26-30	DPT14 11/19/2009 DPT14-D-40 36-40	DPT15 11/6/2009 DPT15-A-20 16-20	DPT15 11/6/2009 DPT15-B-30 26-30	DPT15 11/6/2009 DPT15-C-40 36-40	DPT16 11/12/2009 DPT16-A-15 11-15	DPT16 11/12/2009 DPT16-B-20 16-20	DPT16 11/12/2009 DPT16-C-30 26-30	DPT16 11/12/2009 DPT16-D-44 40-44	DPT17 11/12/2009 DPT17-A-15 11-15	DPT17 11/12/2009 DPT17-B-20 16-20	DPT17 11/12/2009 DPT17-C-30 26-30	DPT17 11/12/2009 DPT17-D-38 34-38	DPT18 11/10/2009 DPT104-C-30 11-30	DPT18 11/10/2009 DPT18-A-15 11-15	DPT18 11/10/2009 DPT18-B-20 16-20	DPT18 11/10/2009 DPT18-C-30 26-30	DPT18 11/10/2009 DPT18-D-39 35-39	DPT19 11/10/2009 DPT19-A-15 11-15	DPT19 11/10/2009 DPT19-B-20 16-20	DPT19 11/10/2009 DPT19-C-30 26-30	DPT19 11/10/2009 DPT19-D-35 31-35	DPT20 11/11/2009 DPT105-C-39 35-39
Volatile Organic Compounds																											
71-55-6	1,1,1-Trichloroethane	µg/l	13 U	13 U	13 U	0.5 UJ	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	13 UJ
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	13 U	13 U	13 U	**23 J**	25 U	**22**	**120**	13 U	13 U	13 U	0.5 U	13 U	0.5 UJ	0.5 U	0.5 U	**7.4**	0.5 U	0.5 U	0.5 U	0.5 UJ	**4.8 J**	0.5 UJ	0.5 UJ	0.5 UJ	13 UJ
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	13 U	13 U	13 U	0.5 UJ	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	**3.3**	0.5 U	0.5 U	0.5 UJ	0.5 UJ	**3.7 J**	0.5 UJ	0.5 UJ	0.5 UJ	13 UJ
79-00-5	1,1,2-Trichloroethane	µg/l	**130**	**37**	**17**	**61**	**330**	**14**	**33**	**52**	13 U	13 U	0.5 U	**43**	0.5 U	0.5 U	0.5 U	**48**	0.5 U	0.5 U	0.5 U	0.5 U	**44**	0.5 U	0.5 U	**2.6**	**3.9**	**200**
75-34-3	1,1-Dichloroethane	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	13 U
75-35-4	1,1-Dichloroethene	µg/l	**30**	13 U	13 U	**6.9 J**	25 U	13 U	13 U	**110 J**	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	**1.7**	0.5 U	0.5 U	0.5 U	0.5 U	**2.2**	0.5 U	0.5 U	0.5 U	13 U
87-61-6	1,2,3-Trichlorobenzene	µg/l	13 U	13 UJ	13 UJ	0.5 UJ	25 UJ	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
120-82-1	1,2,4-Trichlorobenzene	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	**11 J**	13 U	13 U	**2.9**	25 U	13 U	13 U	**140**	13 U	13 U	0.5 U	13 U	0.5 UJ	0.5 U	0.5 U	**0.67**	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	13 UJ
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-93-4	1,2-Dibromoethane	µg/l	13 U	13 U	13 U	**1.1 J**	25 U	13 U	13 U	**24**	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	13 UJ
106-93-4	1,2-Dibromoethane - SIM	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	µg/l	13 U	13 U	13 U	**21 J**	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
107-06-2	1,2-Dichloroethane	µg/l	**660**	**1400**	**260**	**570 J**	**2800**	**220**	**220**	**290**	13 U	**3.3 J**	0.5 U	**73**	0.5 U	0.5 U	0.5 U	**0.32 J**	0.5 U	**0.59**	0.5 UJ	0.5 UJ	**200**	0.5 UJ	**1.4 J**	**2.5 J**	**0.73 J**	**8400**
78-87-5	1,2-Dichloropropane	µg/l	**26**	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	**32**	13 U	0.5 U	0.5 U	0.5 U	**0.63**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
541-73-1	1,3-Dichlorobenzene	µg/l	13 U	13 U	13 U	**1.9**	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
106-46-7	1,4-Dichlorobenzene	µg/l	13 U	13 U	13 U	**1.4**	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
107-04-0	1-Bromo-2-Chloroethane	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-93-3	2-Butanone (MEK)	µg/l	130 U	130 U	130 U	5 U	250 U	130 U	130 U	130 U	130 U	130 U	5 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	130 U
591-78-6	2-Hexanone	µg/l	130 U	130 U	130 U	5 U	250 U	130 U	130 U	130 U	130 U	130 U	5 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	130 U
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
460-00-4	4-Bromofluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	130 U	130 U	130 U	5 U	250 U	130 U	130 U	130 U	130 U	130 U	5 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	130 U
67-64-1	Acetone	µg/l	130 U	130 U	130 U	5 U	250 U	130 U	130 U	130 U	130 U	130 U	5 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	**2.1 J**	**1.4 J**	**1.4 J**	5 U	5 U	**1.9 J**	5 U	130 U
71-43-2	Benzene	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**5.4**	**0.74**	0.5 U	0.5 U	13 U
74-97-5	Bromochloromethane	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	13 U
75-27-4	Bromodichloromethane	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
75-25-2	Bromoform	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	**5.2 J**	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	13 U
74-83-9	Bromomethane	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
75-15-0	Carbon Disulfide	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	**0.11 J**	13 U	0.5 U	0.5 U	0.5 U	**0.15 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.22 J**	13 U
56-23-5	Carbon Tetrachloride	µg/l	13 U	13 U	13 U	0.5 UJ	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	13 UJ
108-90-7	Chlorobenzene	µg/l	13 U	13 U	13 U	**1.1**	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
75-00-3	Chloroethane	µg/l	**10 J**	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
67-66-3	Chloroform	µg/l	**10 J**	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	**7.7 J**	**0.69**	13 U	0.5 U	0.5 U	**0.32 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	13 U
74-87-3	Chloromethane	µg/l	**6.3 J**	13 U	13 U	0.5 U	25 U	**5.7 J**	13 U	**4.2 J**	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
156-59-2	cis-1,2-Dichloroethene	µg/l	**26**	**160**	**26**	**390 J**	**110**	**15**	**38**	**380 J**	13 U	13 U	**0.95**	**3.3 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.61**	0.5 U	0.5 U	**1.3**	**1**	**24**
10061-01-5	cis-1,3-Dichloropropene	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
110-82-7	Cyclohexane	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**35**	**16**	0.5 U	0.5 U	13 U
124-48-1	Dibromochloromethane	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
75-71-8	Dichlorodifluoromethane	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
100-41-4	Ethylbenzene	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.11 J**	0.5 U	**0.13 J**	**250**	**4.5**	0.5 U	**0.19 J**	13 U
462-06-6	Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
98-82-8	Isopropylbenzene	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.14 J**	0.5 U	**0.34 J**	**55**	**7.6**	**0.2 J**	0.5 U	13 U
108-38-3	m,p-Xylene	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.3 J**	**0.2 J**	**0.38 J**	**13**	**6.1**	**0.26 J**	**0.19 J**	13 U
79-20-9	Methyl Acetate	µg/l	13 U	13 U	13 U	0.5 UJ	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	13 UJ
1634-04-4	Methyl Tert-Butyl Ether	µg/l	13 U	13 U	13 U	0.5 UJ	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	13 UJ
108-87-2	Methylcylohexane	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.52**	**9.4**	**9.4**	**0.88**	**0.45 J**	13 U
75-09-2	Methylene Chloride	µg/l	13 U	**15**	13 U	**3 J**	25 U	**46**	13 U	13 U	**18**	**11 J**	**0.75**	**8.3 J**	**0.28 J**	**0.47 J**	**0.26 J**	**0.44 J**	0.5 U	**1.2**	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	**15 J**
95-47-6	o-Xylene	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.12 J**	0.5 U	**0.19 J**	0.5 U	13 U
100-42-5	Styrene	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
127-18-4	Tetrachloroethene	µg/l	**24**	13 U	13 U	**4.9**	25 U	13 U	13 U	**43**	**160**	**250**	**8.1**	**100**	**0.34 J**	**0.21 J**	0.5 U	**20**	0.5 U	**4.9**	**1.9**	0.5 U	**26**	**0.15 J**	**0.11 J**	**3.8**	**5.4**	**17**
108-88-3	Toluene	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	**0.12 J**	13 U	0.5 U	0.5 U	0.5 U	**0.15 J**	0.5 U	0.5 U	**0.23 J**	**0.2 J**	**0.2 J**	**2.5**	**0.81**	**0.21 J**	**0.15 J**	13 U
156-60-5	trans-1,2-Dichloroethene	µg/l	**12 J**	**69**	**12 J**	**230 J**	**44**	**5.3 J**	13 U	**170 J**	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	**0.82**	0.5 U	0.5 U	0.5 U	0.5 U	**0.68**	0.5 U	0.5 U	0.5 U	**0.36 J**	**9.9 J**
10061-02-6	trans-1,3-Dichloropropene	µg/l	13 U	13 U	13 U	0.5 U	25 U	13 U	13 U	13 U	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U
79-01-6	Trichloroethene	µg/l	**330**	**330**	**110**	**980**	**1500**	**94**	**330**	**340**	**2.6 J**	13 U	**0.92**	**110**	0.5 U	0.5 U	0.5 U	**97**	0.5 U	**0.42 J**	**0.9**	0.5 U	**99**	**0.68**	0.5 U	**7.9**	**14**	**330**
75-69-4	Trichlorofluoromethane	µg/l	13 U	13 U	13 U	0.5 UJ	25 U	13 U	13 U	13 U	13 U	**4.5 J**	0.5 U	13 U	0.5 U	**0.17 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	13 UJ
75-01-4	Vinyl Chloride	µg/l	**29**	**18**	13 U	**40**	25 U	13 U	13 U	**32**	13 U	13 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	13 U

Notes:

Highlighted cells represent detected concentrations greater than the ROD
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 1-2
Groundwater VOC Results
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

