FIRST FIVE-YEAR REVIEW REPORT FOR SPECTRON, INC. SUPERFUND SITE CECIL COUNTY, MARYLAND

Prepared by

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Region 3
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NOV 14 2017

Date

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LIST OF ABBREVIATIONS & ACRONYMS

AOC	Administrative Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
AWQC	Ambient Water Quality Criteria
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	Contaminant of Concern
DNAPL	Dense Non-Aqueous Phase Liquid
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
GAC	Granular Activated Carbon
GPRA	Government Performance and Results Act
GWCS	Groundwater Cleanup Standard
GWTS	Groundwater Treatment System
HI	Hazard Index
IC	Institutional Control
IROD	Interim Record of Decision
ISTT	In-Situ Thermal Treatment
LNAPL	Light Non-Aqueous Phase Liquid
LUCAP	Land Use Control Assurance Plan
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDE	Maryland Department of the Environment
µg/L	Microgram per Liter
mg/kg	Milligram per Kilogram
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCE	Tetrachloroethene
PDI	Pre-Design Investigation
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level
SI	Stream Isolation
SVOC	Semi-volatile Organic Compound
TBC	To-Be-Considered
TCE	Trichloroethene
TI	Technical Impracticability
TTZ	Target Treatment Zone
VOC	Volatile Organic Compound
WMA	Waste Management Area

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR Reports such as this one. In addition, FYR Reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 Code of Federal Regulations Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the first FYR for the Spectron, Inc. Superfund site (the Site). The triggering action for this statutory review is the on-site construction start date of the operable unit 1 (OU1) remedial action on November 26, 2012. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

On October 14, 1992, EPA proposed listing the Site on the Superfund program's National Priorities List (NPL) and finalized the Site's listing on May 31, 1994. The Site consists of two OUs. This FYR includes a review of OU1 that addresses soil and overburden groundwater and OU2 that addresses bedrock groundwater and Office Area soil. The bedrock groundwater portion of OU2 is further divided into the source area and the dissolved volatile organic compound (VOC) plume.

<u>Site Background</u>

The Site is located about 6 miles north of the Town of Elkton, Cecil County, Maryland in a stream valley formed by Little Elk Creek (Figure 1). The Site consists of the former Spectron, Inc. property, covering about 5 acres, and the groundwater contaminant plume extending to the southeast of the property. A paper mill operated at the Site until it burned down in 1946, followed by a solvent recovery facility between 1962 and 1988. Waste sludge containing solvents such as trichloroethene (TCE) and tetrachloroethene (PCE) was placed in an unlined open air lagoon next to Little Elk Creek. Use of the lagoon and spills and leaks associated with historic operation of the solvent recovery facility contaminated soil and groundwater with VOCs and other chemicals.

State and federal regulators issued multiple permit violations and orders against Spectron, Inc. during its operation. In September 1982, EPA and the predecessor to the Maryland Department of the Environment (MDE), the Maryland Department of Health and Mental Hygiene's Office of Environmental Programs, ordered the property owner to remove the upper 6 inches of contaminated soil and to add an asphalt cover across the Site. The property owner installed concrete perimeter dikes around the process and storage areas and paved the remaining portion of the property with asphalt. This work also included the removal of "hot spots" such as the former lagoon. However, contamination in shallow soils remained following this action.

In 1988, the owner abandoned the property; more than 500,000 gallons of solvents and other liquids reportedly remained in tanks and drums. EPA initiated a removal action in June 1989 to remove the hazardous materials and secure the property. Pursuant to an August 1989 Administrative Order on Consent (AOC), the PRP Group completed the removal action in 1990 to mitigate potential hazards of fire, explosion or exposure to these materials. The PRP Group entered into a second AOC in October 1991 to control seeps of contaminated groundwater that were leaking out of the shallow soil along the bank of Little Elk Creek and posed a potential public health and ecological threat.

The former Spectron, Inc. property consists of two areas separated by Little Elk Creek. The main portion of the property, the former Plant Area, is located on the southern bank of the creek. The former Office Area, covering about 1 acre, is located on the northern bank of the creek (Figure 1). A groundwater treatment building, pole shed and office trailer in the Plant Area are the only structures that remain on site. Most of the Plant Area is paved. The

Plant Area is fenced and accessible only to authorized personnel. Currently, a group of Potentially Responsible Parties (PRPs) own the former Spectron, Inc, property.

Residential properties border the Site to the east and south. Wooded areas border the Site to the north and west. Little Elk Creek flows through the Site from north to south. Public water is currently not available near the Site; residents rely on groundwater as a water source. The nearest residential wells are within several hundred feet of the Site. Residential wells surrounding the Site have been sampled on a regular basis since 1996; site-related contaminants have not been detected above maximum contaminant levels (MCLs).

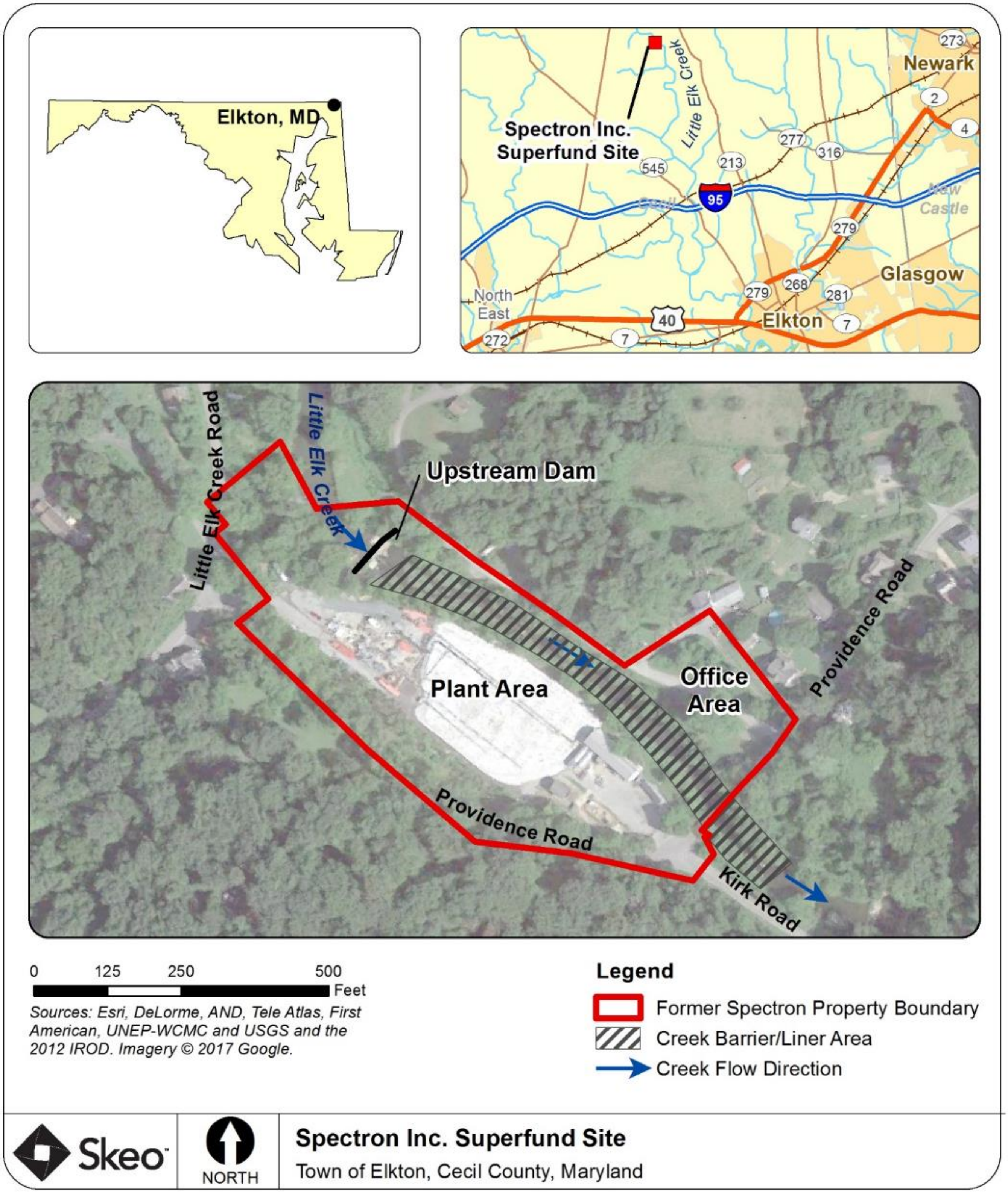
The overburden of the Site is comprised of fill material and native soil that ranges in thickness from 3 to 20 feet. The overburden overlies hard, fractured, crystalline bedrock composed primarily of gneiss and schist. Groundwater flow in the bedrock is along and controlled by interconnected bedrock fractures which are more prevalent in the shallowest 150 feet. Groundwater also follows the foliation planes in bedrock, which dip to the south-southeast.

Appendix A lists documents reviewed for this FYR. Appendix B provides a chronology table. Appendix C includes additional background information, including groundwater flow characteristics.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Spectron, Inc.		
EPA ID: MDD000218008		
Region: 3	**State:** Maryland	**City/County:** Elkton/Cecil
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: EPA		
Author name: John Banks and Aaron Mroz, with additional support provided by Skeo		
Author affiliation: EPA Region 3		
Review period: 1/26/2017 – 11/26/2017		
Date of site inspection: 2/23/2017		
Type of review: Statutory		
Review number: 1		
Triggering action date: 11/26/2012		
Due date *(five years after triggering action date)*: 11/26/2017		

Figure 1: Site Vicinity



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

EPA, MDE and the PRP Group have conducted multiple investigations and removal actions at the Site, including installation of a stream isolation/groundwater and treatment system (SI/GWTS), to identify the nature and extent of contamination and mitigate the most immediate threats to public health and the environment.

The 2003 OU1 remedial investigation (RI) and the 2010 OU2 RI identified contamination in soil, stockpiled soil, and overburden and bedrock groundwater at the Site. While VOCs are the primary contaminants of concern (COCs), the RIs also found elevated levels of semi-volatile organic compounds (SVOCs), pesticides and metals in soil and groundwater (Appendix D, Tables D-1 and D-2). Dense non-aqueous phase liquid (DNAPL), considered a principal threat waste, is also present in overburden and bedrock at the Site.

A baseline risk assessment (BRA) conducted as part of the OU1 RI concluded that the risks to an adult resident, child resident, industrial worker and construction worker would exceed the target levels for carcinogenic and non-carcinogenic risks. The OU1 BRA demonstrated the presence of unacceptable risks to human health from dermal contact and ingestion of soil; and dermal contact, ingestion and inhalation of vapors from overburden groundwater. VOCs present at highly elevated concentrations in groundwater were the predominant risk drivers.

The BRA for OU2, completed in 2009, identified unacceptable risks for potential future exposure (dermal contact, ingestion and/or inhalation of vapors) by child and adult residents to site COCs in bedrock groundwater. The OU2 BRA also identified unacceptable risks for potential future exposure (dermal contact and ingestion) by child and adult residents to COCs in Office Area soil.

A 2007 screening level ecological risk assessment for OU2 determined the risk estimates were driven primarily by contributions from upstream sources and no further evaluation of ecological risk at the Site was required.

Response Actions

Pre-Record of Decision (ROD) Response Actions

In April 1998, EPA and MDE required the installation of the SI/GWTS to prevent contaminated groundwater from the Spectron property from discharging into Little Elk Creek. The stream isolation system included excavation of 2,000 cubic yards of contaminated sediment from the creek bed, installation of a passive drain system, and installation of an impermeable membrane liner to provide a barrier between the creek and contaminated seeps and groundwater. Three sumps are located along the passive drain system and each of these sumps contain a pump that extracts the contaminated groundwater. The contaminated groundwater is then processed through the GWTS for discharge into Little Elk Creek. The excavated contaminated sediment was stockpiled beneath the Drum Storage Building in the northern portion of the property. The SI/GWTS began operating in March 2000. A conceptual drawing of the stream liner system is included as Figure E-1 in Appendix E.

ROD Response Actions

EPA selected a remedy for OU1 in the September 2004 ROD and modified the selected remedy in a March 2012 ROD Amendment. EPA selected an interim remedy for OU2 in the September 2012 Interim Record of Decision (IROD). The IROD addresses the bedrock groundwater source area and Office Area soil. EPA will select a final remedy for the dissolved VOC plume in a future ROD. Table 1 identifies remedial action objectives (RAOs) for each action as specified in the decision documents. Table 2 summarizes major components of the OU1 amended remedy and the OU2 interim remedy.

Table 1: Site RAOs

<table>
<tr><th>OU #</th><th>RAOs</th></tr>
<tr><td>OU1</td><td>1) Ensure continued operation and maintenance of the SI/GWTS, so that federal ambient water quality criteria (AWQCs) for consumption of fish and drinking water are not exceeded within Little Elk Creek, immediately downstream of the SI/GWTS. This is necessary to address potential risks to human health and ecological risks that may occur if the operation were discontinued and contamination were to enter Little Elk Creek. Continued operation and maintenance includes ensuring that the groundwater treatment plant has adequate capacity. The maintenance of the liner is also necessary to prevent the re-establishment of the seeps along the creek banks, which existed prior to the installation of the liner.
2) Prevent current or future direct contact with contaminated soils, which would result in unacceptable levels of risk to human health.
3) Prevent current or future use (ingestion, direct contact or vapor inhalation) of contaminated groundwater that would result in unacceptable levels of risk to human health.
4) Treat principal threat waste (DNAPL and light non-aqueous phase liquid, or LNAPL) in the overburden to the maximum extent practicable, to minimize the continuing source of contamination to groundwater.</td></tr>
<tr><td>OU2</td><td>1. Prevent current or future exposure (ingestion, direct contact and/or vapor inhalation including vapor intrusion) to DNAPL and contaminated bedrock groundwater that would result in unacceptable risk to human health.
2. Prevent current or future direct contact with contaminated soils that would result in unacceptable risk to human health and the environment.
3. Prevent the mobilization of residual or trapped DNAPL.
4. Prevent the migration and expansion of, and reduce the extent of, contaminated bedrock groundwater.
5. Treat principal threat waste (DNAPL) in bedrock groundwater, to the maximum extent practicable, to minimize the continuing source of contamination to bedrock groundwater.
6. Restore contaminated bedrock groundwater to beneficial use, where practicable, defined as meeting the following criteria:
    1. Federal MCLs or non-zero MCL goals (MCLGs), MDE groundwater cleanup standards (GWCSs).
    2. Reduction of cumulative excess carcinogenic risk to less than or equal to 1 in 10,000 (i.e. 10^{-4}) and cumulative excess non-carcinogenic risk to an HI of less than or equal to 1.
7. Ensure continued operation and maintenance of the SI/GWTS, so that AWQCs for consumption of fish and drinking water are not exceeded within Little Elk Creek, immediately downstream of the Site.</td></tr>
<tr><td colspan="2">Sources:
OU1 RAOs as modified by Section H of the 2012 OU1 ROD Amendment.
OU2 RAOs identified in Section H of the 2012 OU2 IROD.</td></tr>
</table>

Table 2: OU1 and OU2 Remedy Components

<table>
<tr><th>OU1
Remedy Components</th><th>OU2
Interim Remedy Components</th></tr>
<tr><td>• Continued operation and maintenance of the SI/GWTS.
• Demolition to grade of all structures in the Plant Area, except the GWTS.
• Placement of onsite debris piles under a cap.
• Grading of the Plant Area.
• Installation of an asphalt (or equivalent) cap.
• In-situ thermal treatment (ISTT) of principal threat waste.
• Monitoring to ensure the effectiveness of the remedy.
• Land and groundwater use restrictions.</td><td>Bedrock Groundwater Source Area
• Pre-design investigation (PDI) to delineate the SI/GWTS capture zone and DNAPL extent.
• Continued operation and maintenance of the SI/GWTS (including modifications/upgrades necessary to treat extracted bedrock groundwater).
• DNAPL collection/extraction and off-site treatment/disposal.
• Groundwater extraction and treatment using the existing GWTS.
• Groundwater monitoring.
• Surface water monitoring.
• Monitored natural attenuation (MNA) evaluation.</td></tr>
</table>

<table>
<tr><th>OU1
Remedy Components</th><th>OU2
Interim Remedy Components</th></tr>
<tr><td></td><td>• Residential well monitoring, temporary water and wellhead treatment.
• Vapor intrusion monitoring and mitigation.
• Land and groundwater use restrictions.
Office Area Soil
• Excavation and consolidation of contaminated soil under the OU1 asphalt (or equivalent) cap.
• Confirmatory sampling and analysis.
• Backfill of excavation using clean fill.
• Land and groundwater use restrictions.</td></tr>
</table>

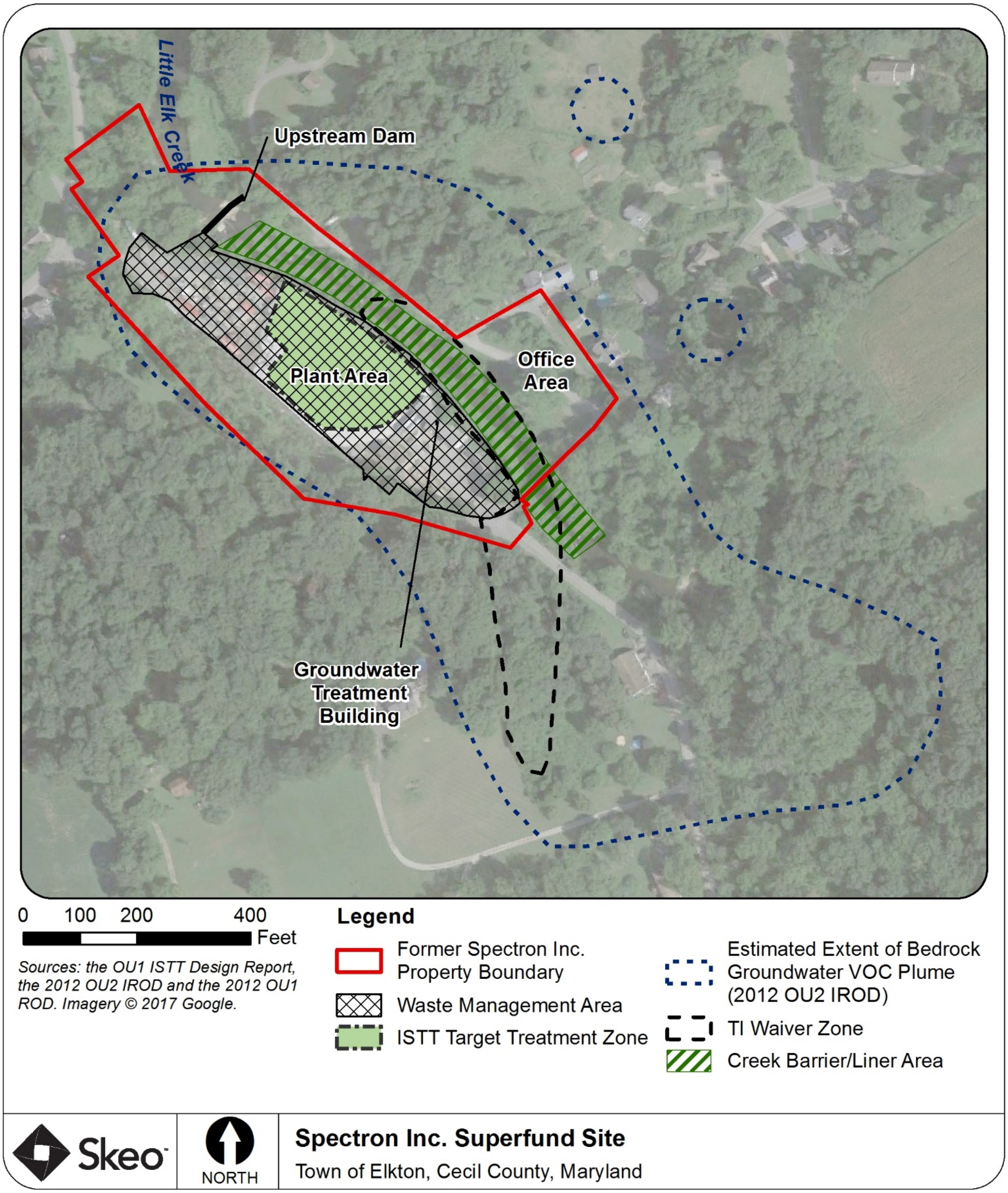
In-situ thermal treatment (ISTT) was selected as the most effective remedy to treat the principal threat waste in soil and overburden groundwater at OU1. The ISTT technology selected for the Site used electrical resistance heating to rapidly heat the subsurface by passing electrical current through contaminated soil and groundwater. The heating evaporated and steam removed VOCs from the soils and groundwater, where they were extracted, and treated by thermal oxidation. ISTT was selected to replace the in-situ reductive dechlorination remedy originally selected in the 2004 OU1 ROD. A treatability study following the 2004 OU1 ROD found that in-situ reductive dechlorination would not be effective on the full suite of contaminants and could be difficult to implement based on the hydrogeological conditions of the overburden and the presence of light non-aqueous phase liquid (LNAPL).

The 2004 OU1 ROD designated the Plant Area as a Waste Management Area (WMA) where waste would be left in place as a component of the OU1 remedy. Figure 2 shows the boundary of the WMA. The 2012 OU2 IROD indicated that the WMA designation would also apply to the OU2 remedy. The waste consists of residual waste and debris piles from the former on-site lagoon, contaminated creek sediments from construction of the SI/GWTS, structural debris and historic building foundations, abandoned drainage pipes, and an abandoned mill race. Based on this designation, groundwater applicable or relevant and appropriate requirements (ARARs) consisting of MCLs, non-zero maximum contaminant level goals (MCLGs) and MDE groundwater cleanup standards (GWCSs) for all COCs will be met at the boundary of the WMA rather than within the WMA.

The 2012 OU2 IROD for the bedrock groundwater also included a Technical Impracticability (TI) Waiver of groundwater ARARs for a portion of the bedrock groundwater source area for select compounds. Due to the presence of DNAPL at depths up to 360 feet below ground surface and the low permeability and limited interconnectivity of fractures in bedrock, EPA determined that it is technically impracticable from an engineering perspective to restore bedrock groundwater in the vicinity of DNAPL to beneficial use using existing technologies. This area, designated as the TI Zone, is located to the northeast of the former Spectron property beneath Little Elk Creek and to the south-southeast of the Plant Area, as shown on Figure 2. Section I.1 of the 2012 OU2 ROD Amendment provides a complete description of the TI Zone. Table F-1 notes the compounds for which the groundwater ARARs are waived within the TI Zone.

Appendix F includes Tables F-1, F-2 and F-3 that summarize numerical performance standards for groundwater, Little Elk Creek surface water and OU2 soil, respectively. Decision documents did not select numerical performance standards for OU1 soil or DNAPL. Instead, EPA has elected to use a multiple lines of evidence approach to evaluate ISTT performance. The 2012 OU1 ROD Amendment and remedial design documents address the evaluation criteria. Appendix F includes Tables F-4 and F-5 that summarizes non-numerical performance standards for each component of the selected remedies.

Figure 2: Detailed Site Map



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<u>Status of Implementation</u>

OU1 – Soil and Overburden Groundwater

The SI/GWTS operates to intercept and treat contaminated groundwater prior to its discharge to Little Elk Creek. Building demolition began in November 2012 and finished in January 2013. The debris piles that remained on-site from the construction of the stream liner system were relocated to the target treatment zone (TTZ) to facilitate the ISTT cap construction. The ISTT system operated from February 1, 2016 through November 14, 2016 with an estimated 15,700 pounds of VOCs removed.

While most of the most of the Plant Area is covered by an impermeable surface, approximately 7% of the Plant Area is not and the PRP Group is planning to install temporary interim stabilization measures over these areas. The interim stabilization measures are being designed to meet the performance standards for the asphalt (or equivalent) cap while the final grading plan and re-use of the Site is determined.

OU2 – Bedrock Groundwater and Office Area Soil

<u>Bedrock Groundwater</u>

The OU2 interim remedial action for bedrock groundwater is currently in the design phase. As part of the pre-design activities, additional monitoring wells have been installed to confirm the delineation of DNAPL and the evaluation of the hydraulic capture zone of the stream isolation system is ongoing. Seven rounds of groundwater samples were collected as part of a MNA Evaluation and the data is currently being reviewed by EPA and MDE to determine if the degradation of VOCs by natural processes is occurring within a reasonable timeframe. The remedial design is expected to be completed in late 2018.

Monitoring of nearby residential wells continues on a semi-annual basis.

<u>Office Area Soils</u>

The PRP Group completed the remedial action for Office Area soils in September 2016. Approximately 200 cubic yards of contaminated soil were excavated, transported and staged at the Plant Area for future consolidation under the asphalt (or equivalent) cap. Following soil removal, the excavation was backfilled using EPA-approved aggregate materials, covered with a minimum of 4 inches of topsoil and seeded to promote vegetative growth.

<u>Institutional Control (IC) Summary</u>

The institutional controls required by the Site decision documents have not been implemented. Table 3 summarizes the required institutional controls for the Site. The decision documents also required a Land Use Control Assurance Plan (LUCAP) that would develop and document the mechanisms for implementing the institutional controls for both OU1 and OU2.

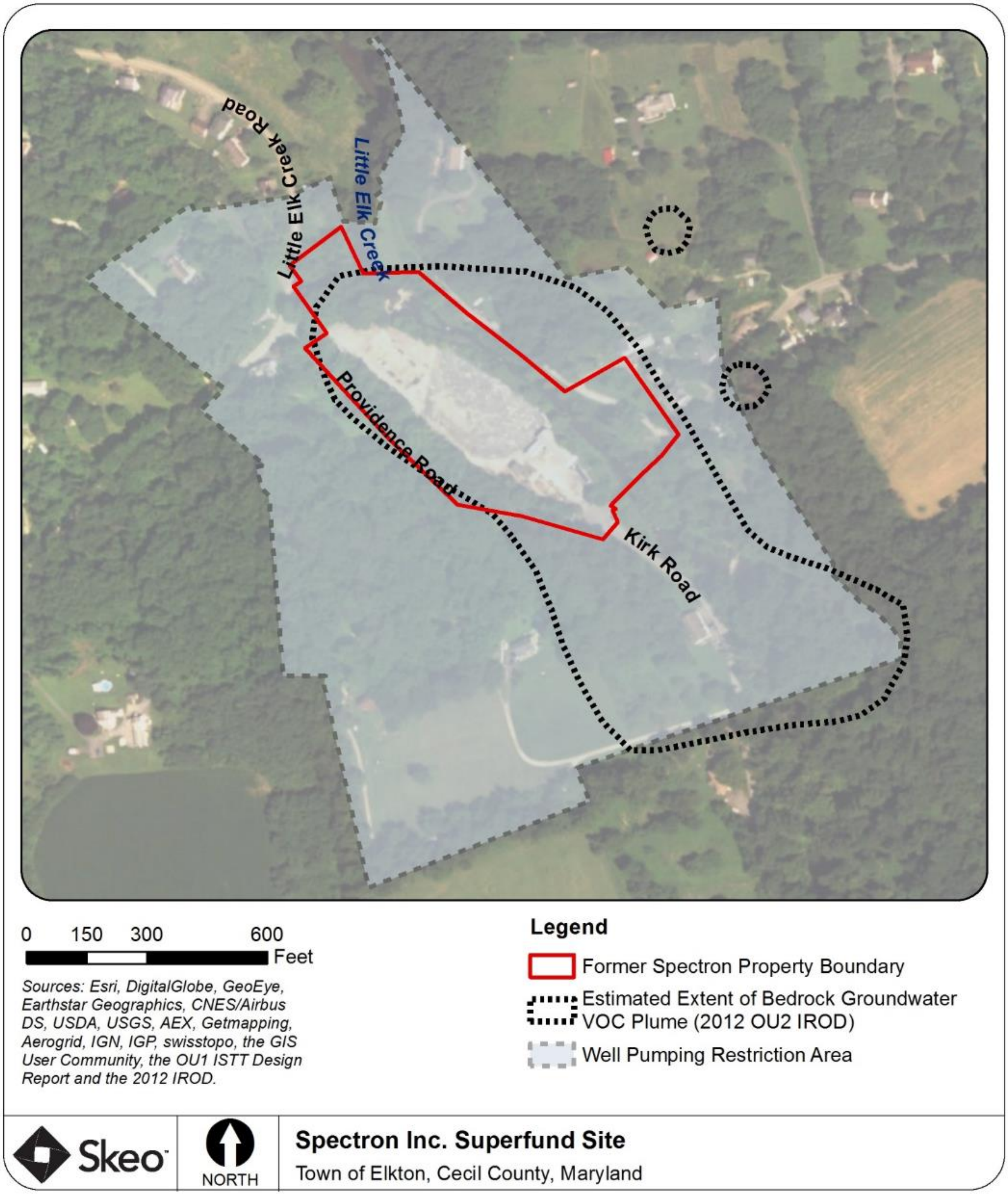
The 2004 OU1 selected remedy designated an area as the Well Pumping Restriction Area (Figure 3). This area was determined as an area which required ICs to protect the in situ reductive dechlorination remedy and was then carried through to the 2012 OU2 IROD as the required area to perform residential well and vapor intrusion sampling.

Despite historical industrial use of the Site, the former Spectron property is currently zoned for residential use, according to the zoning board of Cecil County, Maryland. The properties immediately adjacent to the former Spectron property are currently used for residential purposes or are zoned for residential use if undeveloped. Due to the soil contamination and building rubble below the Plant Area, along with the presence of the GWTS building, EPA has determined that the Site cannot reasonably be expected to return to residential use.

Table 3: Summary of Required Institutional Controls (ICs)

Media, Engineered Controls, and Areas that Do Not Support UU/UE Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	PRP Group property (former Spectron parcel)	Prevent exposure to groundwater and restrict installation of groundwater wells. Restrict activities that would impact the groundwater remedy components.	To be determined.
Groundwater	Yes	Yes	Property within the approximate Well Pumping Restriction Area	Prohibit activities without EPA approval that would impact the groundwater extraction and treatment system, including installation of new residential/ commercial/industrial water supply wells and/or significant increases in pumping rates of existing water supply wells.	To be determined.
Soil	Yes	Yes	PRP Group property (former Spectron parcel)	Restrict residential development. Restrict activities that would interfere with the protective barrier cap, operation of the groundwater containment system, and the in-situ treatment remedy components.	To be determined.
Soil gas	Yes	Yes	PRP Group property (former Spectron parcel)	Require vapor intrusion sampling at any future occupied structure at the Plant Area and Office Area.	To be determined.

Figure 3: 2004 OU1 ROD Well Pumping Restriction Area



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Systems Operations/Operation & Maintenance (O&M)

Current GWTS Operations

The GWTS currently addresses groundwater that discharges to the three collection sumps (Sump 1 through Sump 3) of the stream isolation system/liner at Little Elk Creek. The GWTS also treated wastewater from the ISTT while the ISTT system was in operation, such as groundwater from the overburden hydraulic control wells and from liquids extracted within the TTZ. It is estimated that since the installation and startup of the SI/GWTS over 35,000 pounds of VOCs have been captured and treated.

The GWTS previously treated VOCs in site groundwater via a batch biological process (using two 20,000-gallon powdered activated carbon treatment reactors), which was discontinued in late 2012/early 2013. Currently, VOCs are removed from groundwater via air stripping, with discharge of vapors to a stack/vent (with odor control via vapor-phase granular activated carbon). An air stripper evaluation conducted in support of the January 2013 Treatment Plant Modifications Design Report determined that emissions from the air stripper are below applicable thresholds that would require an air permit, according to federal and MDE requirements.