CAS No.	Chemical	Unit	DPT20 11/11/2009 DPT20-A-15 11-15	DPT20 11/11/2009 DPT20-B-20 16-20	DPT20 11/11/2009 DPT20-C-39 35-39	DPT21 11/11/2009 DPT21-A-15 11-15	DPT21 11/11/2009 DPT21-B-20 16-20	DPT21 11/11/2009 DPT21-C-30 26-30	DPT21 11/11/2009 DPT21-D-38 34-38	DPT22 11/16/2009 DPT22-A-15 11-15	DPT22 11/16/2009 DPT22-B-20 16-20	DPT22 11/16/2009 DPT22-C-30 26-30	DPT22 11/16/2009 DPT22-D-40 36-40	DPT24 11/17/2009 DPT24-A-15 11-15	DPT24 11/17/2009 DPT24-B-20 16-20	DPT24 11/17/2009 DPT24-C-30 26-30	DPT24 11/17/2009 DPT24-D-40 36-40	DPT24 11/17/2009 DPT24-E-50 46-50	DPT25 11/16/2009 DPT25-A-15 11-15	DPT25 11/16/2009 DPT25-B-20 16-20	DPT25 11/16/2009 DPT25-C-30 26-30	DPT25 11/16/2009 DPT25-D-40 36-40	DPT26 11/20/2009 DPT26-A-15 11-15	DPT26 11/20/2009 DPT26-B-20 16-20	DPT26 11/20/2009 DPT26-C-30 26-30	DPT26 11/20/2009 DPT26-D-40 36-40	DPT27 3/2/2011 DPT27-A-20 16-20	DPT27 3/2/2011 DPT27-B-25 21-25	DPT27 3/2/2011 DPT127-B-25 16-20	DPT28 3/3/2011 DPT28-A-15 11-15	DPT28 3/3/2011 DPT28-C-35 21-25	DPT29 3/3/2011 DPT29-B-25 21-25
Volatile Organic Compounds																															
71-55-6	1,1,1-Trichloroethane	µg/l	0.5 UJ	0.5 UJ	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	**0.13 J**	**0.13 J**	**0.11 J**	0.5 U	**0.28 J**	**0.4 J**	**0.42 J**	**7.6**	**3.1**	0.5 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/l	0.5 UJ	0.5 UJ	13 U	0.5 U	13 U	13 UJ	13 U	0.5 U	0.5 U	0.5 U	13 U	**11**	**3.5**	**49**	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
76-13-1	1,1,2-Trichlorotrifluoroethane	µg/l	0.5 UJ	0.5 UJ	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**45**	**73 J**	**70**	0.5 U	0.5 U	0.5 U
79-00-5	1,1,2-Trichloroethane	µg/l	0.5 U	**39 J**	**210**	0.5 U	**19**	**27**	13 U	0.5 U	0.5 U	0.5 U	13 U	**0.77**	**0.62**	**0.59**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.61**	0.5 U	0.5 U
75-34-3	1,1-Dichloroethane	µg/l	0.5 U	**0.29 J**	13 U	0.5 U	13 U	13 U	13 U	0.5 U	**0.16 J**	**0.18 J**	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**10**	**8.8**	**2.7**	**0.2 J**	**6.4**	**6.8**	**7**	**250**	**24 J**	0.5 U
75-35-4	1,1-Dichloroethene	µg/l	0.5 U	**6.8 J**	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	**2.4**	**15**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.9**	**1.2**	**1.4**	**7.8 J**	**43 J**	0.5 U
87-61-6	1,2,3-Trichlorobenzene	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
120-82-1	1,2,4-Trichlorobenzene	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.12 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
96-12-8	1,2-Dibromo-3-Chloropropane	µg/l	0.5 UJ	0.5 UJ	13 U	0.5 U	13 U	13 UJ	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
96-12-8	1,2-Dibromo-3-Chloropropane - SIM	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-93-4	1,2-Dibromoethane	µg/l	0.5 UJ	**0.23 J**	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
106-93-4	1,2-Dibromoethane - SIM	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.15 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
107-06-2	1,2-Dichloroethane	µg/l	**0.86 J**	**2100**	**7700**	**5.7**	**1400**	**1400**	**170**	**0.24 J**	**0.43 J**	**0.56**	**100**	0.5 U	**0.56**	**0.16 J**	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.56**	0.5 U	**0.57**	**2.5 J**	**0.46 J**	0.5 U
78-87-5	1,2-Dichloropropane	µg/l	0.5 U	0.5 U	**6 J**	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
541-73-1	1,3-Dichlorobenzene	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.12 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
106-46-7	1,4-Dichlorobenzene	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.17 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
107-04-0	1-Bromo-2-Chloroethane	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1073-06-9	1-Bromo-3-Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-93-3	2-Butanone (MEK)	µg/l	5 UJ	5 U	130 U	5 U	130 U	130 U	130 U	5 U	5 U	5 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
591-78-6	2-Hexanone	µg/l	5 U	5 U	130 U	5 U	130 U	130 U	130 U	5 U	5 U	5 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
328-84-7	3,4-Dichlorobenzotrifluoride	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
460-00-4	4-Bromofluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
108-10-1	4-Methyl-2-Pentanone (MIBK)	µg/l	5 U	5 U	130 U	5 U	130 U	130 U	130 U	5 U	5 U	5 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
67-64-1	Acetone	µg/l	**4.2 J**	5 U	130 U	5 U	130 U	130 U	130 U	5 U	**1.9 J**	5 U	130 U	**0.97 J**	**0.97 J**	**1.1 J**	5 U	**2.9 J**	**1.3 J**	**1.4 J**	5 U	**2.5 J**	5 U	5 U	5 U	**1.8 J**	5 U	5 U	5 U	5 U	5 U	5 U
71-43-2	Benzene	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	**18**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**2.1**	**0.19 J**	0.5 U	**0.21 J**	**0.17 J**	0.5 U	**0.23 J**	0.5 U	0.5 U
74-97-5	Bromochloromethane	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
75-27-4	Bromodichloromethane	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
75-25-2	Bromoform	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
74-83-9	Bromomethane	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
75-15-0	Carbon Disulfide	µg/l	**0.24 J**	**0.19 J**	13 U	**0.21 J**	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.32 J**	**0.34 J**	**0.27 J**	0.5 U	0.5 U	0.5 U	0.5 U	**0.14 J**	0.5 U
56-23-5	Carbon Tetrachloride	µg/l	0.5 UJ	0.5 UJ	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	**0.77**	**0.73**	**0.66**	**0.56**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.59**
108-90-7	Chlorobenzene	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
75-00-3	Chloroethane	µg/l	0.5 U	**0.78**	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**2.7 J**	**0.48 J**	0.5 U
67-66-3	Chloroform	µg/l	0.5 U	**0.37 J**	13 U	0.5 U	13 U	**6 J**	13 U	0.5 U	0.5 U	0.5 U	**440**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**1.6**
74-87-3	Chloromethane	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
156-59-2	cis-1,2-Dichloroethene	µg/l	0.5 U	**47 J**	**21**	**11**	**50**	**3.2 J**	13 U	0.5 U	**1.1**	**44 J**	**6700**	**0.27 J**	**0.49 J**	**1.8**	0.5 U	0.5 U	0.5 U	**0.43 J**	**4.7**	0.5 U	**2**	**3.4**	**16**	**0.2 J**	**33**	**38**	**38**	**85**	**1200**	0.5 U
10061-01-5	cis-1,3-Dichloropropene	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
110-82-7	Cyclohexane	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.18 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
124-48-1	Dibromochloromethane	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
75-71-8	Dichlorodifluoromethane	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
100-41-4	Ethylbenzene	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
462-06-6	Fluorobenzene	µg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
98-82-8	Isopropylbenzene	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
108-38-3	m,p-Xylene	µg/l	0.5 U	0.5 U	13 U	**0.24 J**	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.13 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
79-20-9	Methyl Acetate	µg/l	0.5 UJ	0.5 UJ	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1634-04-4	Methyl Tert-Butyl Ether	µg/l	**0.31 J**	**0.17 J**	13 U	**0.7**	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	**1.8**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.16 J**	**0.26 J**	**0.22 J**	0.5 U	0.5 U	0.5 U
108-87-2	Methylcylohexane	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
75-09-2	Methylene Chloride	µg/l	**0.55 J**	**0.43 J**	**26**	0.5 U	13 U	13 U	13 U	0.5 U	**1.4**	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.58 U	0.71 U	0.6 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
95-47-6	o-Xylene	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
100-42-5	Styrene	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
127-18-4	Tetrachloroethene	µg/l	0.5 U	**5.8**	**19**	**0.62**	13 U	13 U	13 U	**0.28 J**	**0.31 J**	0.5 U	13 U	**1.1**	**0.95**	**11**	**11**	**0.58**	**0.5 J**	**3.1**	**19**	**8.7**	**0.23 J**	**0.35 J**	**0.33 J**	**0.44 J**	**11**	**10**	**11**	0.5 U	**0.19 J**	0.5 U
108-88-3	Toluene	µg/l	**0.27 J**	**0.17 J**	13 U	**0.93**	13 U	13 U	13 U	0.5 U	0.5 U	**0.13 J**	13 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.3 J**	0.5 U	0.5 U	**0.13 J**	**0.23 J**	**0.12 J**	**0.21 J**	**0.37 J**	**0.42 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
156-60-5	trans-1,2-Dichloroethene	µg/l	0.5 U	**6.9 J**	**9.7 J**	**0.57**	**3.6 J**	13 U	13 U	0.5 UJ	0.5 U	**0.4 J**	**10 J**	0.5 U	0.5 U	**0.21 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.25 J**	**0.26 J**	**0.14 J**	0.5 U	**0.74**	**0.65**	**0.54**	**0.75 J**	**26 J**	0.5 U
10061-02-6	trans-1,3-Dichloropropene	µg/l	0.5 U	0.5 U	13 U	0.5 U	13 U	13 U	13 U	0.5 U	0.5 U	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
79-01-6	Trichloroethene	µg/l	0.5 U	**67 J**	**330**	**0.5**	**40**	**54**	**30**	**7.6**	**6.6**	**12**	**4500**	**5.2**	**3.7**	**31**	**10**	0.5 U	**0.26 J**	**0.54**	**1.2**	**0.29 J**	**0.2 J**	0.5 U	**0.2 J**	**0.15 J**	**32**	**37**	**42**	**4.6**	**12000**	**0.88**
75-69-4	Trichlorofluoromethane	µg/l	0.5 UJ	0.5 UJ	13 U	0.5 U	13 U	13 U	13 U	**0.24 J**	**0.24 J**	0.5 U	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U
75-01-4	Vinyl Chloride	µg/l	0.5 U	**1.6**	13 U	**0.84 J**	13 U	13 U	13 UJ	0.5 U	0.5 U	**8.8**	**560**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**4.2**	**4.9**	**1.1**	0.5 U	**2.3**	**2.5**	**2.4**	**230**	**150 J**	0.5 U

Notes:

Highlighted cells represent detected concentrations greater than the ROD
Bolded values represent detected concentrations.
µg/l - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding estimated reporting limit
UL - Not detected, quantitation limit is probably higher.
L - biased low value
* - Dilution factor of 5.0.
** - Dilution factor of 10.0.
*** - Dilution factor of 100.0.
***** - Dilution factor of 25.0.

Table 2-1
Summary of Pilot Study Results for Overburden Injections
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

Area Name	Amendment	Injection Area	Average Vertical Thickness	Flow Rates (gpm)			Pressures (psi)			Amendment Quantity for Area	Total Volume Injected	No. of Injection Points	Amendment Dosage	Injection Volume
		sq feet	feet	Minimum	Maximum	Average	Minimum	Maximum	Average	lbs of EHC®/lactate	gal		lbs/cyd	gal/cyd
Hydraulic Lactate	Lactate	5,000	21	3.3	33.3	15.3	50	150	97	11,949	46,338	19	3.07	11.92
Pneumatic Lactate	Lactate	5,000	19.5	8.7	47.5	20.4	100	100	100	11,933	55,880	20	3.30	15.47
Hydraulic EHC®	EHC® - entire treatment depth	5,000	18	2.6	19.0	7.9	100	250	185	40,020	18,600	20	12.01	5.58
	EHC® - deep overburden	5,000	4.0	4	10	6	200	250	247	12,450	5,010	27	16.81	6.76
Pneumatic EHC®	EHC® - entire treatment depth	5,000	15	2.2	21.4	8.4	100	400	200	39,160	18,250	22	14.10	6.57
	EHC® - deep overburden	5,000	3.5	3.2	20.0	12.9	200	200	200	12,150	4,860	27	18.75	7.50

Note:

The "entire treatment depth" injections reflect information from the full depth injection intervals which are the injections performed throughout the full depth of the overburden aquifer thickness. The "deep overburden" injections reflect information from injection points that were only performed in the deep overburden aquifer.

Acronyms:

cyd - cubic yard

EHC® - EHC® ISCR Reagent is composed of controlled-release carbon, zero talent iron (ZVI) particles and nutrients used for the in situ treatment of groundwater and saturated soil impacted by heavy metals and persistent organic compounds such as chlorinated solvents, pesticides and energetics.

gal - gallons

gpm - gallons per minute

lbs - pounds

psi - pounds per square inch

sq feet - square feet

Table 2-2
Summary of Pilot Study Results for Bedrock Injections
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

Injection Well Location	Injection Pressure Range (psi)	Total Amendment Volume Injection (gallons)	Total Water Volume for Flushing (gallons)	Issues Encountered	Notes
MW-1B1	10-20	302	50	-	-
MW-1B2	10-20+	39.2	15	High pressure, low injection flow rate	Did not reach target injection volume.
MW-3B1	0-10	520	211	-	-
MW-6B1	0-10	509.5	75	-	-
MW-6B2	0-20+	18.5	21.5	High pressure, low injection flow rate. Attempted gravity feeding amendment. Unsucessfully attempted to redevelop well. Surge block and PVC pipe broke in well that were later removed.	Gravity feeding amendment was attempted. Did not reach target injection volume.
MW-6B3	0-20+	239.2	27.5	High pressure, low injection flow rate	Did not reach target injection volume.
MW-6B4	0-12	360.8	76	-	-
MW-16B1	20+	38.4	50	High pressure, low injection flow rate	Did not reach target injection volume.
MW-16B2	20+	19	20	High pressure, low injection flow rate	Did not reach target injection volume.