Effluent from the GWTS is sampled monthly to determine compliance with a MDE equivalency discharge permit. For the construction of the GWTS a 100 micrograms per liter (µg/L) total VOCs discharge limit was established and this number was kept as a performance standard in the 2004 ROD. As part of GWTS upgrades a new equivalency permit was issued in January of 2016 requiring additional performance standards. In addition to the 100 µg/L total VOCs discharge limit, limits were also set for biological oxygen demand, total suspended solids, arsenic, antimony, phenol, chemical oxygen demand, pH, 1,1,2,2-tetrachloroethane, bis(2-chloroethyl)ether and temperature.

Long-term Monitoring

The RODs require routine sampling of the creek immediately downstream of the groundwater containment system for VOCs and SVOCs. The PRP Group currently conducts quarterly surface water monitoring of Elk Creek for VOCs, but not for SVOCs. The OU2 IROD requires routine monitoring of nearby residential wells for all COCs. The residential monitoring is currently conducted semi-annually for VOCs.

DNAPL is routinely recovered from angled well AW-1, which extends beneath Little Elk Creek. This is the only well where DNAPL is still observed. Approximately 129 gallons of DNAPL have been removed from the well between 2000 and 2016. The DNAPL is disposed of off-site at a permitted waste disposal facility. The greatest maximum DNAPL recovery volume of 25 gallons occurred in September 2016, likely due to the ISTT operations. Figure G-1 in Appendix G shows cumulative DNAPL recovery in this well between 2000 and 2016.

III. PROGRESS SINCE THE PREVIOUS REVIEW

This is the first FYR for the Site.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was published in the *Cecil Whig* on October 13, 2017, stating that the FYR was underway and inviting the public to submit any comments to EPA. Appendix H provides a copy of the public notice. The results of the FYR and the report will be made available at the Site's information repository, located at the Cecil County Library, 301 Newark Avenue, Elkton, Maryland, and online at https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.ars&id=0300192.

During the FYR process, EPA conducted interviews to document any perceived problems or successes with the remedy that has been implemented to date. The results of these interviews are summarized below.

Two nearby residents whose wells are part of the semi-annual sampling and homes were part of the vapor intrusion investigation were interviewed. Both residents express that they feel adequately informed and satisfied with the relationships with EPA and the PRP Group. One resident has lived in the area since the Site was in operation and is very happy with the cleanup and improvements to the Site.

A representative of MDE comments that the site work has been performed according to proposed schedules and is satisfied with the continued level of involvement and interaction with EPA and the PRP Group.

Data Review

This FYR evaluated residential well monitoring data, surface water data from Elk Creek, vapor intrusion data, and overburden and bedrock groundwater data collected between 2012 and 2017. Maps included in Appendix E show surface water and groundwater monitoring well locations.

Residential Well Monitoring

Residential wells within the Well Pumping Restriction Area are sampled on a semi-annual basis for VOCs. Between 2012 and 2016, 23 residential wells were sampled, with the most recent sampling event reviewed for this FYR occurring in November 2016. Analytical results of residential well samples indicate that samples contain no VOCs at concentrations exceeding the MCLs or MDE's groundwater cleanup standards, where applicable. Future sampling will also include analysis of 1,2,4-dichlorobenzene and bis(2-chloroethly)ether. These two SVOCs are site-related COCs and are not included in the analysis of the VOCs.

During the most recent sampling event in November 2016, samples were collected from 17 residential locations, including one location with a granular activated carbon (GAC) treatment system.[1] At 14 residential locations, VOCs were not detected above laboratory method detection limits. At two locations, chloroform (a trihalomethane) was detected at concentrations below 2 µg/L, compared to the MCL of 80 µg/L for total trihalomethanes.

Three samples were collected at the property with the GAC treatment system: one prior to entering the GAC treatment system, one at the mid-point and one post-treatment. Chloroform, 1,1-dichloroethane and cis-1,2-dichloroethene were detected in the pre-treatment sample at concentrations of 0.6 µg/L (MCL of 80 µg/L for total trihalomethanes), 1.3 µg/L (MCL of 80 µg/L) and an estimated 0.2 µg/L (MCL of 70 µg/L), respectively. No VOCs were detected above method detection limits in the mid-treatment sample. 1,1-Dichloroethane and naphthalene were detected in the post-treatment sample at estimated concentrations of 0.1 µg/L (which is below the MCL of 80 µg/L) and 0.3 µg/L (no MCL), respectively. The detected concentration of naphthalene exceeds the EPA tap water screening level of 0.17 µg/L. Naphthalene is not considered a groundwater COC, as listed in the RODs.

Surface Water Monitoring

Surface water samples are collected quarterly from eight locations along Little Elk Creek to evaluate the effectiveness of the SI/GWTS in reducing VOC concentrations in Little Elk Creek (see Appendix E, Figure E-2). Of the eight samples collected in Little Elk Creek, one sample station is located north of the dam upstream of the Site (LEC-S1), one sample station is located at the upstream end of the creek liner (LEC-S1A), one sample is collected at the downstream end of the creek liner (LEC-S2E), one sample station is located immediately downstream of the creek liner (LEC-S2D), and four sample stations are located progressively downstream of the

[1] The 2004 OU1 ROD indicated that a few residences were provided with GAC filter systems as a precautionary measure even though residential sampling did not detect COCs above MCLs.

creek liner (LEC-S3A, LEC-S3, LEC-S4 and LEC-S5). The most recent sampling event reviewed for the FYR occurred in February 2017.

During the February 2017 sampling event, detected concentrations of all VOCs were below their respective performance standards for Little Elk Creek at all sampled locations. Although not detected in February 2017, estimated concentrations of 1,1,2,2-tetrachloroethane exceeded the 2004 Performance Standard of 0.17 µg/L at several surface water sampling stations during the past five years with a maximum concentration of 0.9 µg/L. Vinyl chloride occasionally exceeded its surface water performance standard of 0.025 µg/L during this FYR period with a maximum concentration 0.4 µg/L.

The February 2017 total VOC concentrations at the surface water sampling locations ranged between non-detect and 0.4 µg/L. Compared to data collected since 1995, the concentrations measured during the February 2017 sampling event are at the lower end of the historical concentration range of detected VOCs and are similar to levels observed since the SI/GWTS became operational.

Recent samples have not been analyzed for surface water COCs other than VOCs. The 2012 OU2 IROD also identified several SVOCs, including bis(2-chloroethyl)ether, 4-chloroaniline, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 4-methylphenol and 1,2,4-trichlorobenzene, as COCs for Little Elk Creek. Future sampling events will be expanding the analytical suite to include all COCs.

NPDES Monitoring

This FYR reviewed effluent monitoring data collected between 2012 and March 2017; the performance standard has been met except during and immediately after ISTT operations. Between March 2016 and January 2017, total VOC concentrations exceeded the 100 µg/L total VOCs discharge limit, primarily due to elevated detections of acetone and 2-butanone. The ISTT operations caused an increase in the amount of VOCs being sent to the GWTS. Acetone and 2-butanone are not efficiently removed by the current treatment process. The most recent effluent data from March 2017 reported that total VOCs were well below the total VOC performance standard at a concentration of 5 µg/L. Since issuing the new equivalency permit, effluent samples have not been analyzed for phenol or bis(2-chloroethyl)ether to determine if concentration of these compounds exceed their discharge limits. Appendix G, Table G-1, includes the VOC effluent data collected between 2012 and January 2017.

Vapor Intrusion Monitoring

The PRP Group conducted vapor intrusion sampling in support of the FYR as required in the 2012 OU2 IROD. The sampling occurred in March and May of 2017 at eight properties where the PRP Group were able to gain access. The results indicated that there was not a complete vapor intrusion pathway that resulted in unacceptable risk.

Groundwater Monitoring

The PRP Group conducted a groundwater monitoring event in November 2012 as part of the pre-design work for the bedrock groundwater remedy. This FYR addresses this sampling event because it is the most recent site-wide sampling event conducted prior to remedy implementation. Groundwater samples were collected from 18 overburden monitoring wells, six pairs of overburden observation wells, 34 conventional bedrock wells and seven Westbay® multi-port sampling systems (with a total of 29 sampling ports). Bedrock well AW-1 was not sampled due to the presence of DNAPL. Samples were analyzed for VOCs and dissolved hydrocarbons (methane, ethane and ethene). Select samples were also analyzed for 1,4-dioxane. Results from the pre-design sampling event and data collected from select wells following implementation of the OU1 ISTT remedy are discussed below. Appendix E, Figures E-3 and E-4 show monitoring well locations for OU1 and OU2, respectively.

Overburden Groundwater (OU1)
The results from the pre-design groundwater monitoring event in 2012 indicated VOC concentrations were detected in groundwater from the following wells where total VOC concentrations were detected above or approaching 100,000 µg/L:

- MW-13 (328,290 µg/L)
- MW-17 (101,257 µg/L)
- MW-18D (150,815 µg/L)
- OW-1S (98,970 µg/L)
- OW-4S (159,538 µg/L)
- OW-4D (363,354 µg/L)

During implementation of the ISTT remedy, the PRP Group collected performance monitoring groundwater samples from select wells in the treatment zone. The PRP Group also conducted one round of the post-ISTT groundwater sampling in January 2017. Table 4 summarizes total VOC concentrations prior to, during and after implementation of ISTT for select wells.

Preliminary results show significant reductions in total VOC concentrations for several wells, including MW-13, MW-17 and MW-18D. However, two wells, MW-16D and MW-28, reported increases in total VOC concentrations. Total VOC concentrations in MW-16D nearly quadrupled between the December 2015 baseline sampling event and the first post-ISTT sampling event. Well MW-16D is located along the northern edge of the treatment zone, adjacent to the creek.

Appendix G, Table G-2 includes a summary of all OU1 groundwater results collected between 2012 and 2017.

Table 4: Total VOC Concentrations (µg/L) for Select OU1 Wells

Well	Pre-ISTT		During ISTT Implementation (heating)			Post-ISTT (cooldown)
	November 2012[a]	December 2015	May 2016	July 2016	August 2016	January 2017
MW-3D	76,148	85,704	59,939	938	154	17,179
MW-13	328,290	165,065	NA[b]	NA	NA	638
MW-16D	43,777	56,814	4,260	545	128,933	204,470
MW-17	101,257	32,872 / 33,037[c]	15,165	1,401	7,373	2,761
MW-18D	150,815	143,580	7,665	5,325	60,670	41,914
MW-22	NA	248,942	94,620	5,499	2,003	857
MW-23	NA	92,132	47,081	6,447	NA	NA
MW-28	26,347[a]	14,557	68,982	41,888	33,488	35,056
MW-29	85[a]	282	NA	NA	NA	72
MW-31	1,002[a]	1,147	567	359	167	105

Notes:
a) The samples from MW-28, MW-29 and MW-31 were collected in March 2014.
b) NA = not applicable. Sample not collected.
c) Primary sample / duplicate sample results shown.

Rows highlighted in dark gray represent locations where total VOC concentrations increased between pre-ISTT sampling and post-ISTT sampling.

Bedrock Groundwater (OU2)
The PRP Group has collected additional samples at various bedrock wells since 2012 as part of pre-design investigations. The greatest VOC concentrations were detected in groundwater from the following wells where total VOC concentrations were detected above or approaching 100,000 µg/L:

- AW-2 (174,653 µg/L) in December 2012 (located in the TI Waiver Zone)

- VW-8DD (353,281 µg/L – primary sample and 376,657 µg/L – duplicate sample) in December 2012
- VW-9D (3,964,153 µg/L) in December 2012 (located in the TI Waiver Zone)
- VW-13D (1,764,900 µg/L) in December 2012
- VW-19 Zone 2 (2,294,508 µg/L) in November 2012.
- VW-23 Zone 3 (129,009 µg/L) in February 2012
- VW-23 Zone 4 (131,827 µg/L) in February 2012
- VW-23 Zone 5 (133,697 µg/L – primary sample and 173,843 µg/L – duplicate sample) in February 2012
- VW-31 (92,593 µg/L) in June 2014
- VW-33S (218,662 µg/L) in August 2016
- VW-33I (99,412 µg/L) in August 2016
- VW-33D (120,024 µg/L) in August 2016

Figure G-2 in Appendix G shows the approximate extent of the groundwater VOCs plume and the TI Waiver Zone. Seven rounds of groundwater samples were collected as part of the MNA Evaluation and the data is currently being reviewed by EPA and MDE. The remedy for bedrock groundwater (OU2) is currently in the remedial design phase. Groundwater sampling did not include sampling for all COCs. Future sampling will include all compounds that are listed as COCs.

Appendix G, Table G-3 includes a summary of all OU2 groundwater results collected between 2012 and 2017.

Site Inspection

The site inspection took place on February 23, 2017. Participants included EPA Remedial Project Manager Aaron Mroz, EPA Community Involvement Coordinator Cathleen Kennedy, Katie Matta of EPA's Biological Technical Assistance Group, MDE project manager Irena Rybak, Navjot Mangat from Earth Data Northeast (PRP Group contractor), and Hagai Nassau and Jill Billus from Skeo (EPA's FYR contractor). The purpose of the inspection was to assess the protectiveness of the remedy. Appendix I is the site inspection checklist. Appendix J includes photographs from the site inspection.

Site inspection participants toured the groundwater treatment plant, the in-situ thermal treatment area, the former office area and some downgradient monitoring wells. Groundwater & Environmental Services, Inc., the operator of the groundwater treatment system, is on site twice per week. GES has seen no evidence of trespassing during its five years at the Site. The former Plant Area is surrounded by a 6-foot chain-link fence topped with barbed wire; site inspection participants did not observe any fence damage. Site inspection participants noted that some monitoring wells within the fenced area are not locked. However, all wells observed outside the fenced area were secure and labeled.

Site inspection participants observed the stream isolation system in Little Elk Creek. No obstructions were observed.

As part of the FYR site inspection, Skeo visited the Site's local document repository (Cecil County Public Library, 301 Newark Avenue, Elkton, Maryland 21921). The library had compact discs containing up-to-date documents for the Site.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

OU1 – Soil and Overburden Groundwater

The OU1 remedial action is currently being constructed in accordance with the requirements of the 2004 OU1 ROD, 2012 OU1 ROD Amendment and design specifications. The implemented components of the OU1 remedy, such as the SI/GWTS, are functioning as intended. The SI/GWTS effectively collects and treats groundwater prior to discharge to Little Elk Creek. In general, treated effluent from the GWTS has complied with the 100 µg/L total VOCs discharge limit. During implementation of the ISTT, total VOC concentrations exceeded the discharge limit, primarily due to elevated detections of acetone and 2-butanone. The elevated concentrations of acetone and 2-butanone in the effluent were related to ISTT operations and have returned to pre-ISTT levels.

The GWTS plant was upgraded in 2013 to include an air stripper and additional treatment capacity. The GWTS continues to be well-maintained and is regularly monitored. The SI/GWTS has captured over 35,000 pounds of VOCs since operations began in 2000. The SI/GWTS has also been operated in a manner that prevents flotation of the stream liner and allows fish to travel up to the dam.

Results from routine sampling of Little Elk Creek show that the SI/GWTS is reducing VOC concentrations in the creek. During the most recent sampling event in February 2017, all concentrations were below the performance standards. Future sampling will include the SVOCs listed as the site surface water COCs.

As documented in the ISTT Remedial Action Completion Report, results show significant reductions in total VOC concentrations for several overburden wells and the ambient groundwater temperatures have returned to pre-heating levels.

The asphalt (or equivalent) cap has not been constructed at this time so this part of the remedy cannot be evaluated at this time.

OU2 – Bedrock Groundwater and Office Area Soil

The OU2 interim remedy is currently being constructed in accordance with the requirements of the 2012 OU2 IROD and design specifications. The implemented component of the OU2 remedy, the excavation of OU2 Office Area contaminated soil, is complete and successfully removed 200 cubic yards of impacted soil. Post-excavation soil sampling indicated that performance goals for lead were met, except for two small areas where soil could not be removed without compromising significant physical structures. Question B of this FYR evaluates the impact of the soil contamination left in place.

The groundwater portion of the OU2 interim remedy is currently in the design phase. A decision document for the bedrock dissolved VOC plume is expected in 2019.

In the interim, results of regular residential well sampling within the Well Pumping Restriction Area indicate that samples contain no site-related VOCs at concentrations exceeding federal MCLs or MDE's groundwater cleanup standards, where applicable. DNAPL collection at AW-1 also occurs on a regular basis.

Vapor intrusion sampling was performed in 2017 for this FYR and the results indicated that there was not a complete vapor intrusion pathway that resulted in unacceptable risk.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

Changes in Standards and To-Be-Considered (TBC) Criteria

The federal MCLs and non-zero MCLGs included on Table 1 of the 2012 OU2 IROD (and summarized in Appendix F, Table F-2 of this FYR) have not changed, nor have new standards been promulgated for these chemicals (see Appendix K).

For those chemicals without federal MCLs or non-zero MCLGs, the 2012 OU2 IROD selected the MDE groundwater cleanup standards (GWCS) as performance standards. The current 2017 MDE GWCS for 1,1,2,2-tetrachloroethane is more stringent than the 2012 MDE GWCS. The current 2017 MDE GWCSs for 1,1-dichloroethane and 4-methyl-2-pentanone are less stringent than the respective 2012 MDE GWCSs. All other MDE GWCSs have not changed (see Appendix K).

The groundwater cleanup goals remain protective because the total risk-based standard (cancer risk 1 x 10^{-4} or less, HI of 1 or less) is part of the performance standards.

The surface water performance standards in Table 11 of the 2004 OU1 ROD are summarized in Appendix F, Table F-1 of this FYR. The drinking water protection objective was based on "the close proximity of residential wells along Little Elk Creek, downstream of the Site." In the 2003 risk assessment, Little Elk Creek surface water was evaluated using drinking water exposure assumptions.

As part of this FYR, the 2004 OU1 ROD's Table 11 cleanup goals have received an updated risk assessment, using current EPA Region 3 default exposure assumptions and updated toxicity factors from the May 2016 Regional Screening Level table. This updated assessment shows that the goals for 1,1-dichloroethane, ethylbenzene, and 4-chloroaniline would no longer be protective in combination for a cancer risk and the goals for 4-chloroaniline and 1,2,4-trichlorobenzene exceed non cancer risk. Over the last five years the surface water sampling results for these contaminants have not been detected at levels that would indicate unacceptable risk.

Federal AWQCs for surface water, included on Table 11 of the 2004 OU1 ROD and summarized in Appendix F, Table F-1 of this FYR, have changed for several COCs (see Appendix L). The current 2017 AWQCs for benzene, chlorobenzene, trans-1,2-dichloroethene, ethylbenzene, toluene, 1,1,2-trichloroethane, TCE, vinyl chloride and 1,2,4-trichlorobenzene are more stringent than the respective 2012 AWQCs. The current 2017 AWQCs for chloroform, 1,2-dichloroethane, 1,1-dichloroethene, methylene chloride, 1,1,2,2-tetrachloroethane, PCE, 1,1,1-trichloroethane, 1,2-dichlorobenzene and 1,4-dichlorobenzene are less stringent than the respective 2012 AWQCs.

For the Office Area soil the performance standards for arsenic and lead are 21.6 milligrams per kilogram (mg/kg) and 400 mg/kg, respectively. Arsenic remains protective under current default exposure and toxicity assumptions (i.e., within the 1 x 10^{-6} to 1 x 10^{-4} cancer risk range, and at an HI of 1 or less, even for potential residents). For lead, EPA issued a memo in December 2016 that indicated blood-lead levels could be of concern at levels lower than previously thought. However, a project-specific goal for lead of 300 mg/kg was used for the excavation of the Office Area, because the cleanup standard is likely to be revised in the future. Based on Table 4 of the OU2 (Office Area Soil) Remedial Action – Remedial Action Completion Report, the average lead concentration left behind is about 145 mg/kg. This includes two samples (965 mg/kg and 854 mg/kg) that were left in place despite exceeding the 300 mg/kg goal, because they were close to significant physical structures such as a utility pole. Exclusive of those two samples (i.e., in areas where the soil would be more accessible), the average soil concentration would be 72 mg/kg. In either case, this indicates that the remaining soil lead is unlikely to pose an unacceptable risk. EPA is continuing to monitor the changes in the science associated with the blood-lead levels and believes the remedy will be protective.

The air emissions standards from the treatment plant specify a target cancer risk of 1 x 10^{-6} and a HI of 1. Therefore, this standard continues to be protective.

The vapor intrusion goal in the 2012 OU2 IROD specifies sampling and mitigation if necessary (if the HI exceeds 1 or the cancer risk exceeds 1 x 10^{-4}). Therefore, this goal also remains protective.

Groundwater goals were specified for the bedrock source area in OU2 outside the TI Waver Zone and WMA. (A decision document for the bedrock dissolved VOC plume is expected in the future.) The performance standards for the bedrock source area include a risk-based standard (cancer risk less than or equal to 1 x 10^{-4}, and HI less than or equal to 1). Therefore, the bedrock source area groundwater goals remain protective. Residential wells also must meet the same risk goals or else alternate water supplies are provided. This goal also remains protective.

Changes in Toxicity and Risk Assessment Methods

Toxicity factors and risk assessment methodologies have changed since the original risk assessments were performed and have been evaluated in the discussions above.

Changes in Exposure Pathways

In the past five years the soil and debris has been graded and placed under the ISTT cap. The Office Area soil has been excavated and moved to the Plant Area. No other exposure pathways have changed over the past five years.

Vapor intrusion sampling took place in 2017. While some VOCs were detected, including in the sub-slab environment and indoor air, the concentrations did not indicate unacceptable risk.

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

No other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the FYR:
None

Issues and Recommendations Identified in the FYR:

OU(s): OU1, OU2	**Issue Category:** Institutional Controls			
	Issue: Institutional controls have not yet been implemented. Status reports on institutional controls have not been submitted for EPA's review every two years, as required by the 2004 OU1 ROD.			
	Recommendation: Prepare the LUCAP as required by decision documents to develop and document the mechanisms for implementing the institutional controls for both OU1 and OU2. Implement the institutional controls. Update EPA on the status of institutional controls every two years as required by the 2004 OU1 ROD.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	6/1/2018

VII. PROTECTIVENESS STATEMENTS

OU1 Protectiveness Statement	
Operable Unit: OU1	***Protectiveness Determination:*** Will be Protective
Protectiveness Statement: The OU1 remedy is expected to be protective of human health and the environment upon completion. In the interim, exposure pathways that could result in unacceptable risks are being controlled through the cleanup actions to date. Results from routine sampling of Little Elk Creek show that the SI/GWTS is reducing VOC concentrations in the creek. Pavement, buildings and fencing within and around the Plant Area prevent direct exposure to contaminated soil. ISTT reduced contaminant concentrations in soil and groundwater.	

OU2 Protectiveness Statement	
Operable Unit: OU2	***Protectiveness Determination:*** Will be Protective
Protectiveness Statement: The OU2 interim remedy is expected to be protective of human health and the environment when it is completed. In the interim, exposure pathways that could result in unacceptable risks are being controlled through the cleanup actions to date. Results from routine sampling of Little Elk Creek show that the SI/GWTS is reducing VOC concentrations in the creek. Contaminated soil was removed from the Office Area. Results of regular residential well sampling indicate that samples contain no site-related VOCs at concentrations exceeding drinking water standards. Significant vapor intrusion has not been observed to show unacceptable risk.	

Government Performance and Results Act (GPRA) Measure Review
As part of this five-year review the GPRA Measures have also been reviewed. The GPRA Measures and their status are provided as follows:

Environmental Indicators
Human Health: Human Health Exposure Under Control
Groundwater Migration: Groundwater Migration Under Control

Sitewide Ready for Anticipated Use
The site has not yet been designated for re-use.

VIII. NEXT REVIEW

The next FYR Report for the Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

2012-2017 Groundwater, Surface Water and Residential Well Water Sampling Results, draft, provided by the PRP Group.

Fourth Quarter 2016 Residential Well and Creek Water Sampling Results – Elkton, Maryland, Spectron, Inc. Superfund Site. VonNieda Environmental, LLC. January 2017.

Interim Record of Decision, Operable Unit 2, Bedrock Groundwater and Office Area Soil, Spectron, Inc. Superfund Site, Elkton, Cecil County, Maryland. EPA Region 3. September 2012.

ISTT Final Remedial Design Report, Spectron Superfund Site, Operable Unit 1 (OU-1). O'Brien & Gere. December 2014.

ISTT Remedial Action Completion Report, Spectron Superfund Site, Operable Unit 1 (OU-1), Elkton, Maryland. June 2017

OU-2 (Office Area Soil) Remedial Action – Remedial Action Completion Report, Spectron Superfund Site, Elkton, Maryland. O'Brien & Gere Engineers, Inc. September 2016.

Pre-Design Investigation / Focused Feasibility Study Report for DNAPL in Groundwater, Operable Unit 1, Spectron Superfund Site, Elkton, Maryland. O'Brien & Gere. September 2011.

Record of Decision, Spectron, Inc. Superfund Site, Operable Unit 1, Elkton, Cecil County, Maryland. EPA Region 3. September 2004.

Record of Decision Amendment, Operable Unit 1, Soil and Overburden Groundwater, Spectron, Inc. Superfund Site, Elkton, Cecil County, Maryland. EPA Region 3. March 2012.

Summary of Vapor Intrusion (VI) Sampling Activities, Operable Unit 2, Spectron Superfund Site, Elkton, Maryland. July 2017.

Treatment Plant Modifications Design Report, Galaxy-Spectron Superfund Site, 101 Providence Road, Elkton, MD, 21921. Groundwater & Environmental Services Inc. January 2013.

APPENDIX B – SITE CHRONOLOGY

Table B-1: Site Chronology

Event	Date
Site discovery	1979
EPA and the predecessor to MDE issued an order requiring Spectron, Inc. to remove the upper 6 inches of contaminated soil, add an asphalt cover throughout the Site and remove hot spots such as the former lagoon	September 1982
Spectron, Inc. ceased operations and abandoned the Site	1988
EPA, with assistance from MDE, conducted a removal action to remove more than 500,000 gallons of flammable liquids in holding tanks and to secure the Site	June-August 1989
EPA and MDE negotiated an AOC with the PRP Group to conduct a removal action	August 1989
PRP Group conducted a removal action to remove and dispose of drums and to clean out flammable sludges from the tanks	1990
EPA and MDE negotiated an AOC with the PRP Group to control seeps of contaminated groundwater that were leaking out of the shallow soil along the bank of Little Elk Creek	October 1991
EPA proposed the Site for listing on the NPL	October 1992
EPA listed the Site on the NPL	May 1994
EPA and the PRP Group signed an AOC, requiring the PRP Group to conduct an RI/FS; the PRP Group began the RI/FS for OU1	May 1996
MDE, in cooperation with Agency for Toxic Substances and Disease Registry, completed a Preliminary Public Health Assessment Report	September 1996
EPA and MDE required installation of the SI/GWTS to prevent contaminated groundwater seeps from the Spectron property from discharging into Little Elk Creek	April 1998
PRP Group began construction for the SI/GWTS	Fall 1998
PRP Group completed the SI/GWTS and the treatment plant began operating	March 2000
PRP Group began the RI/FS for OU2	May 2001
PRP Group completed the RI/FS for OU1	March 2003
PRP Group completed the removal action, EPA issued the OU1 ROD	September 2004
PRP Group began the remedial design for OU1	June 2006
EPA and the PRP Group executed a Consent Decree for the PRP Group to perform the OU1 and OU2 remedies at the Site	January 2007
PRP Group completed the OU2 RI	2010
PRP Group purchased the former Spectron property	December 2011
EPA issued the OU1 ROD Amendment	March 2012
PRP Group completed the OU2 FS; EPA issued the OU2 Interim ROD; the PRP Group began the remedial design for OU2	September 2012
PRP Group completed the remedial design for OU1	October 2012
PRP Group began the remedial action for OU1 with demolition of site buildings	November 2012
PRP Group began the heating component of the ISTT OU1 remedy	February 2016
PRP Group conducted the soil removal at the OU2 Office Area	September 2016
The heating period for ISTT ended	November 2016

APPENDIX C – SITE BACKGROUND

C1: History of Activities Leading to Contamination

A paper mill originally operated at the Site until it burned down in 1946. In 1961, Galaxy Chemicals began a solvent recovery operation that treated used solvents and other chemicals generated by the electronics, pharmaceutical, paint and chemical process industries by removing impurities, and then recycling the clean solvents and chemicals. Galaxy Chemicals went bankrupt in 1975 and the facility was re-opened as Solvent Distillers, with primarily the same ownership.

In 1978, Solvent Distillers changed its name to Spectron. Spectron closed the facility in 1988 and went into bankruptcy. Solvent recycling operations reportedly handled more than 1 million gallons of liquids per year when in operation. Both LNAPLs and DNAPLs were released while the solvent recycling operation was active, resulting in contaminated groundwater and DNAPL seeps along the western bank of Little Elk Creek. Waste sludge containing solvents such as TCE and PCE was placed into an unlined open air lagoon adjacent to Little Elk Creek. The waste sludge then migrated into the creek through shallow groundwater or by being washed out of the lagoon during storm events. When the owner abandoned the Site in 1988, more than 500,000 gallons of solvents and other liquids were left on site in tanks and drums.

Historical operation of the solvent recycling facility contaminated soil and overburden material, overburden groundwater and bedrock groundwater at the Site.

C2: Site Characteristics

Current and Future Land Use

The Site is located about 6 miles north of Elkton, Maryland, and is situated in a stream valley formed by Little Elk Creek. Residential properties border the Site to the east and south. Wooded areas border the Site to the north and west. Little Elk Creek flows through the Site from north to south.

Land use near the Site is primarily residential and agricultural. Despite historical industrial use of the Site, the property is currently zoned for residential use, according to the zoning board of Cecil County, Maryland. The properties immediately adjacent to the Site are currently used for residential purposes or are zoned for residential use if undeveloped. Due to the soil contamination and building rubble below the Plant Area, along with the presence of the GWTS building, EPA has determined that the Site cannot reasonably be expected to return to residential use. Instead, potential future uses include a community park or access ramp to Little Elk Creek, development of the Site for commercial/light industrial use, or as a county utility vehicle maintenance/parking facility.

Public water supplies are not currently or reasonably anticipated to be available in the vicinity of the Site and any future development would need to rely on groundwater as a water source. Such use would be subject to the restrictions imposed by the institutional controls component of the Site's decision documents.

The PRP Group purchased the facility property from the former owner/operator in December 2011. Currently, the GWTS plant, an office trailer for remedial contractors and a pole shed are the only buildings on site. All other structures were demolished in 2010 or 2012 are part of the remedial action.

Geology and Hydrogeology

Overburden at the Site is composed of fill material (reworked sandy soil containing rubble and demolition debris), alluvial sediments from the stream channel, and weathered bedrock (saprolite). In many locations, a clear distinction between fill material and alluvial sediments is not apparent, with the overburden stratigraphy consisting of fill and debris in a sandy matrix. The overburden alluvial sediments can be further sub-divided into an upper layer of sand and silt that is commonly underlain by a basal sand and gravel of varying composition and thickness.

The overburden overlies hard, fractured, crystalline bedrock composed primarily of gneiss and schist. Bedrock beneath the former Spectron property and to the west of the stream consists of the Little Northeast Creek member of the James Run Formation. The 2012 OU2 IROD provides additional detail on the bedrock fracture and structure characteristics at the Site.

Typical groundwater depths in the overburden range from about 2 to 5 feet below ground surface. Overburden groundwater flows across the Spectron property generally to the east, toward Little Elk Creek. However, the flow direction is not uniform. Groundwater in the northwestern portion of the property flows to the northeast and in and the southern portion of the property flows to the southeast. In the central portion of the property, the groundwater flow is more radial toward the creek, with flow directions ranging from north to due east.

Groundwater flow in bedrock at the Site is controlled by interconnected bedrock fractures. Most of the water-bearing fractures identified in monitoring well boreholes are associated with foliation planes in the bedrock, which dip at a shallow angle to the south-southeast. Refer to the 2012 OU2 IROD for additional detail on the bedrock characteristics at the Site.

APPENDIX D – SITE CONTAMINANTS OF CONCERN

Table D-1: OU1 COCs, by Media

COC	Media
1,1,2,2-Tetrachloroethane, PCE, TCE, vinyl chloride, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, 1,4-dichlorobenzene, 1,2,4-trichlorobenzene, Arochlor-1242, aluminum, antimony, arsenic, barium, cadmium, chromium, iron, lead, manganese, mercury, nickel	Soil[a]
Acetone, benzene, benzyl chloride, 2-butanone, chlorobenzene, chloroethane, chloroform, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethene, ethylbenzene, methylene chloride, 4-methyl-2-pentanone, 1,1,2,2-tetrachloroethane, PCE, toluene, 1,1,1-trichloroethene, 1,1,2-trichloroethene, TCE, 1,1,2-trichloro-1,2,2-trifluoroethane, vinyl chloride, xylene, bis(2-chloroethyl)ether, 4-chloroaniline, 2-chlorophenol, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2-methylnaphthalene, 4-methylphenol, naphthalene, 1,2,4-trichlorobenzene, alpha-BHC, beta-BHC, delta-BHC, dieldrin, heptachlor epoxide, aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, vanadium, zinc	Overburden Groundwater[a]
Acetone, benzene, 2-butanone, chlorobenzene, chloroethane, chloroform, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, methylene chloride, 4-methyl-2-pentanone, naphthalene, 1,1,2,2-tetrachloroethane, PCE, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, TCE, vinyl chloride, bis(2-chloroethyl)ether, 4-chloroaniline, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 4-methylphenol, 1,2,4-trichlorobenzene	Surface Water[b]

Notes:
a) Soil and groundwater COCs identified in Table 1 of the 2012 OU1 ROD Amendment.
b) Surface water COCs identified in Table 11 as chemicals for which performance standards were established, 2004 OU1 ROD.

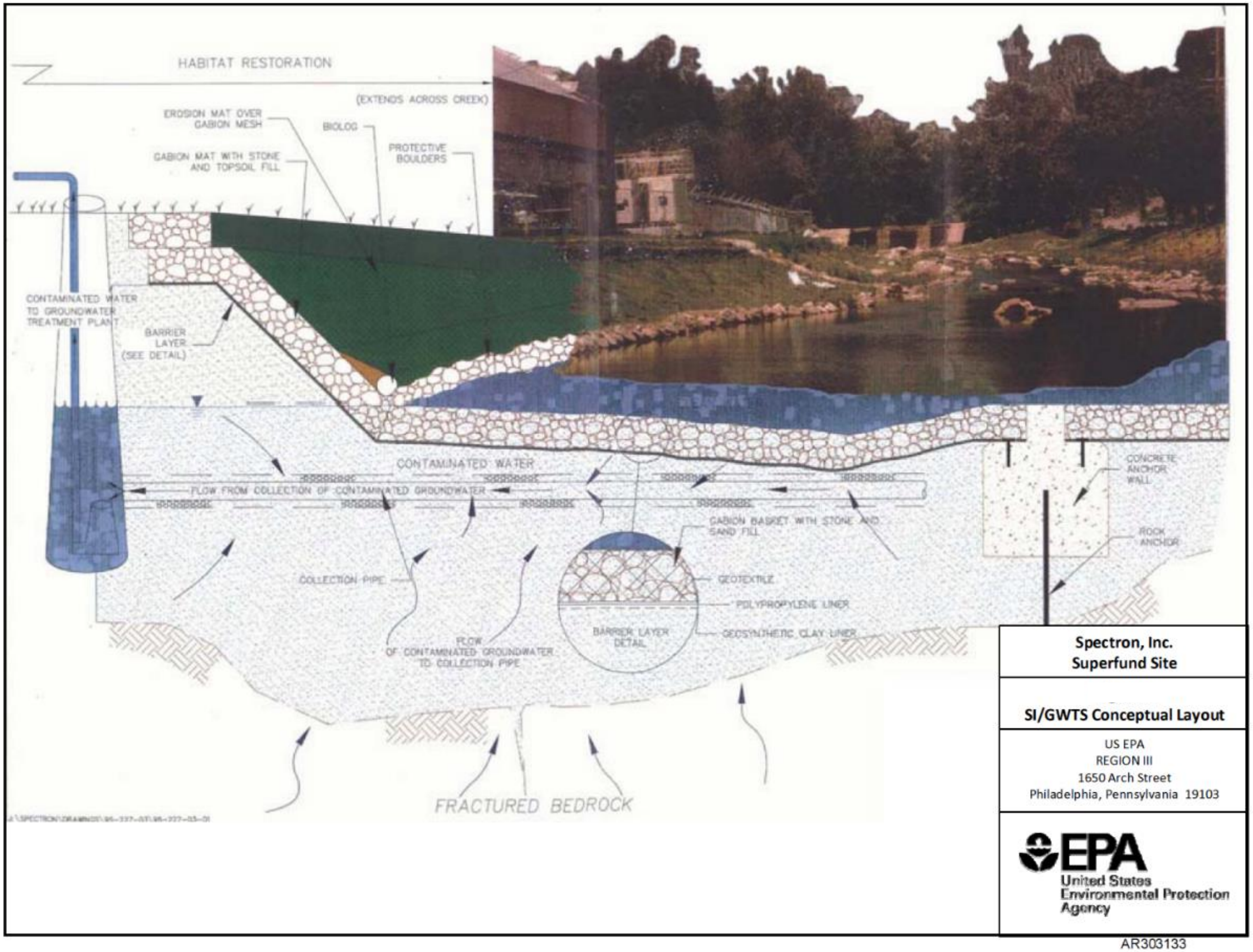
Table D-2: OU2 COCs by Media

COC	Media
1,1,2,2-Tetrachloroethane, 1,1,2-trichloroethane, 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,2-dichloroethane, benzene, bis(2-chloroethyl)ether, chlorobenzene, chloroform, cis-1,2-dichloroethene, ethylbenzene, 4-methyl-2-pentanone, methylene chloride, PCE, toluene, TCE, vinyl chloride, xylene (total)	Bedrock Groundwater[a]
Arsenic, lead	Office Area Soil[a]

Notes:
a) COCs identified in Table 1 of the 2012 OU2 IROD.

APPENDIX E – SUPPLEMENTAL SITE FIGURES

Figure E-1: SI/GWTS Conceptual Layout



Source: 2012 OU2 IROD

Figure E-2: Surface Water Sampling Locations

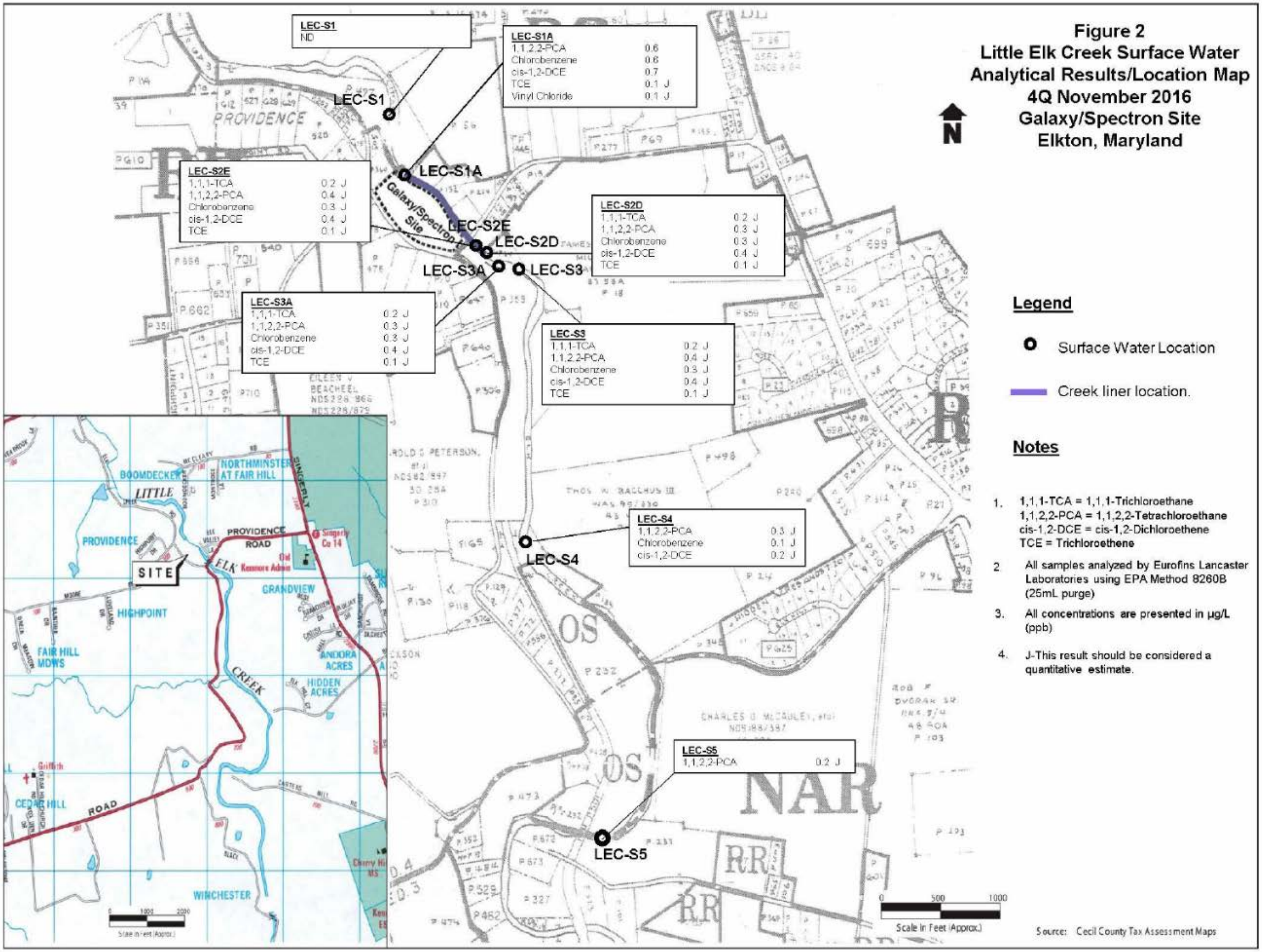
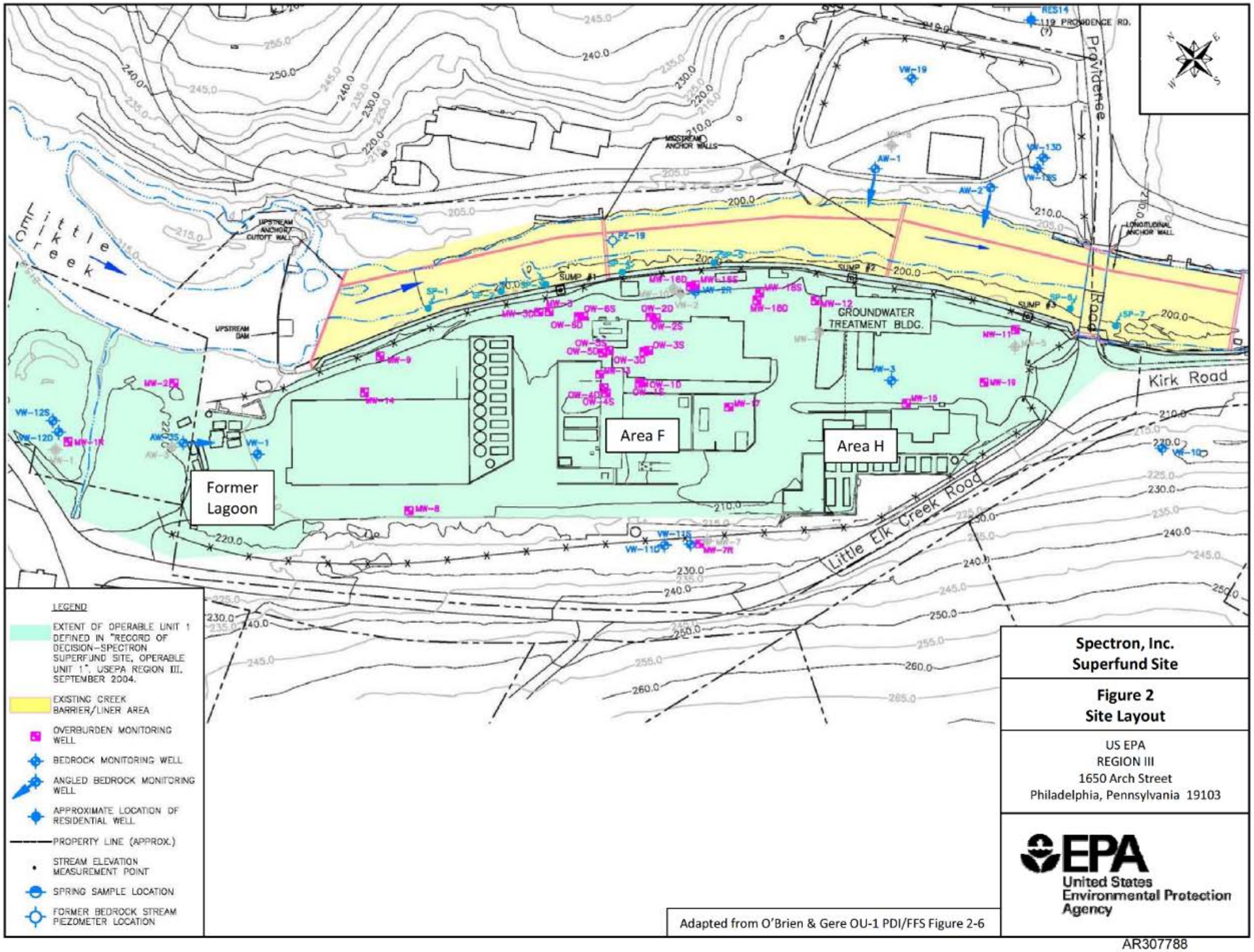
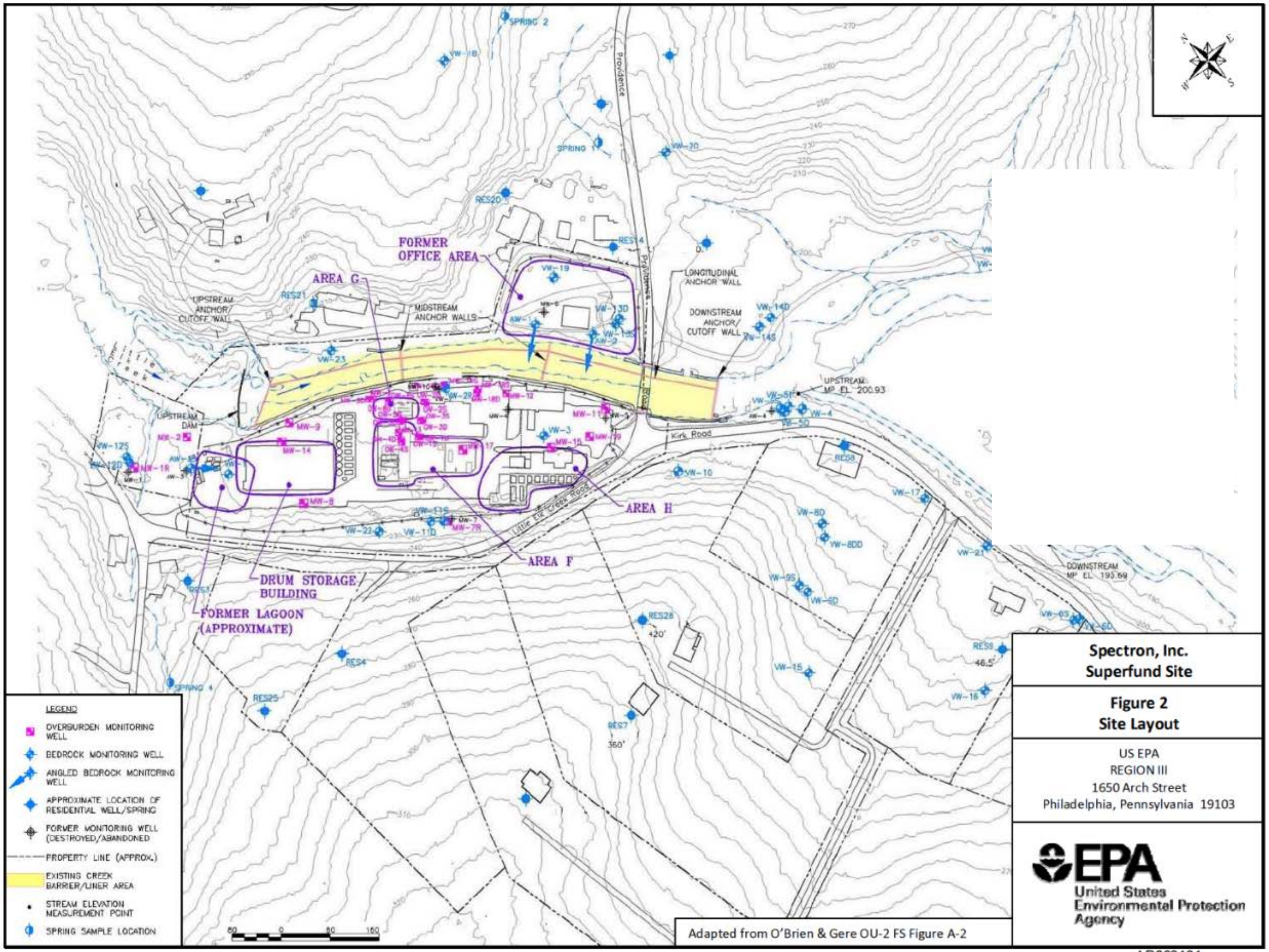


Figure E-3: OU1 Groundwater Monitoring Wells



Source: 2012 OU1 ROD Amendment

Figure E-4: OU2 Groundwater Monitoring Wells



AR303131

Source: 2012 OU2 IROD

APPENDIX F –PERFORMANCE STANDARDS

Table F-1: Performance Standards for Groundwater

COC	Performance Standard[a] (µg/L)	Basis	TI Waiver Compound[b]
1,1,2,2-Tetrachloroethane	1	MDE GWCS[c,d]	X
1,1,2-Trichloroethane	3	EPA MCLG[e]	X
1,1,1-Trichloroethane	200	EPA MCL	X
1,1-Dichloroethane	80	MDE GWCS	X
1,1-Dichloroethene	7	EPA MCL	X
1,2,4-Trichlorobenzene	70	EPA MCL	
1,2-Dichlorobenzene	600	EPA MCL	X
1,2-Dichloroethane	5	EPA MCL	X
Benzene	5	EPA MCL	
Bis(2-chloroethyl)ether	0.0096	MDE GWCS	
Chlorobenzene	100	EPA MCL	X
Chloroform	80	EPA MCL	X
Cis-1,2-dichloroethene	70	EPA MCL	X
Ethylbenzene	700	EPA MCL	
4-Methyl-2-pentanone	50	MDE GWCS	X
Methylene chloride	5	EPA MCL	X
PCE	5	EPA MCL	X
Toluene	1,000	EPA MCL	
TCE	5	EPA MCL	X
Vinyl chloride	2	EPA MCL	X
Xylene (total)	10,000	EPA MCL	

Notes:

a) Performance standards identified in Table 1 of the 2012 OU2 IROD.
b) TI Waiver Compounds as identified in Table 4 of the 2012 OU2 IROD; “X” designates a TI Waiver compound.
c) MDE GWCS = Maryland Department of the Environment Groundwater Cleanup Standard.
d) MDE groundwater cleanup standard is relevant and appropriate if there is no MCL/non-zero MCLG.
e) EPA MCL/non-zero MCLG = EPA Maximum Contaminant Level or Non-Zero Maximum Contaminant Level Goal.

Once performance standards are achieved for all site COCs, a risk assessment will be performed to confirm that exposure to groundwater would result in a cumulative excess carcinogenic risk of less than or equal to 10^{-4} and a cumulative non-carcinogenic HI of less than or equal to 1.

Table F-2: Performance Standards for Little Elk Creek Surface Water

COC	Performance Standard (µg/L)	Basis
Acetone	5,500	Risk-based (HI=1)
Benzene	2.2	AWQC
2-Butanone	7,000	Risk-based (HI=1)
Chlorobenzene	130	AWQC
Chloroethane	3.6	Risk-based (carcinogenic risk of $1x10^{-6}$)
Chloroform	5.7	AWQC
1,1-Dichloroethane	800	Risk-based (HI=1)
1,2-Dichloroethane	0.38	AWQC
1,1-Dichloroethene	0.057	AWQC
Trans-1,2-dichloroethene	140	AWQC
Ethylbenzene	530	AWQC
Methylene chloride	4.6	AWQC
4-Methyl-2-pentanone	6,300	Risk-based (HI=1)
Naphthalene	6.5	Risk-based (HI=1)
1,1,2,2-Tetrachloroethane	0.17	AWQC
PCE	0.69	AWQC
Toluene	1,300	AWQC
1,1,1-Trichloroethane	200	Maryland state water quality standard for protection of drinking water
1,1,2-Trichloroethane	0.59	AWQC
TCE	2.5	AWQC
Vinyl chloride	0.025	AWQC
Bis(2-chloroethyl)ether	0.03	AWQC
4-Chloroaniline	150	Risk-based (HI=1)
1,2-Dichlorobenzene	420	AWQC
1,4-Dichlorobenzene	63	AWQC
4-Methylphenol	180	Risk-based (HI=1)
1,2,4-Trichlorobenzene	35	Maryland state water quality standard for protection of drinking water

Source: Criteria listed in Table 11 of the 2004 OU1 ROD.

a) The criteria listed in this performance standard are, unless otherwise noted, AWQCs for the consumption of fish and drinking water.

b) For those compounds that are COCs in the overburden groundwater but which do not have AWQCs for the consumption of fish and drinking water, the value listed is either the level in drinking water that results in a HI of 1, the level in drinking water that results in a carcinogenic risk of 1×10^{-6}, a Maryland state water quality standard for protection of drinking water (if available), or the AWQC for the protection of aquatic life (Freshwater Criterion Continuous Concentration).

µg/L = micrograms per liter

Table F-3: Performance Standards for OU2 Office Area Soil

COC	Performance Standard (mg/kg)	Basis
Arsenic	21.6	Project-specific
Lead	400[a]	Project-specific

Source: Table 1 of the 2012 OU2 IROD.

Notes: The 2012 OU2 IROD specified a lead cleanup goal of 400 mg/kg. EPA changed the cleanup goal for lead in soil to a project-specific goal of 300 mg/kg on August 24, 2016. The modified cleanup goal is reflected in the Office Area Final (100%) Remedial Design Report issued on September 2, 2016.

mg/kg = milligrams per kilogram

Table F-4: OU1 Non-Numerical Performance Standards[a]

OU	Remedy Component and Source	Performance Standard
OU1	Groundwater Treatment Plant Section 11.2.1, 2004 OU1 ROD	1. Collected groundwater shall be treated, prior to discharge to Little Elk Creek, to comply with the substantive requirements of the National Pollutant Discharge Elimination System (NPDES) program and the Maryland discharge limitations and monitoring requirements (100 parts per billion, total VOCs) 2. Any air emissions shall meet the substantive requirements of Maryland general emission standards, Maryland regulations governing toxic air pollutants and federal air emission standards for process vents. In addition, the emissions shall not exceed risk based standards of 1 x 10^{-6} carcinogenic risks and HI of 1 for non-carcinogenic risks. 3. A capacity evaluation shall be completed during the remedial design to determine if additional treatment capacity is required. 4. Plant components shall be maintained, and replaced as necessary, to minimize downtime and equipment leaks, and to maximize treatment performance, especially in the powdered activated carbon tanks. 5. Monitoring reports shall be submitted to EPA at such frequency and in such detail to allow EPA to determine whether the groundwater treatment plant comply with the ROD and, whether the performance standards one through four above, have been achieved and are being maintained. 6. On-site handling of hazardous waste and solid waste, resulting from the operation of the groundwater treatment plant, shall be in accordance with ARARs. Off-site disposal and handling shall be in accordance with state and federal waste regulations. Waste streams may be characterized on a yearly basis, unless regulations require more frequent characterization. 7. An emergency notification plan shall be developed and followed during the remedial design to inform or alert EPA and MDE of possible shut downs or failures that may impact nearby residents or the environment.

OU	Remedy Component and Source	Performance Standard
OU1	Creek Liner, Creek Cut-Off Walls and Impervious Protective Cover Section 11.2.1, 2004 OU1 ROD	1. Federal AWQCs for consumption of fish and drinking water, and those other standards listed in Table 11 of the OU1 ROD (and summarized in Table 5 of this FYR) shall be met in Little Elk Creek. This shall be achieved by continued maintenance, and modifications as necessary, of the groundwater containment system. 2. Routine sampling shall be performed within the creek immediately downstream of the Groundwater Containment System for the VOCs and SVOCs listed in Table 11 of the OU1 ROD (and summarized in Table 5 of this FYR). Detections of VOCs that exceed the standards could indicate a bypass or failure of the groundwater containment system that would require correction. 3. The collection system shall be operated in such a manner as to prevent flotation of the stream liner. 4. A vegetative cover shall be maintained for the area surrounding the groundwater containment system within and along Little Elk Creek. The purpose of a vegetative cover is to provide stream bank stabilization and habitat cover. An evaluation report, on the adequacy of the vegetative cover, shall be developed and submitted to EPA every two years following the issuance of the ROD. 5. The creek containment system shall be maintained such that fish can travel up to the dam.
OU1	Asphalt (or Equivalent) Cap Section L.2.1.1, 2012 OU1 ROD Amendment	Install a cap consisting of asphalt or equivalent material over the entirety of the Plant Area at the Site that shall: 1. Eliminate potential direct contact with contaminated soil and overburden groundwater. 2. Provide long-term minimization of migration of liquids. 3. Function with minimum maintenance. 4. Promote drainage of run-on and run-off and minimize erosion or abrasion of the cap. 5. Accommodate settling and subsidence so that the cap’s integrity is maintained. 6. Have a permeability less than or equal to the permeability of the natural subsoils present. 7. Incorporate portions of existing asphalt and/or concrete areas if such materials can meet requirements 1 through 6 above.

OU1	In-Situ Thermal Treatment Section L.2.2.1, 2012 OU1 ROD Amendment	Conduct thermal treatment throughout the DNAPL Treatment Area to achieve maximum treatment of principal threat waste, consisting of the following elements: 1. Install a thermal/vapor cap over the DNAPL Treatment Area that shall insulate the treated area from ambient air, reduce direct water infiltration and assist in vapor recovery. 2. Heat the overburden to establish and maintain subsurface temperatures of 90° Celsius in the vadose zone and 100° Celsius in the saturated zone throughout the DNAPL Treatment Area to boil groundwater and DNAPL and to boil or reduce the viscosity of LNAPL. 3. Extract vapor, steam, groundwater, DNAPL and LNAPL using extraction wells. 4. Establish and maintain control of vapor, steam, groundwater, DNAPL and LNAPL within the DNAPL Treatment Area. 5. Cool and treat extracted vapor, steam, groundwater, DNAPL and LNAPL. Extracted DNAPL and LNAPL shall be collected and disposed of off site at an approved waste disposal facility. Remaining extracted material shall be treated and discharged on site using the existing SI/GWTS. 6. Meet the following performance standards established in Section 11.2.1 of the 2004 OU1 ROD: a) Effluent discharged from the existing SI/GWTS resulting from treated vapor, steam, groundwater, DNAPL and LNAPL shall meet the substantive requirements of the NPDES program and the Maryland discharge limitations and monitoring requirements and shall contain less than 100 µg/L of total VOCs. Surface water in Little Elk Creek shall meet the numerical performance standards established in 2004 OU1 ROD (and summarized in Appendix F-1 of this FYR). b) Air emissions from the existing SI/GWTS resulting from treated vapor steam, groundwater, DNAPL and LNAPL shall meet the substantive requirements of Maryland general air emissions standards, Maryland regulations governing toxic air pollutants, and federal air emissions standards for process vents. In addition, emissions shall not exceed risk-based standards of 10^{-6} for carcinogenic risks or a HI of 1 for non-carcinogenic risks. c) Air emissions, if any, from the thermal treatment system during operation shall meet the substantive requirements of Maryland general air emissions standards, Maryland regulations governing toxic air pollutants, and federal air emissions standards for process vents. In addition, emissions shall not exceed risk-based standards of 10^{-6} for carcinogenic risks or a HI of 1 for non-carcinogenic risks. 7. Reinject treated groundwater within the DNAPL Treatment Area, if determined to be appropriate for thermal treatment and the overburden is determined to be sufficiently permeable. 8. Monitor and report the following parameters continuously throughout treatment: temperature in the vadose and saturated zones; vapor, steam, groundwater, DNAPL and LNAPL extraction rates; groundwater contaminant concentrations; and air emissions from the thermal treatment system, if any. 9. Conduct saturated soil sampling and analysis prior to, during and following the conclusion of thermal treatment. Post-treatment sampling shall be conducted a minimum of 14 days following shutdown of the thermal treatment system. 10. Continue treatment until EPA determines that the following parameters indicate that maximum treatment of principal threat waste within the DNAPL Treatment Area has been achieved: a) temperature in the vadose and saturated zones b) vapor, steam, groundwater, DNAPL and LNAPL extraction rates c) groundwater contaminant concentrations d) saturated soil contaminant concentrations 11. Monitor and report groundwater contaminant concentrations following treatment until temperatures within the vadose and saturated zones return to ambient levels. 12. Conduct additional thermal treatment within the DNAPL Treatment Area or portions thereof, based on the results of post-treatment saturated soil sampling prescribed in item 9 above, until EPA determines that maximum treatment of principal threat waste has been achieved.

OU	Remedy Component and Source	Performance Standard
OU1	Institutional Controls Section 11.2.5, 2004 OU1 ROD	A LUCAP shall be developed to address institutional controls, including land use restrictions, for the Site. The institutional controls contained in the OU1 ROD were based on current, reasonably anticipated uses of the Site and area in the vicinity of the Site, but could change in the future if such uses change. The purpose of the LUCAP shall be to prevent exposure to unacceptable risks associated with remaining site-related contaminants and to protect the components of the selected remedy. A status report on such institutional controls shall be prepared and submitted for EPA's review every two years, at minimum, following the issuance of the ROD.
Notes: a) The 2004 OU1 ROD also included performance standards for demolition and site grading. Because these activities have been implemented, the performance standards are not included in this table.		

Table F-5: OU2 Non-Numerical Performance Standards

OU	Remedy Component	Performance Standard
OU2	PDI	Conduct a PDI consisting of the following components: 1) groundwater capture zone investigation for the existing SI/GWTS 2) delineation of DNAPL extent 3) groundwater contaminant trend analysis
OU2	SI/GWTS	Continue operation and maintenance of the SI/GWTS with the performance standards established in Section 11.2.1 of the 2004 OU1 ROD until federal MCLs, non-zero MCLGs and MDE GWCSs for site COCs are achieved throughout the Bedrock Groundwater Source Area, with the exception of the WMA and TI Zone. Refer to Table F-4 above for the 2004 OU1 ROD performance standards for the SI/GWTS and creek liner, creek cut-off walls and impervious protective cover.
OU2	DNAPL Collection	Collect DNAPL that accumulates in any existing borehole or any future borehole using passive and/or active methodology: 1) Collected DNAPL shall be treated and disposed of off site at a permitted waste disposal facility in accordance with CERCLA (42 U.S.C. § 9621 (d)(3)) and the NCP (40 C.F.R. § 300.440).