Notes:
*The target injection volume was 260 gallons of 60% sodium lactate per well.
psi - pounds per square inch

Table 6-1
Summary Of Permit Equivalencies and Approvals
White Chemical Corporation Superfund Site
Newark, New Jersey

Permit/Approval	Authority	Contact Name/Number
NJDEP Permit Identification Form	Office of Permit Coordination and Environmental Review	Joseph Corleto (609) 984-6974 http://www.state.nj.us/dep/pcer/docs/pifupdate.pdf
NJPDES Discharge to Groundwater Permit Equivalency	Division of Water Quality, NJDEP	Mary Anne Kurserk (609) 292-8427
Well Drilling Permit	Division of Water Supply and GeoScience, NJDEP	To be obtained by the Driller
Well Sealing and Abandonment	Division of Water Supply and GeoScience, NJDEP	To be obtained by the Driller
Construction Permits for construction activites	Local Government - City of Newark	To be obtained by the RA Contractor

Appendix A

Meetings

CDM Smith

993 Old Eagle School Road, Suite 408
Wayne, Pennsylvania 19087
tel: 610 293-0450
fax: 610 293-1920

May 16, 2016

U.S. Department of the Army
Corps of Engineers, Kansas City District
Superfund Section
601 East 12th Street
Kansas City, Missouri 64106-2896

Attn: CENWK- PM-E/Joshua Watts

Project: Contract No. W912DQ-11-D-3004
Task Order No. 017
White Chemical Corporation Superfund Site
Operable Unit 3 (OU3) Remedial Design
Newark, New Jersey

Subject: Conference Call Summary – May 12, 2016

Dear Mr. Watts:

On May 12, 2016, CDM Federal Programs Corporation (CDM Smith) participated in a conference call with representatives of the U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (EPA) to discuss outstanding issues related to the remedial design (RD) for OU3 of the White Chemical Corporation Site (the Site). This letter presents a summary of the major decisions made during the call as well as other key discussion points. The call participants were:

- Josh Watts (USACE Project Manager)
- Frank Bales (USACE Project Engineer)
- Amy Darpinian (USACE Chemist)
- Rich Puvogel (EPA Section Chief)
- Ray Klimcsak (EPA RPM)
- Britanny Hotzler (EPA RPM)
- Katie Mishkin (EPA Hydrogeologist)
- Rachel Griffiths (EPA Hydrogeologist)
- Kershu Tan (CDM Smith Deputy Program Manager)
- Jim Romig (CDM Smith Project Manager)
- Grace Chen (CDM Smith Project Engineer)

Site Definition

At the start of the call EPA provided the definition of the Site for the purposes of the OU3 RD and remedial action (RA). The Site is defined by the 1,000 µg/L contour lines for the various Site contaminants of concern. Based on currently available data, this includes the entirety of the White Chemical property and a large portion of the adjacent 646 Frelinghuysen Avenue property.

Remedial Approach at 646 Frelinghuysen Avenue Property

CDM Smith presented the RD/RA approach that is currently assumed for the 646 Frelinghuysen Avenue property (vertical injection of amendment on a grid) and another potential approach that was considered during the intermediate design (horizontal amendment injection). CDM Smith reviewed the findings of a comparison of the two alternatives that was performed as part of the intermediate design: costs for the vertical injection approach (excluding costs for re-locating the auto reclamation business that is currently operating on the property) are lower than expected costs for horizontal injection and amendment distribution would likely be less effective for horizontal injection than for vertical injection. The group also discussed the access and technical challenges that will be associated with accommodating the existing business on 646 Frelinghuysen property and the City of Newark's redevelopment plans for the White Chemical property.

Decision - EPA determined that the current design approach of vertical injection should be retained for the 646 Frelinghuysen property and that this property should be addressed as an optional item in the USACE PRAC contract to allow flexibility should Site conditions change in the future.

Remedial Approach for the Bedrock Aquifer

The OU3 ROD determined that remediating the bedrock aquifer to chemical-specific ARARs is technically impracticable (TI). The OU3 ROD also states that treatment of the bedrock aquifer would only be conducted to treat mass to the extent practical. Given the enormous amount of contaminant mass present in the bedrock aquifer, much of which is bound into the rock matrix, and since reduction of contaminant levels was demonstrated during the OU3 pilot study, EPA determined that further treatment of the bedrock aquifer will not be required during the RA (continued monitoring of the bedrock aquifer will be part of the RA).

Decision - Since the USACE PRAC contract will be cost reimbursable, the strategy of injecting amendment into nine existing bedrock wells and installing four new monitoring wells will be retained in the PRAC contract (one initial injection and one follow-up injection), since it can be easily removed.

References to Overburden Aquifer

CDM Smith indicated that the overburden aquifer has historically been referred to as two separate aquifers: shallow and deep. CDM Smith suggested that this differentiation be eliminated and future references will be to the overburden aquifer. However, future documents will clearly state that individual wells are screened in the shallow, intermediate, or deep portion of the overburden aquifer. EPA and USACE concurred with this recommendation.

Number of Treatment Applications

EPA and USACE stated that the PRAC contract should include one round of initial amendment injections and one round of follow-up injections.

Overview of Changes from Intermediate Design

CDM Smith discussed several notable changes from the intermediate design that will be incorporated into the pre-final package.

Grid-based Approach for the Pre-Remedial Action Investigation (PRAI)

The intermediate design proposed that during the PRAI targeted groundwater screening activities would be performed to inform the siting of new overburden wells in portions of the White Chemical property where additional data is needed. Since the majority of the overburden aquifer beneath the property is believed to be contaminated at levels above 1,000 µg/L, the pre-final design will propose a grid-based approach to groundwater screening, rather than the more targeted approach discussed in the intermediate submission. EPA and USACE concurred with this approach.

Separate Bioaugmentation from Initial Amendment Injection Activities

The intermediate design proposed mixing site groundwater with lactate as part of the initial round of amendment injection during the RA. Due to concerns regarding the production of sufficient groundwater from the overburden aquifer, and the probability that much of the lactate injected during the pilot study will be consumed by the time the RA is implemented, CDM Smith recommended performing bioaugmentation later in the RA process, based on monitoring data. EPA and USACE concurred with this approach.

Proposed Sequence of Activities

Subsequent to the call, you requested that CDM Smith provide the proposed sequence of RA activities to ensure that it is communicated clearly to all participants. The proposed sequence is as follows:

- mobilization
- geophysical survey and site preparation
- groundwater screening
- well installation
- baseline groundwater sampling
- initial amendment injection event
- 6-month groundwater monitoring event
- Bioaugmenation, as necessary
- 18-month groundwater monitoring event
- 24-month groundwater monitoring event
- second amendment injection event
- 12-month groundwater monitoring event after the second injection
- 24-month groundwater monitoring event after the second injection.

Schedule for Upcoming Milestones and Activities

CDM Smith indicted that the pre-final design package will be submitted on June 10, 2016 and the associated MII cost estimate will be submitted on June 24, 2016. CDM Smith also stated that the supplemental groundwater monitoring event is scheduled for September 2016.

If you have any questions or comments regarding this meeting summary, please contact me at (610)263-2604.

Sincerely,

James Romig
Project Manager
CDM Federal Programs Corporation

110 Fieldcrest Avenue, Suite 6
Edison, New Jersey 08837

November 18, 2022

Mr. Todd Daniels
Project Manager
U.S. Department of the Army
Corps of Engineers, Kansas City District
Superfund Section
601 East 12th Street
Kansas City, Missouri 64106-2896

Project: Contract No. W912DQ21D3004
White Chemical Corporation Superfund Site - Operable Unit 3
Remedial Design
Newark, New Jersey

Subject: 11/14/2022 and 11/17/2022 Meeting Minutes

Dear Mr. Daniels:

CDM Federal Programs Corporation (CDM Smith) is pleased to submit draft minutes for two meetings held via teleconference for the remedial design task order for the White Chemical Corporation Superfund Site. The meetings were held on November 14 and November 17, 2022.

If there are questions concerning this submittal, please contact me at (610) 263-2604.

Sincerely,

James Romig
PE, BCEE, PMP
Project Manager
CDM Federal Programs Corporation

MEETING MINUTES

White Chemical Proposed Remedial Design Revisions

Date: November 14 and 17, 2022
Time: 10:00am and 9:00am EDT, respectively
Location: Teleconference via Microsoft Teams

Project Name: White Chemical Superfund Site, Operable Unit (OU) 3

Attendees:
Todd Daniels, USACE Project Manager
Samantha See, USACE Project Engineer
Scott Williamson, USACE Geologist
Jim Romig, CDM Smith Project Manager
Grace Chen, CDM Smith Project Technical Leader
Bill Glynn, CDM Smith Senior Engineer (November 14th, only)
Keara McKenna, CDM Smith Project Engineer
Peter Ferguson, CDM Smith Project Engineer

Meeting Objective: Discuss proposed revisions to the OU3 remedial design

Site Visit Summary

- USACE and CDM Smith recently visited the site. The project team noted that the site topography has significantly changed. Specifically,
    - a ditch was excavated along the western boundary of the site; and
    - gravel fill was added to specific sections (near MW1 and MW26), raising the ground surface.
- Multiple groundwater monitoring wells could not be located due to the current occupant's landscaping activities.
- The current occupants were unaware of the extent of land needed for remedial action (RA) activities.
    - CDM Smith and USACE agreed that EPA will handle communications with the tenants.

Proposed Site Preparation Changes

- CDM Smith recommended the existing flush-mount groundwater monitoring wells be raised to the existing ground surface.
    - USACE asked how this elevation change would impact injection volume.
        - This elevation change should not impact injection volume because the vertical extent of the targeted injection depth is based off of the extent of the groundwater plume.
    - USACE asked how the existing groundwater monitoring wells will be used in the RA.
        - The groundwater monitoring wells are primarily for long term monitoring, not for the initial groundwater screening.

- CDM Smith recommended that the RA contractor perform a topographic survey at both properties before commencing RA activities.
  - USACE concurred with this recommendation.
- CDM Smith recommended that the RA contractor perform a well survey and perform any necessary repairs/rehabilitation of the existing wells.
  - USACE concurred with this recommendation.
- USACE reminded CDM Smith that access has been acquired for both properties.

Proposed Groundwater Screening Changes

- CDM Smith proposed a 60' x 60' groundwater screening grid. Samples would be collected at 4 depth intervals at each boring, via direct-push technology.
  - USACE requested that a grid with increased spacing be considered, as well as a sampling plan including both primary and secondary locations.
- CDM Smith emphasized the importance of the initial groundwater screening due to a lack of recent data that is representative of the current contamination distribution. Groundwater screening results will determine the final treatment zones.
  - USACE asked if the original contaminant distribution map from 2016 had changed?
    - CDM Smith indicated the contaminant distribution has likely changed as the 2016 design was based off data from the RI and the Pilot Study.
  - USACE asked if the existing wells can be sampled as part of the initial groundwater screening.
    - CDM Smith indicated some of those wells were included in the pilot study treatment zone and, as a result, will likely not reflect the overall contamination profile. Additionally, many of the wells were not found during the site visit.
- USACE requested that the scope of the initial groundwater screening be reduced to approximately 50 primary boring locations.
  - CDM Smith and USACE agreed on a grid of 50 primary boring locations with an additional 20 secondary borings, if needed.
    - The location of those secondary borings will be selected based on data from the primary borings.
    - The design will require primary samples to be analyzed with a fast turnaround time.

Proposed Amendment Injection Changes

- CDM Smith presented the cost breakdown for three different amendment injection approaches: the approach used during the pilot study, injection of EHC exclusively, and a hybrid approach.
  - The pilot study approach involved the following details:
    - sodium lactate injection for concentrations between 100 and 50,000 ug/L of 1,2-DCA;
    - sodium lactate/EHC solution injection for concentrations greater than 50,000 ug/L of 1,2-DCA; and
    - a second injection event of only sodium lactate.