OU	Remedy Component	Performance Standard
OU2	Groundwater Extraction and Treatment	Extract and treat the Bedrock Groundwater Source Area within the Groundwater Extraction Areas. The Groundwater Extraction Areas may be modified based on the results of the PDI/remedial design and/or data collected during operation of the groundwater extraction and treatment system: 1. Extracted groundwater shall be treated using the existing SI/GWTS and discharged to Little Elk Creek and/or reinjected per item 2, below. Effluent and air emissions from the existing SI/GWTS shall continue to meet performance standards established in the 2004 OU1 ROD (Section 11.2.1). The SI/GWTS shall be evaluated during the PDI/remedial design to determine if upgrades are necessary to treat the extracted groundwater to meet the SI/GWTS performance standards. 2. Treated groundwater shall be reinjected into the bedrock to enhance groundwater flow gradients if determined to be appropriate for groundwater extraction and treatment and the bedrock is determined to be sufficiently permeable. Reinjection shall not adversely impact the capture/containment of the SI/GWTS and/or extraction and treatment system or cause unintended contaminant migration; 3. Extraction and treatment of groundwater shall continue until MCLs, non-zero MCLGs and MDE GWCS for Site COCs are achieved throughout the Bedrock Groundwater Source Area, with the exception of the WMA and the TI Zone.
OU2	Groundwater Monitoring	Perform groundwater monitoring within the Bedrock Groundwater Source Area to meet the following objectives: 1) Monitor containment and capture of SI/GWTS and Groundwater Extraction and Treatment system. 2) Confirm the delineation of DNAPL. 3) Evaluate VOC concentration trends over time. 4) Evaluate Bedrock Groundwater Source Area contaminant plume stability (i.e., the Bedrock Groundwater Source Area contaminant plume shall not expand or migrate). 5) Verify that MCLs, non-zero MCLGs and MDE GWCS for site COCs are achieved throughout the Bedrock Groundwater Source Area, with the exception of the WMA and TI Zone. 6) Confirm that once the numerical performance standards for site COCs are achieved, exposure to groundwater would result in a cumulative excess carcinogenic risk of less than or equal to 10^{-4} and a cumulative excess non-carcinogenic HI of less than or equal to 1, throughout the Bedrock Groundwater Source Area, with the exception of the WMA and TI Zone.
OU2	Surface Water Monitoring	Perform surface water monitoring to monitor water quality in Little Elk Creek. Surface water in Little Elk Creek shall be monitored to confirm that the numerical performance standards established in the 2004 OU1 ROD are being achieved.
OU2	MNA Evaluation	Perform groundwater monitoring within the Bedrock Groundwater Dissolved VOC Plume to meet the following objectives: 1. Demonstrate and document whether natural attenuation is occurring in the Bedrock Groundwater Dissolved VOC Plume sufficiently to achieve MCLs, non-zero MCLGs and MDE GWCS for site COCs in a reasonable timeframe compared to a more active remedy. 2. Detect changes in environmental conditions (e.g., hydrogeologic, geochemical, microbiological or other changes) that may reduce the efficacy of any of the natural attenuation processes; 3. Identify any potentially toxic and/or mobile transformation products; 4. Determine whether the Bedrock Groundwater Dissolved VOC Plume is expanding (either downgradient, laterally or vertically); 5. Demonstrate the efficacy of institutional controls and groundwater and residential monitoring requirements.

OU	Remedy Component	Performance Standard
OU2	Residential Well Monitoring and Treatment	Conduct residential well sampling and provide wellhead treatment: 3. Perform periodic monitoring of the residences located within the Well Pumping Restriction Area on a routine basis for all site COCs (subject to homeowner approval). Monitoring frequency will be determined during remedial design and subject to change. 4. Perform periodic monitoring of any future residential or commercial well installed within the Well Pumping Restriction Area on a routine basis for all site COCs. 5. If residential well water quality exceeds MCLs, non-zero MCLGs, or MDE GWCS for any site COCs, a temporary water supply shall be provided followed by the installation of a wellhead treatment system; 6. Existing and future wellhead treatment systems shall be operated and maintained such that drinking water at the tap (after treatment) meets MCLs, non-zero MCLGs and MDE GWCS for site COCs. 7. Wellhead treatment shall continue until groundwater throughout the Well Pumping Restriction Area meets MCLs, non-zero MCLGs and MDE GWCS for site COCs.
OU2	Vapor Intrusion Monitoring and Mitigation	Conduct vapor intrusion sampling at existing occupied structures within the Well Pumping Restriction Area during each FYR and at any new occupied structures when constructed within the Well Pumping Restriction Area (subject to homeowner approval): 1. Vapor intrusion sampling shall consist of sub-slab, indoor air, and outdoor air sampling at each location, where practicable, in accordance with current EPA guidance. 2. Vapor intrusion mitigation shall be conducted if sub-slab, indoor air and/or outdoor air sampling results indicate that actual or potential migration of site-related compounds from contaminated groundwater to indoor air would result in a cumulative excess carcinogenic risk of greater than or equal to 10^{-4} and/or a cumulative excess non-carcinogenic HI of greater than 1. 3. Vapor intrusion mitigation shall continue until: a) Groundwater within the Well Pumping Restriction Area meets MCLs, non-zero MCLGs and MDE GWCS for site COCs. b) Sub-slab, indoor air and/or outdoor air sampling results indicate that actual or potential migration of site-related compounds from contaminated groundwater to indoor air would result in a cumulative excess carcinogenic risk of less than or equal to 10^{-6} and a cumulative excess non-carcinogenic HI of less than or equal to 1.
OU2	Land and Groundwater Use Restrictions	Implement institutional controls within OU2 in conjunction with institutional controls required by the 2004 OU1 ROD. A LUCAP shall be prepared to develop and document the mechanisms for implementing the institutional controls for both OU1 and OU2. The institutional controls shall achieve the following restrictions: 1. Use and/or contact with groundwater, via ingestion, dermal contact or vapor inhalation, within the Office Area shall be prohibited. 2. Activities within the Well Pumping Restriction Area (Figure 12), without EPA approval, that would impact the groundwater extraction and treatment system, including installation of new residential/commercial/industrial water supply wells and/or significant increases in pumping rates of existing water supply wells, shall be prohibited. 3. Vapor intrusion sampling shall be conducted at any future occupied structure at the Plant Area and Office Area. Vapor intrusion sampling shall consist of sub-slab, indoor air, and outdoor air sampling at each location, where practicable, in accordance with current EPA guidance. 4. Activities within the Office Area that would adversely impact the SI/GWTS or groundwater extraction and treatment system, such as excavation or construction, without prior EPA approval, shall be prohibited.

APPENDIX G – SUPPORTING DATA

Table G-1: GWTS Effluent Monitoring Data, 2012 to 2017

Sample ID	Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent	
Sampling Date	**11/14/2012**		**12/10/2012**		**1/7/2013**		**2/4/2013**		**2/20/2013**		**3/4/2013**		**4/8/2013**		**5/8/2013**		**6/10/2013**		**7/16/2013**		**8/12/2013**	
Matrix	**Water**		**Water**		**Water**		**Water**		**Water**		**Water**		**Water**		**Water**		**Water**		**Water**		**Water**	
Units	**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**	
VOCs																						
Acetone	20	U	20	U	20	U	6	U	18	J	6	U	6	U	24		6	U	6	U	6	U
Benzene	5	U	5	U	5	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U
Benzyl Chloride																						
Bromodichloromethane	5	U	5	U	5	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U
Bromoform	5	U	5	U	5	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U
Bromomethane	5	U	5	U	5	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
2-Butanone	10	U	10	U	10	U	3	U	8	J	3	U	3	U	3	U	3	U	3	U	4	J
Carbon Disulfide	5	U	5	U	5	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U
Carbon Tetrachloride	5	U	5	U	5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chlorobenzene	5	U	5	U	5	U	1	J	0.8	U	0.8	U	0.8	U	0.8	U	1	J	0.8	U	0.8	U
Chloroethane	5	U	5	U	5	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Chloroform	5	U	5	U	5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloromethane	5	U	5	U	5	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Dibromochloromethane	5	U	5	U	5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	5	U	5	U	5	U	1	U	1	J	1	U	1	U	1	U	5	J	1	U	1	U
1,3-Dichlorobenzene	5	U	5	U	5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	5	U	5	U	5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethane	5	U	5	U	5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	5	J	5	J	5	J	2	J	1	J	1	U	1	U	2	J	5		1	J	1	J
1,1-Dichloroethene	5	U	5	U	5	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U
cis-1,2-Dichloroethene	5	J	5	J	6		11		2	J	1	J	1	U	2	J	8		4	J	2	J
trans-1,2-Dichloroethene	5	U	5	U	5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	5	U	5	U	5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	5	U	5	J	5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	5	U	5	U	5	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U
1,4-Dioxane																						
Ethylbenzene	5	U	5	U	5	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U
Freon 113	10	U	10	U	10	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Freon 123a																						
2-Hexanone	10	U	10	U	10	U	7	U	7	U	7	U	7	U	7	U	7	U	7	U	7	U
4-Methyl-2-pentanone	10	U	10	U	10	U	5	U	5	U	5	U	5	U	7	J	5	U	5	U	5	U
Methylene Chloride	5	U	5	U	5	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Naphthalene	5	U	5	U	5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Styrene	5	U	5	U	5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,1,2-Tetrachloroethane	5	U	5	U	5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	5	U	28		55		63		43		25		36		42		73		33		23	
Tetrachloroethene	31		5	J	5	J	21		1	U	1	U	1	U	1	U	1	U	1	U	1	U
Toluene	5	U	5	U	5	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U
1,2,3-Trichlorobenzene																						
1,1,1-Trichloroethane	5	U	5	U	5	J	6		1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	5	U	5	U	5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichloroethene	5	U	5	U	5	U	3	J	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2,4-Trimethylbenzene																						
1,3,5-Trimethylbenzene																						
Vinyl Chloride	5	U	5	U	5	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Xylene (Total)	5	U	5	U	5	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U
Total Confident Concentrations	**31**		**28**		**61**		**101**		**43**		**25**		**36**		**66**		**86**		**33**		**23**	
Total Estimated Concentrations	**10**		**20**		**15**		**6**		**30**		**1**		**0**		**11**		**6**		**5**		**7**	

NOTES:

U - Indicates the analysis was completed for the analyte but the analyte was not detected. Value displayed is the Method Detection Limit.

J - Indiates the analysis was completed for the analyte; however, the result was greater than the MDL but less than the limit of quantitation.

µg/L - micrograms per liter

VOCs - volatile organic compounds

(shaded) - not analyzed

Sample ID	Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent	
Sampling Date	9/3/2013		10/9/2013		11/4/2013		12/24/2013		1/13/2014		2/10/2014		3/11/2014		4/8/2014		5/5/2014		6/5/2014		7/2/2014		8/11/2014	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water		Water		Water		Water		Water	
Units	µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
VOCs																								
Acetone	6	U	6	U	6	U	6	J	6	U	6	U	7	J	6	U	6	U	6	U	13	J	6	U
Benzene	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U
Benzyl Chloride																								
Bromodichloromethane	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U
Bromoform	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U
Bromomethane	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
2-Butanone	3	U	3	U	3	U	4	J	3	U	3	U	3	U	3	U	3	U	3	U	4	J	3	U
Carbon Disulfide	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U
Carbon Tetrachloride	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chlorobenzene	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	1	J	1	J	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U
Chloroethane	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Chloroform	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloromethane	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Dibromochloromethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	1	U	1	J	1	J	1	J	3	J	3	J	2	J	2	U	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	1	J	1	U	2	J	1	U	2	J	3	J	4	J	2	J	1	J	1	U	1	U	1	U
1,1-Dichloroethene	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U
cis-1,2-Dichloroethene	2	J	1	U	4	J	2	J	3	J	8		10		3	J	2	J	1	U	1	U	1	U
trans-1,2-Dichloroethene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U
1,4-Dioxane																								
Ethylbenzene	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U
Freon 113	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Freon 123a																								
2-Hexanone	7	U	7	U	7	U	7	U	7	U	7	U	7	U	7	U	7	U	7	U	7	U	7	U
4-Methyl-2-pentanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Methylene Chloride	2	U	2	U	2	U	2	U	2	U	2	J	3	J	2	U	2	U	2	U	2	U	2	U
Naphthalene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Styrene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,1,2-Tetrachloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	27		16		47		21		45		64		60		58		37		12		3	J	18	
Tetrachloroethene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Toluene	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U
1,2,3-Trichlorobenzene																								
1,1,1-Trichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichloroethene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2,4-Trimethylbenzene																								
1,3,5-Trimethylbenzene																								
Vinyl Chloride	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Xylene (Total)	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U
Total Confident Concentrations	**27**		**16**		**47**		**21**		**45**		**72**		**70**		**58**		**37**		**12**		**0**		**18**	
Total Estimated Concentrations	**3**		**0**		**7**		**13**		**6**		**9**		**18**		**7**		**3**		**0**		**20**		**0**	

NOTES:

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J - Indiates the analysis was completed for the analyte; however, the result was greater than the MDL but less than the limit of quantitation.

µg/L - micrograms per liter

VOCs - volatile organic compounds

[shaded box] - not analyzed

Sample ID	Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent	
Sampling Date	**9/4/2014**		**10/24/2014**		**11/3/2014**		**12/1/2014**		**1/12/2015**		**2/2/2015**		**3/2/2015**		**4/6/2015**		**5/14/2015**		**6/1/2015**		**7/7/2015**	
Matrix	**Water**		**Water**		**Water**		**Water**		**Water**		**Water**		**Water**		**Water**		**Water**		**Water**		**Water**	
Units	**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**	
VOCs																						
Acetone	10	J	7	J	6	U	6	U	6	U	6	U	7	J	6	U	6	U	18	J	11	J
Benzene	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U
Benzyl Chloride																						
Bromodichloromethane	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U
Bromoform	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U
Bromomethane	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
2-Butanone	4	J	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	6	J	3	U
Carbon Disulfide	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U
Carbon Tetrachloride	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chlorobenzene	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U
Chloroethane	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Chloroform	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloromethane	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Dibromochloromethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	2	J	2	J	2	J	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	1	U	1	U	1	U	1	U	1	U	1	J	2	J	2	J	1	U	1	U	1	U
1,1-Dichloroethene	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U
cis-1,2-Dichloroethene	1	U	1	U	1	J	1	J	2	J	2	J	2	J	3	J	1	U	1	U	1	U
trans-1,2-Dichloroethene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U
1,4-Dioxane																						
Ethylbenzene	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U
Freon 113	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Freon 123a																						
2-Hexanone	7	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	5	U	5	U	5	U	5	U	5	U	5	J	5	U	5	U	5	U	5	U
Methylene Chloride	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Naphthalene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Styrene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,1,2-Tetrachloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	4	J	7		21		33		41		59		50		48		18		1	U	5	J
Tetrachloroethene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Toluene	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U
1,2,3-Trichlorobenzene																						
1,1,1-Trichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichloroethene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2,4-Trimethylbenzene																						
1,3,5-Trimethylbenzene																						
Vinyl Chloride	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Xylene (Total)	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U
Total Confident Concentrations	**0**		**7**		**21**		**33**		**41**		**59**		**50**		**48**		**18**		**0**		**0**	
Total Estimated Concentrations	**18**		**7**		**1**		**1**		**2**		**5**		**18**		**7**		**0**		**24**		**16**	

NOTES:

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J - Indiates the analysis was completed for the analyte; however, the result was greater than the MDL but less than the limit of quantitation.

µg/L - micrograms per liter

VOCs - volatile organic compounds

[shaded box] - not analyzed

Sample ID	Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent	
Sampling Date	8/18/2015		9/8/2015		10/5/2015		11/11/2015		12/21/2015		1/21/2016		2/11/2016		2/18/2016		2/26/2016		3/3/2016		3/17/2016	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water		Water		Water		Water	
Units	µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
VOCs																						
Acetone	6	U	10	J	6	U	18	J	11	J	7	J	6	U	6	U	6	J	20		100	
Benzene	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.5	U	0.5	U
Benzyl Chloride											1	U	1	U	1	U	1	U	0.5	U	0.5	U
Bromodichloromethane	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.5	U	0.5	U
Bromoform	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.5	U	0.5	U
Bromomethane	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	0.5	U	0.5	U
2-Butanone	3	U	3	U	3	U	13		10		6	J	3	U	3	U	4	J	10		36	
Carbon Disulfide	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	0.5	U	0.5	U
Carbon Tetrachloride	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
Chlorobenzene	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	J	0.8	U	1		0.5	U
Chloroethane	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	0.5	U	0.5	U
Chloroform	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.7	J
Chloromethane	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	0.5	U	0.5	U
Dibromochloromethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
1,2-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	J	2	J	1	J	2		0.5	U
1,3-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
1,4-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
1,1-Dichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
1,2-Dichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	J	1	J	1	U	1		0.5	U
1,1-Dichloroethene	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	1	U	1	U	1	U	1	U	1	J	3	J	4	J	3	J	2	J	2		2	
trans-1,2-Dichloroethene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
1,2-Dichloropropane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
cis-1,3-Dichloropropene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.5	U	0.5	U
1,4-Dioxane													70	U	70	U	70	U	25	U	25	U
Ethylbenzene	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.5	U	0.5	U
Freon 113	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	0.5	U	0.5	U
Freon 123a											5	U	2	U	2	U	2	U	0.5	U	0.5	U
2-Hexanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	1	U	1	U
4-Methyl-2-pentanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	6		11	
Methylene Chloride	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	0.5	U	0.5	U
Naphthalene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
Styrene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
1,1,1,2-Tetrachloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	7		7		12		20		25		23		35		39		24		26		16	
Tetrachloroethene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
Toluene	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.8	U	0.5	U	0.5	U
1,2,3-Trichlorobenzene											1	U	1	U	1	U	1	U	0.5	U	0.5	U
1,1,1-Trichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
1,1,2-Trichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
Trichloroethene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene											1	U	1	U	1	U	1	U	0.5	U	0.5	U
1,3,5-Trimethylbenzene											1	U	1	U	1	U	1	U	0.5	U	0.5	U
Vinyl Chloride	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	0.5	U	0.5	U
Xylene (Total)	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.5	U	0.5	U
Total Confident Concentrations	**7**		**7**		**12**		**33**		**35**		**23**		**35**		**39**		**24**		**68**		**165**	
Total Estimated Concentrations	**0**		**10**		**0**		**18**		**12**		**16**		**6**		**6.8**		**13**		**0**		**0.7**	

NOTES:

U - Indicates the analysis was completed for the analyte but the analyte was not detected. Value displayed is the Method Detection Limit.

J - Indiates the analysis was completed for the analyte; however, the result was greater than the MDL but less than the limit of quantitation.

µg/L - micrograms per liter

VOCs - volatile organic compounds

[shaded box] - not analyzed

Sample ID	Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent		Effluent	
Sampling Date	3/31/2016		4/21/2016		5/18/2016		6/22/2016		7/20/2016		8/24/2016		9/28/2016		10/26/2016		11/15/2016		12/13/2016		1/13/2017	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water		Water		Water		Water	
Units	µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
VOCs																						
Acetone	620		470		590		120		130		16		160		97		59		110		100	
Benzene	0.5	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	0.5	U
Benzyl Chloride	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	0.5	U	0.5	U	0.5	U	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-Butanone	140		3		5		32		15		1	U	14		2		6		6		5	
Carbon Disulfide	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Tetrachloride	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chlorobenzene	1		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	0.5	U	0.5	U	0.5	U	0.5	U	2		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloromethane	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	0.6	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	0.5	U
1,3-Dichlorobenzene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	0.9	J	0.8	J	0.7	J	2		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	0.5	U	0.5	U	0.6	J	1		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethene	0.5	U	0.5	U	0.5	U	0.6	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	4		6		6		7		0.7	J	0.5	U	0.6	J	0.5	U	1	J	0.5	U	0.5	J
trans-1,2-Dichloroethene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,3-Dichloropropene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dioxane	25	U	25	U	25	U	25	U	25	U	25	U	25	U	25	U	25	U	25	U	25	U
Ethylbenzene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Freon 113	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Freon 123a	0.5	U	0.5	U	0.5	U	0.6	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2-Hexanone	2	J	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
4-Methyl-2-pentanone	33		1	U	1	U	1	J	1	U	1	U	2	J	1	U	1	U	1	U	1	U
Methylene Chloride	2		2		4		15		6		0.6	J	12		1		7		5		0.5	J
Naphthalene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Styrene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,1,2-Tetrachloroethane	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	6		0.5	U	0.5	U	1		0.8	J	0.5	U	1		0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,3-Trichlorobenzene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,1-Trichloroethane	0.9	J	2		2		3		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.8	J	0.5	U
1,1,2-Trichloroethane	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3,5-Trimethylbenzene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl Chloride	0.5	U	0.5	U	0.5	U	2		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Xylene (Total)	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Total Confident Concentrations	**806**		**483**		**607**		**183**		**153**		**16**		**187**		**100**		**72**		**121**		**105**	
Total Estimated Concentrations	**4.9**		**0.8**		**1.3**		**2.2**		**1.5**		**0.6**		**2.6**		**0**		**1**		**0.8**		**1**	

NOTES:

U - Indicates the analysis was completed for the analyte but the analyte was not detected. Value displayed is the Method Detection Limit.

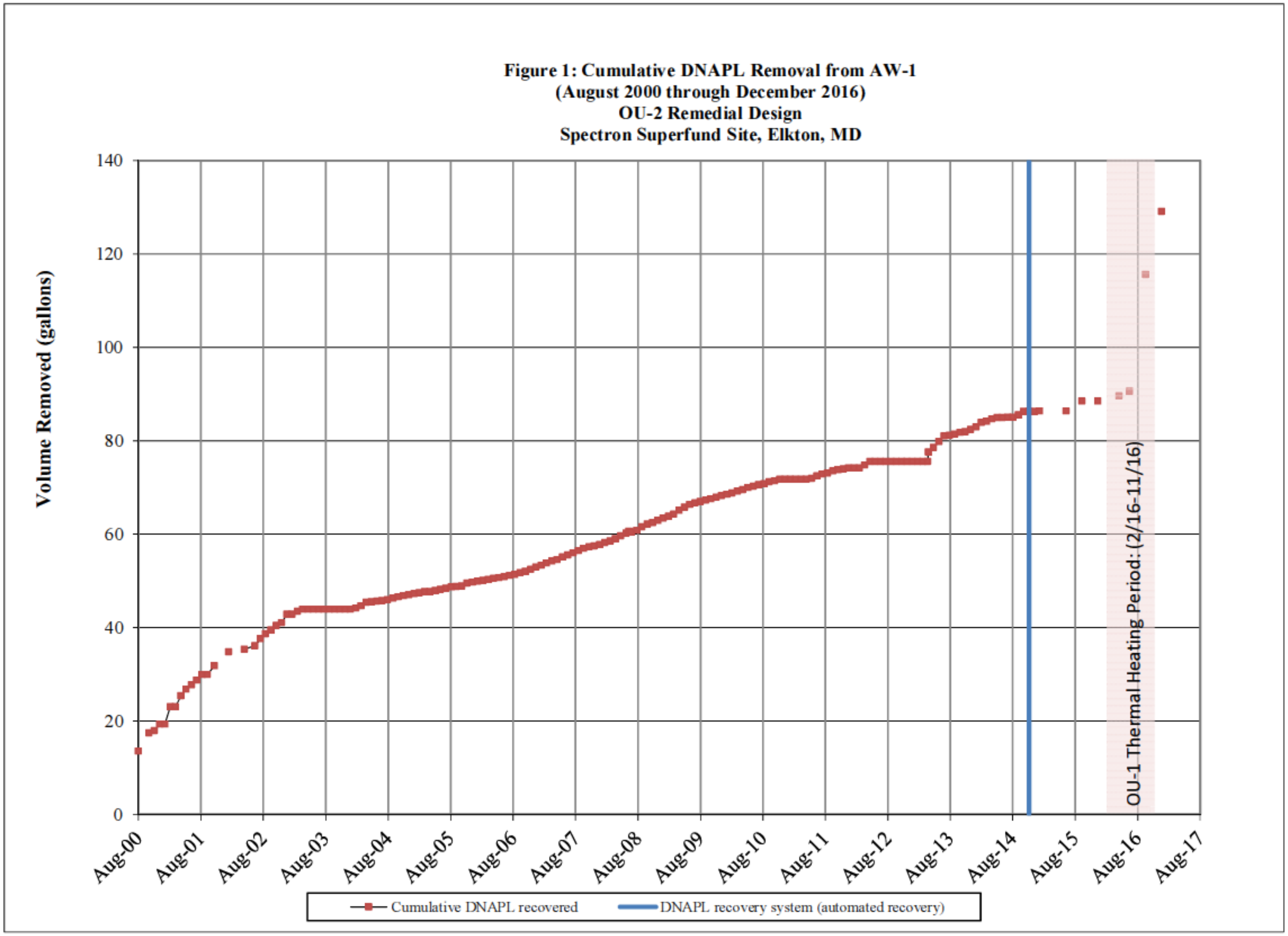
J - Indiates the analysis was completed for the analyte; however, the result was greater than the MDL but less than the limit of quantitation.

µg/L - micrograms per liter

VOCs - volatile organic compounds

[shaded box] - not analyzed

Figure G-1: Cumulative DNAPL Removal from AW-1



OBG
January 2017

Figure G-2: OU2 Bedrock DNAPL/Source Area and Dissolved VOC Areas

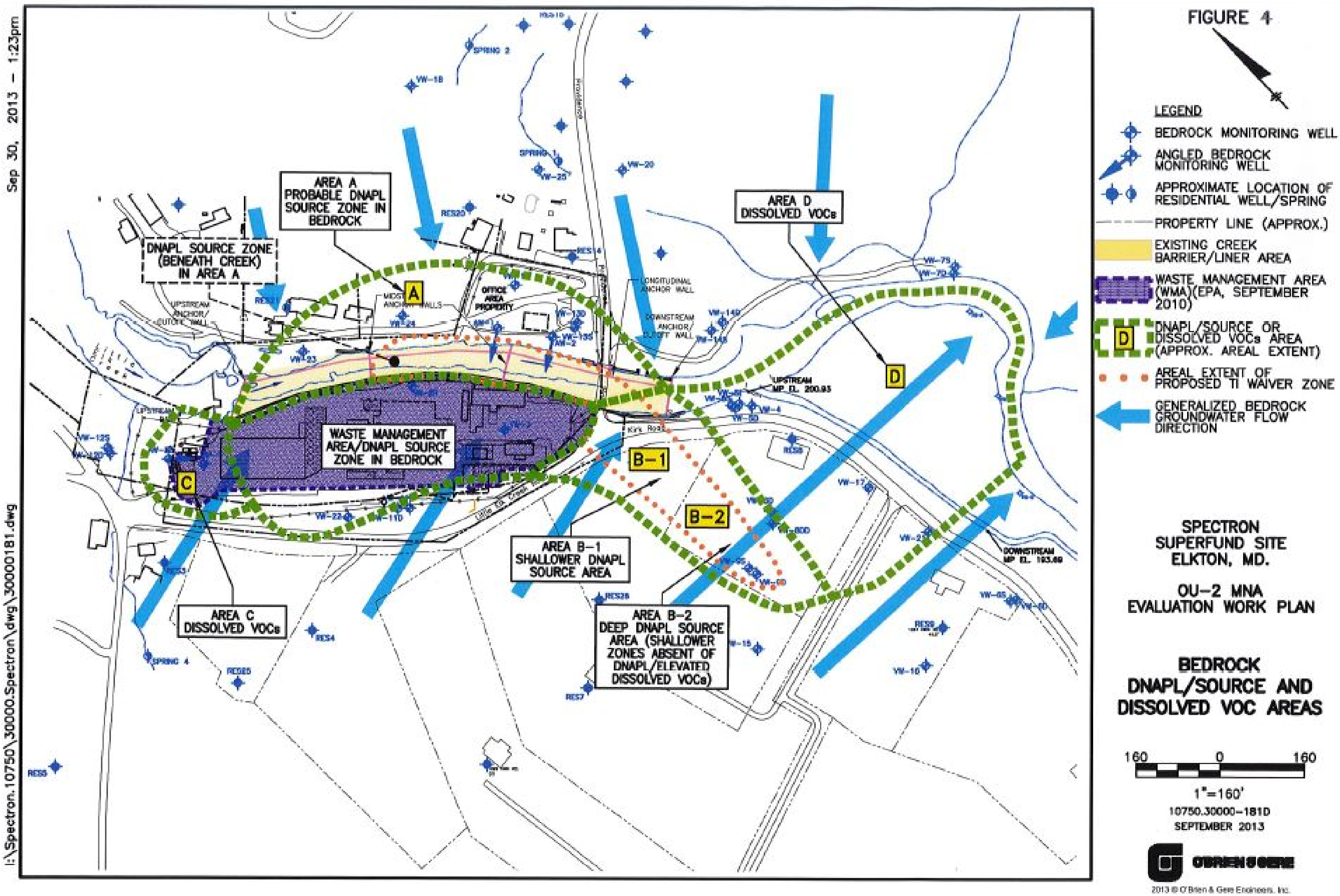


Table G-2: Overburden Groundwater Analytical Data, 2012 to 2017

Summary of VOC Analytical Data for Overburden Groundwater
from 2012 through January 2017
OU-1 - Spectron Superfund Site
Elkton, MD