        - Amendments for the full-scale implementation of this approach would cost approximately $4 million.
    - The approach involving injecting of an EHC/water slurry for all contaminant concentrations.
        - Amendments for the full-scale implementation of this approach would cost approximately $5.5 million.
    - The hybrid approach involved the following details:
        - sodium lactate for concentrations between 100 and 1,000 ug/L of 1,2-DCA; and
        - EHC/water slurry injection for concentrations greater than 1,000 ug/L of 1,2-DCA.
        - Amendments for the full-scale implementation of this approach would cost approximately $4.3 million.
        - Since EHC lasts longer than sodium lactate, this approach would likely not require a second mobilization, and avoid the associated costs.
- USACE agreed that the hybrid approach was the best option. However, the USACE team also expressed interest in including language specifying a second injection event in the design. This approach would provide contractual flexibility in the event that reduction in contaminant levels from the first injection event is not optimal.
    - USACE prefers adding the second injection event to the PRAC contract, rather than a future long-term remedial action contract.
        - Based on the pilot study data, it is possible that only one injection event would be necessary. Once 100 ug/L of 1,2-DCA is achieved in the groundwater, degradation of remaining contamination can continue via monitored natural attenuation.
        - USACE requested that language regarding inclusion of a second injection event be incorporated into the design as a contingency.
        - The need for a second injection event will be determined by both contaminant and amendment concentrations that will be measured during RA monitoring events.

Draft Revised 100% Design Delivery Date

- CDM Smith and USACE agreed to extend the delivery date of the draft revised 100% remedial design to December 20th. The extension is needed due to the nature and magnitude of required changes and the upcoming holiday.

Assigned To	Action Item	Status
USACE	Schedule a meeting with EPA	Scheduled for November 30, 2022
CDM Smith	Incorporate the discussed changes into the design	In Progress

110 Fieldcrest Avenue, Suite 6
Edison, New Jersey 08837

December 01, 2022

Mr. Todd Daniels
Project Manager
U.S. Department of the Army
Corps of Engineers, Kansas City District
Superfund Section
601 East 12th Street
Kansas City, Missouri 64106-2896

Project: Contract No. W912DQ21D3004
White Chemical Corporation Superfund Site - Operable Unit 3
Remedial Design
Newark, New Jersey

Subject: 11/30/2022 Meeting Minutes

Dear Mr. Daniels:

CDM Federal Programs Corporation (CDM Smith) is pleased to submit draft minutes for the meeting for the November 30, 2022 teleconference to discuss proposed modifications to the remedial design for the White Chemical Corporation Superfund Site.

If there are questions concerning this submittal, please contact me at (610) 263-2604.

Sincerely,

James Romig
Project Manager
CDM Federal Programs Corporation

MEETING MINUTES

Date: November 30, 2022
Time: 1:00pm EDT
Location: Teleconference via Microsoft Teams

Project Name: White Chemical Superfund Site, Operable Unit 3

Attendees:

USACE Kansas City District
Todd Daniels, Project Manager
Samantha See, Project Engineer
Scott Williamson, Project Geologist/Hydrogeologist
Robert Blake, Project Engineer
Wendy Stonestreet, USACE Chemist

USACE New York District
Neal Kolb, USACE Resident Engineer
Kinjal Shah, USACE Project Manager

EPA
Brittany Gustavson, Remedial Project Manager

CDM Smith
Jim Romig, Project Manager
Grace Chen, Project Technical Leader
Bill Glynn, Senior Engineer
Kim Kaster, Project Engineer
Keara McKenna, Project Engineer
Peter Ferguson, Project Engineer

Meeting Objective: Discuss proposed revisions to the OU3 remedial design and site access logistics

1. Site Visit Observation and Proposed Changes to Design

- USACE and CDM Smith visited the site on October 25, 2022 and observed that the site topography has significantly changed since submission of the 2016 final design. Specifically,
  - a ditch was excavated along the western boundary of the site; and
  - the entire property had a layer of aggregate added, generally raising the ground surface.
  - all monitoring wells have been converted to flush mount and multiple groundwater monitoring wells could not be located due to the current occupant's landscaping activities.
- Proposed changes to existing monitoring wells
  - CDM Smith recommended the Contractor perform a well condition survey to accomplish the following:
    - locate all existing monitoring wells; and,

        - determine which wells require maintenance (i.e., repairs and adjustments).
    - USACE KC District suggested these wells be surveyed after being located and raised to ground level (if needed).
    - USACE NY District suggested the design include language for an allowance related to the amount of existing monitoring wells that could be replaced.
        - CDM Smith suggested this allowance include the abandonment and replacement of 3 existing monitoring wells.
- CDM Smith indicated plans to perform a new topographic survey which would include a well location survey.
- USACE and EPA approved of these proposed design modifications.

2. Contaminant Distribution

- CDM Smith indicated the 2021 sampling event did not include every well on site.
- CDM Smith indicated many of the wells sampled in 2021 were impacted by the pilot study, which suggests that many wells on site not sampled in 2021 were also likely to be impacted by the pilot study.
    - CDM Smith indicated that the current contamination distribution is unknown.
- CDM Smith proposed an 80 x 80 boring grid for the initial groundwater screening event for a total of approximately 50 sample locations across both properties and 20 secondary boring locations to be determined after receiving primary analytical results. This approach is consistent with the previous discussion with USACE.
    - USACE and EPA approved of this proposed design change.
- CDM Smith indicated that the locations of the proposed long-term monitoring wells would be contingent upon the groundwater screening results.
    - USACE concurred and suggested monitoring wells be protected by either a vault or a thicker concrete pad.
    - EPA indicated the site owners, lessees, and sub-lessees are prohibited from altering any wells on site.

3. Amendment Injection

- CDM Smith presented the cost benefit analysis for three different amendment injection approaches: the approach used in the 2016 design, injection of EHC exclusively, and a hybrid approach.
    - The 2016 design approach involved the following details:
        - sodium lactate injection for concentrations between 100 and 50,000 µg/L of 1,2-DCA;
        - sodium lactate/EHC solution injection for concentrations greater than 50,000 µg/L of 1,2-DCA; and
        - a second injection event of only sodium lactate.
        - Amendment injection for the full-scale implementation of this approach would cost approximately $4 million.
    - A second approach involved injection of an EHC/water slurry for all contaminant concentrations.

        - Amendments for the full-scale implementation of this approach would cost approximately $5.5 million.
    - The hybrid approach involved the following details:
        - sodium lactate injection for concentrations between 100 and 1,000 ug/L of 1,2-DCA; and
        - EHC/water slurry injection for concentrations greater than 1,000 ug/L of 1,2-DCA.
        - Amendments for the full-scale implementation of this approach would cost approximately $4.3 million.
        - Since EHC lasts longer than sodium lactate, this approach would likely not require a second mobilization, and avoid the associated costs.
    - USACE agrees with the hybrid approach and requested that the technical analysis for this modification to be included in the design.
        - CDM Smith indicated the pilot study data demonstrate that EHC has reduced site contaminants to below 200 ug/L while contaminant concentration rebounded in area with lactate injection
        - CDM Smith will provide technical justification for using the hybrid approach in the design analysis report.
- CDM Smith indicated that a second injection event will still be included in the design. This second injection event is contingent upon groundwater monitoring results 24 months after the initial injection event.
    - The second injection event would likely be smaller and involve injecting lactate in areas that are exhibiting contamination rebound.
    - USACE and EPA approved of this modified design approach.
- USACE reminded CDM Smith that the design should include current health and safety, chemistry, and quality assurance requirements.

4. Site Access

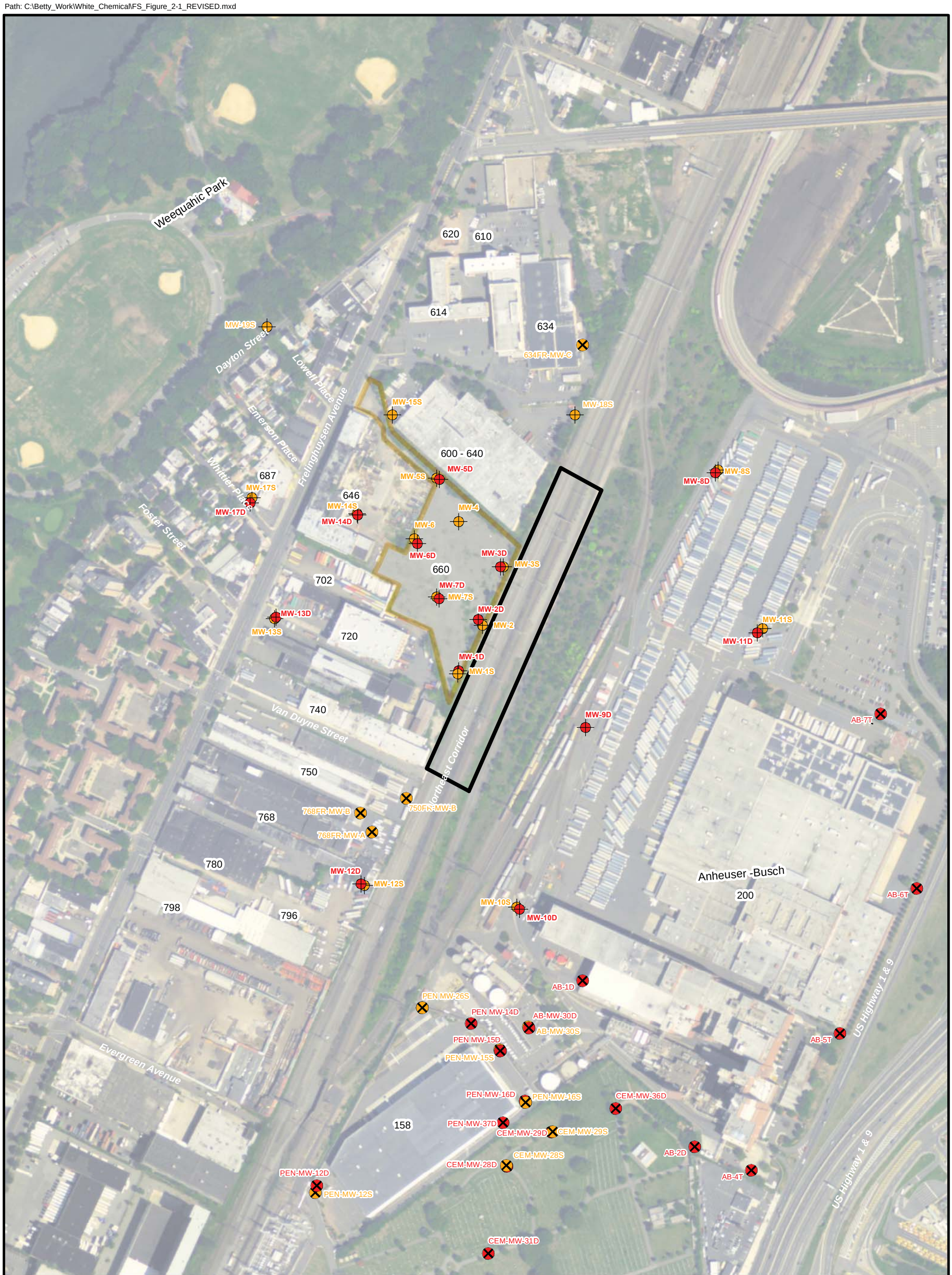
- CDM Smith and USACE asked EPA about the current status of site access.
- EPA indicated that a meeting will be held between EPA RPM and attorney and the property owners and their attorney in the next few weeks to discuss access that will be required during remedial action.
- EPA indicated that the design should assume continued access to 50% of the White Chemical Corporation (WCC) property based on their communication with the City of Newark. The amount of access to 646 Frelinghuysen property at a given time is uncertain at this time. EPA will provide further direction regarding 646 Frelinghuysen access after the meeting.
- CDM Smith suggested including 3 mobilizations in the design (one for each half of the WCC property and one for the entire 646 Frelinghuysen property).
    - USACE suggesting having one month between each mobilization to allow for the contractor and owner/lessee/sub-lessee to coordinate site access.

Assigned To	Action Item	Status
EPA	Finalize and provide access details	In Progress
CDM Smith	Complete the draft design	In Progress

Appendix B

TI Waiver Locations

Path: C:\Betty_Work\White_Chemical\FS_Figure_2-1_REVISED.mxd



Source: New Jersey Department of Environmental Protection Aerial Photography, 2010.

Legend

- Area of TI Waiver
- White Chemical Corporation Property Boundary
- White Chemical wells
- Third Party Wells
- Shallow Overburden Wells
- Deep Overburden Wells

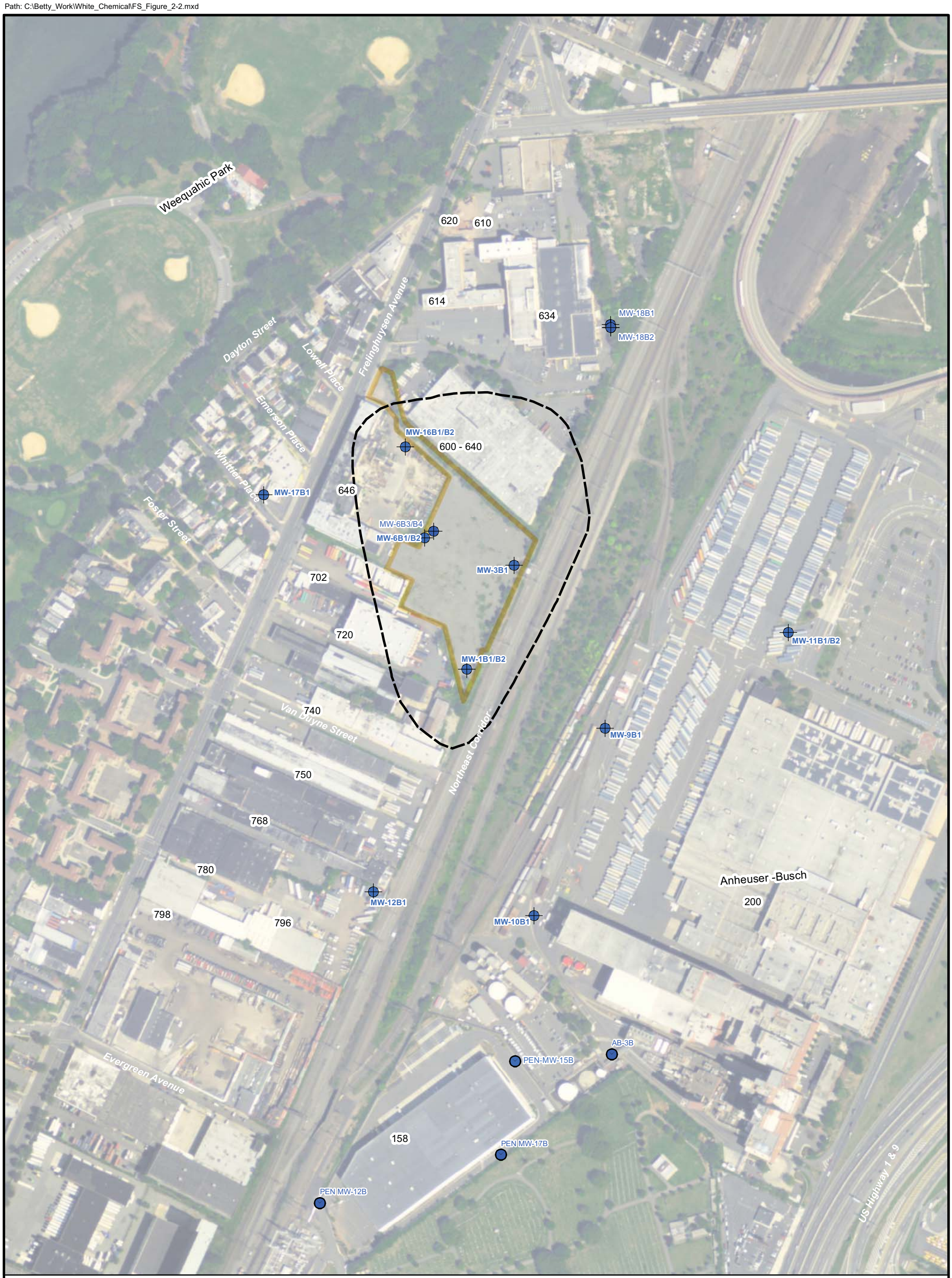
N

0 150 300 Feet

Figure 4-1
Extent of TI Waiver Area Under Rail Line Corridor in the Overburden Aquifer
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

CDM Smith

Path: C:\Betty_Work\White_Chemical\FS_Figure_2-2.mxd



Source: New Jersey Department of Environmental Protection Aerial Photography, 2010.

Legend

Area of TI Waiver

White Chemical Corporation Property Boundary

White Chemical wells

Bedrock Wells

Third Party Wells

N

0 150 300 Feet

Figure 4-2
Extent of TI Waiver in Bedrock Aquifer
White Chemical Corporation
Superfund Site, OU3
Newark, New Jersey

CDM Smith

Appendix C

EHC Dosing Calculation

PROJECT:	White Chemical OU3 Revised RD	COMPUTED BY : GC	CHECKED BY: KK
JOB NO.:	277262	DATE : 1/31/2023	DATE CHECKED: 2/7/2023
CLIENT:	USACE - KC District		WRKSHT NO. : Summary

Description: Calculate the target EHC dosing concentration based on information from the pre-design investigation (PDI).

Information for the hydraulic and pneumatic EHC injections used in these calculations is presented in Table 3-4 and Table 3-5 of the PDI Report (CDM Smith 2016).

EHC injections were performed during the PDI pilot study using two different injection methods - hydraulic and pneumatic injection. Based on pilot study and 2021 groundwater monitoring results, the pilot study EHC injections were effective in achieving long-term contaminant concentration reduction at the site. Therefore, the as-injected dosage completed during the pilot study are calculated herein and used as the basis for developing the EHC dosing for the remedial action (RA).

During the pilot study, EHC injections were performed throughout the target vertical overburden aquifer thickness (herein referred to a "full depth injections") first, then extra injections were completed in the deeper portion of the overburden aquifer at the centroid of the triangle formed from three "full depth injections" (herein referred to a "deep injections"). The deep injections were performed to increase the ROI for the deeper portion of the overburden aquifer which is characterized by tighter silts and clays.

Development of dosing requirements for the design account for the fact that the deep monitoring wells have a 10-foot screen at the bottom of the overburden aquifer, where the bottom portion received amendment from both the "full depth injections" and the "deep injection", while the top portion received just the"full depth injection". As such, the dosing over the calculated using as-injected volumes from the pilot study are used to generate dosing recommendations for the remedial design based on a weighted average for the bottom 10 feet of the overburden.

Overburden Aquifer Treatment Zone Characteristics					
Area	5,000	square feet			
Soil bulk density	93.6	lbs/cubic foot			
Pneumatic EHC As-Injected Pilot Study Dosage					
Full depth injections					
Average injection depth of full depth injections	15	feet			
Total EHC amendment injected through full depth injections	39,160	lbs of EHC			
Average amendment volume injected per foot of full injection depth	2,611	lbs EHC/foot			
Deep injections					
Average injection depth of deep injections	3.5	feet			
Total EHC amendment injected through deep injections	12,150	lbs of EHC			
Average amendment volume injected per foot of deep injection depth	3,471	lbs EHC/foot			
Total volume of soil that received amendment only from full depth injections	57,500	cubic feet	=	5,382,000	lbs
Total volume of soil that received amendment from full depth and deep injections	17,500	cubic feet	=	1,638,000	lbs
Target Total EHC to be injected in the upper 11.5 feet of the overburden aquifer	30,023	lbs of EHC			
Target Total EHC to be injected in the lower 3.5 feet of the overburden aquifer	21,287	lbs of EHC			
Loading based on Pilot Study Pneumatic EHC Injections					
Loading in the upper 11.5 feet	0.52	lbs of EHC/cubic foot of soil	=	14	lbs of EHC/cubic yard of soil
Loading in the lower 3.5 feet	1.22	lbs of EHC/cubic foot of soil	=	33	lbs of EHC/cubic yard of soil
Loading percentage for upper 11.5 feet	0.56%	lbs of EHC/lbs of soil			
Loading percentage for lower 3.5 feet	1.30%	lbs of EHC/lbs of soil			
Calculations accounting for 10-foot well screen of monitoring wells					
Weighted average dosing for the bottom ten feet	0.82%	lbs of EHC/lbs of soil	=	0.77	lbs of EHC/cubic foot of soil
Hydraulic EHC As-Injected Pilot Study Dosage					
Full depth injections					
Average injection depth of full depth injections	17.5	feet			
Total EHC amendment injected through full depth injections	40,020	lbs of EHC			
Average amendment volume injected per foot of full injection depth	2,287	lbs EHC/foot			
Deep injections					
Average injection depth of deep injections	4	feet			
Total EHC amendment injected through deep injections	12,450	lbs of EHC			
Average amendment volume injected per foot of deep injection depth	3,113	lbs EHC/foot			
Total volume of soil that received amendment only from full depth injections	67,500	cubic feet	=	6,318,000	lbs
Total volume of soil that received amendment from full depth and deep injections	20,000	cubic feet	=	1,872,000	lbs
Target Total EHC to be injected in the upper 13.5 feet of the overburden aquifer	30,873	lbs of EHC			
Target Total EHC to be injected in the lower 4 feet of the overburden aquifer	21,597	lbs of EHC			
Loading based on Pilot Study Pneumatic EHC Injections					
Loading in the upper 13.5 feet	0.46	lbs of EHC/cubic foot of soil	=	12	lbs of EHC/cubic yard of soil
Loading in the lower 4 feet	1.08	lbs of EHC/cubic foot of soil	=	29	lbs of EHC/cubic yard of soil
Loading percentage for upper 13.5 feet	0.49%	lbs of EHC/lbs of soil			
Loading percentage for lower 4 feet	1.15%	lbs of EHC/lbs of soil			
Calculations accounting for 10-foot well screen of monitoring wells					
Weighted average dosing for the bottom ten feet	0.75%	lbs of EHC/lbs of soil	=	0.71	lbs of EHC/cubic foot of soil

Design Recommendations for EHC Loading

During the pilot study, the initial 1,2-dichloroethane concentrations in the deep wells ranged from 21,000 to 140,000 ug/L; in the shallow/intermediate wells ranged from 52 to 3,000 ug/L.
The as-injected radius of influence for EHC during the pilot study was 9 feet for the shallow/intermediate zone and 4.5 to 5 feet for the deep zone. To obtain good distribution during the RA, a 14-foot injection spacing is recommended. If concentrations higher than 20,000 ug/L are encountered, a 10-foot injection spacing is recommended.

For 1,2-DCA concentrations between 1,000 and 10,000 ug/L.					
The recommended loading is:	0.50%	lbs of EHC/lbs of soil	=	13	lbs of EHC/cubic yard
For 1,2-DCA concentrations between 10,000 and 20,000 ug/L.					
The recommended loading is:	0.65%	lbs of EHC/lbs of soil	=	16	lbs of EHC/cubic yard
For 1,2-DCA concentrations greater than 20,000 ug/L					
The recommended loading is:	1.0%	lbs of EHC/lbs of soil	=	25	lbs of EHC/cubic yard

References:

1 CDM Smith. 2016. *Draft Pilot Study Report, White Chemical Superfund Site, Operable Unit 3, Remedial Design, Newark, New Jersey* . February 23.

EHC® Reagent Slurry Preparation and Application Guidelines

EHC® *In Situ* Chemical Reduction (ISCR) Reagent is composed of food grade organic carbon and zero-valent iron for reduction of persistent organic and/or inorganic contaminants from the subsurface environment. EHC reagent has been applied for source area treatment, plume treatment, and plume management using methods such as:

- Application into an open excavation via
  - Direct placement in to the base of an excavation following source area removal
  - A trench style permeable reactive barrier (PRB)
  - Soil mixing
- Injection applications

The choice of installation method will depend on your site-specific conditions, including treatment depth and geology.