Location ID	MW-1R	MW-2	MW-3	MW-3D	MW-3D	MW-3D	MW-3D	MW-3D	MW-3D	MW-7R	MW-8	MW-9	MW-11	MW-12
Sample Date	11/14/2012	11/14/2012	11/15/2012	11/16/2012	12/10/2015	5/20/2016	7/14/2016	8/31/2016	1/12/2017	11/14/2012	11/14/2012	11/15/2012	11/15/2012	11/15/2012
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)														
Acetone	<6	<6	23	380	280	590 J	91	54	410	<6	<6	11	6	<6
Benzene	4	4	14	140	110	200	8	<0.5	25	4	4	42	4	70
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	<5	NA	NA	NA	NA	NA
Bromodichloromethane	<1	<1	<2	<20	<1	<200	<0.5	<0.5	<5	<1	<1	<1	<1	<1
Bromoform	<1	<1	<2	<20	<1	<200	<0.5	<0.5	<5	<1	<1	<1	<1	<1
Bromomethane	<1	<1	<2	<20	<1	200	<0.5	<0.5	<5	<1	<1	<1	<1	<1
2-Butanone	<3	<3	<6	84	<6	<1000	10	5	70	<3	<3	7	<3	<3
Carbon Disulfide	<1	<1	<2	<20	<2	200	<0.5	<0.5	<5	<1	<1	<1	<1	<1
Carbon Tetrachloride	<1	<1	<2	<20	<1	200	<0.5	<0.5	<5	<1	<1	<1	<1	<1
Chlorobenzene	<0.8	<0.8	36	890	790	3,300	21	2	370	<0.8	6	1,100	12	250
Chloroethane	<1	<1	12	230	<1	200	<0.5	<0.5	<5	<1	320	2,000	15	110
Chloroform	<0.8	<0.8	6	18	27	200	<0.5	<0.5	<5	<0.8	<0.8	<0.8	2	<0.8
Chloromethane	<1	<1	<2	<20	<1	<200	<0.5	<0.5	<5	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	<0.8	<0.8	2,000	23,000	31,000	250	47	5	1,500	<0.8	160	7	2,000	13
cis-1,3-Dichloropropene	<1	<1	<2	<20	<1	200	<0.5	<0.5	<5	<1	<1	<1	<1	<1
Dibromochloromethane	<1	<1	<2	<20	<1	<200	<0.5	<0.5	<5	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	<1	<1	37	2,900	2,400	4,100	290	6	1,300	<1	2	65	7	110
1,3-Dichlorobenzene	<1	<1	<2	22	22	52 J	0.8 J	<0.5	9 J	<1	<1	2	1	9
1,4-Dichlorobenzene	<1	<1	4	160	150	290	8	<0.5	70	<1	<1	16	3	32
1,1-Dichloroethane	<1	<1	270	3,900	1,600	200	<0.5	<0.5	53	<1	280	34	270	250
1,2-Dichloroethane	<1	<1	24	230	210	<200	2	1	19	<1	30	2	11	16
1,1-Dichloroethene	<0.8	<0.8	11	280	<1	200	24	9	1,200	<0.8	3	<0.8	18	<0.8
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	<1	<1	<2	<20	<1	200	<0.5	<0.5	<5	<1	<1	<1	<1	<1
1,4-Dioxane	NA	NA	2.9	11	<140	7.3	8.3	2.3	<250	NA	NA	62	5.2	4.7
Ethylbenzene	<0.8	<0.8	13	1,000	1,100	3,300	7	0.9 J	320	<0.8	<0.8	210	<0.8	76
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	<2	<2	280	18,000	27,000	<200	13	59	1,000	<2	<2	<2	20	3
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	<2	<2	100	1,100	1,000	<200	0.7 J	0.6 J	200	<2	<2	3	27	150
2-Hexanone	<3	<3	<6	<60	<6	1,000	<1	<1	<10	<3	<3	<3	<3	<3
4-Methyl-2-pentanone	<3	<3	<6	<60	6 J	1,000	15	2	42	<3	<3	<3	<3	<3
Methylene Chloride	<2	<2	<4	380	<4	600	210	25	34	<2	5	17	8	<2
Naphthalene	<1	<1	<2	40	38	200	69	<0.5	18	<1	<1	20	<1	1
Styrene	<1	<1	<2	<20	<2	200	<0.5	<0.5	<5	<1	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane	<1	<1	<2	<20	<1	200	<0.5	<0.5	<5	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	<1	<1	7	29	68	<200	<0.5	<0.5	<5	<1	<1	<1	3	<1
Tetrachloroethene	<0.8	1	160	7,700	2,700	30000 D	73	26	8,100	1	8	13	560	8
Toluene	0.7	0.9	18	2,700	2,000	1,000	40	3	780	0.9	12	930	<0.7	13
trans-1,2-Dichloroethene	<0.8	<0.8	16	35	26	<200	1	<0.5	18	<0.8	2	7	24	9
trans-1,3-Dichloropropene	<1	<1	<2	<20	<1	<200	<0.5	<0.5	<5	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	<1	<1	2	<20	18	200	39	<0.5	11	<1	<1	<1	1	9
1,1,1-Trichloroethane	<0.8	<0.8	530	6,100	11,000	<200	<0.5	<0.5	13	<0.8	160	6	1,100	13
1,1,2-Trichloroethane	<0.8	<0.8	<2	<16	9	200	<0.5	<0.5	<5	<0.8	<0.8	<0.8	1	<0.8
Trichloroethene	<1	5	93	1,300	170	50 J	21	4	690	5	34	10	350	2
1,2,4-Trimethylbenzene	<1	<1	<2	78	86	140 J	1	<0.5	21	<1	<1	70	<1	2
1,3,5-Trimethylbenzene	<1	<1	<2	21	24	50 J	<0.5	<0.5	6 J	<1	<1	28	<1	<1
Vinyl Chloride	<1	<1	250	2,000	850	200	1	<0.5	110	<1	80	5	67	15
Xylene (Total)	<0.8	<0.8	12	3,800	3,300	11,600	28	3	1,200	<0.8	0.9	710	<0.8	27
Total VOCs	4.7	10.9	3,898	76,148	85,704	59,939	938	154	17,179	10.9	1,269	5,380	4,509	1,193
Total VOC TIC	NA	NA	NA	NA	2,200	0	0	0	0	NA	NA	NA	NA	NA
Ethane	<1	<1.0	6.7	17	9.7	NA	NA	NA	NA	<1.0	40	2,200	7.1	56
Ethene	<1	<1.0	84	1,200	140	NA	NA	NA	NA	<1.0	37	420	12	720
Methane	8,100	<3.0	1,400	630	240	NA	NA	NA	NA	<3.0	8,100	5,500	27	300
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/L)
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Overburden Groundwater
from 2012 through January 2017
OU-1 - Spectron Superfund Site
Elkton, MD

Location ID	MW-13	MW-13	MW-13	MW-14	MW-15	MW-16S	MW-16D	MW-16D	MW-16D	MW-16D	MW-16D	MW-16D	MW-17	MW-17
Sample Date	11/20/2012	12/11/2015	1/12/2017	11/15/2012	11/15/2012	11/15/2012	11/16/2012	12/10/2015	5/20/2016	7/14/2016	8/31/2016	1/12/2017	11/16/2012	12/10/2015
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)														
Acetone	420	1,400	1,200	94	< 120	< 30	< 120	140	160	82	2,500	2,900	< 300	97
Benzene	1,900	1,200	14	96	< 10	150	250	280	< 10	2	460	640	980	150
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	< 50	< 5	< 5	< 5	< 20	< 5	< 20	< 3	< 10	< 0.5	< 5	< 50	< 50	< 1
Bromoform	< 50	< 5	< 5	< 5	< 20	< 5	< 20	< 3	< 10	< 0.5	< 5	< 50	< 50	< 1
Bromomethane	< 50	< 5	< 5	< 5	< 20	< 5	< 20	< 3	< 10	< 0.5	< 5	< 50	< 50	< 1
2-Butanone	< 150	< 30	210	30	< 60	< 15	< 60	< 15	25 J	11	530	720	< 150	< 6
Carbon Disulfide	< 50	< 10	< 5	< 5	< 20	< 5	< 20	< 5	< 10	1 J	12	< 50	< 50	< 2
Carbon Tetrachloride	< 50	< 5	< 5	< 5	< 20	< 5	< 20	< 3	10	< 0.5	< 5	< 50	< 50	< 1
Chlorobenzene	9,900	4,200	14	2,300	190	1,400	5,500	6,700	510	34	7,900	12,000	4,400	1,500
Chloroethane	< 50	< 5	< 5	4,500	< 20	24	660	50	10	< 0.5	< 5	< 50	350	< 1
Chloroform	100	45	< 5	< 4	< 16	7	17	17	6 J	< 0.5	46	110	< 40	12
Chloromethane	< 50	< 5	< 5	< 5	< 20	< 5	< 20	< 3	< 10	0.5 J	< 5	< 50	< 50	< 1
cis-1,2-Dichloroethene	50,000	41,000	190	< 4	29,000	4,400	11,000	16,000	27	26	6,900	7,500	31,000	9,200
cis-1,3-Dichloropropene	< 50	< 5	< 5	< 5	< 20	< 5	< 20	< 3	10	< 0.5	< 5	< 50	< 50	< 1
Dibromochloromethane	< 50	< 5	< 5	< 5	< 20	< 5	< 20	< 3	10	< 0.5	< 5	< 50	< 50	< 1
1,2-Dichlorobenzene	2,200	690	< 5	17	1,800	150	460	610	1,300	10	2,300	2,900	1,100	1,000
1,3-Dichlorobenzene	< 50	12 J	< 5	< 5	23	< 5	< 20	12 J	22	< 0.5	31	< 50	< 50	28
1,4-Dichlorobenzene	190	58	< 5	< 5	210	20	120	150	240	0.9 J	300	430	120	140
1,1-Dichloroethane	4,000	2,300	< 5	380	440	2,100	3,600	3,200	< 10	1	270	560	7,200	920
1,2-Dichloroethane	4,500	4,200	< 5	< 5	23	63	190	200	< 10	8	1,100	2,100	340	150
1,1-Dichloroethene	790	700	6 J	< 4	260	28	260	< 3	7 J	25	13,000	20,000	260	< 1
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 50	< 5	< 5	< 5	< 20	< 5	< 20	4 J	< 10	< 0.5	5 J	< 50	< 50	< 1
1,4-Dioxane	14	< 700	27	77	0.73	7.8	8.9	< 350	5.6	12	47	< 100	9	< 140
Ethylbenzene	3,400	1,000	< 5	250	680	550	1,100	1,300	420	5	2,800	5,300	3,300	2,100
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	31,000	18,000	< 5	< 10	1,100	1,900	5,700	7,300	22	47	3,800	12,000	13,000	6,800
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	390	170	< 5	< 10	92	1,100	1,400	720	< 10	1	260	950	1,900	240
2-Hexanone	< 150	< 30	23	< 15	< 60	< 15	< 60	< 15	< 50	< 1	< 10	< 100	< 150	< 6
4-Methyl-2-pentanone	2,000	2,200	48	< 15	< 60	< 15	< 60	< 15	8 J	20	1,700	770	< 150	< 6
Methylene Chloride	21,000	17,000	30	81	< 40	< 10	52	190	57	210	35,000	29,000	140	< 4
Naphthalene	< 50	11 J	< 5	9	28	< 5	< 20	8 J	16	1	49	< 50	< 50	11
Styrene	< 50	< 10	< 5	< 5	< 20	< 5	< 20	< 5	10	< 0.5	< 5	< 50	< 50	< 2
1,1,1,2-Tetrachloroethane	< 50	< 5	< 5	< 5	< 20	< 5	< 20	< 3	< 10	< 0.5	< 5	< 50	< 50	< 1
1,1,2,2-Tetrachloroethane	130	15	< 5	< 5	< 20	13	77	50	< 10	< 0.5	< 5	< 50	290	64
Tetrachloroethene	32,000	11,000	35	< 4	590	12	230	2,500	93	58	23,000	58,000	1,600	61
Toluene	14,000	5,800	15	8,000	1,100	290	2,100	1,800	17	35	12,000	22,000	6,900	950
trans-1,2-Dichloroethene	88	50	< 5	8	74	49	52	49	< 10	0.6 J	160	180	68	30
trans-1,3-Dichloropropene	< 50	< 5	< 5	< 5	< 20	< 5	< 20	< 3	< 10	< 0.5	< 5	< 50	< 50	< 1
1,2,3-Trichlorobenzene	< 50	< 10	< 5	< 5	22	< 5	< 20	7 J	14	0.7 J	43	60 J	< 50	61
1,1,1-Trichloroethane	70,000	44,000	< 5	< 4	12,000	550	6,000	12,000	< 10	< 0.5	27	< 50	16,000	4,000
1,1,2-Trichloroethane	< 40	< 5	< 5	< 4	< 16	8	< 16	7	< 10	< 0.5	< 5	< 50	< 40	< 1
Trichloroethene	18,000	6,100	18	< 5	380	16	200	440	7 J	23	11,000	18,000	1,200	16
1,2,4-Trimethylbenzene	< 50	14 J	< 5	43	200	< 5	< 20	15 J	51	< 0.5	27	< 50	< 50	28
1,3,5-Trimethylbenzene	< 50	< 10	< 5	17	72	< 5	< 20	5 J	12	< 0.5	6 J	< 50	< 50	11
Vinyl Chloride	2,600	2,100	< 5	< 5	890	1,700	3,000	1,600	< 10	0.7 J	260	250	5,300	2,000
Xylene (Total)	10,000	3,200	8 J	1,100	2,000	950	1,800	1,600	1,350	12	5,900	11,000	5,800	3,400
Total VOCs	328,290	165,065	638	16,908	51,175	15,488	43,777	56,814	4,260	545	128,933	204,470	101,257	32,872
Total VOC TIC	NA	3,166	0	NA	NA	NA	NA	1,560	0	0	0	0	NA	2,196
Ethane	15	4.3 J	NA	730	1.5	14	19	27	NA	NA	NA	NA	59	2.7 J
Ethene	380	73	NA	5,800	56	970	3,000	1,400	NA	NA	NA	NA	3,700	290
Methane	79	27	NA	8,100	11	87	270	140	NA	NA	NA	NA	1,200	22
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Overburden Groundwater
from 2012 through January 2017
OU-1 - Spectron Superfund Site
Elkton, MD

Location ID	MW-17	MW-17	MW-17	MW-17	MW-17	MW-18S	MW-18D	MW-18D	MW-18D	MW-18D	MW-18D	MW-18D	MW-19	MW-20
Sample Date	12/10/2015	5/16/2016	7/14/2016	8/31/2016	1/12/2017	11/16/2012	11/16/2012	12/10/2015	5/16/2016	7/14/2016	8/31/2016	1/12/2017	11/15/2012	--
Sample Type	Duplicate	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	--
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	--
Volatile Organic Compounds (µg/L)														
Acetone	94	2,400	680	2,400	< 10	7	410	700 J	410	250	2,500	1,300	< 300	Not Sampled
Benzene	150	67	16	18 J	14	74	780	500	19	13	170	81	< 25	Not Sampled
Benzyl Chloride	NA	NA	NA	NA	< 5	NA	NA	NA	NA	NA	NA	< 5	NA	Not Sampled
Bromodichloromethane	< 1	50	< 5	< 10	< 5	< 1	< 50	< 25	10	< 1	< 10	< 5	< 50	Not Sampled
Bromoform	< 1	< 50	< 5	< 10	< 5	< 1	< 50	< 25	10	< 1	< 10	< 5	< 50	Not Sampled
Bromomethane	< 1	< 50	< 5	< 10	< 5	< 1	< 50	< 25	< 10	< 1	< 10	< 5	< 50	Not Sampled
2-Butanone	< 6	900	370	1,500	< 10	4	< 150	< 150	190	53	1,300	620	< 150	Not Sampled
Carbon Disulfide	< 2	50	< 5	< 10	< 5	< 1	< 50	< 50	10	< 1	< 10	< 5	< 50	Not Sampled
Carbon Tetrachloride	< 1	50	< 5	< 10	< 5	< 1	< 50	< 25	10	< 1	< 10	< 5	< 50	Not Sampled
Chlorobenzene	1,500	1,700	140	370	270	310	6,200	7,400	930	590	5,600	2,700	450	Not Sampled
Chloroethane	< 1	< 50	< 5	< 10	< 5	360	380	< 25	< 10	< 1	< 10	< 5	< 50	Not Sampled
Chloroform	12	50	< 5	< 10	< 5	0.8	43	30 J	5.2 J	1 J	20 J	< 5	< 40	Not Sampled
Chloromethane	< 1	50	< 5	< 10	< 5	< 1	< 50	< 25	< 10	< 1	< 10	< 5	< 50	Not Sampled
cis-1,2-Dichloroethene	9,300	440	40	310	800	860	44,000	29,000	760	420	3,700	1,200	35,000	Not Sampled
cis-1,3-Dichloropropene	< 1	50	< 5	< 10	< 5	< 1	< 50	< 25	10	< 1	< 10	< 5	< 50	Not Sampled
Dibromochloromethane	< 1	50	< 5	< 10	< 5	< 1	< 50	< 25	10	< 1	< 10	< 5	< 50	Not Sampled
1,2-Dichlorobenzene	1,000	600	130	930	420	140	1,600	1,600	1,200	340	3,400	1,500	4,400	Not Sampled
1,3-Dichlorobenzene	28	13 J	< 5	16 J	68	3	< 50	< 50	11	2 J	19 J	13	61	Not Sampled
1,4-Dichlorobenzene	140	61	< 5	78	37	13	160	150 J	83	13	130	86	520	Not Sampled
1,1-Dichloroethane	930	31 J	< 5	< 10	10 J	300	6,800	1,900	18	8	37	24	2,700	Not Sampled
1,2-Dichloroethane	150	50	< 5	< 10	< 5	13	400	270	38	32	440	67	63	Not Sampled
1,1-Dichloroethene	< 1	400	< 5	12 J	7 J	21	850	610	160	530	4,300	1,400	820	Not Sampled
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Sampled
1,2-Dichloropropane	< 1	< 50	< 5	< 10	< 5	< 1	< 50	< 25	< 10	< 1	< 10	< 5	< 50	Not Sampled
1,4-Dioxane	< 140	18	10	10	< 250	5.2	7.3	< 3500	< 2.8	2.7	1.4 J	< 250	8.1	Not Sampled
Ethylbenzene	2,100	670	45	420	220	280	2,800	2,800	340	130	1,600	1,300	1,300	Not Sampled
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	6,800	580	18	450	< 5	310	31,000	41,000	230	370	1,600	2,000	1,300	Not Sampled
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	250	30 J	< 5	28	8 J	280	2,000	980	8.9 J	8	210	380	140	Not Sampled
2-Hexanone	< 6	< 250	< 10	< 20	< 10	< 3	< 150	< 150	50	< 2	< 20	< 10	< 150	Not Sampled
4-Methyl-2-pentanone	< 6	97 J	< 10	49	< 10	< 3	< 150	< 150	25 J	15	270	53	< 150	Not Sampled
Methylene Chloride	< 4	170	22	460	< 5	4	150	< 100	320	410	4,800	770	< 100	Not Sampled
Naphthalene	11	48 J	11	32	15	1	< 50	< 50	54	8	82	51	< 50	Not Sampled
Styrene	< 2	50	< 5	< 10	< 5	< 1	< 50	< 50	10	< 1	< 10	< 5	< 50	Not Sampled
1,1,1,2-Tetrachloroethane	< 1	50	< 5	< 10	< 5	< 1	< 50	< 25	< 10	< 1	< 10	< 5	< 50	Not Sampled
1,1,2,2-Tetrachloroethane	67	< 50	< 5	< 10	< 5	5	650	530	10	< 1	< 10	< 5	< 50	Not Sampled
Tetrachloroethene	71	5,500	390	1,200	10 J	80	8,800	14,000	1,500	1,200	20,000	21,000	290	Not Sampled
Toluene	980	1,200	50	190	85	210	8,300	5,300	430	420	4,400	2,700	4,300	Not Sampled
trans-1,2-Dichloroethene	36	50	< 5	32	250	11	95	80	4 J	4	39	23	46	Not Sampled
trans-1,3-Dichloropropene	< 1	< 50	< 5	< 10	< 5	< 1	< 50	< 25	10	< 1	< 10	< 5	< 50	Not Sampled
1,2,3-Trichlorobenzene	59	44 J	21	120	< 5	3	< 50	< 50	33	7	46	31	79	Not Sampled
1,1,1-Trichloroethane	4,000	35 J	< 5	< 10	< 5	220	27,000	30,000	4 J	< 1	< 10	< 5	20,000	Not Sampled
1,1,2-Trichloroethane	< 1	< 50	< 5	< 10	< 5	< 0.8	< 40	< 25	< 10	< 1	< 10	< 5	< 40	Not Sampled
Trichloroethene	16	460	8 J	160	110	15	400	930	240	460	4,600	2,300	470	Not Sampled
1,2,4-Trimethylbenzene	27	41 J	< 5	24	9 J	4	< 50	< 50	20	2 J	42	56	280	Not Sampled
1,3,5-Trimethylbenzene	10 J	10 J	< 5	< 10	< 5	1	< 50	< 50	4.7 J	< 1	< 10	18	95	Not Sampled
Vinyl Chloride	2,000	50	< 5	14 J	18	360	3,700	1,200	7.2 J	6	64	41	2,900	Not Sampled
Xylene (Total)	3,400	1,450	130	950	410	410	4,700	5,300	890	280	3,800	3,500	4,200	Not Sampled
Total VOCs	33,037	15,165	1,401	7,373	2,761	4,298	150,815	143,580	7,665	5,325	60,670	41,914	79,422	Not Sampled
Total VOC TIC	4,007	0	0	0	0	NA	NA	5,270	0	0	0	0	NA	Not Sampled
Ethane	2.9 J	NA	NA	NA	NA	12	78	39	NA	NA	NA	NA	9.8	Not Sampled
Ethene	320	NA	NA	NA	NA	590	2,900	950	NA	NA	NA	NA	180	Not Sampled
Methane	25	NA	NA	NA	NA	170	1,200	400	NA	NA	NA	NA	72	Not Sampled
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Sampled
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Sampled

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Overburden Groundwater
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Location ID	MW-21	MW-22	MW-22	MW-22	MW-22	MW-22	MW-23	MW-23	MW-23	MW-24	MW-25	MW-26	MW-27	MW-28
Sample Date	--	12/11/2015	5/20/2016	7/14/2016	8/31/2016	1/12/2017	12/11/2015	5/16/2016	7/14/2016	--	--	--	--	3/5/2014
Sample Type	--	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	--	--	--	--	Grab
Sample Matrix	--	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	--	--	--	--	Groundwater
Volatile Organic Compounds (µg/L)														
Acetone	Abandoned	2,300	5,000	1,900	1,300	1,100	170	6600 D	4,400	Abandoned	Not Sampled	Not Sampled	Not Sampled	80 J
Benzene	Abandoned	1,100	150 J	6	< 10	< 5	140	100 DJ	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	150
Benzyl Chloride	Abandoned	NA	NA	NA	NA	< 5	NA	NA	NA	Abandoned	Not Sampled	Not Sampled	Not Sampled	NA
Bromodichloromethane	Abandoned	< 10	< 250	< 1	< 10	< 5	< 3	94 DJ	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
Bromoform	Abandoned	< 10	< 250	< 1	< 10	< 5	< 3	200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
Bromomethane	Abandoned	< 10	250	< 1	< 10	< 5	< 3	200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
2-Butanone	Abandoned	< 60	870 J	210	260	260	< 15	740 DJ	420	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 30
Carbon Disulfide	Abandoned	< 20	250	< 1	< 10	< 5	< 5	200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
Carbon Tetrachloride	Abandoned	< 10	250	< 1	< 10	< 5	< 3	< 200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
Chlorobenzene	Abandoned	7,200	9,200	210	160	28	3,200	4000 D	330	Abandoned	Not Sampled	Not Sampled	Not Sampled	620
Chloroethane	Abandoned	53	< 250	< 1	< 10	< 5	< 3	200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
Chloroform	Abandoned	160	200 J	< 1	< 10	< 5	41	360 D	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 8
Chloromethane	Abandoned	< 10	250	< 1	< 10	< 5	< 3	200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
cis-1,2-Dichloroethene	Abandoned	75,000	4,000	140	36	120	41,000	880 D	150	Abandoned	Not Sampled	Not Sampled	Not Sampled	6,900
cis-1,3-Dichloropropene	Abandoned	< 10	250	< 1	< 10	< 5	< 3	< 200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
Dibromochloromethane	Abandoned	< 10	< 250	< 1	< 10	< 5	< 3	< 200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
1,2-Dichlorobenzene	Abandoned	1,400	3,800	1,300	210	37	1,300	2600 D	890	Abandoned	Not Sampled	Not Sampled	Not Sampled	2,100
1,3-Dichlorobenzene	Abandoned	23 J	53 J	8	< 10	< 5	28	48 DJ	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	16 J
1,4-Dichlorobenzene	Abandoned	230	570	82	22	< 5	230	300 D	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	120
1,1-Dichloroethane	Abandoned	21,000	160 J	6	< 10	< 5	1,700	64 DJ	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	340
1,2-Dichloroethane	Abandoned	4,100	90 J	12	< 10	< 5	240	200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	62
1,1-Dichloroethene	Abandoned	1,000	3,700	140	25	15	210	1000 D	120	Abandoned	Not Sampled	Not Sampled	Not Sampled	54
1,2-Dichloroethene, Total *	Abandoned	NA	NA	NA	NA	NA	NA	NA	NA	Abandoned	Not Sampled	Not Sampled	Not Sampled	NA
1,2-Dichloropropane	Abandoned	< 10	250	< 1	< 10	< 5	< 3	200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
1,4-Dioxane	Abandoned	< 1400	7.1	6.8	6	< 250	< 350	39.4	50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 700
Ethylbenzene	Abandoned	2,700	3,800	110	82	16	2,800	1800 D	210	Abandoned	Not Sampled	Not Sampled	Not Sampled	570
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	Abandoned	38,000	1,500	26	< 10	11	11,000	660 D	66 J	Abandoned	Not Sampled	Not Sampled	Not Sampled	360
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	Abandoned	4,100	210 J	4	< 10	20	330	54 DJ	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	140
2-Hexanone	Abandoned	< 60	1,300	< 2	< 20	< 10	< 15	1,000	< 100	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 30
4-Methyl-2-pentanone	Abandoned	1,900	< 1300	32	< 20	36	< 15	1700 D	< 100	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 30
Methylene Chloride	Abandoned	4,600	800	420	38	< 5	< 10	170 DJ	230	Abandoned	Not Sampled	Not Sampled	Not Sampled	320
Naphthalene	Abandoned	< 20	250	32	< 10	< 5	12 J	120 DJ	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	15 J
Styrene	Abandoned	< 20	< 250	< 1	< 10	< 5	< 5	200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
1,1,1,2-Tetrachloroethane	Abandoned	< 10	< 250	< 1	< 10	< 5	< 3	< 200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
1,1,2,2-Tetrachloroethane	Abandoned	660	< 250	< 1	< 10	< 5	120	200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
Tetrachloroethene	Abandoned	10,000	33,000	1,900	610	250	240	17000 D	2,900	Abandoned	Not Sampled	Not Sampled	Not Sampled	350
Toluene	Abandoned	12,000	12,000	270	220	15	2,000	3800 D	220	Abandoned	Not Sampled	Not Sampled	Not Sampled	1,400
trans-1,2-Dichloroethene	Abandoned	170	< 250	3	< 10	< 5	56	< 200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	33 J
trans-1,3-Dichloropropene	Abandoned	< 10	< 250	< 1	< 10	< 5	< 3	200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
1,2,3-Trichlorobenzene	Abandoned	24 J	250	42	14 J	< 5	40	200	71 J	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 10
1,1,1-Trichloroethane	Abandoned	49,000	< 250	< 1	< 10	< 5	18,000	< 200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	1,700
1,1,2-Trichloroethane	Abandoned	100	250	< 1	< 10	< 5	6	200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	< 8
Trichloroethene	Abandoned	4,500	6,600	150	100	11	300	2400 D	160	Abandoned	Not Sampled	Not Sampled	Not Sampled	740
1,2,4-Trimethylbenzene	Abandoned	22 J	60 J	11	< 10	< 5	28	52 DJ	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	65
1,3,5-Trimethylbenzene	Abandoned	< 20	250	5	< 10	< 5	11 J	< 200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	19 J
Vinyl Chloride	Abandoned	3,700	250	3	< 10	< 5	2,200	200	< 50	Abandoned	Not Sampled	Not Sampled	Not Sampled	940
Xylene (Total)	Abandoned	6,200	9,800	370	220	38	6,900	5500 D	630	Abandoned	Not Sampled	Not Sampled	Not Sampled	2,400
Total VOCs	Abandoned	248,942	94,620	5,499	2,003	857	92,132	47,081	6,447	Abandoned	Not Sampled	Not Sampled	Not Sampled	26,347
Total VOC TIC	Abandoned	3,070	0	0	0	0	6,009	0	0	Abandoned	Not Sampled	Not Sampled	Not Sampled	210 J
Ethane	Abandoned	14	NA	NA	NA	NA	2.9 J	NA	NA	Abandoned	Not Sampled	Not Sampled	Not Sampled	NA
Ethene	Abandoned	340	NA	NA	NA	NA	150	NA	NA	Abandoned	Not Sampled	Not Sampled	Not Sampled	NA
Methane	Abandoned	88	NA	NA	NA	NA	15	NA	NA	Abandoned	Not Sampled	Not Sampled	Not Sampled	NA
Ethanol	Abandoned	NA	NA	NA	NA	NA	NA	NA	NA	Abandoned	Not Sampled	Not Sampled	Not Sampled	NA
Methanol	Abandoned	NA	NA	NA	NA	NA	NA	NA	NA	Abandoned	Not Sampled	Not Sampled	Not Sampled	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Overburden Groundwater
from 2012 through January 2017
OU-1 - Spectron Superfund Site
Elkton, MD