APPLICATION INTO AN OPEN EXCAVATION

Excavation base:

The most common application for direct placement of EHC reagent is the addition of EHC to saturated soil and/or standing groundwater at the base of an excavation following a source area removal (See Figure 1). EHC can either be mixed into the backfill material prior to placement or applied in lifts and then mixed in place. It is advisable to mix the EHC with sufficient backfill to cover the thickness of the excavation that is expected to encounter groundwater, taking into account seasonal variability in the groundwater table.

Figure 1. Backfill with 5% EHC by weight at an open excavation following source area removal

The EHC powder could also be physically mixed into saturated soil at the base of an excavation using a backhoe. Depending on the remaining impacts and the treatment goals, an application rate of 0.5 - 5% of EHC by soil mass is generally recommended for backfill applications.

Trench/PRB:

EHC reagent could also be added to a trench excavation to form a PRB for plume management (Figure 2). The trench is installed across the plume and backfilled with a mixture of EHC and sand up to the groundwater table to form a reactive zone. The groundwater is treated as it passes though the reactive barrier. In general, a higher

application rate of 5 - 10% of EHC by soil mass is recommended to sustain continuous removal over time. The remainder of the trench is backfilled with clean fill material (e.g. pea gravel or sand).

Figure 2. Placement of a mixture of EHC and sand into a trench excavation to form a PRB for plume control

Mixing of EHC with Backfill Material:

If wind is low, the dry powder can be mixed with the backfill at ground surface using construction equipment. Alternatively, the powder can be mixed into the backfill in the excavation using construction equipment and safe construction methods. If winds are high, it may be necessary to prepare a slurry of EHC containing a high percentage of solids and mix the slurry into the backfill or it may help to spray with water during application. See Figure 3.

Figure 3. Dry mixing of EHC (provided in sacks) and sand

Direct Soil Mixing:

The EHC reagent may also be placed directly on the bottom of an excavation either in dry powder form if winds are low, or in slurry form if winds are high. In such a case, it may be advisable to mix the powder or slurry into the native soil at the bottom of the excavation using construction equipment and safe construction methods. This will be particularly useful if contaminants are expected to be present in the remaining soil. For deeper impacts, deep soil mixing equipment such as a Lang Tool could be used. See Figure 4.

Figure 4. Deep soil mixing using a Lang Tool

APPLICATION VIA INJECTION

The most common application method for EHC is direct injection using direct push technology. The EHC is mixed with water to form a slurry and is injected directly through the direct push probe rods in to the saturated zone. The preferred approach for injections is often in the top-down direction using an injection tip that directs the slurry horizontally, for example pressure activated direct push tips have been successfully utilized. For each injection point, the rods are initially advanced to the top of the targeted depth interval and a specified volume of slurry is injected before proceeding down to the next depth. The injections are to be evenly distributed over the targeted depth interval, using a vertical injection spacing of approximately 2-4 ft.

Figure 5. Injection tip with horizontal direction low pressure demonstration with water

Water Flushing during Injection:

It is not recommended to apply larger amounts of chase water for the purpose of distributing EHC, but it is recommended to inject a smaller volume of water upon completion of a point to clean the rods. Flushing with water between injection intervals can be required to avoid clogging of the injection tip, but normally, if the injection flow rate is kept >3 gpm and the time inbetween injections are kept to a minimum, water flushing between intervals is not required. In general, it is recommended to keep water flushing at a minimum to limit the risk of daylighting and only inject just enough water to clean out the injection tip.

Injection Spacing:

The recommended spacing between injection points are based on two factors: radius of influence distribution (ROI) and soil acceptance. Both of these factors may vary greatly depending on injection technique and lithology. It is recommended to be as flexible as possible during a field installation and/or to evaluate these parameters during a pilot-scale test injection. However, based on experience from a range of sites, a ROI of at least 5 ft is observed with direct injection; due to this an injection spacing of 10 to 15 ft (staggered rows) is generally recommended. Soil acceptance may also vary greatly depending on the lithology and injection depth. As a general guideline, we recommend no more than 100 lbs EHC per vertical foot for more permeable formations. For clayey formations, soil acceptance has in some instances been limited to 20 lbs per vertical foot. Therefore, a closer spacing may have to be applied in a scenario with a higher dosing requirement combined with a low permeability formation to limit the injection volume per point. Note that significantly greater ROIs has been observed with fracturing techniques with up to 8,000 lbs EHC injected per fracture and ROIs of more than 30 ft. Information on how to monitor the ROI and observations from a range of sites is available upon request.

Pump Requirements:

Using an injection pump that is capable of generating at least 500 psi of pressure at a flow rate of 5 gpm is recommended. The pump needs to be able to handle solids. For example piston pumps, grout pumps and progressing cavity pumps have worked well in the past, with a preference towards the piston and grout pumps. EHC would typically be injected at pressures of 100 to 200 psi. However, higher pressures are sometimes required to initiate the injection. It would be ideal to have a higher pressure pump available on site that can generate over 500 psi and as high a flow rate as possible. Deeper installations may require higher injection pressures.

Other injection considerations:

Sufficient rod length and injection tips are recommended to allow 3 to 5 injection points to be capped overnight to prevent backflow if need be (more for shallow depths and less for deep installations).

PREPARATION OF EHC SLURRY

EHC reagent may need to be mixed into a slurry to avoid loss of product or for direct push injections. The solids content of the slurry may be varied depending on the desired injection volume and slurry properties. When applied via direct injection, normally a concentration of between 25 and 35% solids is targeted as calculated as the mass of EHC divided by the mass of water plus EHC. This results in a final wet density of the slurry of approximately 1.09 to 1.13 g/cm^3. More dilute slurry may promote permeation (as opposed to fracturing) in more granular formations if the flow rate and pressure is kept low. More viscous slurry with up to 35% solids has been found to limit problems with daylighting during injection, particularly for shallow applications into low-permeability formations.

EHC is delivered as a dry powder in 50-lb bags or 2,000 lb supersacks. Table 1 indicates the volume of water required to attain a given percent solids level for a 50-lb bag of EHC.

	25% slurry	30% slurry	35% slurry
Mass EHC per bag (lbs)	50	50	50
Volume water per bag (USG)	18.0	14.0	11.1
Estimated specific gravity of slurry	1.09	1.11	1.13
Volume slurry per bag (lbs)	22.0	18.0	15.2

Table 1. Volume of water required to attain different slurry solids contents per 50-lb bag of EHC.

Figure 6. EHC slurries

Preparing the EHC slurries on site in a mixing tank with a paddle-mixer at the bottom (grout mixers) is recommended (figure 7). The slurry is then transferred to a feed tank connected to a pump allowing for easy transfer of the slurry; the slurry could then be pumped straight into the application – either the excavation or injection pump. In general, we recommend continuous mixing in smaller batches (<100 USG / 400 L) to avoid settling of solids at the bottom.

The EHC slurry has also been prepared in a variety of other ways; everything from in-line automated mixing systems and recirculation of slurry using high-flow trash pumps to manual mixing using a hand-held drill with a mixing attachment. However, particularly for larger projects, a mechanical mixing system on site is recommended.

Figure 7. Grout / paddle mixing unit with feed-tank and injection pump.

Figure 8. Mixing of EHC slurry using recirculation

HEALTH AND SAFETY

Prior to working with EHC consult the Safety Data Sheet (SDS) to understand proper safety, handling, storage and disposal procedures. Any vessel that contains wet EHC or EHC and water must be vented due to potential pressure build up from fermentation gasses. When working with EHC, it is recommended to use standard personal protective equipment, including: safety glasses, steel toe boots, nitrile gloves, hearing protection (when direct push equipment is used), and hard hat. Dust mask may be required when in close contact with EHC under certain conditions.

The information contained herein is presented to the best of our knowledge, PeroxyChem makes no representations or warranties regarding the accuracy, quality, or reliability of this information and shall under no circumstances be liable with respect to such information. EHC IS a Trademark of PeroxyChem. © 2017 PeroxyChem. All rights reserved. Document 08-02-ESD-17

Appendix D

Technical Memorandum: Revised Placement of Bedrock Monitoring Wells

110 Fieldcrest Avenue #8, 6th Floor
Edison, New Jersey 08837
tel: 732 225-7000

March 2, 2023

U.S. Department of the Army Corps of Engineers,
Kansas City District
Superfund Section
601 East 12th Street
Kansas City, Missouri 64106-2896

ATTN: CENWK-PM-E/Todd Daniels

PROJECT: Contract No. W912DQ-21-D-3004, Task Order W912DQ22F3062
White Chemical Corporation Superfund Site – Operable Unit 3
Remedial Design Revision
Newark, New Jersey

SUBJECT: Revised Placement of Bedrock Monitoring Wells Technical Memorandum

Dear Mr. Daniels:

CDM Federal Programs Corporation (CDM Smith) is pleased to submit this technical memorandum documenting recommendations for the revised placement of bedrock monitoring wells for the White Chemical Corporation Superfund Site, located in Newark, New Jersey.

If there are questions concerning this submittal, please contact me at (610) 263-2604.

Sincerely,

CDM SMITH FEDERAL PROGRAMS CORPORATION

James Romig
Project Manager

cc: M. Rahmani, CDM Smith

Memorandum

To: *Jim Romig, Grace Chen*

From: *Stu Barden, Anthony Kuster*

Date: *March 2, 2023*

Subject: *Revised Placement of Bedrock Monitoring Wells, Remedial Design*
White Chemical Corporation Superfund Site, OU3

CDM Federal Programs Corporation (CDM Smith) has been tasked by the U.S. Army Corps of Engineers, Kansas City District with preparing the draft revised 100% remedial design (RD) and final revised 100% RD at Operable Unit 3 (OU3) of the White Chemical Corporation Superfund Site (the site) under Contract No. W912DQ21D3004, Task Order W912DQ22F3062.

As part of the revision to the RD, the recommendation to install four bedrock monitoring wells near MW-3B1 to monitor amendment injections into MW-3B1 was re-evaluated. The key observation triggering the re-evaluation was the 2021 groundwater monitoring results that showed all contaminants of concern (COCs) at MW-3B1 were below the detection limits.

This memorandum presents that re-evaluation and the newly proposed locations of the four bedrock monitoring wells.

Background and Time Line

The 2016 100% RD proposed four bedrock monitoring wells to be installed around the MW-3B cluster (CDM Smith 2016b). The bedrock monitoring wells consisted of one pair along strike from MW-3B1 and one pair down dip from MW-3B1 (**Figure D-1**). The objective for these bedrock monitoring wells was to collect site-specific data on the extent and impact of the treatment zone from bedrock well injections and to evaluate the hydraulic properties of bedrock fractures. Within each pair, one monitoring well was planned to be screened in the same bedding plane as MW-3B1 and the other monitoring well to be screened deeper than MW-3B1, each in a separate borehole about 15 feet (ft) apart. The distance of these two well pairs was designed to be 50 to 100 ft from MW-3B1.

During the OU3 remedial investigation (RI) sampling in 2011, prior to any treatment, the observed concentrations of 1,2-dichloroethane (1,2-DCA) in bedrock ranged from 35 to 180,000 micrograms per liter (µg/L). The maximum trichloroethene (TCE) concentration was 2,800 µg/L; the maximum 1,1,2-trichloroethane (1,1,2-TCA) concentration was 2,500 µg/L; and the maximum 1,2-dibromoethane (EDB) concentration was 1,500 µg/L (CDM Smith 2012).

As part of the pilot study, baseline sampling was conducted in June 2014. Then, lactate amendment was injected into all nine existing bedrock wells in 2014 (**Figure D-2**). Two rounds of post-injection sampling were conducted in April 2015 (Round 1) and December 2015 (Round 2). The results of these sampling events provided evidence that contaminant concentrations significantly decreased in the bedrock wells relative to the 2011 RI sampling results and relative to the baseline sampling results (CDM Smith 2016a).

Six of the nine bedrock wells were sampled again in November 2021 (Weston 2021), referred to herein as Round 3 post-injection sampling. Results from 2021 showed that total contaminant concentrations decreased at all six sampled wells (**Figure D-3**). Notably, results for all COCs at MW-3B1 were below the detection limit. Baseline sampling will be conducted as part of the remedial action to confirm COC concentrations at MW-3B1. However, based on the 2021 data, amendment injection at MW-3B1 is not anticipated. Instead, CDM Smith recommends selecting the most highly contaminated bedrock well, where amendment injection is likely to occur, and installing four monitoring wells around that well to monitor amendment distribution. This is a logical deviation from the original plan in the RD, based on the current distribution of site contaminants.

Recommended Locations for Bedrock Monitoring Wells

According to the data collected in 2021, the bedrock location with the highest contaminant concentrations was MW-6B1. While concentrations of 1,2-DCA dropped substantially and chlorinated ethene daughter products (e.g., vinyl chloride and ethene) were detected at high concentrations in the post-injection sampling rounds, these trends did not continue into 2021 (**Figure D-3**). Instead, 1,2-DCA concentrations rebounded to 12,100 µg/L (11,500 in a duplicate sample) at MW-6B1 (**Table D-1**). Ethene was not analyzed in Round 3, however. These results suggest that a source is still contributing to the fracture zone intersected by MW-6B1. One explanation for the observed rebound is that matrix diffusion from low-permeability pores into a high-permeability fracture zone may still be occurring. Matrix diffusion testing conducted at MW-6B in 2010 supports this theory.

Matrix diffusion testing was completed during the RI at MW-6B on rock cores collected from 36 to 100 ft bgs. The highest levels of 1,2-DCA contamination in the rock matrix were found from 36 to 56 ft bgs (CDM Smith 2012). Estimated contaminant concentrations in pore water within this zone averaged 130,000 µg/L and ranged up to 550,000 µg/L, much greater than the 63,000 µg/L groundwater concentrations measured during packer testing of this interval. This indicates a concentration gradient from the bedrock matrix pore water to the mobile groundwater in bedrock fractures. Thus, bedrock matrix back diffusion is probable at the depth interval of MW-6B1 (42 to 52 ft bgs) and likely contributed to the concentration rebound observed based on the 2021 groundwater sampling event.

Based on the concentration rebound at MW-6B1, CDM Smith recommends updating the RD to locate the four proposed bedrock monitoring wells near MW-6B1 and monitor responses to amendment injection into MW-6B1, rather than MW-3B1. Remaining unchanged is the planned

deployment of pressure transducers in the new monitoring wells to collect hydraulic data during injections and evaluate radius of influence with water quality data. Also remaining unchanged is the approach to orienting the four proposed monitoring wells. CDM Smith still recommends placing one pair of wells along strike and one pair down dip, with each pair 50 to 100 ft from the injection well. Within each pair, one well (a shallow bedrock well) is planned to be screened in the same bedding plane as MW-6B1, and one well (a deep bedrock well) is planned to be screened in a deeper zone than MW-6B1. Each well will be installed in a separate borehole, located approximately 15 feet apart, for each well pair. Previously, the average sitewide orientation of bedding fractures (dip azimuth: 315°, dip angle: 20°) was used to laterally orient the monitoring wells proposed near MW-3B1. However, at MW-6B1, a notable fracture zone is present at 44 ft bgs (dip azimuth: 290°, dip angle: 15°), and the location of the proposed monitoring wells is based on the orientation of fractures in this zone. MW-6B1 also notably accepted amendment at a rate of 1 to 2 gallons per minute, injected under atmospheric pressure (CDM Smith 2016a).

Therefore, CDM Smith recommends installation of four bedrock monitoring wells at the coordinates listed in **Figure D-4** as follows:

- MW-109B1 (along strike from MW-6B1/2 bedrock well cluster)
- MW-109B2 (along strike from MW-6B1/2 bedrock well cluster)
- MW-110B1 (down dip from MW-6B1/2 bedrock well cluster)
- MW-110B2 (down dip from MW-6B1/2 bedrock well cluster)

References

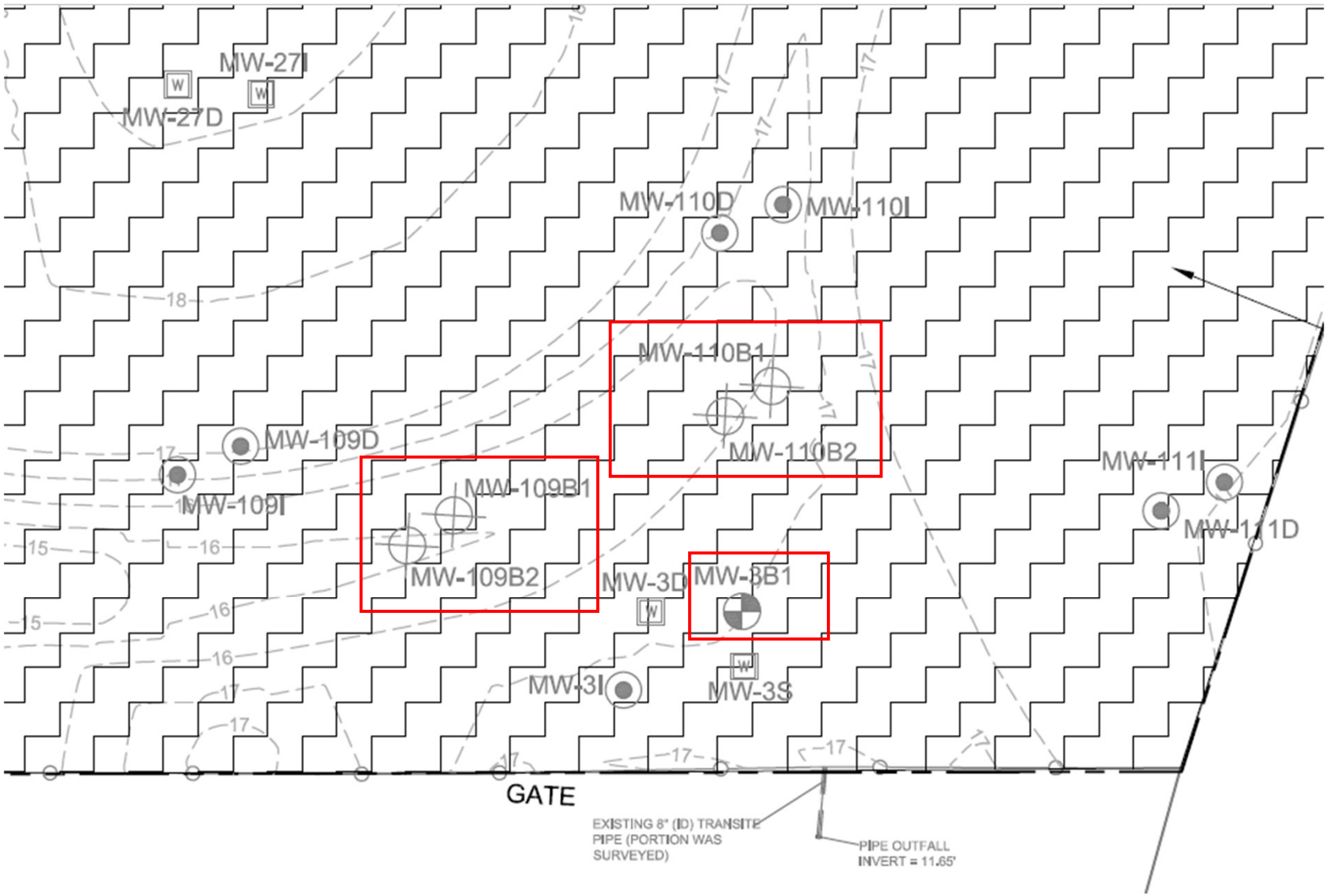
CDM Smith. 2012. *Final Remedial Investigation Report*. White Chemical Corporation Superfund Site, OU3-Groundwater. Remedial Investigation/Feasibility Study. Newark, Essex County, New Jersey.

———. 2016a. *Draft Pilot Study Report*. White Chemical Corporation Superfund Site, OU3-Groundwater. Remedial Design. Newark, Essex County, New Jersey.

———. 2016b. *Final Design Analysis Report*. White Chemical Corporation Superfund Site, OU3. Remedial Design. Newark, New Jersey.

Weston. 2021. *Monitoring Well Sampling Report*. White Chemical Corporation Site. Newark, Essex County, New Jersey.

Figures



Strike/Dip

20 0 40 Feet

TRUE N

CDM Smith

EXISTING OVERBURDEN MONITORING WELLS
UTILITY POLE
NEW OVERBURDEN WELL
EXISTING BEDROCK WELL
NEW BEDROCK WELL

Figure D-1
Proposed Locations of Bedrock Monitoring Wells in previous Final Design package (2016)
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

Path: F:\White Chemical\GIS\White Chemical\MXD\Figure_3-3_Pilot_Study_Area.mxd

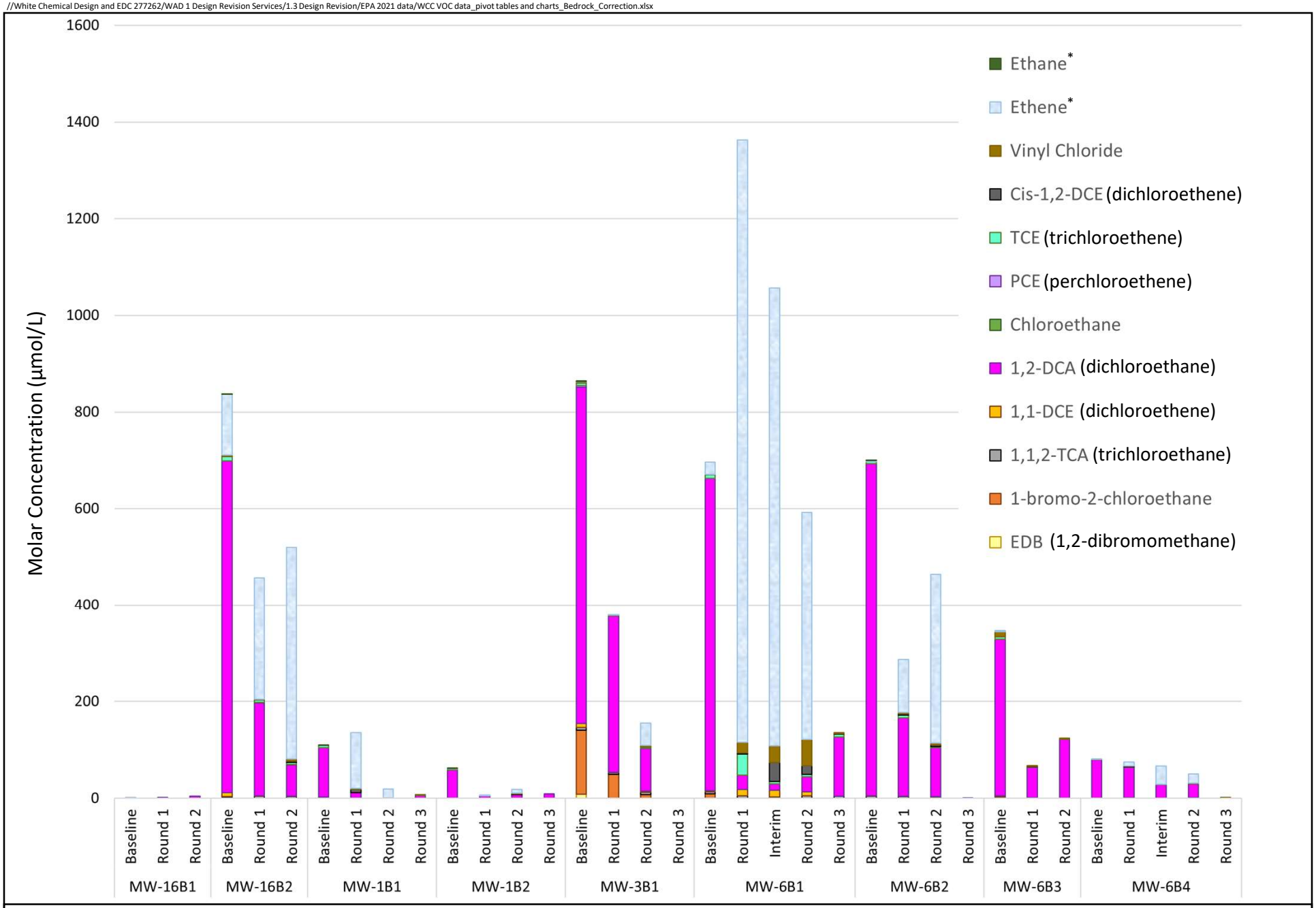
Source: New Jersey Department of Environmental Protection Aerial Photography, 2007.