Location ID	MW-28	MW-28	MW-28	MW-28	MW-28	MW-28	MW-28	MW-28	MW-29	MW-29	MW-29	MW-30	MW-31	MW-31
Sample Date	12/10/2015	5/20/2016	7/14/2016	8/31/2016	9/26/2016	10/12/2016	10/21/2016	1/12/2017	3/5/2014	12/9/2015	1/12/2017	--	3/5/2014	12/9/2015
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	--	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	--	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)														
Acetone	31	3,000	2,800	1,600	670	2,200	970	< 10	< 6	< 6	< 1	Not Sampled	< 6	< 12
Benzene	180	300	66	38	< 50	27	18 J	230	< 0.5	1 J	< 0.5	Not Sampled	14	31
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	Not Sampled	NA	NA
Bromodichloromethane	< 0.5	100	< 10	< 10	< 50	< 5	< 10	< 5	< 5	< 0.5	< 0.5	Not Sampled	< 1	< 1
Bromoform	< 0.5	< 100	< 10	< 10	< 50	< 5	< 10	< 5	< 1	< 0.5	< 0.5	Not Sampled	< 1	< 1
Bromomethane	< 0.5	100	< 10	< 10	< 50	< 5	< 10	< 5	< 1	< 0.5	< 0.5	Not Sampled	< 1	< 1
2-Butanone	< 3	670	430	310	150 J	350	240	17 J	< 3	< 3	< 1	Not Sampled	< 3	< 6
Carbon Disulfide	< 1	100	< 10	< 10	< 50	< 5	< 10	< 5	< 1	< 1	< 0.5	Not Sampled	< 1	< 2
Carbon Tetrachloride	< 0.5	< 100	< 10	< 10	< 50	< 5	< 10	< 5	< 1	< 0.5	< 0.5	Not Sampled	< 1	< 1
Chlorobenzene	340	1,700	820	490	300	260	240	420	< 0.8	1	< 0.5	Not Sampled	34	420
Chloroethane	10	< 100	< 10	< 10	< 50	< 5	< 10	< 5	< 1	< 0.5	< 0.5	Not Sampled	2 J	< 1
Chloroform	2	< 100	< 10	< 10	< 50	< 5	< 10	< 5	< 0.8	< 0.5	< 0.5	Not Sampled	< 0.8	< 1
Chloromethane	< 0.5	< 100	< 10	< 10	< 50	< 5	< 10	< 5	< 1	< 0.5	< 0.5	Not Sampled	< 1	< 1
cis-1,2-Dichloroethene	6,100	11,000	2,300	3,300	3,700	2,100	870	25,000	11	61	3	Not Sampled	230	400
cis-1,3-Dichloropropene	< 0.5	100	< 10	< 10	< 50	< 5	< 10	< 5	< 1	< 0.5	< 0.5	Not Sampled	< 1	< 1
Dibromochloromethane	< 0.5	100	< 10	< 10	< 50	< 5	< 10	< 5	< 1	< 0.5	< 0.5	Not Sampled	< 1	< 1
1,2-Dichlorobenzene	1,700	8,500	8,800	7,500	2,500	5,800	8,900	2,300	< 1	< 1	< 0.5	Not Sampled	4 J	5 J
1,3-Dichlorobenzene	14	42 J	26	29	< 50	23	30	6 J	< 1	< 1	< 0.5	Not Sampled	< 1	< 2
1,4-Dichlorobenzene	100	350	300	270	95 J	210	290	65	< 1	< 1	< 0.5	Not Sampled	3 J	22
1,1-Dichloroethane	380	1,400	42	21	< 50	12	< 10	530	3 J	7	0.6 J	Not Sampled	57	8
1,2-Dichloroethane	20	420	< 10	< 10	< 50	6 J	< 10	140	2 J	7	2	Not Sampled	3 J	1 J
1,1-Dichloroethene	36	650	310	37	< 50	30	48	130	1 J	1	2	Not Sampled	4 J	1 J
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Sampled	NA	NA
1,2-Dichloropropane	< 0.5	100	< 10	< 10	< 50	< 5	< 10	< 5	< 1	< 0.5	< 0.5	Not Sampled	< 1	< 1
1,4-Dioxane	< 70	153	220	160	66	220	42	150	< 70	< 70	< 25	Not Sampled	< 70	< 140
Ethylbenzene	410	2,200	870	830	220	480	500	300	< 0.8	< 0.5	< 0.5	Not Sampled	6	5
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	1,100	1,100	200	< 10	< 50	< 5	< 10	< 5	13	11	6	Not Sampled	65	21
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	200	280	120	29	< 50	20	20 J	140	< 2	< 2	< 0.5	Not Sampled	28	14
2-Hexanone	< 3	500	< 20	< 20	< 100	< 10	< 20	< 10	< 3	< 3	< 1	Not Sampled	< 3	< 6
4-Methyl-2-pentanone	< 3	500	130	48	< 100	60	< 20	140	< 3	< 3	< 1	Not Sampled	< 3	< 6
Methylene Chloride	< 2	2,900	120	< 10	< 50	< 5	12 J	< 5	< 2	< 2	0.9 J	Not Sampled	7	< 4
Naphthalene	19	32 J	130	65	< 50	72	96	27	< 1	< 1	< 0.5	Not Sampled	< 1	< 2
Styrene	< 1	100	< 10	< 10	< 50	< 5	< 10	< 5	< 1	< 1	< 0.5	Not Sampled	< 1	< 2
1,1,1,2-Tetrachloroethane	< 0.5	100	< 10	< 10	< 50	< 5	< 10	< 5	< 1	< 0.5	< 0.5	Not Sampled	< 1	< 1
1,1,2,2-Tetrachloroethane	8	< 100	< 10	< 10	< 50	< 5	< 10	< 5	< 1	2	2	Not Sampled	< 1	< 1
Tetrachloroethene	72	20,000	19,000	14,000	2,800	6,600	7,200	1,600	5 J	120	5	Not Sampled	110	38
Toluene	460	5,200	2,400	1,200	340	600	500	930	< 0.7	< 0.5	< 0.5	Not Sampled	18	2 J
trans-1,2-Dichloroethene	25	100	11 J	< 10	< 50	6 J	< 10	52	< 0.8	1	< 0.5	Not Sampled	< 0.8	7
trans-1,3-Dichloropropene	< 0.5	< 100	< 10	< 10	< 50	< 5	< 10	< 5	< 1	< 0.5	< 0.5	Not Sampled	< 1	< 1
1,2,3-Trichlorobenzene	1 J	< 100	36	< 10	< 50	< 5	< 10	< 5	< 1	< 1	< 0.5	Not Sampled	< 1	< 2
1,1,1-Trichloroethane	1,200	100	< 10	< 10	< 50	< 5	< 10	< 5	33	46	47	Not Sampled	110	6
1,1,2-Trichloroethane	4	74 J	< 10	< 10	< 50	< 5	< 10	16	0.8	0.7 J	< 0.5	Not Sampled	< 0.8	< 1
Trichloroethene	36	1,500	630	370	110	180	150	1,600	5	21	3	Not Sampled	36	24
1,2,4-Trimethylbenzene	69	160	110	110	< 50	83	96	13	< 1	< 1	< 0.5	Not Sampled	< 1	< 2
1,3,5-Trimethylbenzene	21	41 J	34	21	< 50	14	17 J	< 5	< 1	< 1	< 0.5	Not Sampled	< 1	< 2
Vinyl Chloride	1,100	110	83	160	300	120	35	350	< 1	2	< 0.5	Not Sampled	27	140
Xylene (Total)	950	8,200	4,700	4,500	960	2,500	2,800	900	< 0.8	< 0.5	< 0.5	Not Sampled	14	2 J
Total VOCs	14,557	68,982	41,888	33,488	11,541	19,773	22,104	35,056	85	282	72	Not Sampled	1,002	1,147
Total VOC TIC	778	0	0	0	0	0	0	0	0	0	0	Not Sampled	0	0
Ethane	15	NA	NA	NA	NA	NA	NA	NA	NA	< 1	NA	Not Sampled	NA	9.7
Ethene	390	NA	NA	NA	NA	NA	NA	NA	NA	< 1	NA	Not Sampled	NA	79
Methane	310	NA	NA	NA	NA	NA	NA	NA	NA	11	NA	Not Sampled	NA	190
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Sampled	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Sampled	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Overburden Groundwater
from 2012 through January 2017
OU-1 - Spectron Superfund Site
Elkton, MD

Location ID	MW-31	MW-31	MW-31	MW-31	MW-32	MW-33	MW-33	MW-33	MW-34	MW-34	MW-34	GWE-03	GWE-04	GWE-05
Sample Date	5/16/2016	7/14/2016	8/31/2016	1/12/2017	--	9/26/2016	10/12/2016	1/12/2017	9/26/2016	10/12/2016	1/12/2017	9/26/2016	9/26/2016	9/26/2016
Sample Type	Grab	Grab	Grab	Grab	--	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	--	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)														
Acetone	5.7	6	< 1	< 1	Not Sampled	3,500	2,600	610	2,000	1,900	530	410	450	< 20
Benzene	9	2	1 J	< 0.5	Not Sampled	< 100	< 25	8 J	50	43	15	160	310	47
Benzyl Chloride	NA	NA	NA	< 0.5	Not Sampled	NA	NA	NA	NA	NA	< 3	NA	NA	NA
Bromodichloromethane	< 1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	< 25	< 25	< 10
Bromoform	< 1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	< 25	< 25	< 10
Bromomethane	< 1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	< 25	< 25	< 10
2-Butanone	2.2 J	< 1	< 1	< 1	Not Sampled	1,300	980	180	2,200	1,000	330	280	160	< 20
Carbon Disulfide	0.24 J	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	< 25	< 25	< 10
Carbon Tetrachloride	1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	< 25	< 25	< 10
Chlorobenzene	130	52	15	1	Not Sampled	440	240	79	640	640	270	270	640	350
Chloroethane	1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	350	< 25	< 10
Chloroform	< 1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	510	< 25	< 10
Chloromethane	< 1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	< 25	< 25	< 10
cis-1,2-Dichloroethene	72	91	35	7	Not Sampled	240	140	430	2,900	1,500	21,000	28,000	22,000	7,900
cis-1,3-Dichloropropene	1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	< 25	< 25	< 10
Dibromochloromethane	1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	< 25	< 25	< 10
1,2-Dichlorobenzene	41	3	1	< 0.5	Not Sampled	210	180	170	1,200	1,500	540	990	5,000	1,200
1,3-Dichlorobenzene	0.99 J	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	15	21	7	< 25	< 25	< 10
1,4-Dichlorobenzene	11	4	2	< 0.5	Not Sampled	< 100	< 25	17	100	140	48	49 J	230	51
1,1-Dichloroethane	4	3	2	1	Not Sampled	< 100	< 25	< 5	24	17	10	8,900	1,500	220
1,2-Dichloroethane	2.7	2	0.9 J	< 0.5	Not Sampled	< 100	< 25	< 5	17	8 J	4 J	770	240	65
1,1-Dichloroethene	2.5	1	0.6 J	< 0.5	Not Sampled	< 100	< 25	11	150	210	66	1,500	95	14 J
1,2-Dichloroethene, Total *	NA	NA	NA	NA	Not Sampled	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	< 25	< 25	< 10
1,4-Dioxane	2.8	0.4 J	0.5	< 25	Not Sampled	98	400	9.2	6 J	5.9	< 130	50	460	90
Ethylbenzene	19	2	0.6 J	< 0.5	Not Sampled	250	160	63	1,000	1,100	550	240	940	180
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	3	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	140	90	250	920	380	36
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	4.2	2	0.7 J	< 0.5	Not Sampled	< 100	< 25	8 J	330	340	83	410	220	26
2-Hexanone	5	< 1	< 1	< 1	Not Sampled	< 200	< 50	< 10	< 10	< 10	< 5	< 50	< 50	< 20
4-Methyl-2-pentanone	2.5 J	< 1	< 1	< 1	Not Sampled	< 200	67 J	32	130	80	16	370	890	< 20
Methylene Chloride	27	40	5	< 0.5	Not Sampled	190 J	210	< 5	750	220	< 3	14,000	240	< 10
Naphthalene	2.3 B	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	13	18	5 J	< 25	36 J	< 10
Styrene	1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	< 25	< 25	< 10
1,1,1,2-Tetrachloroethane	< 1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	< 25	< 25	< 10
1,1,2,2-Tetrachloroethane	< 1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	990	120	310
Tetrachloroethene	110	120	70	89	Not Sampled	110 J	47 J	34	4,100	3,900	12	6,800	1,900	61
Toluene	13	2	0.6 J	< 0.5	Not Sampled	160 J	80	38	1,400	1,000	660	4,300	3,900	730
trans-1,2-Dichloroethene	2.4	2	0.7 J	< 0.5	Not Sampled	< 100	< 25	6 J	130	97	68	150	85	19 J
trans-1,3-Dichloropropene	< 1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	< 25	< 25	< 10
1,2,3-Trichlorobenzene	1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	26 J	51	73	120	27	< 25	< 25	< 10
1,1,1-Trichloroethane	< 1	< 0.5	< 0.5	1	Not Sampled	< 100	< 25	< 5	< 5	< 5	4 J	41,000	530	160
1,1,2-Trichloroethane	< 1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	< 5	< 5	< 3	100	49 J	18 J
Trichloroethene	49	19	26	6	Not Sampled	< 100	< 25	64	1,300	1,300	7	1,900	220	63
1,2,4-Trimethylbenzene	0.44 J	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	16	21	11	< 25	60	12 J
1,3,5-Trimethylbenzene	1	< 0.5	< 0.5	< 0.5	Not Sampled	< 100	< 25	< 5	5 J	6 J	4 J	< 25	< 25	< 10
Vinyl Chloride	15	13	5	< 0.5	Not Sampled	< 100	< 25	< 5	72	52	25	950	1,700	310
Xylene (Total)	28	1	0.5 J	< 0.5	Not Sampled	380	240	110	1,400	1,500	870	1,700	5,000	700
Total VOCs	567	359	167	105	Not Sampled	3,378	2,770	1,310	18,161	14,929	24,882	115,659	46,905	12,562
Total VOC TIC	0	0	0	0	Not Sampled	0	0	0	0	0	0	0	0	0
Ethane	NA	NA	NA	NA	Not Sampled	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	NA	NA	NA	NA	Not Sampled	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	NA	NA	NA	NA	Not Sampled	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethanol	NA	NA	NA	NA	Not Sampled	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	Not Sampled	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Overburden Groundwater
from 2012 through January 2017
OU-1 - Spectron Superfund Site
Elkton, MD

Location ID	GWE-5	GWE-19	GWE-27	OW-1S	OW-1D	OW-2S	OW-2D	OW-3S	OW-4S	OW-4D	OW-5S	OW-5D	OW-6S	OW-6D
Sample Date	5/6/2015	5/7/2015	5/7/2015	11/19/2012	11/19/2012	11/20/2012	11/19/2012	11/19/2012	11/19/2012	11/19/2012	--	1/12/2017	11/16/2012	11/16/2012
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	--	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	--	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)														
Acetone	65 J	7 J	< 60	< 300	< 120	< 30	< 300	< 120	420	1,100	Abandoned	2,500	< 120	< 60
Benzene	180	52	140	300	60	88	320	230	760	5,800	Abandoned	23	5,400	7,500
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Abandoned	NA	NA	NA
Bromodichloromethane	< 5	< 0.5	< 5	< 50	< 20	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
Bromoform	< 5	< 0.5	< 5	< 50	< 20	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
Bromomethane	< 5	< 0.5	< 5	< 50	< 20	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
2-Butanone	< 30	< 3	< 30	< 150	< 60	< 15	250	< 60	< 150	370	Abandoned	570	73	< 30
Carbon Disulfide	< 10	< 1	< 10	< 50	< 20	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
Carbon Tetrachloride	< 5	< 0.5	< 5	< 50	< 20	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
Chlorobenzene	1,200	1,800	5,100	4,200	980	2,400	8,300	6,700	1,800	6,100	Abandoned	370	1,400	2,300
Chloroethane	10 J	< 0.5	27	< 50	< 20	17 J	340	< 20	< 50	< 100	Abandoned	< 1	150	2,400
Chloroform	6 J	< 0.5	< 5	85	< 16	28	47	50	230	1,300	Abandoned	< 1	130	18
Chloromethane	< 5	< 0.5	< 5	< 50	< 20	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
cis-1,2-Dichloroethene	18,000	3,500	990	43,000	9,900	14,000	39,000	30,000	33,000	76,000	Abandoned	350	12,000	6,600
cis-1,3-Dichloropropene	< 5	< 0.5	< 5	< 50	< 20	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
Dibromochloromethane	< 5	< 0.5	< 5	< 50	< 20	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
1,2-Dichlorobenzene	3,500	14	130	2,300	530	270	450	760	1,200	1,300	Abandoned	130	< 20	41
1,3-Dichlorobenzene	25 J	4 J	< 10	61	< 20	8 J	< 50	22	< 50	< 100	Abandoned	< 1	< 20	< 10
1,4-Dichlorobenzene	220	130	99	420	110	90	120	280	120	120	Abandoned	7	< 20	14
1,1-Dichloroethane	680	18	280	3,800	940	2,600	7,800	4,300	4,400	16,000	Abandoned	8	5,100	5,600
1,2-Dichloroethane	240	7	< 5	440	97	110	350	410	1,600	4,700	Abandoned	2	390	340
1,1-Dichloroethene	51	4	< 5	240	83	64	390	130	470	3,800	Abandoned	570	270	130
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Abandoned	NA	NA	NA
1,2-Dichloropropane	< 5	< 0.5	< 5	< 50	< 20	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
1,4-Dioxane	< 700	< 70	< 700	7.6	3.1	5.4	9.5	10	13	14	Abandoned	15	6.5	14
Ethylbenzene	1,200	300	280	4,100	560	750	1,600	2,000	2,800	3,400	Abandoned	130	20	130
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	550	26	1,400	8,900	3,100	1,900	9,400	4,900	19,000	37,000	Abandoned	14	510	740
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	170	15	91	410	160	280	1,000	410	290	340	Abandoned	240	270	740
2-Hexanone	< 30	< 3	< 30	< 150	< 60	< 15	< 150	< 60	< 150	< 300	Abandoned	17	< 60	< 30
4-Methyl-2-pentanone	40 J	< 3	< 30	< 150	< 60	< 15	< 150	< 60	500	540	Abandoned	110	< 60	< 30
Methylene Chloride	300	< 2	< 20	< 100	< 40	< 10	< 100	260	7,900	12,000	Abandoned	8	< 40	67
Naphthalene	12 J	11	< 10	< 50	< 20	11 J	< 50	51	< 50	< 100	Abandoned	4	< 20	< 10
Styrene	< 10	< 1	< 10	< 50	< 20	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
1,1,1,2-Tetrachloroethane	< 5	< 0.5	< 5	< 50	< 20	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
1,1,2,2-Tetrachloroethane	230	2	8 J	170	70	64	54	93	210	2,100	Abandoned	< 1	120	49
Tetrachloroethene	12,000	1,200	150	570	88	78	370	190	17,000	42,000	Abandoned	370	3,600	38
Toluene	4,600	230	280	4,900	430	450	6,000	3,000	6,000	18,000	Abandoned	820	870	1,100
trans-1,2-Dichloroethene	130	30	7 J	110	33	55	120	85	75	330	Abandoned	14	22	40
trans-1,3-Dichloropropene	< 5	< 0.5	< 5	< 50	< 20	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
1,2,3-Trichlorobenzene	< 10	< 1	< 10	96	24	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
1,1,1-Trichloroethane	840	16	1,200	14,000	3,400	3,700	7,900	9,100	47,000	100,000	Abandoned	< 1	8,200	1,700
1,1,2-Trichloroethane	29	< 0.5	< 5	< 40	< 16	9 J	< 40	< 16	< 40	110	Abandoned	< 1	150	66
Trichloroethene	2,600	630	43	860	100	64	59	160	8,000	22,000	Abandoned	710	820	20
1,2,4-Trimethylbenzene	91	30	< 10	< 50	< 20	5 J	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
1,3,5-Trimethylbenzene	19 J	13	< 10	< 50	< 20	< 5	< 50	< 20	< 50	< 100	Abandoned	< 1	< 20	< 10
Vinyl Chloride	1,500	300	240	2,400	980	1,400	3,800	2,600	870	730	Abandoned	16	4,000	3,800
Xylene (Total)	5,200	2,700	570	7,600	730	1,000	3,500	3,900	6,300	9,300	Abandoned	280	< 16	310
Total VOCs	71,753	14,562	12,032	98,970	22,378	29,446	91,180	69,641	159,538	363,354	Abandoned	4,778	43,502	33,757
Total VOC TIC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Abandoned	0	NA	NA
Ethane	NA	NA	NA	10	4	8.5	110	10	12	21	Abandoned	NA	3.7	15
Ethene	NA	NA	NA	480	230	390	1,100	750	110	150	Abandoned	NA	720	3,800
Methane	NA	NA	NA	55	35	55	160	100	45	43	Abandoned	NA	160	2,200
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Abandoned	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Abandoned	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Table G-3: Bedrock Groundwater Analytical Data, 2012 to 2017

Summary of VOC Analytical Data for Bedrock Groundwater
from 2012 through January 2017
OU-2 - Spectron Superfund Site
Elkton, MD

Location ID	AW-1	AW-2	AW-3S	AW-3S-DUP	AW-3S	AW-3S	AW-3S	AW-3S	AW-3S	AW-3S	AW-3S	AW-3S	AW-3S	AW-3S	VW-1
Sample Date	--	12/7/2012	12/6/2012	12/6/2012	11/21/2013	11/21/2013	2/27/2014	2/27/2014	5/23/2014	9/25/2014	9/25/2014	3/31/2015	6/2/2015	6/2/2015	12/6/2012
Sample Type	--	Grab	Grab	Grab	Grab	Duplicate	Grab	Duplicate	Grab	Grab	Duplicate	Grab	Grab	Duplicate	Grab
Sample Matrix	--	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)															
Acetone	Not Sampled	< 300	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	Not Sampled	72	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzyl Chloride	Not Sampled	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Bromoform	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Bromomethane	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
2-Butanone	Not Sampled	< 150	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1J	< 1J	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1J	< 1J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Chlorobenzene	Not Sampled	490	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	4
Chloroethane	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Chloroform	Not Sampled	60	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
Chloromethane	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
cis-1,2-Dichloroethene	Not Sampled	620	1	1	1 J	1 J	0.8 J	0.8 J	0.8 J	1	1	< 0.5	< 0.5	< 0.5	10
cis-1,3-Dichloropropene	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Dibromochloromethane	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1J	< 1J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,2-Dichlorobenzene	Not Sampled	220	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	Not Sampled	1,100	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,2-Dichloroethane	Not Sampled	10,000	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,1-Dichloroethene	Not Sampled	500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
1,2-Dichloroethene, Total *	Not Sampled	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,4-Dioxane	Not Sampled	0.6	< 0.20	< 0.20	< 0.5	< 0.5	< 0.5J	< 70	< 70	< 0.5	< 70	< 70	< 0.2	< 0.2	< 0.20
Ethylbenzene	Not Sampled	260	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	Not Sampled	4,000	< 2	< 2	< 2	< 2	< 2J	< 2J	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	Not Sampled	< 100	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
2-Hexanone	Not Sampled	< 150	< 3	< 3	< 3	< 3	< 3J	< 3J	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	Not Sampled	1,700	< 3	< 3	< 3	< 3	< 3J	< 3J	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	Not Sampled	140,000	< 2	3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Naphthalene	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-Tetrachloroethane	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,1,2,2-Tetrachloroethane	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	11
Tetrachloroethene	Not Sampled	4,700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	7
Toluene	Not Sampled	570	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.7
trans-1,2-Dichloroethene	Not Sampled	< 40	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.9
trans-1,3-Dichloropropene	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,2,3-Trichlorobenzene	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	Not Sampled	8,700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
1,1,2-Trichloroethane	Not Sampled	< 40	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
Trichloroethene	Not Sampled	1,200	5	5	6	6	3 J	3 J	2	4	4	1	1	1	20
1,2,4-Trimethylbenzene	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-Trimethylbenzene	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	Not Sampled	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Xylene (Total)	Not Sampled	460	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
Total VOCs	Not Sampled	174,653	6	9	7	7	3.8	3.8	2.8	5	5	1	1	1	52.9
Total VOC TIC	Not Sampled	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	NA
Ethane	Not Sampled	1.2	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0
Ethene	Not Sampled	22	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0
Methane	Not Sampled	13	20	20	110	120	66 J	65 J	50	32	34	34	48	49	38
Ethanol	Not Sampled	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	Not Sampled	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/L)
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Angled well AW-1 has not been sampled because of the presence of DNAPL. There has been an automated DNAPL recovery system installed in AW-1 since November 2014

Summary of VOC Analytical Data for Bedrock Groundwater
from 2012 through January 2017
OU-2 - Spectron Superfund Site
Elkton, MD

Location ID	VW-1	VW-1	VW-1	VW-1	VW-1	VW-1	VW-2R	VW-3	VW-4	VW-4	VW-4	VW-4	VW-4	VW-4	VW-4
Sample Date	11/21/2013	2/27/2014	5/22/2014	9/25/2014	3/31/2015	6/2/2015	11/19/2012	12/7/2012	12/6/2012	11/21/2013	2/28/2014	5/23/2014	9/26/2014	3/31/2015	6/3/2015
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)															
Acetone	< 6	< 6	< 6	< 6	< 6	< 6	< 120	< 30	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	160	8	7	11	5	1 J	4	5	9
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 5	< 1	< 1	< 1	< 0.5	< 0.5J	< 0.5	< 0.5
2-Butanone	< 3	< 3	< 3	< 3	< 3	< 3	< 60	< 15	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	< 1	< 1J	< 1	< 1	< 1	< 1	< 20	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	< 1	< 1J	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 5	< 1	< 1	< 1J	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene	4 J	9	12	12	18	0.9 J	2,000	1,700	50	82	38	6	24	29	53
Chloroethane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	77	8	100	90	53	3	30 J	36	110
Chloroform	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	23	< 4	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	21	< 5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,2-Dichloroethene	11	3 J	3	6	4	15	1,800	11,000	35	49 L	12	4	13	8	37
cis-1,3-Dichloropropene	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	< 1	< 1J	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 5	< 1	< 1	< 1J	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	310	540	120	190	90	17 J	57 J	68	120
1,3-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 20	5	1	2 J	< 1	< 1	< 1	< 1	1 J
1,4-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	69	85	10	17 L	8	2 J	5	6	10
1,1-Dichloroethane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	8,400	71	300	350	150	33	110 J	98	210
1,2-Dichloroethane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	1,500	< 5	120	210	71	12	63 J	52	160
1,1-Dichloroethene	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	170	99	3	4 J	1 J	< 0.5	1	0.8 J	3
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
1,4-Dioxane	< 0.5	< 0.5J	< 70	< 0.5	< 70	< 0.2	5.5	< 0.20	2.4	5.3	2.9 J	< 70	2.1	< 70	3.5
Ethylbenzene	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	470	220	43	74 L	32	4	19	25	44
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	< 2	< 2J	< 2	< 2	< 2	< 2	270	400	8	17	7 J	< 2	6 J	5 J	12
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	< 2	< 2	< 2	< 2	< 2	< 2	3,100	48	56	79 L	34	6	21 J	28	49
2-Hexanone	< 3	< 3J	< 3	< 3	< 3	< 3	< 60	< 15	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	< 3	< 3J	< 3	< 3	< 3	< 3	880	< 15	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	< 2	< 2	< 2	< 2	< 2	< 2	51,000	< 10	6	260	49	< 2	100 J	43	560
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 20	21	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 20	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-Tetrachloroethane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	19	23	36	27	37	1	< 20	< 5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene	14	16	17	25	30	6	160	32	3	5	2 J	0.6 J	2	1	6
Toluene	< 0.7	< 0.7	< 0.5	< 0.5	< 0.5	< 0.5	1,200	17	22	74 L	20	3	28 J	19	51
trans-1,2-Dichloroethene	1 J	< 0.8	< 0.5	0.6 J	< 0.5	3	35	44	5	7	4 J	0.6 J	2	3	5
trans-1,3-Dichloropropene	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
1,2,3-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 20	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	370	3,000	17	20 L	7	0.7 J	4	4	8
1,1,2-Trichloroethane	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 16	< 4	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene	40	44	52	60	74	17	130	250	8	9	3 J	1	3	2	7
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 20	48	3	4 J	2 J	< 1	1 J	2 J	3 J
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 20	12	< 1	1 J	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	4,700	210	29	57 L	13	2	16	11	46
Xylene (Total)	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	790	210	88	170 L	63	8	42	47	95
Total VOCs	89	95	120	130.6	163	42.9	77,641	18,028	1,036	1,787	666.9	103.9	553.1	492.8	1,603
Total VOC TIC	0	0	0	0	0	5 J	NA	NA	NA	358	74	0	40	99 J	270 J
Ethane	< 1	< 1	1.1	< 1	1.8 J	< 1	28	1.6	< 1.0	1 K	< 1	< 1	< 1	< 1	< 1
Ethene	< 1	< 1	< 1	< 1	< 1	< 1	1,600	39	640	920 K	350	34 J	260	320	630
Methane	53	42 J	54	60	85	240	820	41	620	770 K	340 J	110	270	330	650
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Bedrock Groundwater
from 2012 through January 2017
OU-2 - Spectron Superfund Site
Elkton, MD

Location ID	VW-5D	VW-5D	VW-5D	VW-5D	VW-5I	VW-5I	VW-5I	VW-5I	VW-5I	VW-5I	VW-5I	VW-5S	VW-5S	VW-5S	VW-5S
Sample Date	12/7/2012	11/19/2013	2/26/2014	5/22/2014	12/4/2012	11/22/2013	2/28/2014	5/20/2014	9/25/2014	4/1/2015	6/2/2015	12/5/2012	11/21/2013	2/28/2014	5/27/2014
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)															
Acetone	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5 J
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
Bromoform	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
Bromomethane	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
2-Butanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	< 1	< 1	< 1J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	< 1	< 1	< 1J	< 0.5	< 1	< 1	< 1J	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1J	< 0.5
Chlorobenzene	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	1	1 J	2 J	2
Chloroethane	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	0.6 J
Chloroform	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
Chloromethane	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
cis-1,2-Dichloroethene	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	1 J	1
cis-1,3-Dichloropropene	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
Dibromochloromethane	< 1	< 1	< 1J	< 0.5	< 1	< 1	< 1J	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1J	< 0.5
1,2-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2	2 J	2 J	3 J
1,3-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	< 1	< 1	< 1	< 0.5	5	4 J	4 J	3	3	3	3	120	97	140	120
1,2-Dichloroethane	< 1	< 1	< 1	< 0.5	1	1 J	2 J	2	2	2	2	19	16	22	21
1,1-Dichloroethene	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
1,4-Dioxane	< 0.20	< 70	< 70	< 70	< 0.20	< 0.5	< 70	< 70	< 0.5	< 70	< 0.2	2.8	5.8	< 70	< 70
Ethylbenzene	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	1 J	2
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	< 2	< 2	< 2J	< 2	< 2	< 2	< 2J	< 2	< 2	< 2	< 2	< 2	< 2	< 2J	< 2
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	7	5	9	10
2-Hexanone	< 3	< 3	< 3J	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	< 3	< 3	< 3J	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2 J	< 2	< 2	< 2	< 2	< 2	< 2
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-Tetrachloroethane	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
1,1,2,2-Tetrachloroethane	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
Tetrachloroethene	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
Toluene	< 0.7	< 0.7	< 0.7	< 0.5	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.7	< 0.7	< 0.7	< 0.5
trans-1,2-Dichloroethene	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
trans-1,3-Dichloropropene	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
1,2,3-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
1,1,2-Trichloroethane	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
Trichloroethene	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	0.7 J
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	0.7 J
Xylene (Total)	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	1 J	2
Total VOCs	0	0	0	0	6	5	6	5	7	5	5	151.8	126.8	178	163.5
Total VOC TIC	NA	0	0	0	NA	0	0	0	0	0	0	NA	6	0	0
Ethane	< 1.0	< 1	< 1	< 1	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1	< 1	< 1
Ethene	< 1.0	< 1	< 1	< 1	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	38	26	46	48
Methane	< 3.0	< 3	< 3J	< 3	4.8	5.7	3.4 J	< 3	9.5	4.1 J	< 3	91	35	48 J	33
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Bedrock Groundwater
from 2012 through January 2017
OU-2 - Spectron Superfund Site
Elkton, MD