Legend

- White Chemical Site Boundary
- 1,2-DCA contour (µg/L), dashed where inferred
- Pilot Study (PS) Part A - EHC Injection
- PS Part B - Lactate Injection
- Shallow Overburden Excavated Area
- Monitoring Well
- Areas on either side of the lines will be treated by different vendors
- Bedrock Wells
- Shallow and Intermediate Overburden Wells
- Deep Overburden Wells

0 40 80 Feet

Figure D-2
Pilot Study Areas
White Chemical Corporation
Superfund Site, OU3
Newark, New Jersey



CDM Smith

Notes:
µmol/L – micromole per liter

* Samples in Round 3 were not analyzed for ethene and ethane.

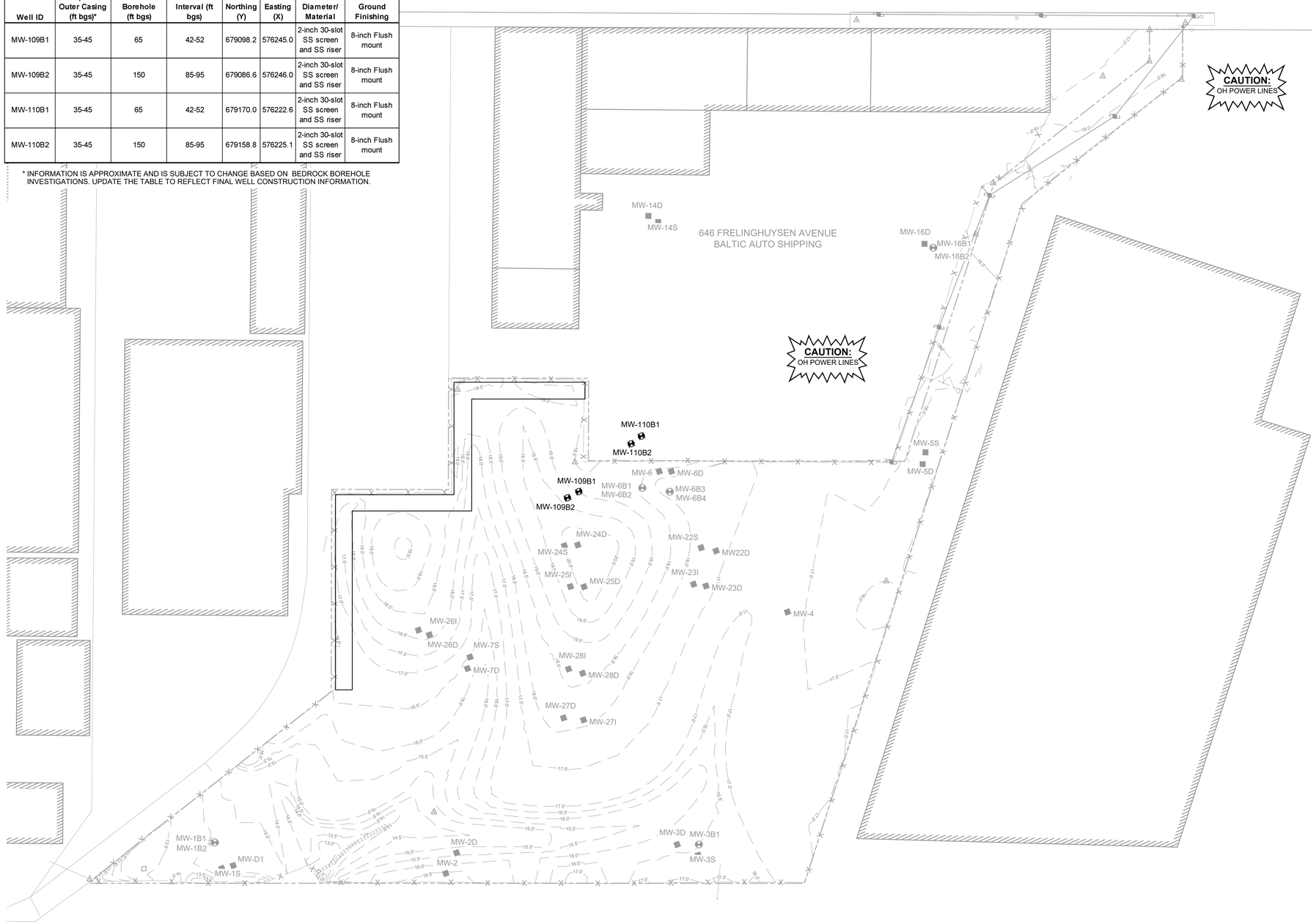
Baseline = June 2014
Post-Injection Round 1 = April 2015
Post-Injection Round 2 = December 2015
Post-Injection Round 3 = November 2021

Figure D-3
Contaminant Concentrations at the Bedrock Study Area
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

BEDROCK MONITORING WELL SPECIFICATIONS
WHITE CHEMICAL CORPORATION SUPERFUND SITE, OU3

Well ID	Depth of Outer Casing (ft bgs)*	Total Depth of Bedrock Borehole (ft bgs)	Depth of Screen Interval (ft bgs)	Northing (Y)	Easting (X)	Well Diameter/ Material	Ground Finishing
MW-109B1	35-45	65	42-52	679098.2	576245.0	2-inch 30-slot SS screen and SS riser	8-inch Flush mount
MW-109B2	35-45	150	85-95	679086.6	576246.0	2-inch 30-slot SS screen and SS riser	8-inch Flush mount
MW-110B1	35-45	65	42-52	679170.0	576222.6	2-inch 30-slot SS screen and SS riser	8-inch Flush mount
MW-110B2	35-45	150	85-95	679158.8	576225.1	2-inch 30-slot SS screen and SS riser	8-inch Flush mount

* INFORMATION IS APPROXIMATE AND IS SUBJECT TO CHANGE BASED ON BEDROCK BOREHOLE INVESTIGATIONS. UPDATE THE TABLE TO REFLECT FINAL WELL CONSTRUCTION INFORMATION.



A1 PLAN: BEDROCK WELL INTALLATION
SCALE: 1"=50'

NOTES:

1. THE CONTRACTOR SHALL ADVANCE THE BEDROCK BOREHOLE, CONDUCT DOWNHOLE GEOPHYSICAL TESTING, AND INSTALL BEDROCK WELLS IN ACCORDANCE WITH SPECIFICATION 33 51 39 AND THE APPROVED PLAN AND AS DIRECTED BY THE CONTRACTING OFFICER.
2. PERFORM THE BASELINE SAMPLING EVENT IN ACCORDANCE WITH SPECIFICATION 01 80 00 AFTER NEW BEDROCK WELLS ARE INSTALLED.
3. PROPOSE WELLS FOR BEDROCK AMENDMENT INJECTION BASED ON BASELINE SAMPLING RESULTS FOR GOVERNMENT APPROVAL.
4. CONDUCT AMENDMENT INJECTION IN ACCORDANCE WITH SPECIFICATION 13 30 00 AND AS DIRECTED BY THE CONTRACTING OFFICER.
5. COLLECT SYNOPTIC WATER LEVEL MEASUREMENTS AND PERFORM GROUNDWATER SAMPLING AT EXISTING BEDROCK WELLS IN ACCORDANCE WITH SPECIFICATION 01 80 00, THE APPROVED QAPP, AND AS DIRECTED BY THE CONTRACTING OFFICER.
6. SCHEDULE BEDROCK WORK CONCURRENT WITH OVERBURDEN ACTIVITIES IN A MANNER THAT MINIMIZES THE DURATION OF THE OVERALL CONSTRUCTION SCHEDULE.

LEGEND

- EXISTING BEDROCK MONITORING WELL
- NEW BEDROCK MONITORING WELL
- EXISTING OVERBURDEN MONITORING WELLS

US Army Corps of Engineers®

MARK	DESCRIPTION	
		D

DESIGNED BY: B. GLYNN
DRAWN BY: A.BOCANEGRA
CHECKED BY: K. MCKENNA
SUBMITTED BY: C. CHEN
SIZE: ANSI D
ISSUE DATE: DECEMBER 2022
SOLICITATION NO.:
CONTRACT NO.: W912DQ-21-D-3004
TASK NO. XXXXXXXXXXXX
FILENAME: 277262 C-105

U.S. ARMY CORPS OF ENGINEERS
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

CDM Smith
CDM Federal Programs Corp.
3130 Fairview Park Drive, Suite 600
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Tel: (703) 485-8500

WHITE CHEMICAL CORPORATIONSUPERFUND SITE
NEWARK, ESSEX COUNTY, NEW JERSEY
NORTH SITE REMEDIAL DESIGN

BEDROCK WELL INSTALLATION

APPENDIX D
FIGURE
D-4

DRAFT 100% DESIGN

%PRODUCTION DATA 4%
%PRODUCTION DATA 3%
%PRODUCTION DATA 2%
ODUCTION DATA 1%

XREFs: [277262-G-BS0001, 277262_V-SVEG01, 277262_V-SVPB01, 277262_B-SI600XX, 277262_V-SVPL01] Images: []
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Tables

Table D-1
Contaminant of Concern Results at MW-6B1/2 Bedrock Wells
White Chemical Corporation Superfund Site, OU3
Newark, New Jersey

	Location	MW-6B1	MW-6B1	MW-6B1	MW-6B1	MW-6B1	MW-6B1	MW-6B1	MW-6B1	MW-6B1	MW-6B2	MW-6B2	MW-6B2	MW-6B2	MW-6B2	MW-6B2
	Date	6/14/2010	6/14/2010	5/20/2011	6/19/2014	4/16/2015	9/29/2015	12/2/2015	11/10/2021	11/10/2021	6/14/2010	5/20/2011	6/19/2014	4/16/2015	12/2/2015	11/10/2021
	Sample ID	MW-6B1-R1	MW-6B1-R1-DUP	MW-6B1-R2	MW-6B1-RDB	MW-6B1-RD1	MW-6B1-BIO	MW-6B1-R2	MW-6B1-R3-01	MW-6B1-R3-02	MW-6B2-R1	MW-6B2-R2	MW-6B2-RDB	MW-6B2-RD1	MW-6B2-R2	MW-6B2-R3
	Parent Sample ID		MW-6B1-R1													
Volatile Organic Compounds (µg/L)																
CAS No	Chemical															
79-34-5	1,1,2,2-Tetrachloroethane	250 U	250 U	250 U	100 U	25 UJ	50 U	50 U	5 U	5 U	250 U	5 U	100 U	25 UJ	50 U	5 U
79-00-5	1,1,2-Trichloroethane	1,100	1,300	600	600	580	380	710	514	508	1,100 J	570 J	550	340	310	5 U
96-12-8	1,2-Dibromo-3-Chloropropane	250 U	250 U	250 U	100 U	88 J	200 UJ	100 U	85.7	97.2	250 UJ	10	100 U	25 UJ	100 U	5 U
106-93-4	1,2-Dibromoethane	250 U	250 U	250 U	100 U	25 U	50 U	50 U	17	19	250 U	9 J	100 U	25 U	50 U	5 U
107-06-2	1,2-Dichloroethane	87,000 J	100,000	54,000	64,000	2,900	1,300	3,100	12,100	11,500	65,000	76,000	68000	16000	10000	20.7
127-18-4	Tetrachloroethene	250 U	250 U	250 U	100 U	61	50 U	50 U	10	12	250 U	10 J	100 U	25 U	50 U	5 U
79-01-6	Trichloroethene	1,000	1,100	620	960	5,700	670	670	738	707	990	580 J	580	760	350	5 U

Notes:

CAS No - Chemical Abstracts Service Registry Number
µg/L - micrograms per liter
J - estimated result
NA - chemical not analyzed
U - not detected at corresponding reporting limit
UJ - not detected at corresponding
estimated reporting limit
UL - Not detected, quantitation limit is probably higher

Pre-Baseline Sampling = 2010, 2011
Baseline Sampling = June 2014
Post-Injection Round 1 = April 2015
Post-Injection Interim Sampling = September 2015
Post-Injection Round 2 = December 2015
Post-Injection Round 3 = November 2021