Location ID	VW-5S	VW-5S	VW-5S	VW-6D	VW-6S	VW-7D	VW-7S	VW-8D	VW-8DD	VW-8DD-DUP	VW-9D	VW-9S	VW-10	VW-11D	VW-11S
Sample Date	9/26/2014	3/31/2015	6/2/2015	12/5/2012	12/3/2012	12/4/2012	12/4/2012	12/5/2012	12/6/2012	12/6/2012	12/6/2012	12/5/2012	12/7/2012	12/6/2012	12/4/2012
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)															
Acetone	< 6	< 6	< 6	< 6	7	< 6	< 6	< 6	960	1,500	< 6000	32	51	< 60	< 6
Benzene	< 0.5	0.8 J	0.7 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	59	73	550	8	6	21	< 0.5
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
Bromoform	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
Bromomethane	< 0.5J	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
2-Butanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	170	210	< 3000	9	46	< 30	< 3
Carbon Disulfide	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
Carbon Tetrachloride	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
Chlorobenzene	3	4	4	< 0.8	< 0.8	< 0.8	< 0.8	2	61	71	1,500	17	390	660	< 0.8
Chloroethane	0.6 J	0.7 J	2	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	3	130	< 10	< 1
Chloroform	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 16	< 16	1,500	< 2	6	< 8	2
Chloromethane	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
cis-1,2-Dichloroethene	1	1	1	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	110	130	3,300	110	8,200	6,200	2
cis-1,3-Dichloropropene	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
Dibromochloromethane	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
1,2-Dichlorobenzene	3 J	4 J	5	< 1	< 1	< 1	< 1	3	< 20	< 20	1,500	10	1,200	< 10	< 1
1,3-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	10	< 10	< 1
1,4-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	100	< 10	< 1
1,1-Dichloroethane	120	120	140	< 1	< 1	< 1	< 1	65	1,800	2,300	18,000	600	4,500	56	< 1
1,2-Dichloroethane	19	21	21	< 1	1	< 1	< 1	< 1	23,000	24,000	170,000	1,600	770	110	< 1
1,1-Dichloroethene	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	71	100	6,300	33	480	21	< 0.8
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
1,4-Dioxane	63	< 70	6.8	< 0.20	< 0.20	< 0.20	< 0.21	< 0.20	2.8	2.5	3.1	< 0.21	6.4	< 0.20	< 0.20
Ethylbenzene	1	2	2	< 0.8	< 0.8	< 0.8	< 0.8	1	< 16	< 16	1,000	8	400	< 8	< 0.8
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	41	68	9,100	< 4	290	< 20	< 2
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	12	15	20	< 2	< 2	< 2	< 2	3	< 40	< 40	< 2000	81	70	< 20	< 2
2-Hexanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 60	< 60	< 3000	< 6	< 15	< 30	< 3
4-Methyl-2-pentanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	6,800	8,100	43,000	230	54	< 30	< 3
Methylene Chloride	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	320,000	340,000	3,400,000	260	110	38	< 2
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
1,1,1,2-Tetrachloroethane	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
1,1,2,2-Tetrachloroethane	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	53	240	< 1
Tetrachloroethene	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	110	150	31,000	160	510	< 8	< 0.8
Toluene	< 0.5	< 0.5	0.9 J	12	< 0.7	< 0.7	< 0.7	61	120	150	20,000	110	3,600	49	< 0.7
trans-1,2-Dichloroethene	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 16	< 16	< 800	< 2	32	430	< 0.8
trans-1,3-Dichloropropene	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
1,2,3-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	< 5	< 10	< 1
1,1,1-Trichloroethane	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	0.8	53	72	190,000	< 2	6,900	< 8	< 0.8
1,1,2-Trichloroethane	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 16	< 16	< 800	< 2	21	24	< 0.8
Trichloroethene	0.6 J	0.8 J	0.6 J	< 1	< 1	< 1	< 1	< 1	200	270	65,000	120	160	28	< 1
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	35	< 10	< 1
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 20	< 20	< 1000	< 2	11	< 10	< 1
Vinyl Chloride	0.6 J	0.8 J	0.9 J	< 1	< 1	< 1	< 1	< 1	660	940	< 1000	5	1,300	590	< 1
Xylene (Total)	3	4	4	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	23	20	2,400	24	1,500	< 8	< 0.8
Total VOCs	170.1	174.1	208.9	12	1	0	0	135.8	353,281	376,657	3,964,153	3,388	30,890	8,467	4
Total VOC TIC	0	32 J	56 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	< 1	< 1	< 1	< 1.0	2.5	< 1.0	2.4	< 1.0	< 1.0	< 1.0	28	2	< 1.0	< 1.0	< 1.0
Ethene	91	97	120	8	23	4	2	54	13	13	230	98	760	24	< 1.0
Methane	73	100	130	280	9,000	5	8,000	22	12	12	210	13	120	< 3.0	< 3.0
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Bedrock Groundwater
from 2012 through January 2017
OU-2 - Spectron Superfund Site
Elkton, MD

Location ID	VW-12D	VW-12D	VW-12D	VW-12D	VW-12D	VW-12S	VW-13D	VW-13S	VW-14D	VW-14S	VW-15	VW-15	VW-15	VW-15	VW-15
Sample Date	12/3/2012	11/20/2013	2/28/2014	5/23/2014	5/23/2014	12/3/2012	12/6/2012	12/3/2012	12/4/2012	12/4/2012	12/5/2012	11/22/2013	2/27/2014	5/28/2014	9/26/2014
Sample Type	Grab	Grab	Grab	Duplicate	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)															
Acetone	< 6	< 6	< 6	< 6	< 6	< 6	1,400	< 6	< 6	< 6	86	71	48	160	26
Benzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	530	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Bromoform	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Bromomethane	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5J
2-Butanone	< 3	< 3	< 3	< 3	< 3	< 3	320	< 3	< 3	< 3	7	7 J	7 J	5 J	< 3
Carbon Disulfide	< 1	< 1	< 1	< 1	< 1	< 1	< 50	< 1	< 1	< 1	5	8	4 J	< 1	6
Carbon Tetrachloride	< 1	< 1	< 1J	< 0.5	< 0.5	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1J	< 0.5	< 0.5
Chlorobenzene	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	860	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Chloroethane	< 1	< 1	< 1	< 0.5	< 0.5	< 1	62	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Chloroform	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	210	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Chloromethane	< 1	< 1	< 1	< 0.5	< 0.5	< 1	57	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
cis-1,2-Dichloroethene	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	660	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
cis-1,3-Dichloropropene	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Dibromochloromethane	< 1	< 1	< 1J	< 0.5	< 0.5	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1J	< 0.5	< 0.5
1,2-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	150	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	< 1	< 1	< 1	< 0.5	< 0.5	< 1	15,000	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,2-Dichloroethane	< 1	< 1	< 1	< 0.5	< 0.5	< 1	90,000	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,1-Dichloroethene	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	2,500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,4-Dioxane	< 0.20	< 70	< 70	< 70	< 70	< 0.20	5.3	< 0.20	< 0.20	< 0.20	< 0.20	< 0.5	< 70	< 70	< 70
Ethylbenzene	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	390	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	< 2	< 2	< 2J	< 2	< 2	< 2	11,000	< 2	< 2	< 2	< 2	< 2	< 2J	< 2	< 2
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	< 2	< 2	< 2	< 2	< 2	< 2	1,100	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
2-Hexanone	< 3	< 3	< 3	< 3	< 3	< 3	< 150	< 3	< 3	< 3	< 3	< 3	< 3J	< 3	< 3
4-Methyl-2-pentanone	< 3	< 3	< 3	< 3	< 3	< 3	23,000	< 3	< 3	< 3	< 3	< 3	< 3J	< 3	< 3
Methylene Chloride	< 2	< 2	< 2	< 2	< 2	< 2	1,600,000	< 2	< 2	< 2	3	3 J	3 J	< 2	2 J
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-Tetrachloroethane	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Tetrachloroethene	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	4,200	< 0.8	< 0.8	1	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Toluene	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	< 0.7	1,600	< 0.7	< 0.7	< 0.7	19	16	6	0.7 J	2
trans-1,2-Dichloroethene	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 40	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
trans-1,3-Dichloropropene	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,2,3-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	8,100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
1,1,2-Trichloroethane	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	56	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Trichloroethene	< 1	< 1	< 1	< 0.5	< 0.5	< 1	4,200	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	< 1	< 1	< 1	< 0.5	< 0.5	< 1	220	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Xylene (Total)	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	680	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Total VOCs	0	0	0	0	0	0	1,764,900	0	0	1	34	34	20	5.7	10
Total VOC TIC	NA	0	0	0	0	NA	NA	NA	NA	NA	NA	401	222	0	76
Ethane	< 1.0	< 1	< 1	< 1	< 1	< 1.0	31	< 1.0	< 2.2	< 1.0	2.7	5.7	4.8 J	< 1	3.7 J
Ethene	< 1.0	< 1	< 1	< 1	< 1	< 1.0	270	< 1.0	1	< 1.0	17	22	20	2.4 J	20
Methane	< 3.0	< 3	< 3J	< 3	< 3	< 3.0	210	< 3.0	8,600	210	170	400	420 J	49	350
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Bedrock Groundwater
from 2012 through January 2017
OU-2 - Spectron Superfund Site
Elkton, MD

Location ID	VW-15	VW-15	VW-16 Zone 1	VW-16 Zone 2	VW-16 Zone 3	VW-16 Zone 4	VW-17 Zone 1	VW-17_Zone_1	VW-17_Zone_1	VW-17_Zone_1	VW-17_Zone_1	VW-17_Zone_1	VW-17_Zone_1	VW-17_Zone_1	VW-17 Zone 2
Sample Date	4/1/2015	6/3/2015	11/26/2012	11/26/2012	11/26/2012	11/26/2012	11/28/2012	11/19/2013	2/25/2014	5/23/2014	5/23/2014	9/24/2014	3/30/2015	6/1/2015	11/28/2012
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Duplicate	Grab	Grab	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)															
Acetone	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Bromoform	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Bromomethane	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5J	< 0.5	< 0.5	< 1
2-Butanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	2 J	5 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Chlorobenzene	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
Chloroethane	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2
Chloroform	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
Chloromethane	< 0.5	0.6 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
cis-1,2-Dichloroethene	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
cis-1,3-Dichloropropene	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Dibromochloromethane	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,2-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,2-Dichloroethane	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	0.8 J	< 0.5	< 0.5	10
1,1-Dichloroethene	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,4-Dioxane	< 70	0.3 J	< 0.21	< 0.22	< 0.21	< 0.21	< 0.21	< 0.5	< 70	< 70	< 70	< 70J	< 70	< 70	< 0.21
Ethylbenzene	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
2-Hexanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3J	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3J	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-Tetrachloroethane	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,1,2,2-Tetrachloroethane	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Tetrachloroethene	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
Toluene	0.9 J	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.7
trans-1,2-Dichloroethene	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
trans-1,3-Dichloropropene	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,2,3-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
1,1,2-Trichloroethane	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
Trichloroethene	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Xylene (Total)	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
Total VOCs	2.9	6.9	0	0	0	0	0	0	0	0	0	0.8	0	0	13
Total VOC TIC	10 J	30 J	NA	NA	NA	NA	NA	0	0	0	0	0	0	0	NA
Ethane	2.6 J	2 J	< 1.0	< 1.0	< 1.0	4.2	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0
Ethene	16	14	< 1.0	< 1.0	< 1.0	2	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2
Methane	240	190	16	11	13	440	43	150	40 J	19	23	850	180	880	230
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Bedrock Groundwater
from 2012 through January 2017
OU-2 - Spectron Superfund Site
Elkton, MD

Location ID	VW-17_Zone_2	VW-17_Zone_2	VW-17_Zone_2	VW-17_Zone_2	VW-17_Zone_2	VW-17_Zone_2	VW-17_Zone_2	VW-17 Zone 3	VW-17_Zone_3	VW-17_Zone_3	VW-17_Zone_3	VW-17_Zone_3	VW-17_Zone_3	VW-17_Zone_3	VW-17_Zone_3
Sample Date	11/18/2013	2/25/2014	5/23/2014	9/24/2014	3/30/2015	6/1/2015	6/1/2015	11/28/2012	11/19/2013	11/19/2013	2/25/2014	2/25/2014	5/23/2014	9/24/2014	9/24/2014
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Duplicate	Grab	Duplicate	Grab	Duplicate	Grab	Grab	Duplicate	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)															
Acetone	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2	1 J	1 J	2 J	2 J	2	1	1
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
Bromoform	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
Bromomethane	< 1	< 1	< 0.5	< 0.5J	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5J	< 0.5J
2-Butanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	< 1	< 1	< 1	3 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2 J
Carbon Tetrachloride	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
Chlorobenzene	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	4	3 J	3 J	4 J	4 J	3	3	3
Chloroethane	4 J	2 J	3	3	3	4	4	< 1	< 1	< 1	< 1	< 1	< 0.5	0.8 J	0.7 J
Chloroform	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5
Chloromethane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
cis-1,2-Dichloroethene	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	3	2 J	3 J	4 J	3 J	3	3	3
cis-1,3-Dichloropropene	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
Dibromochloromethane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
1,2-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	< 1	1 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	46	43	44	57	54	52	45	43
1,2-Dichloroethane	10	12	10	8	11	10	9	120	110	110	130	130	120	98	95
1,1-Dichloroethene	< 0.8	< 0.8	0.7 J	< 0.5	< 0.5	0.6 J	< 0.5	13	16	16	23	18	20	17	15
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
1,4-Dioxane	< 0.5	< 0.5J	< 70	< 0.5	< 70	0.2 J	< 70	< 0.21	< 0.5	< 0.5	< 70	< 70	< 70	< 70J	< 0.5
Ethylbenzene	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2	1 J	1 J	2 J	2 J	1	1	1
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	< 2	< 2	< 2	< 2	< 2	< 2	< 2	9	13	14	18	13	16	13	12
2-Hexanone	< 3	< 3J	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3J	< 3J	< 3	< 3	< 3
4-Methyl-2-pentanone	< 3	< 3J	3 J	< 3	< 3	< 3	< 3	21	17	17	22 J	22 J	27	21	21
Methylene Chloride	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-Tetrachloroethane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
Tetrachloroethene	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5
Toluene	< 0.7	< 0.7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	< 0.5
trans-1,2-Dichloroethene	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2	3 J	3 J	4 J	4 J	3	3	3
trans-1,3-Dichloropropene	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
1,2,3-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5
Trichloroethene	1 J	2 J	1	1	1	1	1	51	42	43	59	53	49	43	40
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
Xylene (Total)	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5
Total VOCs	15	17	17.7	15	15	15.8	14	273	251	255	325	305	296	248.8	239.7
Total VOC TIC	10	12	34	10	15 J	17 J	110 J	NA	1,568	46	39	36	0	28	22
Ethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Ethene	4.2 J	1.4 J	2.1 J	3.4 J	4.1 J	5	1.7 J	1	4 J	4 J	3.7 J	2 J	6	4.5 J	4.1 J
Methane	580	150 J	230	410	420	150	170	230	700	660	530 J	310	1,400	1200 J	690 J
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Bedrock Groundwater
from 2012 through January 2017
OU-2 - Spectron Superfund Site
Elkton, MD

Location ID	VW-17_Zone_3	VW-17_Zone_3	VW-17_Zone_3	VW-17 Zone 4	VW-17_Zone_4	VW-17_Zone_4	VW-17_Zone_4	VW-17_Zone_4	VW-17_Zone_4	VW-17_Zone_4	VW-17 Zone 5	VW-17_Zone_5	VW-17_Zone_5	VW-17_Zone_5	VW-17_Zone_5
Sample Date	3/30/2015	3/30/2015	6/1/2015	11/28/2012	11/18/2013	2/25/2014	5/22/2014	9/24/2014	3/30/2015	6/1/2015	11/28/2012	11/18/2013	2/25/2014	5/22/2014	9/24/2014
Sample Type	Grab	Duplicate	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)															
Acetone	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	1	1	2	2	2 J	2 J	2	2	2	2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5
Bromoform	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5
Bromomethane	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5J	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5J
2-Butanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5
Chlorobenzene	3	3	3	7	9	8	8	8	9	9	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Chloroethane	< 0.5	< 0.5	0.8 J	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5
Chloroform	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Chloromethane	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5
cis-1,2-Dichloroethene	3	3	4	4	4 J	3 J	4	3	4	4	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
cis-1,3-Dichloropropene	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5
Dibromochloromethane	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5
1,2-Dichlorobenzene	< 1	< 1	< 1	2	2 J	2 J	2	2 J	2 J	2 J	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	46	38	57	61	73	57	73	63	71	73	< 1	1 J	3 J	3	4
1,2-Dichloroethane	130	120	120	140	140	130	140	110	160	140	4	5 J	8	8	9
1,1-Dichloroethene	12	10	22	15	25	13	20	18	15	23	< 0.8	< 0.8	1 J	0.7	1
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5
1,4-Dioxane	< 70	< 70	< 0.2	< 0.21	< 0.5	< 70	< 70	< 0.5	< 70	< 0.2	< 0.21	< 0.5	< 70	< 70	< 0.5
Ethylbenzene	1	1 J	2	4	4 J	3 J	4	4	4	5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	9	8	19	12	23	10	17	17	14	23	< 2	< 2	< 2	< 2	< 2
2-Hexanone	< 3	< 3	< 3	< 3	< 3	< 3J	< 3	< 3	< 3	< 3	< 3	< 3	< 3J	< 3	< 3
4-Methyl-2-pentanone	22	21	25	28	21	22 J	29	24	26	29	< 3	< 3	< 3J	< 3	< 3
Methylene Chloride	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-Tetrachloroethane	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5
Tetrachloroethene	< 0.5	< 0.5	< 0.5	2	< 0.8	< 0.8	< 0.5	0.5 J	< 0.5	0.6 J	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Toluene	< 0.5	< 0.5	< 0.5	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5
trans-1,2-Dichloroethene	3	3	5	2	3 J	3 J	3	2	2	3	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
trans-1,3-Dichloropropene	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5
1,2,3-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	1	< 0.8	< 0.8	< 0.5	< 0.5
1,1,2-Trichloroethane	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Trichloroethene	40	33	56	72	90	64	84	71	74	82	2	3 J	4 J	3	5
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	< 0.5	< 0.5	0.5 J	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	0.6 J	< 1	< 1	< 1	< 0.5	< 0.5
Xylene (Total)	< 0.5	< 0.5	< 0.5	3	2 J	2 J	2	2	2	2	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Total VOCs	270	241	316.3	354	398	319	388	327.5	385	398.2	7	9	16	14.7	19
Total VOC TIC	17 J	16 J	23 J	NA	48	22	0	30	21 J	25 J	NA	0	0	0	0
Ethane	< 1	< 1	2.4 J	< 1.0	< 1	< 1	< 1	< 1	< 1	1.3 J	< 1.0	1.3 J	< 1	1.3	1.1 J
Ethene	1.6 J	2.5 J	4.3 J	< 1.0	2.1 J	< 1	2	1.5 J	1.6 J	1.5 J	< 1.0	2.1 J	1.2 J	2	1.6 J
Methane	300	470	760	220	930	160 J	1,400	760	690	410	1,800	5,700	4200 J	4,600	4,400
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Bedrock Groundwater
from 2012 through January 2017
OU-2 - Spectron Superfund Site
Elkton, MD

Location ID	VW-17_Zone_5	VW-17_Zone_5	VW-17 Zone 6	VW-17_Zone_6	VW-17_Zone_6	VW-17_Zone_6	VW-17_Zone_6	VW-17_Zone_6	VW-17_Zone_6	VW-18	VW-19 Zone 1	VW-19 Zone 2	VW-20 Zone 1	VW-20 Zone 2	VW-21 Zone 1
Sample Date	3/30/2015	6/1/2015	11/28/2012	11/18/2013	2/25/2014	5/22/2014	9/24/2014	3/30/2015	6/1/2015	---	11/27/2012	11/27/2012	11/26/2012	11/26/2012	11/27/2012
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	---	Grab	Grab	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	---	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)															
Acetone	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	Not Sampled	18	< 6000	< 6	< 6	< 6
Benzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	7	2,100	< 0.5	< 0.5	< 0.5
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Sampled	NA	NA	NA	NA	NA
Bromodichloromethane	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	< 2	< 1000	< 1	< 1	< 1
Bromoform	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	< 2	< 1000	< 1	< 1	< 1
Bromomethane	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5J	< 0.5	< 0.5	Not Sampled	< 2	< 1000	< 1	< 1	< 1
2-Butanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	Not Sampled	9	< 3000	< 3	< 3	< 3
Carbon Disulfide	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	Not Sampled	< 2	< 1000	< 1	< 1	< 1
Carbon Tetrachloride	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	< 2	< 1000	< 1	< 1	< 1
Chlorobenzene	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	23	6,700	< 0.8	< 0.8	< 0.8
Chloroethane	< 0.5	< 0.5	3	3 J	3 J	2	2	2	2	Not Sampled	< 2	< 1000	< 1	< 1	< 1
Chloroform	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	8	2,600	< 0.8	< 0.8	< 0.8
Chloromethane	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	< 2	< 1000	< 1	< 1	< 1
cis-1,2-Dichloroethene	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	27	3,600	< 0.8	1	< 0.8
cis-1,3-Dichloropropene	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	< 2	< 1000	< 1	< 1	< 1
Dibromochloromethane	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	< 2	< 1000	< 1	< 1	< 1
1,2-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	Not Sampled	4	< 1000	< 1	< 1	< 1
1,3-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	Not Sampled	< 2	< 1000	< 1	< 1	< 1
1,4-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	Not Sampled	< 2	< 1000	< 1	< 1	< 1
1,1-Dichloroethane	2	5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	49	10,000	< 1	< 1	< 1
1,2-Dichloroethane	7	9	4	3 J	3 J	3	2	3	3	Not Sampled	270	86,000	< 1	< 1	< 1
1,1-Dichloroethene	0.6 J	2	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	54	5,500	< 0.8	< 0.8	< 0.8
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	< 2	< 1000	< 1	< 1	< 1
1,4-Dioxane	< 70	< 0.2	< 0.21	< 0.5	< 70	< 70	< 0.5	< 70	< 0.2	Not Sampled	< 0.20	8.3	< 0.21	< 0.21	< 0.20
Ethylbenzene	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	9	1,700	< 0.8	< 0.8	< 0.8
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	Not Sampled	71	31,000	< 2	< 2	< 2
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	Not Sampled	< 4	< 2000	< 2	< 2	< 2
2-Hexanone	< 3	< 3	< 3	< 3	< 3J	< 3	< 3	< 3	< 3	Not Sampled	< 6	< 3000	< 3	< 3	< 3
4-Methyl-2-pentanone	< 3	< 3	< 3	< 3	< 3J	< 3	< 3	< 3	< 3	Not Sampled	94	19,000	< 3	< 3	< 3
Methylene Chloride	< 2	< 2	9	< 2	< 2	< 2	< 2	< 2	< 2	Not Sampled	5,000	1,800,000	< 2	< 2	< 2
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	Not Sampled	< 2	< 1000	< 1	< 1	< 1
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	Not Sampled	< 2	< 1000	< 1	< 1	< 1
1,1,1,2-Tetrachloroethane	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	< 2	< 1000	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	13	3,300	< 1	< 1	< 1
Tetrachloroethene	< 0.5	< 0.5	3	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	240	42,000	< 0.8	< 0.8	< 0.8
Toluene	< 0.5	< 0.5	1	< 0.7	< 0.7	< 0.5	< 0.5	< 0.5	0.6 J	Not Sampled	94	22,000	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	< 2	< 800	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	< 2	< 1000	< 1	< 1	< 1
1,2,3-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	Not Sampled	< 2	< 1000	< 1	< 1	< 1
1,1,1-Trichloroethane	< 0.5	< 0.5	8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	1,100	220,000	< 0.8	< 0.8	< 0.8
1,1,2-Trichloroethane	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	< 2	< 800	< 0.8	< 0.8	< 0.8
Trichloroethene	3	5	2	< 1	< 1	0.7	0.7 J	0.7 J	0.6 J	Not Sampled	140	36,000	< 1	4	< 1
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	Not Sampled	< 2	< 1000	< 1	< 1	< 1
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	Not Sampled	< 2	< 1000	< 1	< 1	< 1
Vinyl Chloride	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	< 2	< 1000	< 1	< 1	< 1
Xylene (Total)	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	Not Sampled	19	3,000	< 0.8	< 0.8	< 0.8
Total VOCs	12.6	21	29.8	6	6	5.7	4.7	5.7	6.2	Not Sampled	7,231	2,294,508	0	5	0
Total VOC TIC	0	7 J	NA	0	0	0	0	15 J	130 J	Not Sampled	NA	NA	NA	NA	NA
Ethane	< 1	< 1	4.4	2 J	1.8 J	2.5	6.6	< 1	< 1	Not Sampled	1.4	13	< 1.0	< 1.0	< 1.0
Ethene	2.6 J	1.6 J	2	1.7 J	1.5 J	1	2.4 J	6	4.9 J	Not Sampled	1	96	< 1.0	< 1.0	< 1.0
Methane	4,400	2,400	12,000	9,100	8700 J	6,600	27,000	20,000	15,000	Not Sampled	< 3.0	65	8.1	58	67
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Sampled	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Sampled	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Bedrock Groundwater
from 2012 through January 2017
OU-2 - Spectron Superfund Site
Elkton, MD

Location ID	VW-21_Zone_1	VW-21_Zone_1	VW-21_Zone_1	VW-21 Zone 2	VW-21_Zone_2	VW-21_Zone_2	VW-21_Zone_2	VW-21 Zone 3	VW-21_Zone_3	VW-21_Zone_3	VW-21_Zone_3	VW-21 Zone 4	VW-21_Zone_4	VW-21_Zone_4	VW-21_Zone_4
Sample Date	11/20/2013	2/26/2014	5/21/2014	11/27/2012	11/20/2013	2/26/2014	5/21/2014	11/26/2012	11/20/2013	2/26/2014	5/21/2014	11/26/2012	11/20/2013	2/26/2014	5/21/2014
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)															
Acetone	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Bromoform	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Bromomethane	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2-Butanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	< 1	< 1J	< 1	< 1	< 1	< 1J	< 1	< 1	< 1	< 1J	< 1	< 1	< 1	< 1J	< 1
Carbon Tetrachloride	< 1	< 1J	< 0.5	< 1	< 1	< 1J	< 0.5	< 1	< 1	< 1J	< 0.5	< 1	< 1	< 1J	< 0.5
Chlorobenzene	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
Chloroethane	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Chloroform	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
Chloromethane	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
cis-1,2-Dichloroethene	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
cis-1,3-Dichloropropene	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Dibromochloromethane	< 1	< 1J	< 0.5	< 1	< 1	< 1J	< 0.5	< 1	< 1	< 1J	< 0.5	< 1	< 1	< 1J	< 0.5
1,2-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
1,2-Dichloroethane	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
1,1-Dichloroethene	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
1,4-Dioxane	< 70	< 70	< 70	< 0.21	< 70	< 70	< 70	< 0.21	< 70	< 70	< 70	< 0.21	< 70	< 70	< 70
Ethylbenzene	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	< 2	< 2J	< 2	< 2	< 2	< 2J	< 2	< 2	< 2	< 2J	< 2	< 2	< 2	< 2J	< 2
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
2-Hexanone	< 3	< 3J	< 3	< 3	< 3	< 3J	< 3	< 3	< 3	< 3J	< 3	< 3	< 3	< 3J	< 3
4-Methyl-2-pentanone	< 3	< 3J	< 3	< 3	< 3	< 3J	< 3	< 3	< 3	< 3J	< 3	< 3	< 3	< 3J	< 3
Methylene Chloride	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-Tetrachloroethane	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
1,1,2,2-Tetrachloroethane	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Tetrachloroethene	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
Toluene	< 0.7	< 0.7	< 0.5	< 0.7	< 0.7	< 0.7	< 0.5	< 0.7	< 0.7	< 0.7	< 0.5	< 0.7	< 0.7	< 0.7	< 0.5
trans-1,2-Dichloroethene	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
trans-1,3-Dichloropropene	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
1,2,3-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
1,1,2-Trichloroethane	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
Trichloroethene	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Xylene (Total)	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8	< 0.5
Total VOCs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total VOC TIC	0	0	0	NA	0	0	0	NA	0	0	0	NA	0	0	0
Ethane	< 1	< 1	< 1	< 1.0	< 1	< 1	< 1	< 1.0	< 1	< 1	< 1	< 1.0	< 1	< 1	< 1
Ethene	< 1	< 1	< 1	< 1.0	1.8 J	2.2 J	< 1	1	2.9 J	< 1	2.7 J	< 1.0	2.6 J	3 J	2.9 J
Methane	95	73 J	62	7.2	80	75 J	14	26	99	30 J	77	10	38	41 J	37
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Bedrock Groundwater
from 2012 through January 2017
OU-2 - Spectron Superfund Site
Elkton, MD

Location ID	VW-21 Zone 5	VW-21_Zone_5	VW-21 Zone 6	VW-21_Zone_6	VW-22 Zone 1	VW-22 Zone 1	VW-22 Zone 2	VW-22 Zone 2	VW-22 Zone 3	VW-22 Zone 3	VW-22 Zone 4	VW-22 Zone 4	VW-23 Zone 1	VW-23 Zone 1	VW-23 Zone 2
Sample Date	11/26/2012	11/20/2013	11/26/2012	11/20/2013	2/21/2012	11/27/2012	2/21/2012	11/27/2012	2/21/2012	11/27/2012	2/21/2012	11/27/2012	2/21/2012	11/28/2012	2/21/2012
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)															
Acetone	< 6	< 6	< 6	< 6	< 6	< 6	7	< 6	19	< 60	< 30	< 60	45	30	130
Benzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	36	38	20	20	33	12	45
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
Bromoform	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
Bromomethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
2-Butanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 6	< 30	< 15	< 30	23	16	58
Carbon Disulfide	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
Carbon Tetrachloride	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
Chlorobenzene	< 0.8	< 0.8	< 0.8	< 0.8	4	< 0.8	8	4	760	1,100	430	510	340	160	570
Chloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
Chloroform	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	10	< 8	< 4	< 8	< 4	< 2	< 4
Chloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
cis-1,2-Dichloroethene	< 0.8	< 0.8	< 0.8	< 0.8	71	39	120	100	3,300	10,000	3,900	5,600	5,200	1,300	2,500
cis-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
Dibromochloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
1,2-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	22	< 10	6	< 10	< 5	< 2	< 5
1,3-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
1,4-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2	< 10	< 5	< 10	< 5	< 2	< 5
1,1-Dichloroethane	< 1	< 1	< 1	< 1	3	2	64	60	55	49	53	37	330	130	440
1,2-Dichloroethane	< 1	< 1	< 1	< 1	< 1	2	5	6	77	77	73	61	970	330	1,400
1,1-Dichloroethene	< 0.8	< 0.8	< 0.8	< 0.8	2	2	19	14	46	16	13	11	34	3	39
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
1,4-Dioxane	< 0.21	< 70	< 0.22	< 70	< 70	< 0.21	< 70	< 0.21	< 140	0.42	< 350	0.34	< 350	0.5	< 350
Ethylbenzene	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 8	5	< 8	< 4	< 2	4
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	< 2	< 2	< 2	< 2	16	4	96	38	940	57	290	22	< 10	< 4	< 10
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	7	< 20	13	< 20	37	7	49
2-Hexanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 6	< 30	< 15	< 30	< 15	< 6	< 15
4-Methyl-2-pentanone	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 6	75	< 15	< 30	430	340	1,200
Methylene Chloride	< 2	< 2	< 2	< 2	58	9	20	23	1,800	< 20	< 10	55	53	5	18,000
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
1,1,1,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
1,1,2,2-Tetrachloroethane	< 1	< 1	< 1	< 1	36	13	42	20	2,100	1,700	140	96	52	< 2	130
Tetrachloroethene	< 0.8	< 0.8	< 0.8	< 0.8	6	3	25	13	460	< 8	< 4	< 8	< 4	< 2	320
Toluene	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	4	65	9	23	56	19	110
trans-1,2-Dichloroethene	< 0.8	< 0.8	< 0.8	< 0.8	5	2	12	10	190	430	230	380	84	30	75
trans-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
1,2,3-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
1,1,1-Trichloroethane	< 0.8	< 0.8	< 0.8	< 0.8	75	35	500	280	3,400	88	150	21	< 4	< 2	< 4
1,1,2-Trichloroethane	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	1	1	33	34	8	11	7	3	9
Trichloroethene	< 1	< 1	< 1	< 1	74	28	97	51	3,300	< 10	18	16	16	7	7,800
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 10	< 5	< 10	< 5	< 2	< 5
Vinyl Chloride	< 1	< 1	< 1	< 1	6	< 1	3	3	280	380	510	440	19	290	18
Xylene (Total)	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	10	< 8	< 4	< 8	< 4	< 2	10
Total VOCs	0	0	0	0	432	139	1,144	623	20,322	14,109	9,998	7,303	12,968	2,653	35,352
Total VOC TIC	NA	0	NA	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	< 1.0	< 1	< 1.0	< 1	NA	< 1.0	NA	< 1.0	NA	< 1.0	NA	< 1.0	NA	< 1.0	NA
Ethene	< 1.0	2.5 J	< 1.0	1.7 J	NA	< 1.0	NA	< 1.0	NA	13	NA	27	NA	38	NA
Methane	7.5	47	220	570	NA	< 3.0	NA	< 3.0	NA	< 3.0	NA	< 3.0	NA	3.9	NA
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Bedrock Groundwater
from 2012 through January 2017
OU-2 - Spectron Superfund Site
Elkton, MD

Location ID	VW-23 Zone 2	VW-23 Zone 3	VW-23 Zone 3	VW-23 Zone 4	VW-23 Zone 4	VW-23 Zone 4	VW-23 Zone 5	VW-23 Zone 5	VW-23 Zone 5	VW-24_Zone_1	VW-24_Zone_2	VW-24_Zone_3	VW-24_Zone_4	VW-24_Zone_4	VW-25
Sample Date	11/28/2012	2/21/2012	11/28/2012	2/21/2012	11/28/2012	11/28/2012	2/21/2012	2/21/2012	11/28/2012	10/24/2013	10/24/2013	10/24/2013	10/24/2013	10/24/2013	10/24/2013
Sample Type	Grab	Grab	Grab	Grab	Grab	Duplicate	Grab	Duplicate	Grab	Grab	Grab	Grab	Grab	Duplicate	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)															
Acetone	< 60	< 300	< 120	180	< 60	< 120	110	< 300	< 120	< 20	< 40	< 20	< 40	8 J	< 20
Benzene	25	85	77	88	66	56	97	130	90	13	10	2 J	13	17	< 5
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
Bromoform	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
Bromomethane	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
2-Butanone	41	< 150	< 60	< 60	44	< 60	44	< 150	< 60	4 J	< 20	< 10	< 20	< 10	< 10
Carbon Disulfide	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
Carbon Tetrachloride	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
Chlorobenzene	330	1,200	1,100	640	480	420	850	1,700	900	100	79 K	4 J	88	110	< 5
Chloroethane	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	3 J	< 10	< 5	< 10	< 5	< 5
Chloroform	< 8	< 40	34	< 16	< 8	< 16	< 8	< 40	< 16	5 J	14	7	11	14	< 5
Chloromethane	< 10	< 50	< 20	29	< 10	< 20	28	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
cis-1,2-Dichloroethene	5,800	15,000	14,000	12,000	11,000	11,000	13,000	21,000	16,000	240	170	43	210	270	< 5
cis-1,3-Dichloropropene	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
Dibromochloromethane	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
1,2-Dichlorobenzene	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	43	31	1 J	36	41	< 5
1,3-Dichlorobenzene	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
1,4-Dichlorobenzene	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	5 J	4 J	< 5	4 J	5 J	< 5
1,1-Dichloroethane	270	820	820	1,300	1,100	920	1,400	1,300	1,400	710	44 K	16	150	200	< 5
1,2-Dichloroethane	750	3,000	2,600	4,300	3,700	3,200	4,600	3,600	3,800	260	240	90	260	290	< 5
1,1-Dichloroethene	21	68	71	100	66	56	120	130	110	44	68 K	20	55	91	< 5
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
1,4-Dioxane	0.43	< 3,500	1.1	< 1,400	1.3	1.1	< 700	< 3,500	1	< 250	< 500	< 250	< 500	< 250	< 250
Ethylbenzene	< 8	< 40	< 16	< 16	8	< 16	17	< 40	17	21	9 J	< 5	22	31	< 5
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	< 20	< 100	< 40	< 40	< 20	< 40	< 20	< 100	< 40	260	630	120	550	730	< 10
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	< 20	< 100	61	150	73	62	170	150	110	67	< 10	< 5	18	26	< 5
2-Hexanone	< 30	< 150	< 60	< 60	< 30	< 60	< 30	< 150	< 60	< 10	< 20	< 10	< 20	< 10	< 10
4-Methyl-2-pentanone	< 30	2,900	2,500	2,700	2,400	2,100	2,700	3,100	2,100	< 10	< 20	< 10	< 20	< 10	< 10
Methylene Chloride	150	90,000	31,000	98,000	29	< 40	97,000	120,000	< 40	810	860	56	1,300	1,400	< 5
Naphthalene	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
Styrene	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
1,1,1,2-Tetrachloroethane	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
1,1,2,2-Tetrachloroethane	51	< 50	100	< 20	12	< 20	52	210	23	79	120	1,200	150	160	< 5
Tetrachloroethene	< 8	360	130	24	< 8	< 16	20	630	< 16	1,100	1,400	180	1,100	1,500	< 5
Toluene	64	220	200	250	790	150	300	340	300	110	48 K	5 J	86	110	< 5
trans-1,2-Dichloroethene	51	130	140	73	60	50	92	210	100	26	6 J	9	15	21	< 5
trans-1,3-Dichloropropene	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
1,2,3-Trichlorobenzene	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
1,1,1-Trichloroethane	< 8	< 40	< 16	< 16	< 8	< 16	< 8	< 40	< 16	290	2,000	380	1,500	2,000	< 5
1,1,2-Trichloroethane	< 8	< 40	21	< 16	< 8	< 16	< 8	< 40	< 16	3 J	3 J	10	4 J	4 J	< 5
Trichloroethene	< 10	96	< 20	39	< 10	< 20	43	78	< 20	500	520	1,100	570	660	< 5
1,2,4-Trimethylbenzene	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
1,3,5-Trimethylbenzene	< 10	< 50	< 20	< 20	< 10	< 20	< 10	< 50	< 20	< 5	< 10	< 5	< 10	< 5	< 5
Vinyl Chloride	< 10	< 50	21	38	18	< 20	40	55	27	8	5 J	1 J	8 J	14	< 5
Xylene (Total)	< 8	< 40	< 16	23	16	< 16	32	< 40	33	35	40	< 5	34	46	< 5
Total VOCs	7,553	129,009	52,876	131,827	19,863	18,015	133,697	173,843	25,011	4,736	6,301	3,244	6,184	7,740	0
Total VOC TIC	NA	NA	NA	NA	NA	NA	NA	NA	NA	270 J	100 J	50 J	170 J	190 J	< 0
Ethane	< 1.0	NA	1	NA	4.4	4.6	NA	NA	4.4	NA	NA	NA	NA	NA	NA
Ethene	11	NA	11	NA	64	69	NA	NA	42	NA	NA	NA	NA	NA	NA
Methane	3.5	NA	5.2	NA	26	28	NA	NA	15	NA	NA	NA	NA	NA	NA
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Summary of VOC Analytical Data for Bedrock Groundwater
from 2012 through January 2017
OU-2 - Spectron Superfund Site
Elkton, MD

Location ID	VW-26	VW-26 (DUP)	VW-27	VW-28	VW-29	VW-29	VW-30	VW-31	VW-32	VW-33S	VW-33I	VW-33D	VW-34S	VW-34S	VW-34D
Sample Date	3/5/2014	3/5/2014	3/5/2014	3/5/2014	6/11/2014	6/11/2014	6/11/2014	6/11/2014	6/11/2014	8/31/2016	8/30/2016	8/30/2016	8/31/2016	8/31/2016	8/30/2016
Sample Type	Grab	Duplicate	Grab	Grab	Grab	Duplicate	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Duplicate	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)															
Acetone	55 J	84 J	< 6	< 6	91 J	97 J	150 J	220 J	120 J	< 1000	< 1000	370 J	< 20	< 20	7 J
Benzene	20 J	21 J	< 0.5	8	350	350	50	97	90	< 50	< 50	48 J	< 1	< 1	< 1
Benzyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	< 5	< 10	< 5	< 1	< 5	< 5	< 10	< 10	< 10	< 50	< 50	< 50	< 1	< 1	< 1
Bromoform	< 5	< 10	< 1	< 1	< 5	< 5	< 10	< 10	< 10	< 200	< 200	< 200	< 4	< 4	< 4
Bromomethane	< 5	< 10	< 1	< 1	< 5	< 5	< 10	< 10	< 10	< 50	< 50	< 50	< 1	< 1	< 1
2-Butanone	< 15	< 30	< 3	< 3	< 30	< 30	< 60	< 60	< 60	< 500	< 500	< 500	< 10	< 10	< 10
Carbon Disulfide	< 5	< 10	< 1	< 1	< 10	< 10	< 20	< 20	< 20	< 250	< 250	< 250	< 5	< 5	< 5
Carbon Tetrachloride	< 5	< 10	< 1	< 1	< 5	< 5	< 10	< 10	< 10	< 50	< 50	< 50	< 1	< 1	< 1
Chlorobenzene	210	220	< 0.8	130	1,500	1,400	1,200	1,000	1,800	1,400	440	480	< 1	< 1	0.6 J
Chloroethane	< 5	< 10	< 1	< 1	100	100	< 10	< 10	< 10	< 50	< 50	< 50	< 1	< 1	< 1
Chloroform	< 4	< 8	< 0.8	< 0.8	7 J	7 J	< 10	52	26	84	< 50	61	< 1	< 1	< 1
Chloromethane	< 5	< 10	< 1	< 1	< 5	< 5	< 10	< 10	< 10	< 50	< 50	< 50	< 1	< 1	< 1
cis-1,2-Dichloroethene	5,700	5,700	11	69	8,900	9,200	5,700	12,000	12,000	67,000	10,000	14,000	24	24	110
cis-1,3-Dichloropropene	< 5	< 10	< 1	< 1	< 5	< 5	< 10	< 10	< 10	< 50	< 50	< 50	< 1	< 1	< 1
Dibromochloromethane	< 5	< 10	< 1	< 1	< 5	< 5	< 10	< 10	< 10	< 50	< 50	< 50	< 1	< 1	< 1
1,2-Dichlorobenzene	520	520	< 1	< 1	270	260	1,600	1,800	780	7,300	1,400	1,700	< 5	< 5	2 J
1,3-Dichlorobenzene	< 5	< 10	< 1	< 1	< 10	< 10	48 J	24 J	< 20	77 J	< 250	< 250	< 5	< 5	< 5
1,4-Dichlorobenzene	32	31 J	< 1	7	33 J	32 J	210	200	88 J	720	130 J	170 J	< 5	< 5	< 5
1,1-Dichloroethane	97	100	3 J	< 1	510	500	290	350	530	3,000	1,100	2,900	3	3	36
1,2-Dichloroethane	12 J	12 J	< 1	< 1	35	35	200	280	690	720	1,400	7,300	< 1	< 1	4
1,1-Dichloroethene	71	73	< 0.8	0.8 J	260	240	310	690	510	2,600	810	990	< 1	< 1	3
1,2-Dichloroethene, Total *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	< 5	< 10	< 1	< 1	< 5	< 5	< 10	< 10	< 10	< 50	< 50	< 50	< 1	< 1	< 1
1,4-Dioxane	< 350	< 700	< 70	< 70	< 10	< 10	< 10	< 10	< 10	7.3	1.6	2.1	< 0.2	< 0.2	0.18 J
Ethylbenzene	280	280	< 0.8	1 J	490	480	2,400	1,800	840	2,600	570	680	< 1	< 1	< 1
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	4,300	4,500	12	3 J	8,500	9,600	17,000	23,000	13,000	1,700	700	770	< 10	< 10	4 J
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	87	89	< 2	< 2	320	320	52 J	130	54 J	170 J	< 250	260	< 5	< 5	< 5
2-Hexanone	< 15	< 30	< 3	< 3	< 30	< 30	< 60	< 60	< 60	< 500	< 500	< 500	< 10	< 10	< 10
4-Methyl-2-pentanone	< 15	< 30	< 3	< 3	< 30	< 30	< 60	64 J	68 J	300 J	380 J	1,500	< 10	< 10	< 10
Methylene Chloride	15 J	< 20	< 2	< 2	21 J	21 J	600	1,700	3,200	4,600	15,000	40,000	< 4	< 4	2 J
Naphthalene	< 5	< 10	< 1	< 1	18 J	17 J	< 20	< 20	< 20	51 J	< 250	< 250	< 5	< 5	< 5
Styrene	< 5	< 10	< 1	< 1	< 10	< 10	< 20	< 20	< 20	< 250	< 250	< 250	< 5	< 5	< 5
1,1,1,2-Tetrachloroethane	< 5	< 10	< 1	< 1	< 5	< 5	< 10	< 10	< 10	< 50	< 50	< 50	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	20 J	19 J	< 1	< 1	140	140	230	370	1,700	210	< 50	59	< 1	< 1	< 1
Tetrachloroethene	330	320	4 J	300	2,700	2,700	14,000	13,000	7,500	21,000	12,000	9,600	2	2	6
Toluene	270	270	< 0.7	< 0.7	1,000	990	580	3,200	1,200	16,000	7,300	5,900	< 1	0.6 J	0.6 J
trans-1,2-Dichloroethene	19 J	17 J	< 0.8	< 0.8	41	41	340	49	510	51	< 50	< 50	< 1	< 1	< 1
trans-1,3-Dichloropropene	< 5	< 10	< 1	< 1	< 5	< 5	< 10	< 10	< 10	< 50	< 50	< 50	< 1	< 1	< 1
1,2,3-Trichlorobenzene	< 5	< 10	< 1	< 1	< 10	< 10	210	31 J	21 J	< 250	< 250	< 250	< 5	< 5	< 5
1,1,1-Trichloroethane	1,900	1,900	17	< 0.8	6,600	6,700	7,600	20,000	16,000	63,000	33,000	21,000	11	11	60
1,1,2-Trichloroethane	< 4	< 10	< 0.8	< 0.8	< 5	< 5	19 J	< 10	41	49 J	< 50	< 50	< 1	< 1	< 1
Trichloroethene	110	110	5	54	1,900	1,900	1,200	9,300	1,900	15,000	13,000	10,000	5	5	9
1,2,4-Trimethylbenzene	15 J	14 J	< 1	< 1	36 J	35 J	25 J	46 J	< 20	290	< 250	74 J	< 5	< 5	< 5
1,3,5-Trimethylbenzene	< 5	< 10	< 1	< 1	12 J	11 J	< 20	< 20	< 20	93 J	< 250	< 250	< 5	< 5	< 5
Vinyl Chloride	190	190	< 1	22	400	420	620	210	1,100	940	180	230	< 1	< 1	11
Xylene (Total)	620	640	< 0.8	< 0.8	1,500	1,500	3,100	3,200	1,400	9,700	2,000	2,300	< 1	< 1	< 1
Total VOCs	20,537	20,743	63	664	35,643	36,999	57,584	92,593	65,048	218,662	99,412	120,024	45	45.6	248.38
Total VOC TIC	75 J	0	0	0	1400 J	770 J	810 J	1900 J	0	0	0	0	0	0	0
Ethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

Location ID	RES-28	RES-28	RES-28
Sample Date	12/4/2013	3/9/2014	6/3/2014
Sample Type	Grab	Grab	Grab
Sample Matrix	Groundwater	Groundwater	Groundwater
Volatile Organic Compounds (µg/L)			
Acetone	< 6	< 6	< 6
Benzene	< 0.5	< 0.5	< 0.5
Benzyl Chloride	NA	NA	NA
Bromodichloromethane	< 1	< 1	< 0.5
Bromoform	< 1	< 1	< 0.5
Bromomethane	< 1	< 1	< 0.5
2-Butanone	< 3	< 3	< 3
Carbon Disulfide	< 1	< 1	< 1
Carbon Tetrachloride	< 1	< 1	< 0.5
Chlorobenzene	< 0.8	< 0.8	< 0.5
Chloroethane	< 1	< 1	< 0.5
Chloroform	< 0.8	< 0.8	< 0.5
Chloromethane	< 1	< 1	< 0.5
cis-1,2-Dichloroethene	< 0.8	< 0.8	< 0.5
cis-1,3-Dichloropropene	< 1	< 1	< 0.5
Dibromochloromethane	< 1	< 1	< 0.5
1,2-Dichlorobenzene	< 1	< 1	< 1
1,3-Dichlorobenzene	< 1	< 1	< 1
1,4-Dichlorobenzene	< 1	< 1	< 1
1,1-Dichloroethane	< 1	< 1	< 0.5
1,2-Dichloroethane	< 1	< 1	< 0.5
1,1-Dichloroethene	< 0.8	< 0.8	< 0.5
1,2-Dichloroethene, Total *	NA	NA	NA
1,2-Dichloropropane	< 1	< 1	< 0.5
1,4-Dioxane	< 70	< 70	< 70
Ethylbenzene	< 0.8	< 0.8	< 0.5
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	< 2	< 2	< 2
1,2-Dichloro-1,1,2-trifluoroethane (CFC-123a)	< 2	< 2	< 2
2-Hexanone	< 3	< 3	< 3
4-Methyl-2-pentanone	< 3	< 3	< 3
Methylene Chloride	< 2	< 2	< 2
Naphthalene	< 1	< 1	< 1
Styrene	< 1	< 1	< 1
1,1,1,2-Tetrachloroethane	< 1	< 1	< 0.5
1,1,2,2-Tetrachloroethane	< 1	< 1	< 0.5
Tetrachloroethene	< 0.8	< 0.8	< 0.5
Toluene	< 0.7	< 0.7	< 0.5
trans-1,2-Dichloroethene	< 0.8	< 0.8	< 0.5
trans-1,3-Dichloropropene	< 1	< 1	< 0.5
1,2,3-Trichlorobenzene	< 1	< 1	< 1
1,1,1-Trichloroethane	< 0.8	< 0.8	< 0.5
1,1,2-Trichloroethane	< 0.8	< 0.8	< 0.5
Trichloroethene	< 1	< 1	< 0.5
1,2,4-Trimethylbenzene	< 1	< 1	< 1
1,3,5-Trimethylbenzene	< 1	< 1	< 1
Vinyl Chloride	< 1	< 1	< 0.5
Xylene (Total)	< 0.8	< 0.8	< 0.5
Total VOCs	0	0	0
Total VOC TIC	0	0	0
Ethane	< 1	< 1	< 1
Ethene	< 1	< 1	< 1
Methane	< 3	< 3	< 3
Ethanol	NA	NA	NA
Methanol	NA	NA	NA

Notes:
All concentrations shown in micrograms per liter (µg/
* - 1,2 Dichloroethene, Total is the sum of
cis-1,2-Dichloroethene and trans-1,2-Dichloroethene
J - Estimated concentration
D - Result of a dilution run
B - Blank contamination
NA - Not analyzed

APPENDIX H – PRESS NOTICE

EPA REVIEWS CLEANUP

SPECTRON SUPERFUND SITE

The U.S. Environmental Agency is reviewing the cleanup that was conducted at the Spectron, Inc. Superfund Site located in Elkton, Maryland. EPA inspects sites regularly to ensure that cleanups remain protective of public health and the environment. This review will focus on specific portions of the remedy that have already been implemented to ensure they continue to be protective in the long-term. Findings from the current review being conducted will be available December 2017.

To ask questions and/or provide site-related information:

Contact: Alexander Mandell, *Community Involvement Coordinator*
Phone: 215-814-5517
Email: mandell.alexander@epa.gov

To access detailed site information and Review Report:
https://www.epa.gov/superfund/spectron

Protecting public health and the environment

APPENDIX I – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: Spectron, Inc.	**Date of Inspection:** 02/23/2017
Location and Region: Elkton, Maryland, Region 3	**EPA ID:** MDD000218008
Agency, Office or Company Leading the Five-Year Review: EPA Region 3	**Weather/Temperature:** Sunny/approx. 65 degrees F

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Other: creek liner, in-situ thermal treatment, DNAPL collection, groundwater and surface water monitoring
- ☐ Monitored natural attenuation
- ☒ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ Name _____ Title _____ Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** _____ Name _____ Title _____ Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

Agency _____
Contact _____ Name | _____ Title | _____ Date | _____ Phone No.
Problems/suggestions ☐ Report attached: _____

Agency _____
Contact _____Name | _____ Title | _____ Date | _____ Phone No.
Problems/suggestions ☐ Report attached:______

Agency _____
Contact _____ Name | _____ Title | _____ Date | _____ Phone No.
Problems/suggestions ☐ Report attached:______

Agency _____
Contact _____ Name | _____ Title | _____ Date | _____ Phone No.
Problems/suggestions ☐ Report attached: _____

Agency _____

Contact	______ Name	______ Title	______ Date	______ Phone No.
Problems/suggestions ☐ Report attached:______				

4. **Other Interviews** (optional) ☐ Report attached:

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

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

Remarks: O&M documents apply to the GWTS only; other remedy components are under construction.

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

☒ Contingency plan/emergency response plan ☒ Readily available ☒ Up to date ☐ N/A

Remarks: ______

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

Remarks: ______

4. **Permits and Service Agreements**

☐ Air discharge permit*	☐ Readily available	☐ Up to date	☒ N/A
☒ Effluent discharge	☒ Readily available	☒ Up to date	☐ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits: ______	☐ Readily available	☐ Up to date	☒ N/A

Remarks: *A variance was granted for air discharge. Effluent data is subject to discharge limitations in the OU1 ROD.

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

Remarks: ______

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

Remarks: ______

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

Remarks: The OU1 remedial action is currently underway. Long-term groundwater monitoring has not been implemented yet.

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

Remarks: ______

9. **Discharge Compliance Records**

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

Remarks: ______

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

Remarks: Visitors must sign in at the office trailer.

IV. O&M COSTS

This section is not applicable at this time.
The remedy is currently under construction.

1. **O&M Organization**

☐ State in-house ☐ Contractor for state
☐ PRP in-house ☐ Contractor for PRP
☐ Federal facility in-house ☐ Contractor for Federal facility
☐ ______

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place ☐ Unavailable
Original O&M cost estimate: ______ ☐ Breakdown attached

Total annual cost by year for review period if available

From: ______ (Date)	To: ______ (Date)	______ (Total cost)	☐ Breakdown attached
From: ______ (Date)	To: ______ (Date)	______ (Total cost)	☐ Breakdown attached
From: ______ (Date)	To: ______ (Date)	______ (Total cost)	☐ Breakdown attached
From: ______ (Date)	To: ______ (Date)	______ (Total cost)	☐ Breakdown attached
From: ______ (Date)	To: ______ (Date)	______ (Total cost)	☐ Breakdown attached

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

Describe costs and reasons: ______

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

A. Fencing

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

Remarks: ______

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: Signs located at the gated entrance.

C. Institutional Controls (ICs) – The remedy is under construction. ICs have not yet been implemented.

1. **Implementation and Enforcement**

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

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

Type of monitoring (e.g., self-reporting, drive by): ______

Frequency: ______

Responsible party/agency: ______

Contact	______	______	______	______
	Name	Title	Date	Phone no.

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

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

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

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

Other problems or suggestions: ☐ Report attached

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

Remarks: Institutional controls have not yet been implemented.

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: ______

2. **Land Use Changes On Site** ☐ N/A

Remarks: ______

3. **Land Use Changes Off Site** ☐ N/A

Remarks: None.

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

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

Remarks: ______

B. Other Site Conditions

Remarks: ______

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

The 2012 ROD Amendment requires an asphalt (or equivalent) cap. This remedial component has not been implemented yet and will be evaluated in the next FYR.

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

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

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

1. **Pumps, Wellhead Plumbing and Electrical**

☒ Good condition ☒ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: Three sumps collect groundwater prior to discharge to the creek.

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☒ Readily available ☒ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

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

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☒ Oil/water separation ☐ Bioremediation

☒ Air stripping ☒ Carbon adsorbers

☒ Filters: bag filters

☐ Additive (e.g., chelation agent, flocculent): _____

☐ Others: _____

☒ Good condition ☐ Needs maintenance

☒ Sampling ports properly marked and functional

☒ Sampling/maintenance log displayed and up to date

☒ Equipment properly identified

☒ Quantity of groundwater treated annually: Approximately 18,000,000 gallons

☐ Quantity of surface water treated annually: _____

Remarks: GWTS upgrades were completed in 2013 in order to accept additional flow from the in-situ thermal treatment process.

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☒ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: ______

4. **Discharge Structure and Appurtenances**

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: ______

5. **Treatment Building(s)**

☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair

☒ Chemicals and equipment properly stored

Remarks: ______

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: Some monitoring wells within the fenced area are not locked. However, all wells observed outside the fenced area were secure and labeled.

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

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

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: ______

X. OTHER REMEDIES: IN-SITU THERMAL TREATMENT

The PRP Group implemented in-situ thermal treatment between February and November 2016 at the Site. Above-ground remedy components, including heater wells, extraction wells and monitoring points, appeared to be in good condition. The insulating concrete cover over the treatment zone appeared to be in good condition. Active treatment ended in November 2016 and was in the monitoring phase at the time of the inspection. Vapor treatment components and upgradient extraction wells for hydraulic control were no longer in operation.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

There are multiple components to the OU1 remedy, some of which are complete and some of which are still under construction. The SI/GWTS intercepts and treats contaminated seeps and groundwater discharging to Little Elk Creek. The creek liner is intended to provide a physical barrier between the creek and contaminated seeps and groundwater. The SI/GWTS appears to be functioning as designed.

Remedial components not yet complete include in-situ thermal treatment, capping and implementation of institutional controls. The OU1 ROD Amendment states that in-situ thermal treatment is designed to treat principal threat waste (DNAPL) to the maximum extent possible. The installation of an asphalt (or equivalent) cap, once complete, is expected to eliminate potential direct exposure to contaminated soil and

	overburden groundwater, provide long-term minimization of migration of liquids, and promote drainage. Institutional controls, once implemented, will limit land use and prevent exposure to any remaining potentially unacceptable risks. These remedial components are expected to be effective once complete and will be evaluated in the next FYR.
B.	**Adequacy of O&M**
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. O&M activities for the GWTS are ongoing; no issues have been identified. Other remedial components are under construction. Site-wide O&M will be implemented after remedy construction is complete.
C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. None at this time.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. None at this time.

Site Inspection Participants:
Aaron Mroz, EPA Remedial Project Manager
Katie Matta, EPA Biological Technical Assistance Group
Cathleen Kennedy, EPA Community Involvement Coordinator
Irena Rybak, MDE
Navjot Mangat, Earth Data Northeast
Hagai Nassau, Skeo
Jill Billus, Skeo

APPENDIX J – SITE INSPECTION PHOTOS

Entrance to the former Plant Area.

Air stripper in the GWTS building.

Air emission stack outside the GWTS building.

Covered pile of soil excavated from the Office Area.


Interior of one of three sumps pumping water to the GWTS.


Thermal cap for the ISTT system. Little Elk Creek is at right.


Upstream dam on Little Elk Creek. Intake hoses provided water for ISTT.


Downstream contingency discharge location to be used when high-flow conditions require bypass of the treatment system.

Downstream contingency discharge location. Gabion baskets on far shore of Little Elk Creek.

Excavated location at the Office Area.

APPENDIX K – ARARS REVIEW

Table K-1: Groundwater ARARs Review

COC	2012 Performance Standard[a] (µg/L)	Basis	2017 ARAR[b]	ARAR Change
1,1,2,2-Tetrachloroethane	1	MDE GWCS[c,d]	0.053[e]	More stringent
1,1,2-Trichloroethane	3	EPA MCLG[e]	3	No change
1,1,1-Trichloroethane	200	EPA MCL	200	No change
1,1-Dichloroethane	80	MDE GWCS	90[e]	Less stringent
1,1-Dichloroethene	7	EPA MCL	7	No change
1,2,4-Trichlorobenzene	70	EPA MCL	70	No change
1,2-Dichlorobenzene	600	EPA MCL	600	No change
1,2-Dichloroethane	5	EPA MCL	5	No change
Benzene	5	EPA MCL	5	No change
Bis(2-chloroethyl)ether	0.0096	MDE GWCS	0.0096[e]	No change
Chlorobenzene	100	EPA MCL	100	No change
Chloroform	80	EPA MCL	80	No change
Cis-1,2-dichloroethene	70	EPA MCL	70	No change
Ethylbenzene	700	EPA MCL	700	No change
4-Methyl-2-pentanone	50	MDE GWCS	630[e]	Less stringent
Methylene chloride	5	EPA MCL	5	No change
PCE	5	EPA MCL	5	No change
Toluene	1,000	EPA MCL	1,000	No change
TCE	5	EPA MCL	5	No change
Vinyl chloride	2	EPA MCL	2	No change
Xylene (total)	10,000	EPA MCL	10,000	No change

Notes:

a) Performance standards identified in Table 1 of the 2012 OU2 IROD.

b) 2017 ARAR is the EPA MCL/non-zero MCLG unless otherwise noted. Current MCLs/MCLGs are available at https://www.epa.gov/sites/production/files/2016-06/documents/npwdr_complete_table.pdf , accessed 3/29/17.

c) MDE GWCS = Maryland Department of the Environment Groundwater Cleanup Standard

d) MDE groundwater cleanup standard is relevant and appropriate if there is no MCL/non-zero MCLG.

e) 2017 ARAR is the MDE GWCS, available at http://www.mde.state.md.us/programs/Land/MarylandBrownfieldVCP/Documents/www.mde.state.md.us/assets/document/Final%20Update%20No%202.1%20dated%205-20-08(1).pdf, accessed 3/29/17.

Table K-2: Surface Water ARARs Review

COC	2004 Performance Standard[a] (µg/L)	Basis[b]	2017 ARAR[c]	ARAR Change
Acetone	5,500	risk-based (HI=1)	NA	NA
Benzene	2.2	AWQC	0.58-2.1	More stringent
2-Butanone	7,000	risk-based (HI=1)	NA	NA
Chlorobenzene	130	AWQC	100	More stringent

COC	2004 Performance Standard[a] (µg/L)	Basis[b]	2017 ARAR[c]	ARAR Change
Chloroethane	3.6	Risk-based (carcinogenic risk of $1x10^{-6}$)	NA	NA
Chloroform	5.7	AWQC	60	Less stringent
1,1-Dichloroethane	800	Risk-based (HI=1)	NA	NA
1,2-Dichloroethane	0.38	AWQC	9.9	Less stringent
1,1-Dichloroethene	0.057	AWQC	300	Less stringent
Trans-1,2-dichloroethene	140	AWQC	100	More stringent
Ethylbenzene	530	AWQC	68	More stringent
Methylene chloride	4.6	AWQC	20	Less stringent
4-Methyl-2-pentanone	6,300	Risk-based (HI=1)	NA	NA
Naphthalene	6.5	Risk-based (HI=1)	NA	NA
1,1,2,2-Tetrachloroethane	0.17	AWQC	0.2	Less stringent
PCE	0.69	AWQC	10	Less stringent
Toluene	1,300	AWQC	57	More stringent
1,1,1-Trichloroethane	200	Maryland state water quality standard for protection of drinking water	10,000 (AWQC)	Less stringent
1,1,2-Trichloroethane	0.59	AWQC	0.55	More stringent
TCE	2.5	AWQC	0.6	More stringent
Vinyl chloride	0.025	AWQC	0.022	More stringent
Bis(2-chloroethyl)ether	0.03	AWQC	0.03	No change
4-Chloroaniline	150	Risk-based (HI=1)	NA	NA
1,2-Dichlorobenzene	420	AWQC	1,000	Less stringent
1,4-Dichlorobenzene	63	AWQC	300	Less stringent
4-Methylphenol	180	Risk-based (HI=1)	NA	NA
1,2,4-Trichlorobenzene	35	Maryland state water quality standard for protection of drinking water	0.071 (AWQC)	More stringent

Notes:

c) Criteria listed in Table 2 of the 2012 OU2 IROD.

d) Basis presented in Table 11 of the 2004 OU1 ROD. The criteria listed in the 2004 performance standard are, unless otherwise noted, AWQCs for the consumption of fish and drinking water. For those compounds that are COCs in the overburden groundwater, but which do not have AWQCs for the consumption of fish and drinking water, the value listed is either the level in drinking water that results in a HI of 1, the level in drinking water that results in a carcinogenic risk of 1×10^{-6}, a Maryland state water quality standard for protection of drinking water (if available), or the AWQC for the protection of aquatic life (Freshwater Criterion Continuous Concentration).

e) 2017 ARARs are the AWQCs for consumption of water plus organism, available at https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table, accessed April 10, 2017.

NA – not applicable (performance standard not based on ARAR)